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Client: Blackbird Technologies, Inc.
Model: Panther
FCC ID: X6K-PAN-001
Standards: FCC Part 25
Report #: 2012108

Appendix K: User Manual

Please refer to the following pages.

Panther™ v1.0 User's Manual

**Submitted by:
Blackbird Technologies, Inc.**
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The product described herein uses satellite and terrestrial technologies that are inherently subject to transmission and reception limitations and will operate intermittently under certain environmental conditions. Extreme weather or objects that prevent an unobstructed view of the sky may restrict reception or transmission of messages, as well as acquisition of GPS coordinates. Accordingly, Blackbird Technologies, Inc. cannot guarantee that this product will operate without interruption under these conditions.

1 Introduction

The Panther™ is a global positioning system (GPS) tracker with satellite communications and GSM transmitters designed for worldwide blue force tracking. The Panther includes a high-sensitivity GPS receiver to determine location. It also includes Globalstar satellite and GSM communications hardware that transmits data such as timestamp, longitude, latitude, and altitude to Blackbird's Gotham™, a centralized monitoring web application.

The Panther device integrates with Blackbird Technologies' Gotham system. The Gotham system

is a comprehensive back-end solution for monitoring, operating, and managing tagging, tracking, and locating (TTL) devices and viewing associated geospatial data.

For information about Blackbird's other TTL products and services, and for technical support, contact the Blackbird Help Desk through the following email address:

ttl-help@blackbirdtech.com

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.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, 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 has been shown to be compliant for localized specific absorption rate (SAR) for uncontrolled environment/general exposure limits specified in ANSI/IEEE Std. C95.1-1999 and has been tested in accordance with the measurement procedures specified in IEEE 1528-2003, OET Bulletin 65 Supp. C and Safety Code 6.

Changes or modifications not expressly approved by Blackbird could void the user's authority to operate the equipment.



Figure 1. Panther

1 Panther Hardware Device

The Panther, depicted in Figure 1, is a self-contained personnel locator device powered by a rechargeable lithium-polymer battery pack. The device gives the user a simple three-button interface and is designed to be user-configurable and field-upgradable through a USB connection.

1.1 Operational Description

The Panther firmware employs three reporting modes: Beaconing, Status Check-in, and Emergency.

When the Panther is operating in Beaconing mode, it will automatically transmit its location at a user-defined interval.

The Status Check-in operation is initiated when the user presses the **OK** button. This will cause the Panther to send an “OK” message along with its current location.

During any mode, the Emergency Sequence can be initiated by simultaneously pressing and holding the **Emergency Mode** button and the **OK** button for 4+ seconds.

1.2 Power Functionality

To power on the Panther, press and hold the **Power** button until the device vibrates once.

To power off the Panther, press and hold the **Power** button until the device vibrates twice.

1.3 LED Functionality

The Panther contains two light-emitting diodes (LEDs) that are used to indicate battery level and network status. (See Figure 2 for LED location.) Figure 3 and Figure 4 identify the Battery-Level LEDs. Figure 5 identifies the Network Status LED displays.

LED Color	Meaning
Green (single blink)	Good battery level (> 7.4 v)
Amber (single blink)	Low battery level (between 7.0v and 7.4 v)
Red (single blink)	Critical battery level (< 7.0 v)
Red (rapid flash with Network Status LED alternately flashing)	Hardware failure

Figure 2. Battery-Level LEDs During Device Operation (not in Dock)

LED Color	Meaning
Green (solid)	Battery is fully charged
Amber (solid)	Battery is recharging
Red (solid)	A battery charging fault has occurred
Red/green (alternating flash)	A temperature-related battery charging fault has occurred

Figure 3. Battery-Level LEDs While Charging (Docked)

LED Color	Meaning
Green (single blink)	GSM path selected
Amber (single blink)	Globalstar path selected
Red (triple blink)	Searching for GSM signal
Green (solid)	Configuration mode, executing power on self-test
Amber (solid)	Configuration mode, power on self-test complete
Red (rapid flash with Battery Status LED also alternately flashing)	Hardware failure

Figure 4. Network Status LED Displays

1.4 Emergency Mode Functionality

To activate **Emergency Mode** on the Panther, simultaneously press and hold the **Emergency Mode** button and the **OK** button for approximately 4 seconds. When Emergency Mode is activated, the device will vibrate the Morse code distress pattern, the LEDs will be turned off, all buttons will be disabled, and the internal vibration motor will be turned off. In addition, all external buttons will become disabled (unless the deactivate emergency mode function is invoked). Once the Panther has entered Emergency mode, it will begin sending emergency messages containing current location data. The Panther will continue to operate in Emergency mode until the mode is cancelled (by the configuration application or remotely by Gotham) or the battery pack has been completely exhausted or removed.

There are two ways to deactivate Emergency Mode on the Panther:

- Using the buttons on the Panther, follow these steps:
 - Press OK
 - Press Emergency
 - Press OK
 - Press Emergency
 - Press Power
- Log in to the Gotham web application and click the **Cancel Emergency** button located in the *Panther Configuration* pane in the *Devices* page.

1.5 SIM Card Holder

The SIM card holder is used to store the SIM card for the GSM modem. The SIM card is located behind the battery.

1.7 Beacon Intervals

Normal Beacon Interval: This is the user-defined interval at which the Panther will transmit its location when it is not in Emergency Mode. The options are 1 min, 5 min, 15 min, 30 min, 60 min, or Disabled.

When the Panther is configured for beacon operation, it will send position reports at the user-defined beacon interval. When this occurs, the Panther will attempt to obtain a GPS position. The beacon message will be sent to the Gotham server as soon as the GPS has obtained a valid fix or has timed out.

Emergency Mode Stages: This is the interval at which the Panther will report its location when in Emergency Mode. The user may define up to four different Emergency Mode Stages. The *Length of Time* options for each Emergency Mode Stage are 1 hour, 2 hours, 4 hours, 8 hours, 16 hours, 24 hours, and Indefinitely. The *Beacon Interval* options are 30 sec, 1 min, 2 min, 5 min, 10 min, and 15 min. Regardless of the number of Emergency Mode Stages that the user wishes to define, the *Length of Time* option for the **last** Emergency Mode Stage should always be set to “Indefinitely.” When multiple Emergency Mode Stages are defined, the Panther will, upon being placed into Emergency Mode, begin sending emergency beacons at the rate specified by the *Beacon Interval* option for the first Emergency Mode Stage. This will continue for the duration of time specified by the *Length of Time* option for the first Emergency Mode Stage. When this period of time has elapsed, the device will then start transmitting emergency beacons at the rate specified by the *Beacon Interval* option for the second Emergency Mode Stage and will continue for the duration of time specified by the *Length of Time* option for the second Emergency Mode Stage. This pattern will continue until an Emergency Mode Stage with a *Length of Time* option set to “Indefinitely” is reached. Once this occurs, the Panther will continue to send emergency beacons at the appropriate beacon interval until Emergency Mode is cancelled or the battery pack has been completely exhausted or removed.

Dismiss Emergency Mode via button press: To enable the ability to deactivate the emergency beacon mode via the device, select this checkbox. Without this option selected, there are only two other methods for deactivating emergency mode. See Section 3.4 for more information on deactivating emergency mode.

1.8 Communications

The Panther can communicate via two communication networks: GSM and Globalstar.

Priority Settings: “Priority” indicates the order the Panther will follow to determine which network to use. “Timeout” is the amount of time the Panther will wait before declaring a network unavailable and then moving on to the next priority modem to establish a communication path.

The user is required to specify at least one modem. The *Modem* options are GSM and Globalstar. The *Timeout* options are 1 min, 1 min 30 sec, 2 min, 2 min 30 sec, 3 min, 3 min 30 sec, 4 min, 4 min 30 sec, and 5 min.

Network Polling Interval: This is the frequency with which the Panther re-evaluates network availability. The Panther continues to use the last network successfully used until the timeout for the network is exceeded or the *Network Polling Interval* has lapsed.

If network connectivity cannot be established on the highest priority modem within the timeout value assigned to that modem, the Panther will then check for connectivity using the modem with the next highest priority level (if there is one). Assuming that connectivity can be established using a modem with a lower priority level, the Panther will continue to use this modem until the *Network Polling Interval* time has elapsed. When this occurs, the Panther will reset the modems and will attempt to establish connectivity using the highest priority modem again. If that network is still unavailable, the Panther will then search for a connection using the next highest priority modem and so on.

The interval options are Every Transmission, 15 min, 30 min, and 60 min.

If it is desired that the Panther always attempt the highest priority network first, the *Network Polling Interval* should be set to *Every Transmission*.

NOTE: *The rate at which the modem polls the networks can have a significant impact on shot latency and battery life. For example, if the Panther is configured to poll the available networks on every transmission in an area where the only available path is the second priority modem, then the Panther will require the first priority modem to be powered up long enough to determine that the network is unavailable before falling back to the second priority modem. In this case, the Panther would spend roughly twice as much power and time than if it had been configured to only use the second priority modem.*

GSM Network Monitoring Time: When the *Power Savings* option entitled *Turn off modems when not in use* is enabled, the *GSM Network Monitoring Time* value will appear. This value represents the time that the Panther will remain connected to the GSM network after polling for connectivity on that network. The additional time allows the device to receive any incoming messages from the network. For example, assume that the Panther is configured to use the GSM modem as the highest priority modem, and the next highest priority modem is the Globalstar modem. If the Panther is unable to connect to a GSM network, it will then begin searching for a connection on the Globalstar network. Assuming that a connection is made using the Globalstar modem, the Panther will continue to use this modem until the *Network Polling Interval* has elapsed. When this occurs, the Panther will reset all modems and will begin searching for a connection using the highest priority modem (in this case, the GSM modem). If the Panther is now able to establish a connection to the GSM network, it will continue to use the GSM modem to communicate. However, even if the *Turn off modems when not in use* option is enabled, the GSM modem will remain powered on and connected to the GSM network for a period of time defined by the *GSM Network Monitoring Time* value.

This allows time for the Panther to receive any incoming messages that may have been sent to it over this network. Once the *GSM Network Monitoring Time* value has elapsed, the modem will be powered down until it is time for the Panther to transmit again.

1.9 Power Savings

Power Savings options provide the ability to conserve power by turning off the active modem and GPS module when not in use.

Turn off GPS when not in use: When selected, this option will cause the GPS to be turned off between beacon intervals, thereby conserving battery life.

Turn off modems when not in use: When selected, the Panther will turn off the active modem (GSM or Globalstar) when it is not in use to conserve battery life.