

Lotek



PinPoint Commander

USER MANUAL

REVISION 02

22 FEB 2018

#MGPS12

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1. Introduction

1.1. Overview

The PinPoint Commander or PPC is used to communicate with PinPoint VHF tags or LiteTrack collars for downloading their data, uploading new schedules and testing Proximity functions.

The PPC is lightweight and portable. It works with either a simple whip or directional antennas such as a Yagi or a H Antenna, to further increase its effective range.

A list of tags/collars to be communicated with is created by PinPoint Host software and stored on a micro SD card. The downloaded data is stored on the same micro SD card as well. A USB connection is used to transfer data from PPC to a Windows computer (PC).

The unit can work in autonomous mode (Main Menu > Download > Schedule), where it will operate unattended following a schedule. Separate solar power can be used to power the unattended unit.

1.2. Specification

Items	Parameters
Size (mm)	159.4(L) x 77.9(W) x 33.5(H) ^[1]
Weight (g)	240g (without batteries) 295g (with 3 AA type alkaline batteries)
PC Connection	Mini USB
Operating Temperature	-20C - +50C
Storage temperatures	-40C -+50C
Power Source	External: USB or DC source (Min 5V~Max 25V) Internal: 3 AA alkaline or rechargeable batteries
Operational life	27 to 40 hours continuous work ^[2]
Radio Frequency range	Band within 142-172 MHz
Antenna	Whip or directional antenna (e.g. Yagi or H) with coaxial cable and BNC connector
Data Storage	2GB+ Micro SD

1. The height of antenna and power connector is not included.

2. Calculation is based on AA Alkaline batteries with 1200mAH capacity. The actual working longevity may vary depending on intensity of RF communications and setting of screen backlight.

2. Use of PinPoint Commander (PPC)

2.1. User Interface



Up / Down Keys

1. Highlight a line from menu list
2. In edit mode, change digital value



Enter key

1. Select the highlighted menu item and enter sub menu
2. Execute an operation
3. Confirm a change



Escape key

1. Back to higher level menu
2. Escape from a task

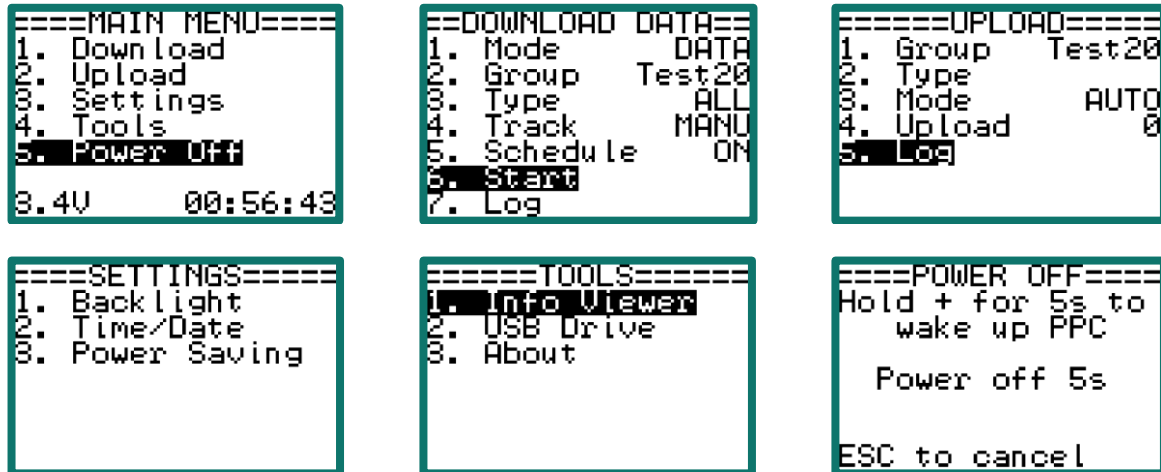


Plus key

1. Wake up PPC from power off mode by holding for 5 seconds
2. Wake up PPC from screen saving mode
3. Toggle between screens
4. Modify contents

2.2. Menu Structure

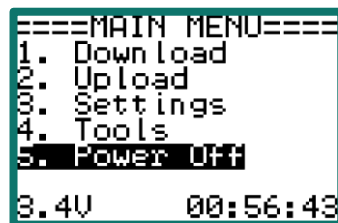
The fundamental menu structure is illustrated below:



Use arrow keys to navigate menu items. Use Enter key to choose.

2.3. Main Menu

When the PPC unit is first switched on, the main menu is shown, from where you can select one of four options:



1. **Download:** search for tags/collars, data download from tags/collars that are within communication range, autonomous mode, etc.
2. **Upload:** Can upload new schedules, etc. to the tag that has been previously loaded onto the PPC.
3. **Settings:** setup of PPC unit operation including, change of backlight, update of time/date and modifications of screen savings parameters.
4. **Tools:** Viewing tag ID list and statistics of downloaded data. Connection to a PC to download collected data.
5. **Power Off:** turn PPC to power down mode.

The left hand figure at the bottom of the indicates battery voltage and the right hand figures, the time.

2.4. Download Data Submenu

From the Main menu, selecting Download will display the 'DOWNLOAD DATA' submenu as shown below. This allows configuration of the download settings, initiates data download and checks the status of the tags or collars.

```
==DOWNLOAD DATA==
1. Mode          DATA
2. Group         Test20
3. Type          ALL
4. Track         MANU
5. Schedule Le   ON
6. Start
7. Log
```

A brief summary of settings is displayed on the right side of top three menu items, including working mode, group and data type for download.

Start menu item is highlighted by default.

NOTE: It is important to have an antenna attached to the PPC unit before starting data download. Failure to do so may cause permanent damage to the radio circuits.

2.4.1. Mode

There are two modes of operation:

1. **Status:** PPC will search for tags/collars that appear on the previously uploaded ID list and are within communication range. It will display detected tags/collars' IDs and data statistics only.
2. **Data:** Data from contacted tags/collars are downloaded to onboard micro-SD card.

```
==SEARCH MODE==
1. Status
2. Data ✓
```

Move the Up / Down keys to highlight download options. The ✓ mark indicates current selection.

To activate your selection, press the Enter key. Use Escape key to exit.

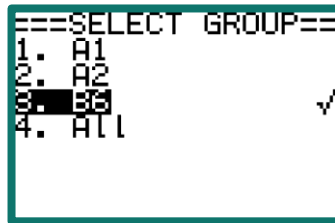
When **Data** is highlighted an additional option called **Threshold** appears which can be adjusted. The **Threshold** defines the minimum data size that will be uploaded.

The value of 0kB means that all acquired data is downloaded and 50kB is the maximum threshold, meaning that only if the data exceeds 50kBytes will it be downloaded. Use + key to change threshold value with 10kB step. The purpose of this feature is to prevent too frequent downloading of very small data amounts.

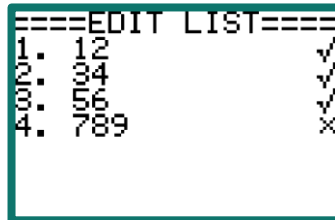
The selected mode can be seen on the **DOWNLOAD DATA** screen at the end of the line of **Mode** item. If **Data** is selected, it will show "Data", if **Status** is selected, it will show "Stat".

2.4.2. Group

With the first set of tags sent with the commander, IDs will have been pre-loaded onto the PPC. If you need to upload IDs yourself, for a new set of tags, or after management of them, please see Section 3.2 ID List Creation. To facilitate field trips and data management, the ID list is divided into groups that may correspond to animal's locations. The maximum number of IDs in a group is 256. Maximum of 8 groups are allowed in a list. You can select a group and view or edit its contents. Use the Enter key to enable/disable an ID from the list. Move the Up / Down keys to navigate GROUP menu items and click the Enter key, to select the group of interest. The ✓ sign marks selected group.



When a group is selected, the **EDIT LIST** allows you to enable or disable an ID from the list by clicking the Enter key. When a tag is selected, a ✓ mark is added to the end of the tag ID. When a tag is de-selected, a X mark is added to the end of the tag ID. The de-selected tag ID will be skipped during tag data download. By default, all tag IDs in the selected group are enabled.

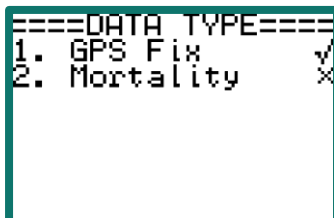


An ID can belong to more than one group.

2.4.3. Type

Some tags have additional data such as activity and mortality, and these can be viewed and edited under **DATA TYPE** menu item.

If you are only interested in one or two data types, then the other data types can be skipped during download to save battery power.



Use the Up / Down keys to highlight a data type group and use the Enter key to enable/disable a data type.

When all supported data types are selected, a string “ALL” appears on the **DOWNLOAD DATA** screen at end of the menu item Type, otherwise only Type Number (digital form) will be shown. The table below summarizing available data types.

Type Number	Type	Abbreviation
0	No data	“
1	GPS fix	‘G’
2	GPS schedule	‘S’
3	Beacon schedule	‘B’
4	RF com schedule	‘R’
5	Activity	‘A’
6	Proximity	‘P’
7	Mortality	‘M’

The abbreviation of data type is used for the file extension.

2.4.4. Track – Automatic or Manual

Once the Track menu item is highlighted and the Enter key entered, the Track Mode sub menu indicates if the PPC is configured for Automatic or Manual tracking by the ✓ mark next to the item. Highlighting the Automatic or Manual option and selecting the Enter key will change the option.

2.4.5. Schedule

The **SCHEDULE** allows you to leave the logger in the field to download data autonomously.

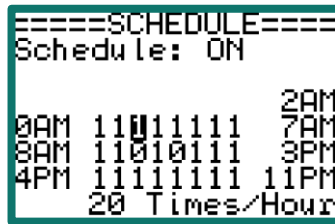
SCHEDULE allows autonomous download, where the unit periodically attempts to communicate with tags/collars in the download range.

The Schedule shows three editable options:

- Schedule, either ON (active hour) or OFF (passive hour)
- 24-hour schedule
- Times / Hour which defines the number of communication attempts within an active hour. Minimum 1, Maximum 60 (i.e. once per minute).

Press the Plus key to enter Edit mode.

While in the Edit mode, Up / Down keys change the field value, The Enter key applies changes, the Plus key moves cursor to next field, the Escape key exits Schedule setup menu.



When the cursor is in one of the hour fields, the actual hour is displayed. "1" means active for that hour, "0" means inactive (no communication attempts within this hour).

When schedule mode is ON, the PPC LCD backlight will be off except when a key stroke is detected.

2.4.6. Start

When the Start menu item is highlighted and \square key entered, the PPC will start searching for collars/tags according to the contents of selected ID list, data types and download mode. Once a tag/collar has been found, the unit initiates data download. The PPC will repeat the download operations until all the tags in the tag list were searched for.

The PPC displays working status during tag searching and data downloading. No user involvement is required during this activity. To abort the operation, the key \square needs to be entered, or a SKIP/EXIT command selected from the bottom line.

Depending on the numbers of tags, the amount of data, and RF environment, the download operation can last minutes or hours. The following download time estimation in good RF conditions is based on 9600bps data transfer rate.

Data Size	# of data records (approximately)	Estimated Download Time
10kB	500	10 seconds
100kB	5000	2 minutes
1MB	50000	20 minutes

The actual download time will vary depending on RF link quality.

There are a few different status screens that show up during communication process.

1. BROADCAST..

The PPC broadcast attempts to wake up all tags/collars that belong to the group that was called. Once a tag from the group receives this call it waits for further instructions from the PPC on a separate communication channel. If the tag from a different group receives this call it will ignore it.

```
===BROADCAST..===  
Call A1 (7)  
  
b: Exit
```

In this example, the PPC is calling tags from group A1 and the call will be finished in 7 seconds.

2. FIND TAGS

```
===FIND TAGS===  
Link 6002  
Found 2/10  
  
b: Exit
```

After broadcasting a 'wake up' message and receiving responses from the tags within range, the PPC is ready to communicate with tags that responded. In the manual mode it waits for the user to select the tag/collar ID to communicate with first. In the automatic mode it chooses the order in which to download data or status.

```
===FIND TAGS===  
Link 6002  
Found 0/10  
  
b: Exit
```

If no tag was found, then the list is empty and the PPC stops data download operation.

```
===INIT DOWNLOAD===  
Init 123  
  
(3)
```

In the example on the left, the PPC is initializing data download from tag ID 123. If initialization fails and the time-out is reached, this tag will be skipped and the PPC will move to the next tag on the list, or in **manual mode** it will wait for further instructions from the user.

3. DOWNLOADING..

```
===DOWNLOADING===  
Tag 123  
Data: 4567  
File: 18688  
Read: 64000  
Retries: 56  
+: Skip/Exit J: Go
```

If the download initiation is successful, the PPC starts to download data from the tag. The actual volume of data collected in the tag, the volume of downloaded data and the number of retries will be dynamically presented.

When the data download is completed, the PPC will move to the next tag on the active list until all tags have been downloaded. In case of manual mode, it will wait for further instructions from the user.

At any time, the user can stop or abort the data downloading process by selecting *Skip* or *Exit*. Selecting *Skip* will stop data downloading from the current tag and will move to the next one. Selecting *Exit* will terminate the entire data download operation. Press the Plus key to switch between the two options and press the Enter key to apply the selection.

2.4.7. Log

The Log menu item allows the user to review recent data download status. The example screen is shown below.

```

===DOWNLOAD LOG===
FW:08:68   Type:G
Data:      1900B
15:44:33  04/04/17
1.         41043  L
2.         123   %
3.         456   X
4.         789   ✓
    
```

Use the Up / Down keys to move among different IDs on the active list. If the list size is larger than 4, it will scroll.

The summary data above the list includes PPC firmware version, data type (refer to 2.4.3 for the meaning of the number), data volume in bytes and the time and date the file was created.

Each tag on the list includes a specifier at the end of the line to indicate the download status. There are four types of specifiers as described below:

Specifier	Meaning
✓	Completely downloaded
%	Partially downloaded
X	Failed to download
Blank	No download action due to no data or unwanted data type
L	Applicable to Solar Tag. L indicates the solar voltage of tag has detected low during data downloading causing the PPC to terminate the download.

The partial or failure to download usually happens in case of communication problems due to weak signals or too much radio frequency noise. Potential causes include long distance to tag, radio interference, unfavourable hilly and rocky terrain. Blank specifier means the tag has not collected any data, or its data type is disabled by the setup (refer to 2.4.3).

2.5. Upload

This submenu allows the upload of schedules like GPS and Beacon changes. If the upload of a schedule is successful, this will overwrite the existing schedule and as the tag is active, the schedule is active immediately.

Selecting the Upload option brings up the screen:

```
====UPLOAD====
1. Group   Test20
2. Type
3. Mode    Auto
4. Upload  4
5. Log
```

2.5.1. Group

This allows you to select a group of tags you wish to upload to. The screen will list all the groups available which you can select individually or select the All option to upload to all groups.

```
====SELECT GROUP====
1. Test20  2 ✓
2. ALL     2
J: Display/Edit
```

Selecting one of the groups will list the Tag IDs in that group with the ✓ indicating the tag(s) to be uploaded to.

```
====VIEW LIST====
1. 51000 ✓
2. 51200 ✓
```

2.5.2. Type

The Type submenu defines which schedule will be uploaded. If All is indicated, selecting this option provides a screen that displays the type of schedule being uploaded.

```
====UPLOAD TYPE====
1. GPS      ✓
2. Beacon   ✓
```

Here we have the option to upload both the GPS and Beacon schedules. Highlighting the line using the Up / Down keys then selecting will either insert a ✓ or a X, where the x indicates do not upload this option. If you select one schedule only, the main upload screen under Type will change from 'All' to S1 for GPS, S2 for Beacon, etc. If all options have an 'x' then the Type field, is blank.

2.5.3. Mode

The Mode submenu defines when the schedules will be uploaded. This can be done automatically when the tag is in range or manually. Selecting this option enables another screen which allows you to select either 'Automatic' or 'Manual'.

2.5.4. Upload

The Upload submenu displays the number of schedules (total for all schedule types) to upload. In the example above (section 2.5), it shows 4. Selecting this option, you will see the broadcast screen where it tries to connect to the tags in the group (Test20 in this case). It will display 'Link' after a few seconds followed by the 'Upload Log' screen.

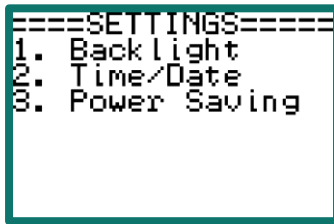
```
====UPLOAD LOG====
1. 0044249.S01 -
2. 0044249.S02 -
3. 0044136.S01 ✓
4. 0044137.S01 ✓
```

The files with the ✓ have uploaded. The 0044137.S01 indicates tag ID 44136 has uploaded the GPS schedule (S01 for GPS, S02 for Beacon).

2.5.5. Log

This shows the log as shown in the previous section.

2.6. Settings



The **Settings** submenu allows you to tune the LCD backlight to your own preferences, adjust time & date and set a screen saving schedule to save battery power.

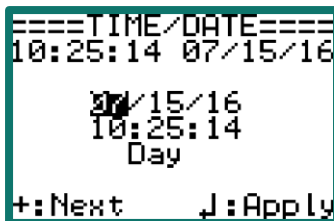
2.6.1. Backlight



The LCD backlight consumes significant battery power during normal operations. The PPC allows user to adjust the LCD backlight to fit the ambient light . Use Up and Down arrow keys to change the backlight to a comfortable level. 100% presents brightest and 0% presents the darkest.

Use the Enter key to enter the new selection. Use the Escape key to go back to the previous menu. If the Escape key is used before the Enter key, the backlight setting does not change.

2.6.2. Time/Date

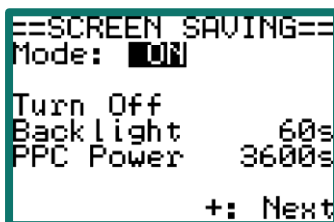


The PPC comes with an internal RTC (Real Time Clock).

NOTE: Every time the PPC has its batteries removed, it requires that time and date is entered. If not, downloaded data files will be presented with an incorrect time stamp.

The time/date is presented on six editable fields. Use the Up / Down keys to modify the number in the highlighted field. Use the Enter key to enter the highlighted number only. Use the Plus key key to jump to the next field without entering the number.

2.6.3. Screen Saving



The PPC unit has a screen saving mechanism to save battery power. When power saving is enabled, the PPC will turn off the **Backlight** after a specific period of inactivity that you can adjust. **PPC Power** defines when it will enter sleep mode after a specific period of inactivity.

Use the Up / Down keys to modify the number/option in the highlighted field. Use the Enter key to activate the highlighted field. Use the Plus key to jump to the next field.

If the PPC is in sleep mode, pressing + key for more than 5 seconds will wake it up.

2.7. Tools

```
====TOOLS====
1. Info Viewer
2. USB Drive
3. About
```

The TOOLS menu allows a review of tag/collar ID lists within groups, downloaded data files and sensors.

It also provides information about the PPC unit hardware/firmware revision, operating frequency and the unit serial number.

2.7.1. Information Viewer

```
====INFO VIEWER====
1. ID List
2. File List
3. Upload List
4. Proxi. Radar
```

INFO VIEWER displays groups uploaded to PPC, ID lists within groups, downloaded data files and sensor information such as ambient temperature and battery voltage.

```
====ID LIST====
Groups : 2
IDs    : 6
1. Test20 4
2. Test25 2
J: View List
```

ID List allows group selection and viewing a group's ID list. Highlight a group from the list and press the Enter key to view IDs. Use the Up / Down keys to scroll IDs. Use the Escape key to go back to the previous menu.

```
====LIST VIEW====
1. 51000
2. 51200
3. 51300
4. 51400
```

Selecting a group will list the Tag ID's associated with the Group. Use the Escape key to go back to the previous menu.

```
====FILE LIST====
44249.G 184320
44136.G 883200
44137.G 153200
44329.G 153200
44145.G 153200
44249.G 153200
```

File List displays the list of files in memory that has been downloaded. The list consists of the name (with a suffix indicating the type of file – G is GPS data) and size in bytes. Use the Up / Down keys to scroll up and down the files. Use the Escape key to go back to the previous menu.


```

===UPLOAD LIST===
 1 0044249.S01-
 2 0044249.S02-
 3 0044136.S01-
 4 0044137.S01-

```

Upload List displays the list of Tag ID's that have new schedules to upload and if they have been uploaded (✓) or not (-). The suffix S01, S02, etc. indicates the schedule type. Use the Escape key to go back to the previous menu.

```

\PROXIMITY RADAR\
 000 R-73 T12:51
 000 R-73 T12:54
 000 R-74 T12:55
 000 R-78 T12:01
 000 R-79 T12:02
 000 R-78 T12:02
b: Exit

```

Proxi. Radar can be used to check proximity transmit function if tags that have proximity enabled (with VHF). The PPC will listen for the tags and display their Proximity ID, received signal strength (R-73 Received at -73dBm RSSI) and time (HH:MM). This real time monitoring continues until you exit by pressing the Escape key which takes you back to the previous menu.

2.7.2. USB Drive

```

USB Mass Storage

b: exit

```

After connecting PPC to a PC with a USB cable, and entering the USB Drive command, the PPC unit becomes an external USB drive. The embedded micro-SD in PPC is now directly accessible by the PC.

The PC may need to download a few drivers from the Internet before it can recognize the new USB device, so it can take a few minutes before it shows up in the file manager.

After a successful connection is made, previously prepared ID lists can be updated and downloaded data can be copied.

When the PPC unit is connected to a USB port, its internal battery is bypassed and it is powered by the PC. When USB cable is removed, the internal battery automatically switches back on.

For instructions on how to download data, upload ID lists and upload schedules refer to Section 3: ID List Creation, Data Download and schedule upload.

2.7.3. About

```

====ABOUT====
FW : 1.45
Date: Feb 22 2018
SN : 12345
Band: 173.100MHz
TXPW: 15dBm

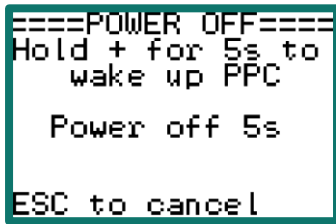
Lotek Wireless

```

The ABOUT screen provides information about firmware, build date, communication frequency, PPC serial number and copyright information.

The unit's frequency band and serial number are pre-set in the factory and cannot be modified.

2.8. Power Off



The unit can be powered off for storage or transportation. To turn the PPC back on, press the Plus key for more than 5 seconds.

3. ID List Creation and Data Download

3.1. Micro-SD Card Access

The PPC comes with an internal micro-SD card that is not physically accessible by the user. However, the **USB Drive** feature under **Tools** menu effectively turns the PPC unit into a USB drive. This results in the PPC looking like a local drive to the PC.

The only use of the USB drive is management of ID lists, downloading collected data files and uploading schedules. Use with the command functions within PinPoint Host.

3.2. ID List Creation

Before heading out to the field to collect data, a list containing tags/collars IDs needs to be created. This ID list file must be created in the PP Host and the instructions are available in PinPoint Host user guide. The resulting list name is **IDList.PPC** and it is stored on PPC onboard micro-SD card. This is transferred to the PPC using the PP Host application under **Tools>Upload IDList to PPC**.

The PPC has a limited memory space allowing up to 256 tags be searched at a time. If you have more than 256 tags, the IDs should be divided into groups with each group containing up to 256 tag IDs. Up to 16 groups are allowed. The same ID may belong to more than one group. Each group name may contain a maximum of 8 characters.

3.3. Data Download

It is important that data is downloaded via the PinPoint Host using **Tools > PPC Data File Transfer**. Refer to the PinPoint Host user manual for more details. Do not download data from the PPC as if it was a USB drive, because essential file formatting occurs only when using PP Host for the transfer.

3.4. Schedule Upload

New Schedules for deployed tags must be created and uploaded onto the PPC using the PinPoint Host application via Tools > PPC Remote Upload Management. Refer to the PinPoint Host user manual for more details.

4. Energy Saving Consideration

The protocol defined in the RF link intends to

1. Maximize energy efficiency
2. Minimize user involvement
3. Support autonomous data download

The PPC uses three AA batteries, or an external power source (6~25VDC), or USB power. Any AA size battery, alkaline or rechargeable, can be used in the PPC.

AA Alkaline batteries with nominal 1800mA~2600mA capacity, can support PPC full working mode for 27 to 40 hours.

Rechargeable batteries are also a good option to reduce operating cost.

Tags consume about 50mA during transmission and about 5mA in receiving mode. To save energy, tags use duty cycles. In the PinPoint Host, you can set the RF link to be on for a specified number of hours per day and during this time they are in receive mode for 20ms every 10 seconds on Channel 1. If a valid Tag hello message is detected during this 20ms window and the address matches, then the tag will switch to continuous receive mode on channel 2 for 20 seconds. If either the Hello or Tag ID does not match, the tag goes back to sleep.

While on channel 2, the PPC quizzes the tag for its status information. If the tag contains new data, the PPC will ask it to switch to Channel 3 for data downloading. If there is more than one tag in this group that turned to receive mode, the PPC will sequentially communicate with all of them.

The key reason to use multiple channels in the communication is to reduce the chance of accidentally waking up tags of no interest.

If the PPC cannot interrogate all tags in the group within its allocated time window of 20 seconds, the remaining tags will go back to Channel 1 in Wakeup when ready mode.

We recommend you plan before conducting data download operation in the field to maximize energy efficiency.

5. Selection of Antenna

The PPC is supplied with a Whip antenna but this has limited range. For longer detection and download range, use a directional antenna such as an H or Yagi antenna.

6. Storage and Maintenance

Put the PPC in a dry and clean place when not in use. Remove the batteries and clean-up the PPC surface.

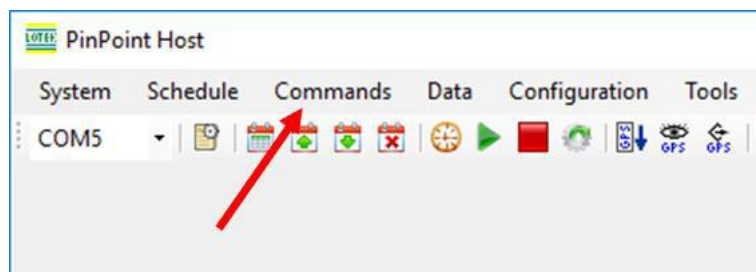
Appendix 1. Firmware Upgrade

The PPC is normally supplied with the latest firmware but sometimes you may be required to upgrade the firmware for fault resolution or new features. The PPC can be returned to Lotek, Biotrack or Sirtrack but the PPC is supplied with the necessary components for the user to upgrade the unit themselves.

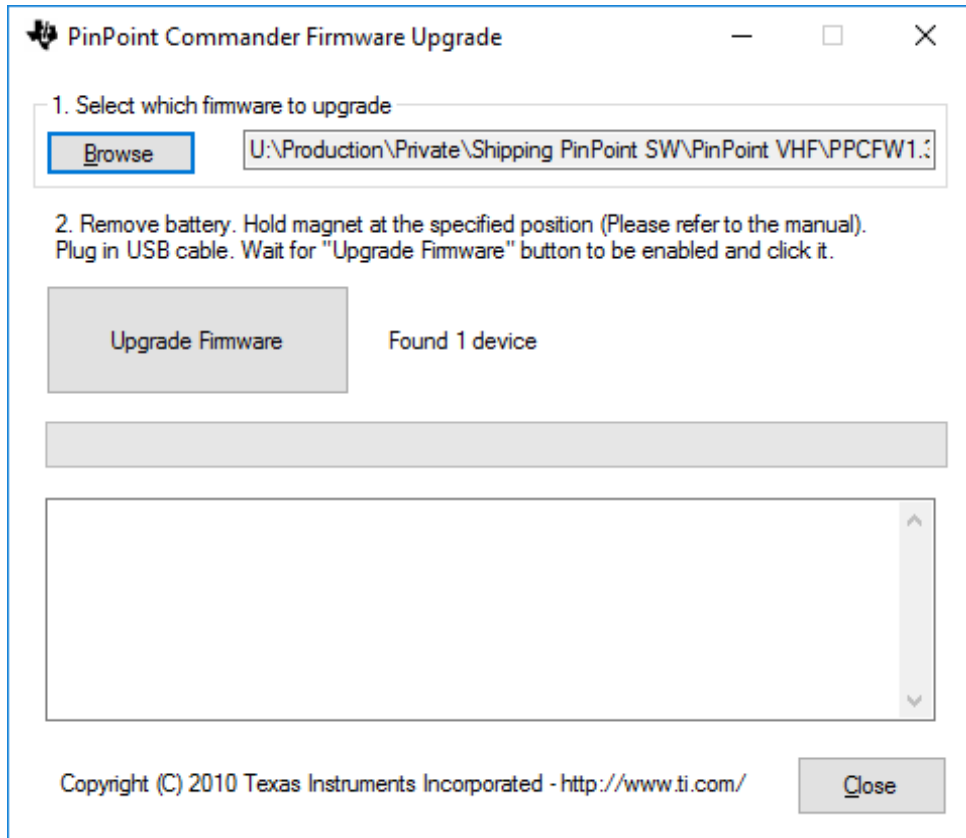
The firmware upgrade of PPC is implemented through the USB port using the PinPoint Host Application.

Required materials: USB cable, a magnet and the firmware file.

Open up the PP Host Application.



Select the Pulldown Commands and then select PinPoint Commander Unit> Upgrade Firmware.

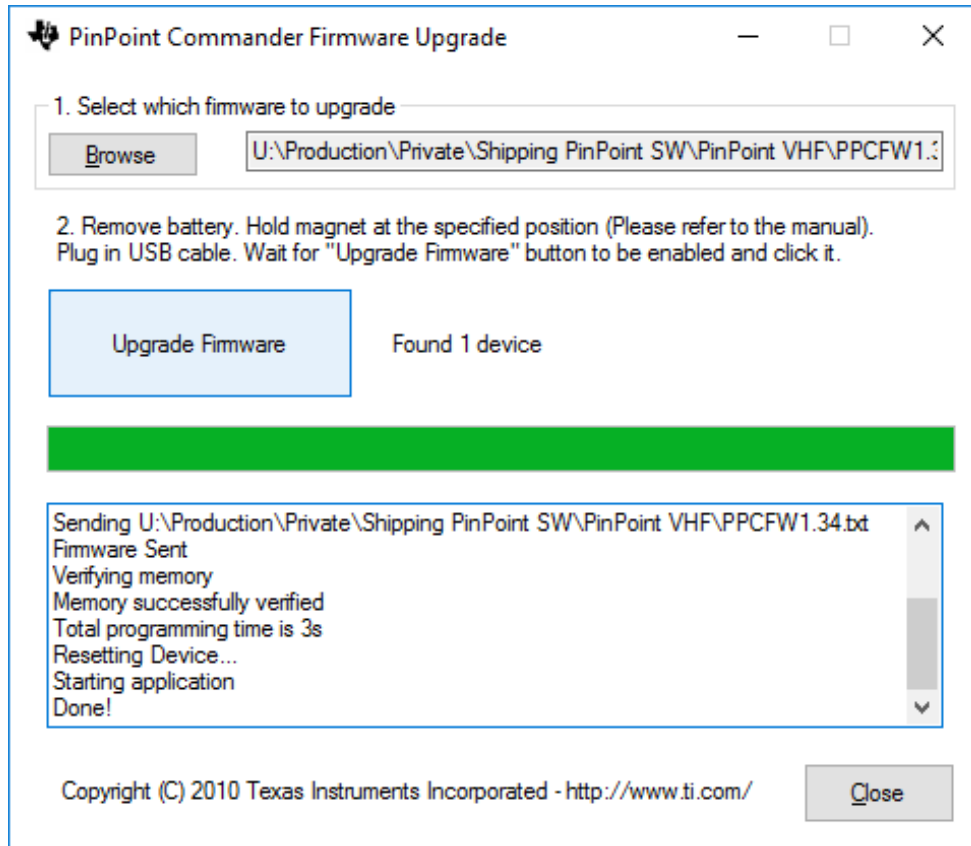


Select the location of the PPC Firmware

Remove the batteries from receiver, put magnet on the right side of PPC LCD



Using the USB cable to connect PPC and PC, the Upgrade Firmware button becomes active and the Found 1 device is indicated.



Wait for the upgrade to finish and then select 'Close'.