

SEATRACK PathTrack GPS logger protocol for 2025

NEW !!!

New content for 2025 in the protocol is marked with this symbol – please read carefully!



Common guillemots Photo: Malin Kjellstadli Johansen

List of protocols

Protocols	Pages	
1) PathTrack software	2	
2) PathTrack picoFix GEO mini - 2025 model	3 – 23	
a) <u>Summary</u>	3	
b) <u>Models</u>	4	
c) <u>Deployment</u>	5 - 7	
d) <u>Start-up</u>	8-16	
e) <u>Testing the tags</u>	17	
f) <u>Downloading data</u>	18 - 19	
g) Disconnecting and recharging	20	
h) <u>Processing data</u>	21	
i) <u>Appendix</u>	22	
j) Troubleshooting	23	
3) PathTrack nanoFix GEO mini - 2024 model	24 - 42	
a) <u>Summary</u>	24	
b) <u>Deployment</u>	25	
c) <u>Start-up</u>	26 - 31	
d) <u>Downloading</u>	32	
e) <u>Processing</u>	35	

These protocols are meant to serve as guidelines for field work carried out in cooperation with SEATRACK in 2025. Please distribute them as whole or in part to field teams as you see fit. If any questions arise, please contact <u>Svenja.Neumann@npolar.no</u> or <u>Vegard.Brathen@nina.no</u>

PathTrack Software

PathTrack Software Download and Installation, USB Drivers and Windows .Net Framework. NEW !!! PathTrack software version 'ArchivalUSB_SetupV3Pt77' should be installed on your machine prior to setting up the tags.

Please contact support@pathtrack.co.uk for the latest version of the software.

It is <u>essential</u> that this version of host software is installed, or any later versions subsequently provided by PathTrack, as previous versions will not be compatible with the additional programming features of these tags and will result in tags being incorrectly programmed and unlikely to operate correctly.

Product Summary:

- PathTrack picoFix[®] GEO mini devices for 'leg ring attachment' are archival GPS logger devices which <u>must be recovered</u> in order to obtain their data.
- The model being provided is a non-solar device, hence they must be <u>fully charged</u> <u>prior to deployment</u> to maximise data collection.
- The devices do include an immersion sensor to avoid wasting GPS power when the tag is submerged.
- Finally, the tags also include an <u>accelerometer that can be used to capture 3D</u> <u>behaviour</u> data that aligns with the GPS data capture events as well as an immersion sensor that will provide regular wet/dry data.

NEW !!!

2025 GPS models

PathTrack picoFix[®] GEO mini Models

NEW !!!

2025 GPS models

PathTrack has designed **2 new leg-mounted GPS prototypes** with <u>saltwater sensor</u> and <u>accelerometer</u> for the 2025 SEATRACK field season.



GPS for Common eider, Great skua, Northern fulmar, European shag, Northern gannet and gull species

- Weight: ≤3.6 g
- Battery: approx. 60 % better battery capacity than in 2024
- Shape: ~27x20x9mm for the main tag housing plus ~27mm of external antenna protruding but:
 - Additional strengthening at curve of antenna to withstand rougher wear and tear by EUSH and NOGA
 - Depth: similar depth proofing level as the 2024 model (approx. 60 m)



GPS for Common guillemot and Brünnich's guillemot

- Weight: ≤4.1 g
- Battery: same as the 2024 model
- Shape: ~27x20x9mm for the main tag housing plus ~27mm of external antenna protruding
- Depth: increased depth proofing level to 150 m





Important: When deploying the GPS, please also note the different antenna orientations for guillemots. You can find our recommendations can be found <u>here.</u>

PathTrack picoFix[®] GEO mini Deployment

NEW !!!

2025 GPS models

Northern gannets and European shags

We recommend using one of the two attachment variations shown below. You are free to choose:



Notes for attachment:

- Cable ties used were 2,4 mm wide and 115 mm long
- The orientation of the cable tie(s) is not critical. However, the cables ties should placed in a way that they do not present an extra area the logger could get hooked with or that it is uncomfortable for the bird.
- Make sure to avoid putting pressure on the 3 pins on top of the device, i.e. do not force cable ties that are too wide between the pins !
- When the cable tie is cutt off, put a drop of superglue inside the lock.

PathTrack picoFix[®] GEO mini Deployment

2025 GPS models

NEW !!!

All other species

We recommend using one of the two attachment variations shown below. You are free to choose:



Notes for attachment:

- In varation a, no holes were drilled into the ring, but the cable ties were attached around the ring
- Cable ties used were 2,4 mm wide and 92 mm long
- The orientation of the cable tie(s) is not critical. However, the cables ties should placed in a way that they do not present an extra area the logger could get hooked with or that it is uncomfortable for the bird.
- Make sure to avoid putting pressure on the 3 pins on top of the device, i.e. do not force cable ties that are too wide between the pins !
- When the cable tie is cutt off, put a drop of superglue inside the lock.

Important: When deploying the GPS, please also note the different antenna orientations for guillemots. You can find our recommendations on the <u>next page</u>.

PathTrack picoFix[®] GEO mini Deployment

PathTrack Logger Deployment (Mounting Advice)

When attaching the PathTrack devices to the animal, we recommend the following orientation for:

Guillemots: the antenna should be orientated in such a way that it <u>is facing **downwards**</u> away from the bird's body when the bird is stood upright and to make it point backwards when flying.

Common eider, Great skua, Northern fulmar, European shag, Northern gannet and gull species: the antenna should be orientated in such a way that it <u>is facing **upwards**</u>, so that it does not hit the ground/get damaged when the bird stands upright (see photo below).

Orientation of antenna

NEW !!!

2025 GPS models



European shag with 2024 GPS logger. Photo: Nina Dehnhard.

PathTrack picoFix® GEO mini Start-up

1. Start-up PathTrack loggers





You will need a magnet to connect your device to the computer.



NEW !!!

2025 GPS models

The **red** programming/charging units provided in 2024 and 2025!

 \checkmark





The WHITE programmer cables (which were supplied with the 2023 tags) must **NOT** be used with the **2024 tags** as the power is too strong and will damage the batteries.

The RED programmer cables can be used safely with the 2023 and 2024 tags.

First synchronise your pc clock

Device configuration involves the use of PC time to timestamp the GPS data on the device. To minimise time errors, ensure your PC has recently been synchronised to internet time/UTC. Go to the 'Date & time' settings on your pc. 'Synchronise your clock', then select the 'Time zone' of your tag deployment :

Synchronise your clock	
Last successful time synchronisation: 21/02/2025 08:17:32 Time server: time.windows.com	
Sync now	
Time zone	
(UTC+00:00) Dublin, Edinburgh, Lisbon, London	\sim

Note: The output data of the tag is always GPS/UTC time. So, for example, a PC that is set to Central European Time during the summer months will be +2 hours in advance of UTC. Therefore, if a tag start time is set in the software to 14:00 then the first GPS will be taken at 14:00 CET, which will be equivalent to 12:00 UTC. This will be reflected in the output data of the tag, ie. the 'start time' will appear as 12:00hrs in the output data, so it will need to be converted afterwards by exactly +2hrs to reflect the start time in the local time zone.

NEW !!!

2025 GPS models

Connect PathTrack Device via the USB programmer to the PC

 Connect the PathTrack Device via the USB Programmer Cable to the PC. The 2025 tags must only be connected to the PC using the red programming/charging units provided in 2024 and 2025. They <u>must not be</u> connected to the PC using the white programming/charging units provided in previous seasons (before 2024) otherwise the batteries on the tags will be damaged resulting in reduced capacity and possibly tag failure.



NEW !!!

2025 GPS models

2. Connect the USB plug into the PC and then proceed to connect the picoFix tag to the programming board using the procedure shown in the video below, noting that the four wires of the programming board are colour coded (see below):



The figure shows a picture of the tag, with the position of the colour coded connector rings and antenna. The tag housing is installed with 3x holes and outer ridges to allow for securely attaching the tag to the ring.

Note: It is not critical which order the cables are connected, but it is essential that the RED CONNECTOR is not connected to any tag pin other than the RED PIN.

3. The grabbers should be attached to the corresponding tag pins.

4. It is then essential that the RED LED on the tag is lit, and remains lit, before progressing to 'connecting' the tag in the software. It can take up to 4 minutes for the LED to light.



Note: The magnet swipe is safe and will not erase any GPS data, if you are connecting post deployment.

5. Once the red LED is on, open the PathTrack software on your PC, then connect the software to the device by selecting the "Connect" option from the "Device" menu.

e Confi	igure Dev	ice GSM Connect	Help	
		Connect		
Activity lo				

NOTE: In the Activity log window at the top of the software the **ID of the device** that has been connected to will be shown as illustrated below.



NEW !!!

2025 GPS models

NEW !!!

2025 GPS models

 A dialog box will appear asking if you wish to update the device schedule. Select "Yes" to change the schedule or "No" for it to remain as it is.



7. If "Yes" is selected to change the configuration, the configuration screen will then appear :

	two schedules
Schedule 1	Schedule 2
Operational mode	Operational mode
 Fixed interval (short term) 	 Fixed interval (short term)
 Solar driven (medium term) 	 Solar driven (medium term)
 Solar assisted (long term) 	 Solar assisted (long term)
Minimum GPS sampling interval	Minimum GPS sampling interval
24 hours 🗸	
Daily On/Off Periods	Daily On/Off Periods
GPS Start hour (local time)	GPS Start hour (local time)
0	0 🔹
No off periods (DS Star have feedbiller)	CBS Stee hour free lines)
GPS Stop nour (local time)	GPS Stop nour (local time)
'Off' period behaviour	'Off' period behaviour
~	✓
Applicable Months for Schedule 1	Applicable Months for Schedule 2
🔽 Jan 🔽 Feb 🔽 Mar 💟 Apr	🗌 Jan 📄 Feb 📄 Mar 📄 Apr
🔽 May 🔽 Jun 🔽 Jul 💽 Aug	May Jun Jul Aug
Sep Oct Nov Dec	Sep Oct Nov Dec
GPS start time (local time)	
05 (04 (2025	Set to pow + 5 mine

PathTrack picoFix® GEO mini Start-up

2025 GPS models

8. There are two configuration screens that can be accessed and used in order to fully configure the tags. The two configuration screens appear as separate 'tabs', one is for 'GPS' configuration (as shown on previous page), and one for 'Accelerometer' configuration (as shown below).

Mode of operation	Capture rate	
Continuous OGPS centred bursts	1 Hz	12.5 Hz
O Disable accelerometer	O 25 Hz	○ 50 Hz
Data type	Range	
Raw X, Y, Z data	○ +/- 2g	() +/- 4g
Scalar sum (Sqrt(X ² +Y ² +Z ²))	O +/- 8g	○ +/- 16g
Daily start time (local time) Hour Minute	Second daily Hour	v start time (local time) Minute
Total but 60s	rst length	
Memory capacity checker		

NEW !!!

2025 GPS models

- 9. <u>The Seatrack recommended deployment configuration settings are embedded in the tag</u>.
- 10. To activate these settings simply select a GPS 'fixed interval' **of >6hrs or more** and then select your preferred 'start time' and click 'OK' at the bottom of the configuration screen. See below configuration example which will activate the Seatrack settings:

NanoFix with Accelerometer

Accelerometer	
GPS settings	
Enable single schedule	ble two schedules 🗌 Disable
Schedule 1	Schedule 2
Operational mode	Operational mode
 Fixed interval (short term) 	 Fixed interval (short term)
 Solar driven (medium term) 	 Solar driven (medium term)
 Solar assisted (long term) 	Solar assisted (long term)
Minimum GPS sampling interval	Minimum GPS sampling interval
8 hours \checkmark	✓
Daily On/Off Periods	Daily On/Off Periods
GPS Start hour (local time)	GPS Start hour (local time)
0 🚖	0 🚖
GPS Stop hour (local time)	GPS Stop hour (local time)
24 🌲	24 🚖
'Off' period behaviour	'Off' period behaviour
× .	
Applicable Months for Schedule 1	Applicable Months for Schedule 2
🖉 Jan 🔽 Feb 🔽 Mar 🔽 Apr	🗌 Jan 📄 Feb 📄 Mar 📄 Apr
🖸 May 🔽 Jun 🔽 Jul 🔽 Aug	May Jun Jul Aug
Sep 🔽 Oct 🔽 Nov 🔽 Dec	Sep Oct Nov Dec
GPS start time (local t	ime)
07/04/2025 🗸 12:1	17:28 Set to now + 5 mins
 April 2025 	j >
Mon Tue Wed Thu	Fri Sat Sun - 100%
31 1 2 3	4 5 6 Cancel
14 15 16 17	18 19 20
21 22 23 24	25 26 27
28 29 30 1 5 6 7 8	2 3 4 9 10 11
Today: 0	5/04/2025

PathTrack picoFix® GEO mini Start-up

11. The below message will then appear confirming these settings are being activated, select 'Yes' to confirm that you accept the programming.

Seatrack c	onfiguration			×
?	Selecting a GPS Seatrack deploy configuration p programming (a session) or No t	rate of 6 hours ment configura arameters. Pres and hide this wa o Cancel	or more sets the ta tion including acce s Yes to accept this rrning for the rema	ig into elerometer inder of this
			Yes	No

12. Within a few seconds a window should then appear confirming that the schedule has been successfully updated on the device, select 'OK'.

Schedule	updated	×
1	Schedule successfully updated on device. When battery recharged simply close down software or choose disconnect option then unplug device from PC	
	ОК	

13. You can see in the software 'Activity Log' window, the Seatrack configuration settings have been successfully activated. Battery level can be seen in the upper right part.

05.04.2	E 10.40 C-L	- d. / d		 60s burst wind 25Hz Sample +/-8g Range Raw X, Y, Z d 	low Rate lata capture		Positioning Process Data
		ST	ATUS		POSITION		

2025 GPS models

14. Now you can safely disconnect the tag from the software: Select the "Disconnect" option from the "Device" menu.

🚽 PathTrack Host So	oftware (V3.73)
File Configure	Device GSM Connect Help
	Disconnect
Activity log	
	Tag start time - 12:17:28 on 07/04/2025 (PC GPS mode - Fixed interval GPS active from 00:00:00 to 24:00:00 each di

- 15. The device can then be removed from the programmer. Carefully disconnect the cable grabbers from the device.
- 16. Immediately after being physically disconnected from the PC/programmer, the RED LED on the tag will **flash fast 10x times** (fast flash = 5x per second) which confirms the tag is successfully programmed.



 NOTE: If you want to check at any time if the Seatrack configuration is active on a tag, simply swipe the magnet along the tag and check that the LED gives the 10x FAST flash confirmation. The magnet swipe is always safe and will not delete any GPS data or reset the configuration on the tag. The tag configuration can only be reset by connecting the tag to the software and changing the configuration settings via the configuration screen.

2025 GPS models

PathTrack picoFix[®] GEO mini Testing the tags

(non-standard programming)

2025 GPS models

NEW !!!

If it is necessary to set up a quick GPS test for a 2025 Pathtrack leg ring tag, you
must then select a GPS interval of 6hrs or less in the tag GPS configuration screen.
For testing purposes, ideally select a GPS fixed interval of around 10 or 15 mins and
leave the tag outside with a clear view of the sky (and satellites) and leave on test
for 3-4 hours to get a good sample of data.

GPS settings	
Enable single schedule Enable tw	o schedules 📄 Disable
Schedule 1	Schedule 2
Operational mode	Operational mode
 Fixed interval (short term) 	 Fixed interval (short term)
Solar driven (medium term)	 Solar driven (medium term)
 Solar assisted (long term) 	 Solar assisted (long term)
Minimum GPS sampling interval	Minimum GPS sampling interval
Daily On/Off Periods	Daily On/Off Periods
GPS Start hour (local time)	GPS Start hour (local time)
V ▼ No off periods	○ ▼ No off periods
GPS Stop hour (local time)	GPS Stop hour (local time)
24 🌲	24 🜲
'Off' period behaviour	'Off' period behaviour
Applicable Months for Schedule 1	Applicable Months for Schedule 2
🗹 Jan 🔽 Feb 🔽 Mar 🔽 Apr	Jan Feb Mar Apr
🗹 May 🔽 Jun 🔽 Jul 🔽 Aug	🗌 May 🗌 Jun 📄 Jul 📄 Aug
Sep Oct Nov Dec	Sep Oct Nov Dec
GPS start time (local time)	
05/04/2025 v 12:57:41	Set to now + 5 mins

 If you have activated 'test' GPS settings of 6hrs or less, when you disconnect the tag from the software the tag RED LED will confirm the tag has been activated with a 'test' configuration by giving 10x SLOW FLASHES (approx. 1x flash per second).

PathTrack picoFix® GEO mini Downloading data

NEW !!!

2025 GPS models

- 1. Make sure the connector pins of the loggers are clean (i.e. clear of any dirt)
- 2. Connect the Pathtrack USB programming board/cable to the PC. To do this, follow the procedure in the section Start-up GPS loggers, steps 1 3 carefully.

Remember: It is not critical which order the cables are connected, but it is essential that the **RED CONNECTOR** is not connected to any tag pin other than the **RED PIN**.

3. Once the **RED LED** on the tag is lit (and remains lit), connect the software to the device by selecting the "Connect" option from the "Device" menu.

🖳 PathTrack Host Software (V3.73)	
File Configure Device GSM Co Connect Activity log 05.04.25 13:09 >> Software started (Version:3.73)
LED To speed up this process, use a magnet, swipe the tag once, the RED LED should then light within a few seconds. PATHTRACK	Please remember to do the magnet swipe if the RED LED does not show up. You can find information on how to do a magnet swipe <u>here</u> .

- 4. The software will then ask if you want to download the data from the tag, if you select '**Yes**' any data that has not yet downloaded from the tag will then download.
- 5. A progress bar at the bottom of the software screen will provide the status of the download operation. Note that with a full set of GPS and accelerometer data the download time could be some tens of minutes.

PathTrack picoFix® GEO mini Downloading data

2025 GPS models

- 6. If you are not ready to download the data, select 'No', the data will remain stored on the tag, and you can reconfigure/or disable the tag as you wish. All the data will download the next time you connect to the tag and select 'Yes' to download data. Note if you do not download the data and then redeploy the tag, the tag will then collect data until the memory is full, at which point the tag will 'STOP' collecting data until you have downloaded the data from it.
- 7. The number of data points downloaded will be indicated in the Activity log window.
- 8. The downloaded data should appear in corresponding Tag folders in your PC directory:

C:\Users\YOUR_PC_NAME\AppData\Local\Pathtrack\archival_usb\log files

The GPS data will download as a .raw file. The file name structure for this file being as follows: 'ObsDDMMYY_HHMMSS_TagXXXXX.raw' (Where the first 6 digits are the date, the next six are the time and then the final five digits are the tag ID.

2x additional files will also download if there is accelerometer data, these will download as separate text files. The file name structures for these files being as follows:

'ObsDDMMYY_HHMMSS_TagXXXXAccel.txt.'
 'ObsDDMMYY_HHMMSS_TagXXXXAccWetDry.txt.'

PathTrack picoFix[®] GEO mini Disconnecting and **NEW !!!** recharging

2025 GPS models

- If you are not re-deploying the tag, it should then be disabled after data has 1. downloaded.
- 2. To disable tag - when prompted to Update Tracking Parameters select 'Yes' and then select 'Disable' at the top of the Configuration Screen, and then 'OK'.

	Update of param	eters			×
	? No da param	ta found on tag. leters?	Do you wish	to update tracking	
			Ye	s No	
🚽 Config	juration				-
GPSs	ettings				
🗆 E	nable single schedu	le 🗌 Er	able two sch	edules 🔽	Disable
Sch	edule 1			Schedule 2	
-O	perational mode			Operational mode	
) Fixed interval (sho	ort term)		 Fixed interval ((short term)
) Solar driven (med	ium term)		🔿 Solar driven (n	nedium term)

- 3. The tag can then be recharged in preparation for the next deployment. Each device will require up to a three-hour recharge between deployments to ensure the battery is fully charged.
- 4. After charging the battery and selecting the "Disconnect" option from the "Device" menu, the device can be removed from the programmer.
- 5. Carefully disconnect the grabbers from the device.
- The **RED LED** on the device may remain lit for up to 5s after disconnecting. 6.

PathTrack picoFix® GEO mini Processing data



- 1. Note that an **internet connection** is required to process the data obtained by the picoFix[®] devices in order to produce locations.
- 2. To process a data file, you open the PathTrack Host Software and select the "Process Data" button on the right-hand side of the software.

Pa File	thTrack Host So	oftware (Va	3.73) GSM Connect	Heln			_		×	
rile	Activity log	>> Softwar	e started (Version:2	леџ .73)			System stat Device Battery Le Positioning Proces	us vel ss Data		

- 3. Navigate to the appropriate device directory and select the file to be processed. Note that when the data was downloaded from the device the file name and path was written to the Activity log window.
- 4. If previous data has been processed then the software will ask if the new data is to be appended to the existing data. Usually select "No" so that only the new data will exist in the workspace.
- 5. The software will automatically download all files it requires from the internet to process the data files.
- 6. The software will then prompt you for the estimated start position. Please enter a reasonably accurate position, certainly within 100km.
- 7. Provided the data set contains a sufficient number of tracked satellites the data will automatically process.
- 8. Once completed the data can be saved via the 'File->Save results to file' menu so that it does not need to be processed again. Also, the .pos file produced can then be imported into Excel as it employs csv formatting.
- 9. The data can be viewed in Google Earth using the button near the bottom of the software window (provided Google Earth is installed and has been found by the software. If Google Earth has not been found by the software, then this can be configured via the 'Configure->User Options' menu).

PathTrack picoFix[®] GEO mini APPENDIX

NEW !!!

2025 GPS models

1. Column Headers for .pos file data imported into Excel:

- A. Day
- B. Month
- C. Year
- D. Hour
- E. Minute
- F. Second
- G. Second of the day
- H. Number of satellites processed
- I. Latitude
- J. Longitude
- K. Altitude
- L. Clock offset
- M. Accuracy indicator (this is just a processing parameter, not for customer analysis)
- N. Battery level (V)

2. Column Headers for Accel.txt file data imported into Excel:

- A. Year,
- B. Month,
- C. Day,
- D. Hour,
- E. Minute,
- F. Second,
- G. X-acceleration,
- H. Y-acceleration,
- I. Z-acceleration,
- J. 3D acceleration.
- All accelerations are given with the units of g (gravitational constant)

3. Column Headers for AccWetDry.txt file data imported into Excel:

Same as above Accel.txt file but with additional column.

The final column (K.) indicates if the tag is 'wet' or 'dry':

1 = WET

0 = DRY

PathTrack picoFix[®] GEO mini Tag connection troubleshooting

NEW !!!

2025 GPS models

Possible connection issues

LED doesn't come on

Tag will not connect LED comes on then goes dim

LED flashes ten times, but then won't connect to software

Tag connects to software, but then disconnects after a short period

Connection Fixes

- Gently scrape the tag rings with a scalpel to remove an oxidisationor dirt that might have built up during deployment, which is
- interrupting the connection with the programmer grabbers
- 2 Ensure Tag is sufficiently charged
- **3** Wiggle the grabbers around to secure a good connection
- 4 LED might be faulty, so try connecting to the software even if it doesn't come on
- **5** Swipe the tag with a magnet
- 6 Leave the tag in a bag of rice for a couple of days to dry out, then repeat above
- 7 Check with Pathtrack for latest PC Driver and software updates

IMPORTANT - Storage tips and tag maintenance:

- A. Before putting tags into storage, after deployment, ensure they are thoroughly cleaned of any biomaterial and saltwater residue. Rinsing the tags in clean water should suffice. Check the tags for any damage sustained during the deployment.
- B. Once the tags are completely dried, charge the tags to a minimum of 70%+ before putting tags into storage. Note: storing tags with a completely empty battery for an extended period can significantly degrade the condition of the lithium-ion battery installed.
- C. Store the tags in a dry place, out of direct sunlight, at room temperature. Ideally keep the tags stored in their original packaging (individual antistatic bags)
- D. Give the tags a maintenance charge, every 2 months, between deployments, to maintain the condition of the lithium-ion battery and keep the optimum battery level for storage at 70%+.

If you have any queries or concerns about the condition of your tags, please contact <u>support@pathtrack.co.uk</u> for further advice

2024 GPS model



For downloading the latest version of the PathTrack software, please following the instructions on page 3.

Product Summary:

PathTrack nanoFix[®] GEO mini devices for 'leg ring attachment' are archival GPS logger devices which must be recovered in order to obtain their data. The model being provided is a non-solar device, hence they must be fully charged prior to deployment to maximise data collection. The devices do include an immersion sensor to avoid wasting GPS power when the tag is submerged. Finally, the tags also include an accelerometer that can be used to capture 3D behaviour data that aligns with the GPS data capture events as well as an immersion sensor that will provide regular wet/dry data.

PathTrack nanoFix[®] GEO mini Deployment

2024 GPS model

PathTrack Logger Deployment (Mounting Advice):



Figure 1. The tag with the position of the connector rings and antenna.

When attaching the PathTrack devices to the animal, we recommend the following orientation for:

Guillemots: the antenna should be orientated in such a way that it is facing downwards away from the bird's body when the bird is stood upright and to make it point backwards when flying.

Gull sp., Common eider, European shag, Northern gannet: the antenna should be orientated in such a way that it is facing upwards, so that it does not hit the ground/get damaged when the bird stand upright.



Figure 2. The tag housing is installed with 3x holes and outer ridges to allow for securely attaching the tag to the ring.

2024 GPS model

Start-up PathTrack loggers

- 1. Device configuration involves the use of PC time to timestamp the GPS data on the device. To minimise time errors, ensure the PC has recently been synchronised to internet time. PCs can be set to any time zone with the configuration then set within that time zone. Hence a PC set to Central European Time during the summer months will be +2 hours in advance of UTC. Therefore, if a start time is set in the software at 14:00 then the first GPS will be taken at 14:00 CET, which will be equivalent to 12:00 UTC. The data output by the tags is always converted to UTC for simplicity when processing the data. Connect the PathTrack Device via the USB Programmer Cable to the PC as per previous instructions.
- 2. Connect the PathTrack Device via the USB Programmer Cable to the PC. These 2024 tags must only be connected using the red programming/charging units provided in 2024. They <u>must not</u> be connected using the white programming/charging units provided in previous seasons otherwise the batteries on the tags will be damaged resulting in reduced capacity and possibly tag failure. Connect the USB plug into the PC and then proceed to connect the nanoFix tag to the programming board using the programming board are colour coded.

It is <u>essential</u> that the **RED connector** is not connected to any tag pin other than the **RED pin**.

See next page

2024 GPS model

- The orientation as seen from above is shown in Figure 3.
 The cable grabbers should be attached to the corresponding tag pins in the following order:
 - 1. WHITE
 - 2. **RED**
 - 3. GREEN
 - 4. BLACK
 - 4. <u>It is then essential to wait</u> for the **RED LED** to light on the tag before progressing to connect the tag to the software.

It may take several minutes for the LED to light and remain lit.





IMPORTANT:

The WHITE programmer cables (which were supplied with the 2023 tags) must **NOT** be used with the **2024 tags** as the power is too strong and will damage the batteries.

The RED programmer cables can be used safely with the 2023 and 2024 tags.

5. Open the PathTrack software on your PC, then connect the software to the device by selecting the "Connect" option from the "Device" menu, see Figure 4.

File Configure		Device	GSM Connect Help	Figure 4
		Co	nnect	01
A	ctivity log			

- 6. A dialog box will appear asking if you wish to update the device schedule. Select "Yes" to change the schedule or "No" for it to remain as it is.
- 7. If "Yes" is selected to change the configuration, then the configuration screen will then appear.

See next page

2024 GPS model

8. As these tags include an accelerometer there are two configuration screens that must be accessed and used in order to fully configure the tags. The two configuration screens appear as separate 'tabs' as illustrated in Figure 5 below; one is for 'GPS' configuration (as shown in Figure 5), and one for 'Accelerometer' configuration (as shown in Figure 6, next page).

GPS Accelerometer	Figure		
GPS settings			
Enable single schedule	wo schedules Disable		
Schedule 1	Schedule 2		
Operational mode	Operational mode		
Fixed interval (short term)	Fixed interval (short term)		
Solar driven (medium term)	 Solar driven (medium term) 		
 Solar assisted (long term) 	 Solar assisted (long term) 		
Minimum GPS sampling interval	Minimum GPS sampling interval		
24 hours V	~		
Daily On/Off Periods	Daily On/Off Periods		
GPS Start hour (local time)	GPS Start hour (local time)		
0	0 🗇		
No off periods	No off periods		
GPS Stop nour (ocal time)	GPS Stop nour (local time)		
'Off' period behaviour	Off' period behaviour		
Applicable Months for Schedule 1	Applicable Months for Schedule 2		
🖾 Jan 🔝 Feb 🖾 Mar 🖾 Apr	🗌 Jan 📄 Feb 📄 Mar 📄 Apr		
🖾 May 🖾 Jun 🖾 Jul 🖾 Aug	May Jun Jul Aug		
Sep 🖾 Oct 🖾 Nov 🖾 Dec	Sep Oct Nov Dec		
GPS start time (local time)			
18/04/2024 ~ 10:19:06	Set to now + 5 mins		

2024 GPS model



GPS	Accelerometer				-igure 6
Ac	ccelerometer settings				0
	Mode of operation				
		GPS centred hurste	Capture rate	0.000	
	Continuous		⊖ 1 Hz	0 12.5 Hz	
		 Disable accelerometer 	25 Hz	○ 50 Hz	
	Data type		Range		
	Raw X, Y, Zd	lata	○ +/- 2g	○ +/- 4g	
	Scalar sum (Sqrt(X ² +Y ² +Z ²))		•+/- 8g	○ +/- 16g	
	Temporal control				
	Time windows				
	Daily time	window	Two daily	time windows	
	Daily start time	e (local time)	Second daily	start time (local time)	
	Hour	✓ Minute ✓	Hour	Minute	
	Time window	duration	Time window	duration	
		Total bu	rst length		
		005			
	Memory	capacity checker			
	- Heritary				
		Constitution	a lavel 1%		Ouiok text
		Current batte	ry ievel - 1 %		Guick test

9. The software will automatically pre-populate the recommended deployment settings for your tags. The recommended settings are shown in Figure 5 and Figure 6. Therefore, all that is required is to set the GPS start time and date for the tags on the GPS configuration screen and Click 'OK'.

- 10. Within a few seconds a window should appear confirming that the schedule has been successfully updated on the device.
- 11. Select the "Disconnect" option from the "Device" menu.



- 12. The device can now be removed from the programmer*. *Carefully disconnect the grabbers from the device in the reverse order to which you connected them. Disconnect the grabbers in order: BLACK, GREEN, RED, WHITE
- 13. Immediately after being physically disconnected from the PC, the RED LED on the tag should flash ten times which confirms the tag is successfully programmed.

2024 GPS model

PathTrack nanoFix[®] GEO mini Downloading

2024 GPS model

Steps to download data:

- Connect the PathTrack USB programming board/cable to the PC. To do this, 1. follow the procedure in the previous section "start-up loggers". Steps 2 - 4carefully.
- Connect the software to the device by selecting the "Connect" option from the 2. "Device" menu.

Countral
Connect
tivity log

3. In the Activity log window at the top of the software the ID of the device that has been connected to will be shown as illustrated below.



- All data will download automatically from the device. A progress bar at the 4. bottom of the software will provide the status of the download operation. Note that sometimes the download can pause for periods up to 30s. It is not necessary to do anything to reset the download – it will simply recover automatically. Note that with a full set of GPS and accelerometer data the download time could be some tens of minutes.
- The number of data points downloaded will be indicated in the Activity log 5. window. 32

PathTrack nanoFix[®] GEO mini Downloading

2024 GPS model

6. The device should then be disabled

To disable tag - when prompted to Update Tracking Parameters select 'Yes' and then select 'Disable' at top of the Configuration Screen, and then 'OK'

Update	of parameters	-	×
	No data found on ta parameters?	g. Do you wish to updat	te tracking
		Yes	No
Configuration			-
GPS settings			
Enable sin	gle schedule	Enable two schedules	Disable
Schedule 1		Schedule	2
Operationa	l mode	Operati	ional mode
 Fixed in 	nterval (short term)	⊖ Fix	ed interval (short term)
🔘 Solar d	lriven (medium term)	⊖ Sol	lar driven (medium term)

- 7. The tag can then be recharged in preparation for the next deployment. Each device will require up to a three-hour recharge between deployments to ensure the battery is fully charged.
- 8. After charging the battery and selecting the "Disconnect" option from the "Device" menu, the device can be removed from the programmer.
- 9. Carefully disconnect the grabbers from the device in the reverse order to which you connected them. Disconnect in order: BLACK, GREEN, RED, WHITE.
- 10. The LED on the device may remain lit for up to 5s after disconnecting.

PathTrack nanoFix[®] GEO mini Downloading

2024 GPS model

11. The downloaded data should appear in the corresponding Tag folders in your PC directory:

C:\Users\YOUR_PC_NAME\AppData\Local\PathTrack\archival_usb\logfiles

The GPS data will download as a .raw file. The file name structure for this file being as follows: 'ObsDDMMYY_HHMMSS_TagXXXXX.raw' (Where the first 6 digits are the date, the next six are the time and then the final five digits are the tag ID. The accelerometer data will download as a separate text file. The file name structure for this file being as follows: 'ObsDDMMYY_HHMMSS_TagXXXXAccel.txt.'

Hard resetting the device:

- If the device continually fails to connect to the PC, and the problem cannot be resolved through disconnecting of the device from the programmer, unplugging the cable from the PC, and restarting the host software before reattempting to connect, then it may be necessary to hard-reset the device. Ensure that the tag pins are free from dirt and debris which may be interrupting the connection with the programmer cable grabbers.
- 2. Note that if the device is currently active then resetting in this manner may lose up to 15 of the last location data sets taken by the device. All data prior to those will, however, be preserved.
- 3. The hard reset should be performed with the device connected to a PC via a programmer.
- 4. To perform the hard reset simply pass a strong magnet over the side of the device

PathTrack nanoFix[®] GEO mini Processing data

2024 GPS model

Processing data:

- 1. Note that an internet connection is required to process the data obtained by the nanoFix[®] devices in order to produce locations.
- 2. To process a data file, select the "Process Data" button on the right-hand side of the software.
- 3. Navigate to the appropriate device directory and select the file to be processed. Note that when the data was downloaded from the device the file name and path was written to the Activity log window.
- 4. If previous data has been processed, then the software will ask if the new data is to be appended to the existing data. Usually select "No" so that only the new data will exist in the workspace.
- 5. The software will automatically download all files it requires from the internet to process the data files.
- 6. The software will then prompt you for the estimated start position. Please enter a reasonably accurate position, certainly within 100km.
- 7. Provided the data set contains sufficient number of tracked satellites the data will automatically process.
- 8. Once completed the data can be saved via the 'File->Save results to file' menu so that it does not need to be processed again. Also, the .pos file produced can then be imported into Excel as it employs csv formatting.
- 9. The data can be viewed in Google Earth using the button near the bottom of the software window (provided Google Earth is installed and has been found by the software. If Google Earth has not been found by the software then this can be configured via the 'Configure- >User Options' menu)

Good luck and happy trapping

