



Securing Your World

# **G4S Longitude GPS Device User Operation Manual**

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## Document Revisions

Revision	Date	Author	Description
1.01	Dec 9, 2010	Harv Hundal	Initial Document Version
1.02	Dec 16, 2010	Tina Chu	Added Regulatory Compliance info.
1.03	Feb 15, 2011	Steve Rosset	Corrected Compliance info & minor typos

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## 1. INTRODUCTION

This document describes operation of the G4S Longitude GPS device. The G4S Longitude GPS device (hereon referred to as the “GPS” device) is one piece of the Longitude offender GPS tracking system and is designed to communicate with a G4S PID3 device. Detailed description of the operation of the PID3 device is covered in a separate manual.

The GPS device uses GPS satellites as well as CDMA cell tower based location information to determine the geographical location of an offender (or participant) at any time. The GPS device periodically reports its location information as well as status information to a monitoring centre using the CDMA wireless network. The PID3 is a body-worn device that is securely strapped around the offender’s ankle or arm and is in regular communication with the paired GPS device by means of a short-range ZigBee radio link. This short range radio link between the GPS device and the PID3 is used to ensure that the GPS device is being carried by the offender (or in close proximity to the offender) and that the location of the offender can be monitored. Figure 1 shows the GPS and PID3 devices.



**Figure 1:** Longitude GPS device (left) and PID3 device (right)

The PID3 device may only be paired with one GPS device at any time. The PID3 device paired to a particular GPS device is determined by a configuration command sent to the GPS device from the Monitoring Centre. The GPS and PID3 form a network and communicate with each other using secure encrypted messages with a unique key for each such GPS/PID3 network. This allows multiple GPS/PID3 paired devices to co-exist.

The GPS device is a portable device meant to be carried by the offender at all times. The device may be carried in a pocket or it may be clipped on to the strapped-on PID3 device as shown in Figure 2.



**Figure 2:** GPS device clipped on to body-worn PID3 device

The GPS device is fitted with a rechargeable lithium ion battery. Hence, the offender will periodically need to place the GPS device in a charging cradle as shown in Figure 3. The charging cradle can be plugged into any standard wall outlet providing 100 – 240V AC at 50/60Hz. While the GPS device is on the charging cradle, the offender needs to ensure that he/she stays within close range of the GPS device as the GPS device will register a PID3 missing event if the PID3 device worn by the offender is not within communicable range of the GPS device (approximately 200 – 300 feet).



**Figure 3:** GPS device on charging cradle

## 2. GENERAL OPERATIONAL DESCRIPTION

### 2.1 INITIAL STARTUP AND CONFIGURATION

If the GPS device is initially turned off, placing it in the charging cradle will wake it up from its OFF state. It will then automatically attempt to connect to the monitoring centre server via the CDMA network using the devices default configuration settings. On initial startup, the device always gets updated device configuration settings from the monitoring centre. If the initial default device settings do not allow the GPS device to connect to the appropriate monitoring centre server, the device may also receive updated configuration setting commands sent from the monitoring centre platform (via SMS) and start using them.

Configuration settings determine such things as which server the GPS device communicates with, the serial number of its paired PID3, as well as the appropriate rate plan to use. The rate plan for the device determines how often the device attempts to acquire a GPS fix – which may be different depending on whether the fixes are impaired or not. The rate plan also determines how often the stored GPS and status information is reported to the monitoring centre. The device may be configured to obtain GPS based location fixes only, or GPS based fixes as well as CDMA network based fixes.

The GPS device will allow only the PID3 device for which it is configured to be paired with to join its network. Other configuration settings determine the maximum amount of time that may elapse since receiving the last status message from the PID3 device before the GPS device registers and reports a PID3 missing event to the monitoring centre.

### 2.2 LOCATION AND STATUS LOGGING AND REPORTING

The GPS device logs and reports time-stamped GPS location data as well status messages, which are then reported to the monitoring center server using the CDMA network. GPS location data includes latitude and longitude data, quality of GPS fix, date and time of fix, and whether the fix was a GPS fix or CDMA network based fix. The GPS device also logs and reports the following status information:

- GPS device battery status
- GPS device charge begin and end times
- GPS device case tamper status
- Paired PID3 strap open status
- Paired PID3 strap tamper latched status
- Paired PID3 battery status for both the PID3 main battery and PID3 vibrator battery
- Paired PID3 extended information such as the serial number of the Officer Key FOB (OKF) device used to last wake up and shut down the PID3 device, last PID3 shutdown reason, battery voltages and battery usage count for both the PID3 main battery and PID3 vibrator battery, and PID3 software version.

## 2.3 OPERATING COMMANDS FROM MONITORING CENTRE

Commands may be sent to the GPS device from the monitoring centre to:

- Activate the GPS devices vibrator for a specified duration or till the user button on the GPS device is pressed (if so configured)
- Activate the GPS devices buzzer for a specified duration or till the user button on the GPS device is pressed (if so configured)
- Blink the GPS devices LED red, green or yellow a specified number of times
- Change the GPS devices rate plan
- Specify the serial number of the paired PID3 and allow the paired PID3 to join its network
- Change the time after which a PID3 missing event is generated
- Commands to be passed on to the PID3 device – such as report extended info messages or shut off the PID3 device

These commands are sent by the monitoring centre based on business rules defined in the monitoring center application.

## 2.4 LED STATUS

The LED on the GPS device is used to provide feedback to the user. While the GPS device is in the charging cradle, the LED behaves as follows:

- The LED blinks red while it is actively charging
- The LED blinks green for 15 minutes after the GPS device battery has reached full charge – subsequently the LED remains off

The LED is normally off when the GPS device is not in the charging cradle. However, the LED may be turned on (red, green, or yellow) if an appropriate command to do so is received from the monitoring centre.

## 3. Regulatory Compliance

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 and part22/24 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

#### **4. Radio Frequency (RF) Safety Exposure**

The tracker has been approved for portable application in the United States.