



# Falcon® 5500 RFID Mobile Hybrid Computer



*Addendum*



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### **Patents**

This product may be covered by one or more of the following patents: 4603262 • 4639606 • 4652750 • 4672215 • 4699447 • 4709369 • 4749879 • 4786798 • 4792666 • 4794240 • 4798943 • 4799164 • 4820911 • 4845349 • 4861972 • 4861973 • 4866257 • 4868836 • 4879456 • 4939355 • 4939356 • 4943127 • 4963719 • 4971176 • 4971177 • 4991692 • 5001406 • 5015831 • 5019697 • 5019698 • 5086879 • 5115120 • 5144118 • 5146463 • 5179270 • 5198649 • 5200597 • 5202784 • 5208449 • 5210397 • 5212371 • 5212372 • 5214270 • 5229590 • 5231293 • 5232185 • 5233169 • 5235168 • 5237161 • 5237162 • 5239165 • 5247161 • 5256864 • 5258604 • 5258699 • 5260554 • 5274219 • 5296689 • 5298728 • 5311000 • 5327451 • 5329103 • 5330370 • 5347113 • 5347121 • 5371361 • 5382783 • 5386105 • 5389917 • 5410108 • 5420410 • 5422472 • 5426507 • 5438187 • 5440110 • 5440111 • 5446271 • 5446749 • 5448050 • 5463211 • 5475206 • 5475207 • 5479011 • 5481098 • 5491328 • 5493108 • 5504350 • 5508505 • 5512740 • 5541397 • 5552593 • 5557095 • 5563402 • 5565668 • 5576531 • 5581707 • 5594231 • 5594441 • 5598070 • 5602376 • 5608201 • 5608399 • 5612529 • 5629510 • 5635699 • 5641958 • 5646391 • 5661435 • 5664231 • 5666045 • 5671374 • 5675138 • 5682028 • 5686716 • 5696370 • 5703347 • 5705802 • 5714750 • 5717194 • 5723852 • 5750976 • 5767502 • 5770847 • 5786581 • 5786585 • 5787103 • 5789732 • 5796222 • 5804809 • 5814803 • 5814804 • 5821721 • 5822343 • 5825009 • 5834708 • 5834750 • 5837983 • 5837988 • 5852286 • 5864129 • 5869827 • 5874722 • 5883370 • 5905249 • 5907147 • 5923023 • 5925868 • 5929421 • 5945670 • 5959284 • 5962838 • 5979769 • 6000619 • 6006991 • 6012639 • 6016135 • 6024284 • 6041374 • 6042012 • 6045044 • 6047889 • 6047894 • 6056198 • 6065676 • 6069696 • 6073849 • 6073851 • 6094288 • 6112993 • 6129279 • 6129282 • 6134039 • 6142376 • 6152368 • 6152372 • 6155488 • 6166375 • 6169614 • 6173894 • 6176429 • 6188500 • 6189784 • 6213397 • 6223986 • 6230975 • 6230976 • 6237852 • 6244510 • 6259545 • 6260763 • 6266175 • 6273336 • 6276605 • 6279829 • 6290134 • 6290135 • 6293467 • 6303927 • 6311895 • 6318634 • 6328216 • 6332576 • 6332577 • 6343741 • 6454168 • 6478224 • 6,568,598 • 6,578,765 • 6705527 • AU703547 • D312631 • D313590 • D320011 • D320012 • D323492 • D330707 • D330708 • D349109 • D350127 • D350735 • D351149 • D351150 • D352936 • D352937 • D352938 • D352939 • D358588 • D361565 • D372234 • D374630 • D374869 • D375493 • D376357 • D377345 • D377346 • D377347 • D377348 • D388075 • D446524 • EP0256296 • EP0260155 • EP0260156 • EP0295936 • EP0325469 • EP0349770 • EP0368254 • EP0442215 • EP0498366 • EP0531645 • EP0663643 • EP0698251 • GB2252333 • GB2284086 • GB2301691 • GB2304954 • GB2307093 • GB2308267 • GB2308678 • GB2319103 • GB2333163 • GB2343079 • GB2344486 • GB2345568 • GB2354340 • ISR107546 • ISR118507 • ISR118508 • JP1962823 • JP1971216 • JP2513442 • JP2732459 • JP2829331 • JP2953593 • JP2964278 • MEX185552 • MEX187245 • RE37166 • Other Patents Pending

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# NOTES

# Falcon® 5500 RFID Mobile Hybrid Computer

## Overview

This document covers the following topics:

### Getting Started

- [Enabling RFID on page 2](#)
- [Reading RFID Tags on page 3](#)

### Configuration Settings

- [Audio on page 7](#)
- [RFID Settings on page 8](#)

### Further Information

- [About RFID Tags on page 12](#)
- [Configuration Parameters on page 14](#)
- [Safety Information on page 17](#)

The Falcon 5500 is a Falcon 4420 Win CE .NET Color Mobile Computer mounted with a special RFID unit. See the *Falcon 4400 Series Quick Reference Guide (QRG)* and the *Falcon 4400 Series Product Reference Guide (PRG)* on the Product CD included with your unit for information not discussed in this RFID Addendum.



Information about the symbols and formatting used in this manual are described in the *Falcon 4400 Series PRG*.

# Getting Started



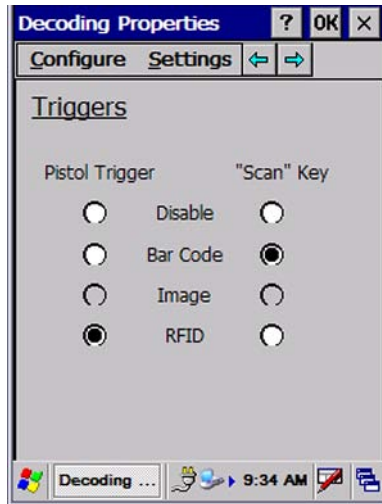
CAUTION

You must charge the Falcon in the RFID-compatible dock prior to first use. The initial charge time is approximately 12 hours. See “Charging the Batteries” in the *Falcon 4400 Series Quick Reference Guide (QRG)* for more information.

## Enabling RFID

Before using your PSC RFID Tag Reader, you must enable the unit for RFID.

1. Power on the unit. Follow the on-screen instructions to calibrate the touchscreen. See the *Falcon 4400 Series PRG* for more information.
2. Go to **Start > Settings > Control Panel**. Double-tap the **Decoding** icon.
3. Select **Configure > General > Trigger Options**.
4. In the Pistol Trigger column, select **RFID**.



5. Tap **OK**.

For information on other RFID configuration options, see [Configuration Settings on page 7](#).

## Reading RFID Tags

### For tag read demo purposes:

Once you have enabled the Falcon to read RFID tags, complete the following steps:

1. Open an application that accepts keyboard wedge data such as Microsoft WordPad (double-tap the icon on the screen, or go to **Start > Programs > Microsoft WordPad**).



**Failure to open an application will inhibit the effective display of tag data.**

2. Aim the device toward the tag you want to read.
3. Press the trigger. The front LED turns orange, indicating that the RFID reader is being used.
4. The device beeps as tags are read.
5. The RFID tag data is entered into the application.
6. When the read is finished, the front LED turns off and a final beep is heard, indicating that the operation is complete.

The RFID Antenna (in the RFID unit) should be positioned to face the tag location.

**Figure 1. Aiming the Falcon 5500**



See [Configuration Settings on page 7](#) for information about modifying the default settings. For more details about RFID tags, see [About RFID Tags on page 12](#).

## Painting

The paint operation gives the operator the ability to cover an area with RF energy to gather more than one tag with a single trigger pull. Painting is achieved by holding down the trigger and sweeping the area containing tags. The energy is terminated either when the trigger is released or a timeout (as specified in the control panel settings) occurs. The device will beep each time additional tags are read while painting. Reference [Read Limits on page 9](#) for information on setting up your unit for painting.

# RFID Electrical Considerations

## Operating time

Under normal operating conditions, the RFID battery will last longer than the Falcon battery. Extended continuous operation may result in the RFID battery discharging before the Falcon battery. When using “paint” mode, the battery will last approximately 3 hours.

If the RFID unit fails to operate or produces error messages on the Falcon screen, it could be an indication that the RFID battery is becoming depleted. The red indicator light will begin to flash when the battery gets low. See [LEDs/Indicators on page 5](#) for more information.

## Charge time

Normal charge time is approximately 4 hours. The time depends on how much charge is in the battery when charging begins.



## LEDs/Indicators

### RFID Battery Charge LEDs

These indicators are visible on the back of the RFID pod. The red LED is on when the unit is in a dock and the RFID battery is charging. The green LED is on when the unit is in the dock and the RFID battery has reached full charge. When the unit is out of the dock, neither LED will be on.

**Figure 2. LED indicators**



### Discharge indicator

If the RFID unit fails to operate or produces error messages on the Falcon screen, it could be an indication that the RFID battery is low. When the battery is close to depletion, the red LED indicator light (located on the back of the RFID unit) will begin to flash. As the battery becomes further discharged, the flashing will increase in intensity.

**Figure 3. Falcon 5500 Dock**



Use only the correct battery chargers and docks with the Falcon 5500 RFID. The technology used for this model is incompatible with other PSC Falcon chargers and docks, including the Falcon 4410/4420 color and monochrome models. Go to the PSC website at [www.psc.com](http://www.psc.com) for information about models and part numbers.

# Configuration Settings

See [Configuration Examples](#) on page 11 for samples of optimized settings for different usages. Refer to the *Falcon 4400 Series PRG* for information about setting other configuration items.

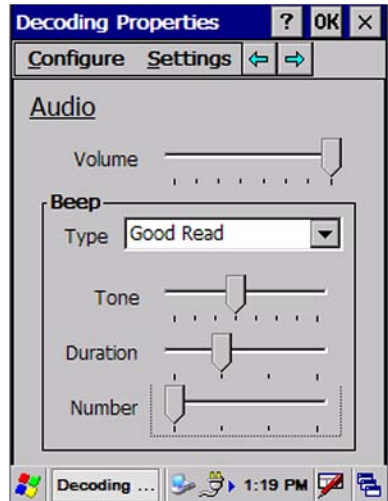
## Audio

1. Go to **Start > Settings > Control Panel**. Double-tap the **Decoding** icon.
2. Select **Configure > General > Audio**.
3. Choose from the following options:
  - **Volume:** Move the slider to raise or lower the audio volume.
  - **Beep Type**

—**Good Read** selects the tone (pitch), duration and number of beeps which are played at the end of a successful RFID painting operation.

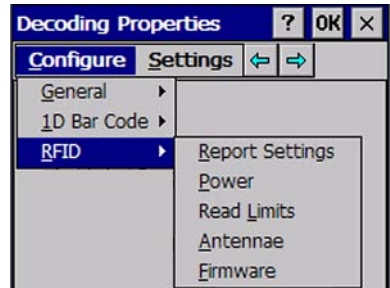
—**RFID Tag Read** selects the pitch and duration of the beep which is played each time one or more tags are read. It can also be disabled, so that only the green LED turns on when new tags are read.

Other options for Beep Type are **RFID Tag Write** or **RFID Failed Write**.



## RFID Settings

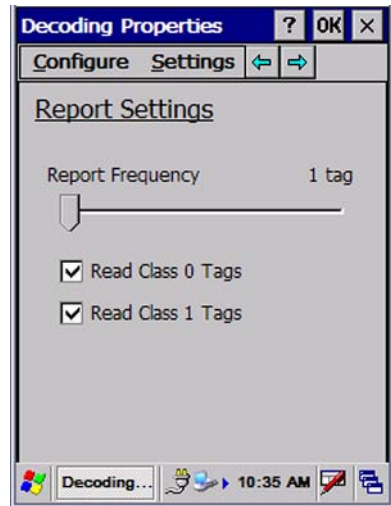
1. Go to **Start > Settings > Control Panel**. Double-tap the **Decoding** icon.
2. Select **Configure > RFID**.
3. Choose one of the available options.



## Report Settings

In the RFID Decoding Properties, do the following to view or modify Report Settings:

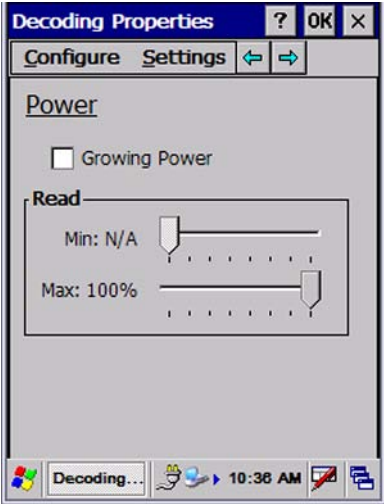
1. Under **Decoding Properties**, go to **Configure > RFID > Report Settings**.
2. **Report Frequency** controls how often RFID tag data is reported to an application. When set to a specific number of tags, data is reported when at least that many new tags have been read. When set to **Infinite**, data is only reported when a painting operation is complete.
3. Selecting the checkboxes for **Read Class 0 Tags** or **Read Class 1 Tags** enables/disables the device to read each class of RFID tags. Improved performance can be achieved by enabling only the class of tags which will be used, if known.



**At least one of the tag types must be enabled.**

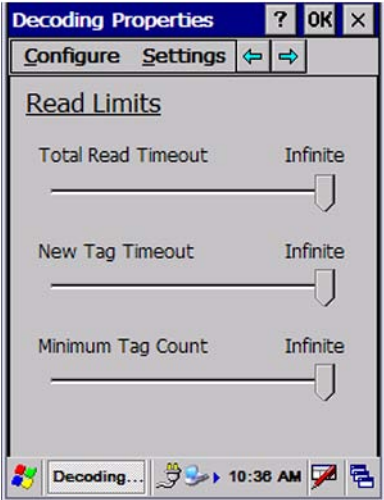
### Power

1. Under **Decoding Properties**, go to **Configure > RFID > Power**
2. Enable/disable **Growing Power** by selecting the checkbox. When disabled, a constant level of RF power is output when reading tags. When enabled, the level of RF power starts at a minimum level, and then increases to a maximum level, where it will remain for the duration of the painting operation.
3. Set **Minimum/Maximum Read** using the sliders.
  - **Minimum Power:** The minimum RF power level to use for reading tags. It only applies when **Growing Power** is enabled.
  - **Maximum Power:** The maximum RF power level to use for reading tags. If **Growing Power** is disabled, this is the power level used for the entire painting operation.



### Read Limits

1. Under **Decoding Properties**, go to **Configure > RFID > Read Limits**
  - **Total Read Timeout:** The maximum amount of time spent performing an entire painting operation. If set to **Infinite**, painting will stop only when the trigger is released, a **New Tag Timeout** occurs, or the minimum number of tags have been read.

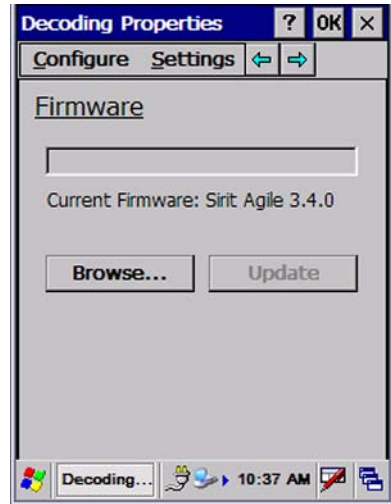


- **New Tag Timeout:** The amount of time to wait between tags before painting will automatically stop. This is the maximum amount of time spent waiting for new tags after a tag has been read. If set to **Infinite**, then painting will stop only when the trigger is released, a **Total Read Timeout** occurs, or the minimum number of tags have been read.
- **Minimum Tag Count:** This the minimum number of tags to attempt to read. If this minimum number of tags have been read during a painting operation, then painting will stop. If set to **Infinite**, then painting will stop only when the trigger is released, or one of the timeout conditions is met.

## Firmware Version

Select to display the current Firmware version.

1. Under **Decoding Properties**, go to **Configure > RFID > Firmware**.  
The current firmware installed in the RFID module will be displayed.
2. To update the RFID module firmware, tap the **Browse** button and then select the file containing the new firmware.
3. Tap the **Update** button to update the RFID module firmware.



# Configuration Examples

The following examples illustrate ways to optimize RFID settings for specific situations.

## Reading tagged items from an entire shelf

Configuration Item	Setting
Report Frequency	1 tag
Total Read Timeout	Infinite
Minimum Tag Count	Infinite
New Tag Timeout	Something longer than the time required to move the RFID antenna over all of the tags (for example 10 seconds)

1. Press the trigger and move across the items on the shelf.  
As new tags are found, the Falcon will beep and new data will immediately be sent to an application.
2. Continue passing over all the items until no beeps are heard, which is an indication that all tags have been read.

## Read a single tag while avoiding reading other tags

Configuration Item	Setting
Growing Power	Enabled
Minimum Power	Lowest setting
Minimum Tag Count	1 tag

1. Place the RFID antenna close to the tag you wish to read and press the trigger.  
The initial low power level should limit the tags which receive RF energy to those which are close to the Falcon. If the Falcon isn't close enough, having **Growing Power** enabled will allow the RF power to increase just enough to read the nearest RFID tag in range.
2. Once the first tag is read, then the operation will stop.

## About RFID Tags

### RFID Antenna

When attempting to utilize the RFID read functionality of the Falcon 5500 RFID unit it is important to note that the antenna is linearly polarized. This feature requires the tags to be similarly aligned in a planar field to optimize read range and efficiency.

### Read Range

The Falcon 5500 RFID has a functional range of two to six feet. Greater read range distances are possible; however, efficiency and predictability of tag data collection will diminish beyond the recommended range. A reduction in functional range may result when attempting to read many tags simultaneously (several cases on a pallet) due to tag performance degradation. Tag performance will vary based upon class, application and environment.

### Proximity of Tags

Tags of similar antenna structure and size can obscure the ability to read multiple tags if they are “stacked” in the read plane. Multiple tag reading performs best when tags are spaced and positioned according to their intended use. A minimum of 4” spacing between tags is recommended.

### Tag Types

- Class 0
- Class 1



**PSC does not recommend or endorse a particular RFID tag type. It is recommended that you evaluate your environment and product to determine the optimum solution for your application.**



## Tag Orientation

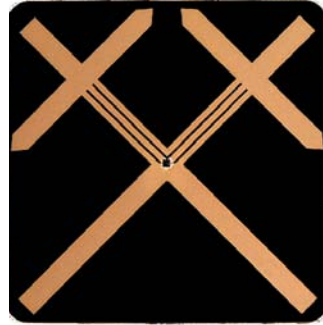
### Single Dipole Antenna Tag

Tags that have a single dipole antenna should be vertically positioned for optimal read performance.



### Dual Dipole Antenna Tag

Tags with dual dipole antennas are less susceptible to polarization and can be read in either horizontal or vertical alignments to the read plane.



## Factors Affecting Performance

- Water or water-based products will inhibit (absorb) the signal.
- Metal surfaces near the tags may affect performance.
- Misuse of tags (i.e. bending the tag antenna) could cause the tags to become dysfunctional.
- Any emitted radiation in the 902Mhz to 928Mhz range can interfere with the device operation.

# Configuration Parameters

The following table lists the configuration parameters which have been added to support RFID. For instructions on how to set these parameters, as well as information on all other configuration parameters, consult the *Falcon 4400 Series Product Reference Guide (PRG)*.

Code Parameter/ Description		I.D. #	Type	Acceptable Input	Defaults		
					Min	Max	Factory
<b>Other Controls</b>				<b>Enter 1 for On and 0 for Off.</b>			
Label Separator	Indicates the label separator.	0028	Value	Any single ASCII character (00 = None)	CR	CR	CR
<b>RFID</b>				<b>Enter 1 for On and 0 for Off.</b>			
Class 0 Enable	Enables Class 0 tags to be read.	0D00	On/Off	On or Off	Off	On	On
Class 1 Enable	Enables Class 1 tags to be read.	0D01	On/Off	On or Off	Off	On	On
Tag Read Beep Enable	Enables the tag read beep.	0D08	On/Off	On or Off	On	On	On
Read Power Mode	Selects the power mode to use for RFID reads.	0D09	On/Off	On = Growing Off =Constant	Off	Off	Off
Allow Duplicates	Allows all tag data to be reported	0D0A	On/Off	On or Off	Off	On	Off
Tag Read Beep Tone	Adjusts the pitch of the tag read beep frequency.	0D20	Value	00 - 08 (00 = Lowest; 07 = Highest; 08 = User Def.)	00	00	00

Code Parameter/ Description		I.D. #	Type	Acceptable Input	Defaults		
					Min	Max	Factory
Tag Read Beep Duration	Determines the duration of a tag read beep.	0D21	Value	00 = 0.07 sec 01 = 0.13 sec 02 = 0.18 sec 03 = 0.36 sec	00	00 (10 seconds)	00
User ID	Specifies the identifier (if any) that is sent by the decoder when parameter Send Code ID (Index 0025) is set to 3. ASCII code zero (null) is used to indicate that an identifier is not to be sent for RFID.	0D28	Value	Any single ASCII character (00 = None)	'Z'	'Z'	'Z'
Minimum Read Power	Sets the minimum RF power setting to start with when reading tags using Read Power Mode (Index 0D09) set to Growing Power (On).	0D29	Value	01 - 08 (1/8 increments 08 = full)	01	01	01
Maximum Read Power	Sets the maximum RF power setting to use when reading tags.	0D2A	Value	01 - 08 (1/8 increments; 08 = full)	08	08	08
Total Read Timeout	Sets the duration of the read operation before it stops. This only applies to reads started by a physical trigger.	0D2C	Value	00 - 9999 (10 ms increments 00 = infinite)	00	00	00
New Tag Read Timeout	Sets the duration of time when no new tags are read before a read operation stops.	0D2D	Value	00 - 9999 (10 ms. increments; 00 = infinite)	100 0	1000	100 0

Code Parameter/ Description		I.D. #	Type	Acceptable Input	Defaults		
					Min	Max	Factory
Minimum Tag Read Count	Sets the minimum number of tags which will trigger the stop of a read operation.	0D2E	Value	00 - 250 (00 = infinite)	00	00	00
Read Report Frequency	Sets the minimum number of new tags which must be seen before a report is sent.	0D2F	Value	00 - 250 (00 = infinite)	01	01	01

# Safety Information

## FCC Statement

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.

## FCC Interference Statement

This equipment has been tested and found to comply with the limits for a Class A 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 commercial 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. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.



The Part 15 radio device operates on a non-interference basis with other devices operating at this frequency when using a integrated antenna. Any changes or modifications to the product not expressly approved by PSC could void the user's authority to operate this device.

## FCC Radio Frequency Exposure statement



This device has been FCC authorized for use in a hand-held configuration only. There are no provisions for body worn operation. Users and nearby persons are required to maintain a separation distance of at least 5cm (2 inches) from the radio and its integral antenna.

## Radio Type

The Falcon 5500 uses a Frequency-Hopping Spread Spectrum (FHSS) radio operating in the 902-928 MHz frequency band.

# NOTES



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