

# Internal Datalogger User Guide

Oregon RFID  
4246 SE Ogden St  
Portland, Oregon 97206  
(503) 788-4380  
(866) 484-3174 toll free  
(866) 611-7087 toll free fax  
<http://www.oregonrfid.com>

November, 2008



(c)2007-2008 Oregon RFID

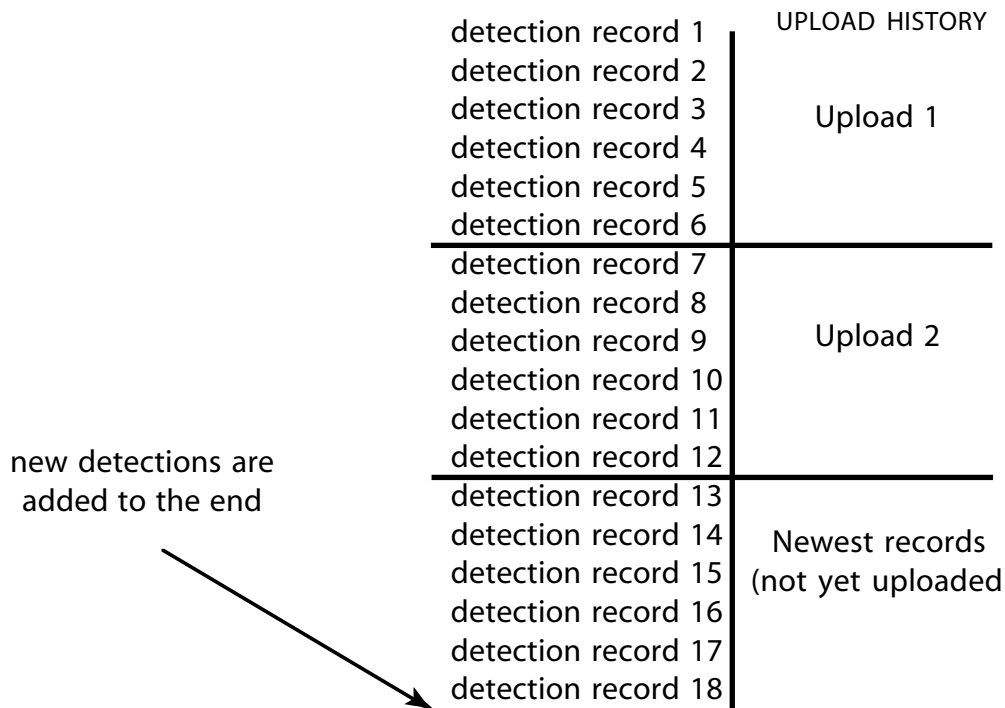
## Internal datalogger

---

The Oregon RFID reader timestamps tag detections and stores them on an internal flash memory card. Event messages are also stored which include parameter changes and system exceptions such as low voltage.

Records are stored consecutively and not deleted. When the database reaches the end it wraps around to write over the oldest records. Using a 512MB card there's room for around 8 million records, so this may take a few years.

To organize this chronological list of records, the datalogger keeps a list of **upload histories**. An upload is when the latest records are retrieved from the database. This is recorded in the history list to allow retrieving the same records again later on.



## **Palm interface**

---

PTLogger is a graphic interface program for the Oregon RFID reader that runs on Palm PDAs. Most any modern Palm with a memory card slot will work. PTLogger also supports Bluetooth for a wireless link to the reader.

PTLogger is used to configure the reader, monitor its operation and upload datalogger records to the Palm for transfer to a desktop or laptop computer.



Download PTLogger from:

*<http://www.oregonrfid.com/software>*

Copy PTLogger.prc to the Palm, then start the program.

Three types of screens are available. Status, Setup and Archive.

## Status

The Status screen shows the last detection record and the time since the tag was seen. When connected to a multiplexer all four antennas are displayed.

Smith Creek			
05/27/08 00:14:28			
0000_0000000114023569			
Since last	Count	Duration	
:08	9	0:00:00.8	
Scn/sec	Noise	Volts	Amps
10.0	0	14.5	.3
Last Upload			
5/26/2008 23:09			
<b>Status</b>	<b>Setup</b>	<b>Archive</b>	

Smith Creek			
02/22/07 20:46:44			
Scans	Time		
Ant /sec	Count	since last	Noise Amp
1 2.0	0	03:58	0 1.0
2 2.0	0	03:58	0 .3
3 2.0	0	03:58	0 .3
4 2.0	0	03:58	0 .3
Supply Volts		Last Upload	
13.8		2/21/2007 9:51	
<b>Status</b>	<b>Setup</b>	<b>Archive</b>	

Single reader

Multiplexer

Tapping on the name or date field shows the dialog for changing it.

Reader Name
Smith Creek.....
OK Cancel

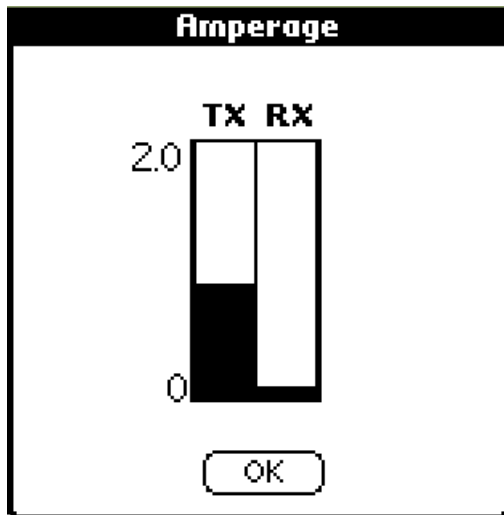
  

Date and Time			
2	22	2007	↑
Month	Date	Year	
20	46	55	↓
Hour	Minute	Second	
Set		Cancel	

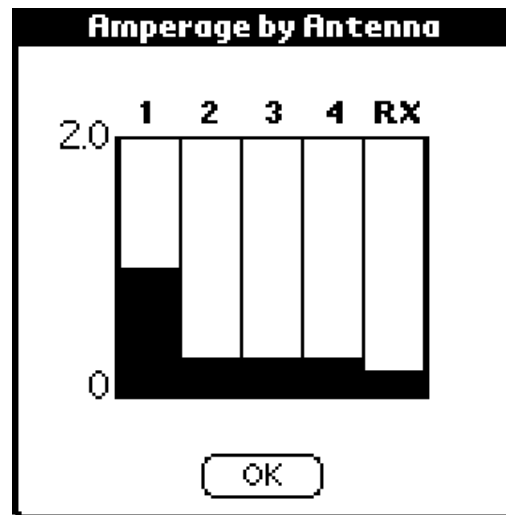
The count field shows the number of consecutive readings. The 'since last' field shows the time since the last tag was seen. The duration is the amount of time a tag is held in the field.

## Amperage

Tapping on the amperage value on the status screen displays a realtime plot of the amperage for transmit and receiving. The plot is updated twice a second.



Single reader



Multiplexer

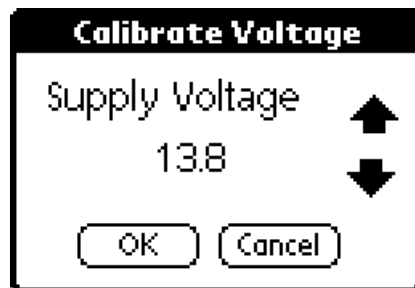
The transmit and receive amperages are plotted. The amperage for each antenna is shown for multiplexer readers.

The tuning of individual antennas can be performed by finding the maximum value while turning the fine tuning adjustment screw.

## *Voltmeter*

The reader has an internal voltmeter. The average voltage for every minute of operation is written to the SD memory card to monitor supply voltage over time.

The calibration is adjusted by tapping on the voltage value and increasing or decreasing the number to match your voltmeter.





## *Charge pulse width*

The amperage used by the reader increases significantly when sending the charge pulse. The longer the pulse, the faster the battery will drain. Battery life can be increased by shortening the pulse time or increasing the listen time.

## *Listen time and read rate*

The read rate (scans per second) is determined by the sum of the charge and listen times.

$$read\ rate = \frac{1}{charge + listen\ cycle\ time}$$

The shortest listen time is 20ms which is the length of the message from the RFID tag. With a 50ms charge time, the read rate is  $1/0.070$  or 14 reads per second.

Some synchronization modes extend the listen time in order to watch for other readers that are out of synch. With wireless and wired synchronization the minimum listen time is 40 ms. That's 11 reads per second.

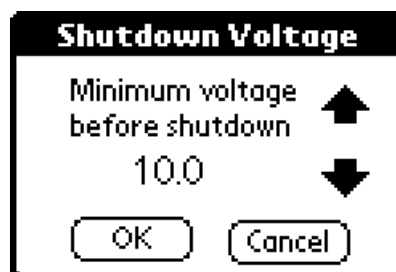
The fastest possible read rate using the shortest charge time is  $15+20$  ms or 28 reads per second.

## *Automatic Shutdown Voltage*

The shutdown voltage is the minimum voltage for the reader to run. When the voltage is below this level the reader will shut off to prevent discharging the battery completely.

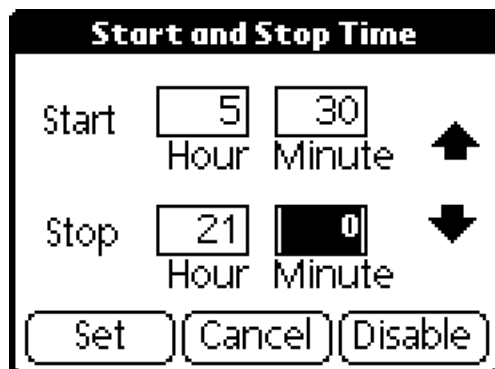
Any automatic shutdown events are logged to the flash memory whenever the reader is turned off. Unfortunately, the datalogger does not log when the reader is switched off. That removes the power to the memory card so it can't be recorded.

When the voltage returns to a few volts above the shutdown voltage, the reader will restart and the wakeup event will be written to the log file. The auto-shutdown feature can be disabled by setting the value to zero.



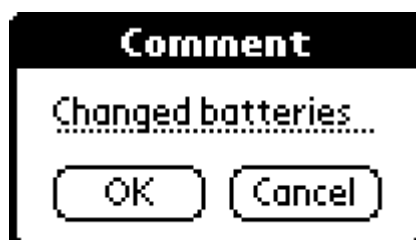
## *Timer operation*

The reader contains a timer that can be used to turn the reader on and off daily.



## *Comments*

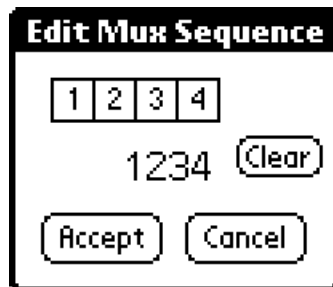
Comments can be added to the log file on the SD memory card. They are timestamped and will be uploaded along with the other detection records.



## *Multiplexer antenna sequence*

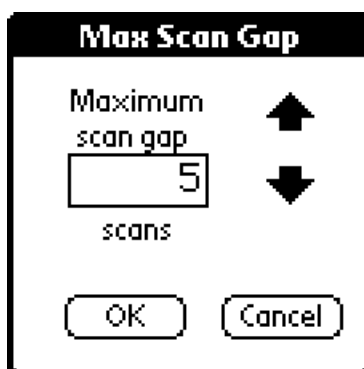
The sequence editor is used to define custom scan sequences or to select one antenna for tuning.

Custom sequences can be added to adjust relative read rates. For example, the sequence “121314” will scan antenna 1 twice as often as the others.



## *Maximum Scan Gap*

This parameter defines the number of gaps in consecutive scans to ignore. It filters out short breaks in the data stream to reduce the number of records written to the log file



The duration in the scan zone will be measured from the first time a tag is seen until the last, including any gaps less than or equal to this value.

If a gap is greater than this parameter, the tag will be considered gone and cause a record to be created in the log file.

If the setting is zero, the datalogger will record every scan, including all gaps.

## Maximum Scan Gap Parameter Example

The RFID reader repeatedly scans for tags many times per second. The rate is determined by the charge and listen time parameters.

Repeated detections are accumulated into records that show the duration and number of consecutive detections. This record shows that the tag was seen for 1.05 seconds for 12 consecutive scans. There was nothing in the field for the previous 59 scans.

```
09/07/2007 22:22:39.57 00:00:01.05 R 0000_00000000152364970 A3 12 59
```

Without the scan gap filter, a series of short detections will generate many records. In this example, all are single detections of the same tag with short gaps between them. This can be caused by a tag at the outer edge of the read zone where detections can be missed.

```
08/08/2008 15:44:39.24 00:00:00.00 R 0000_00000000152364970 A2 1 51
08/08/2008 15:44:40.13 00:00:00.00 R 0000_00000000152364970 A2 1 3
08/08/2008 15:44:41.01 00:00:00.00 R 0000_00000000152364970 A2 1 2
08/08/2008 15:44:41.89 00:00:00.00 R 0000_00000000152364970 A2 1 4
08/08/2008 15:44:42.78 00:00:00.00 R 0000_00000000152364970 A2 1 2
08/08/2008 15:44:43.33 00:00:00.00 R 0000_00000000152364970 A2 1 2
08/08/2008 15:44:44.33 00:00:00.00 R 0000_00000000152364970 A2 1 3
08/08/2008 15:44:45.33 00:00:00.00 R 0000_00000000152364970 A2 1 2
08/08/2008 15:44:46.32 00:00:00.00 R 0000_00000000152364970 A2 1 1
08/08/2008 15:44:47.20 00:00:00.00 R 0000_00000000152364970 A2 1 2
```

With a scan gap value of 5, the short gaps would be ignored and the ten records above will appear as a single record in the logfile.

```
08/08/2008 15:44:39.24 00:00:08.35 R 0000_00000000152364970 A2 30 51
```

## Utilities

The Utilities screens are used for functions that are not changed very often. These include the type of reader, tag display format and synchronization mode selection.

The screenshot shows a utility menu with the following options and settings:

- Reader Type: **Single Reader** (selected), Multiplexer
- Beep Mode: Hex, **Decimal** (selected), 1, 2
- Synch: None
- Buttons: Reset Datalogger Memory, Reset RFID Reader
- Version: 3.1 (left), 1.7 (right)
- Footer: **Status**, **Setup**, **Archive**

The “Reset Datalogger Memory” button will delete all stored detections.

The “Reset RFID Reader” button sets the reader to these values:

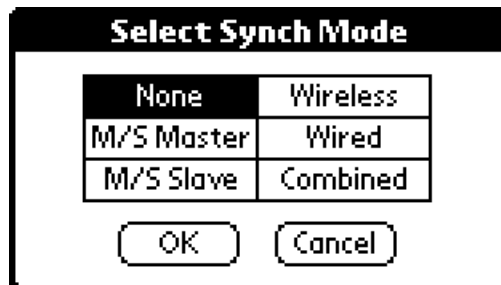
Charge time	50ms
Listen time	50ms
Synch mode	off

For multiplexers:

Number of antennas	1
Mux sequence	‘1’

## Reader Synchronization

There are six synchronization mode settings. Only enable them when necessary.



<b>Mode</b>	<b>Description</b>
None	Reader synchronization disabled
Wireless	The reader will adjust its timing to match the transmit pulse heard from another reader
Wired	A cable is used to transmit the synch pulse
Combined	Both wired and wireless are enabled
M/S Master	The reader generates a pulse over a cable to control others
M/S Slave	The reader will transmit when it receives a pulse from a master over the synch cable

With Wired or Wireless synchronization, each reader listens for transmit pulses from other readers after it reads a tag ID. If a pulse is detected, the reader delays a short time to try to get in step with the other reader.

With Master/Slave, one reader is configured as the master and it sends out a pulse to the slaves. Slaves will not transmit without the signal. When the master is turned off,

the system will stop.

### *Wireless synchronization*

Wireless mode is useful with a mobile reader when it passes near fixed ones. When multiple readers use this mode however, too many can delay and constantly be out of timing.

Extensive instructions for how to setup and configure the various synchronization modes are available from Oregon RFID technical support.

## Archive

---

The datalogger stores all detection and event records in the PDA. The PDA can be used to transfer detection files that are uploaded from multiple readers in the field.

Every time an upload file is created in the PDA, the date and time of that batch is written to the upload history list.

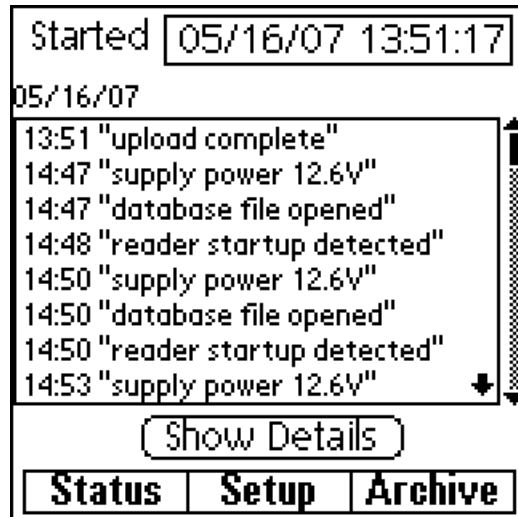
The starting date and time of a batch of upload records is displayed. It also includes the number of detection and event records in the batch.

Double tapping on a record will display the records in that upload.



## *Detection records*

An upload file consists of detection and event messages. The date and time of the start of the batch is in the upper corner.



Double tapping on one record in the archive will display the record detail.

Tap on the Archive field to return to the upload history list.

## Record detail

Two types of records are stored in the reader. Every tag detection generates a timestamped record with (information). Datalogger events are also stored which record when a parameter is changed or something notable has occurred (reader startup, auto-shutdown due to low power).

Initial detection		
2/21/2007 9:33:11.57		
Antenna	Duration	Type
1	0:00:00.00	W
Identifier		
0291 1220973608326776		
Count	Empty	(Return)
2	1	
<b>Status</b>	<b>Setup</b>	<b>Archive</b>

Detection record

Event		
2/21/2007 9:26:49.99		
database file opened 13.8V 0.0A		
<b>Status</b>	<b>Setup</b>	<b>Archive</b>

Event record

The detection record shows the time of initial detection to 0.01 second, the antenna number, the duration the tag was in the field, the type of tag (R for read, W for writeable), the 64 bit identifier in decimal or hex format, the count of consecutive readings and the number of empty scans before this detection. Tap on a field to return to the record list.

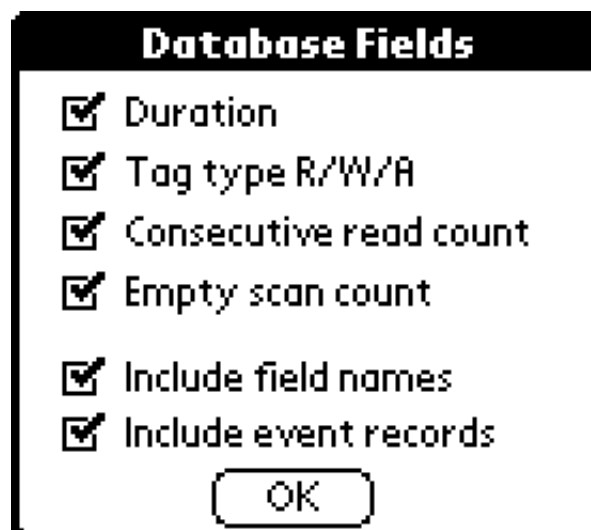
Tap on the Archive field to return to the upload history list.

## *Define record format*

The ASCII text file that is uploaded to the Palm's SD card will contain the tag ID and the date and time of detection. This dialog shows fields that can be included in the exported record.

The option "Include field names" will write one record at the start of the file with the name of each field. These will appear as column headings if the file is imported into a spreadsheet or word processor.

The datalogger stores both tag records and event records. The option "Include event records" causes the event records to be uploaded along with the tag records.



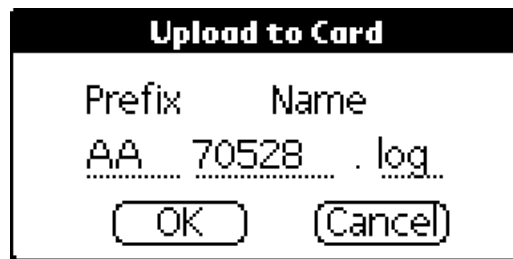
These settings determine the format the record for uploading. The datalogger always records all values.

## *Upload reader to PDA*

Detection records are uploaded to the PDA by pressing the “Upload Reader to PDA” button.

A dialog with the suggested file name made from a site code (up to 3 chars), last digit of the year, the month and day.

The site code should be unique to each reader in order to keep the data sets separated.

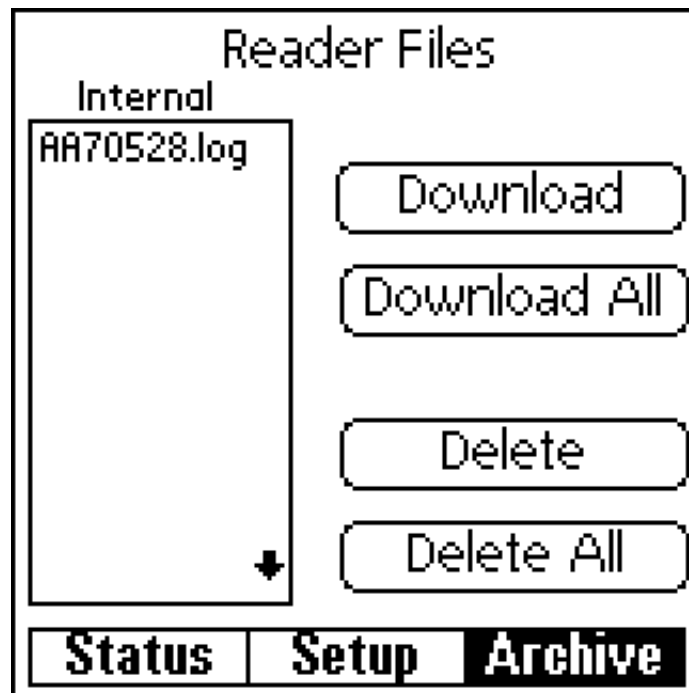


The site code can be edited in this dialog. Any changes are stored in the reader and will be used each time the reader is connected.

## *Show PDA files*

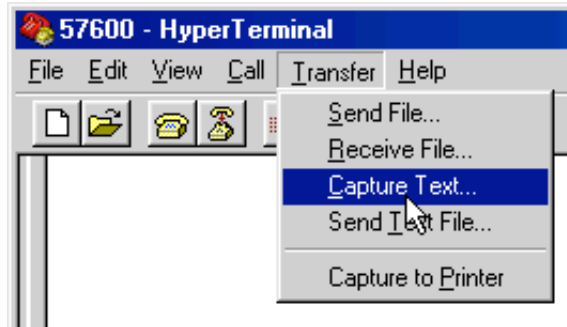
Pressing the “Show PDA Files” button shows the uploaded files collected from readers. These files are stored on the SD memory card if the Palm has one. The card can be read by a PC to transfer them.

The Meazura PDA is sealed and has no removable memory card. The data can be transferred out the serial port and captured on a PC using Hyperterminal. Select a file and press “Download”.

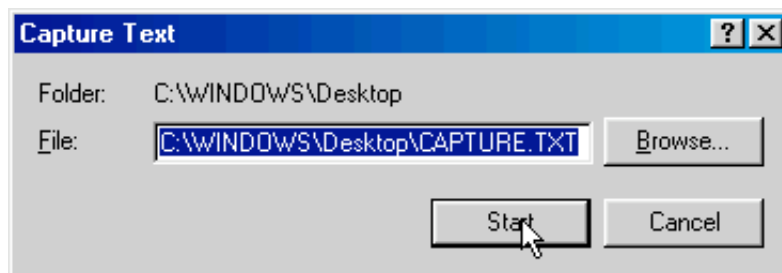


## *Capturing reader files sent over the serial port*

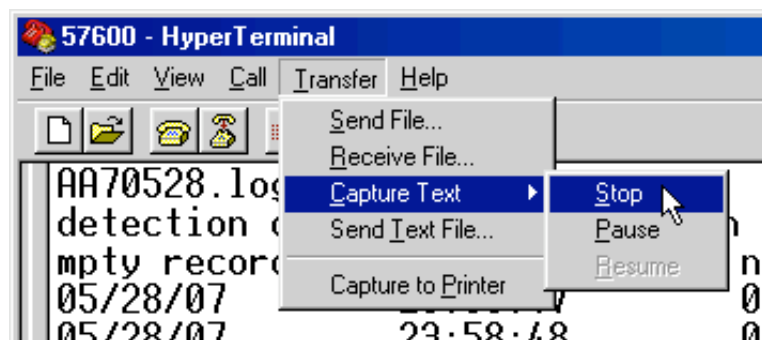
The reader files stored in the PDA can be downloaded over the serial port to another computer. Hyperterminal is used to capture the PDA output.



Select a destination and file name.



When the transfer is complete, stop the capture file.



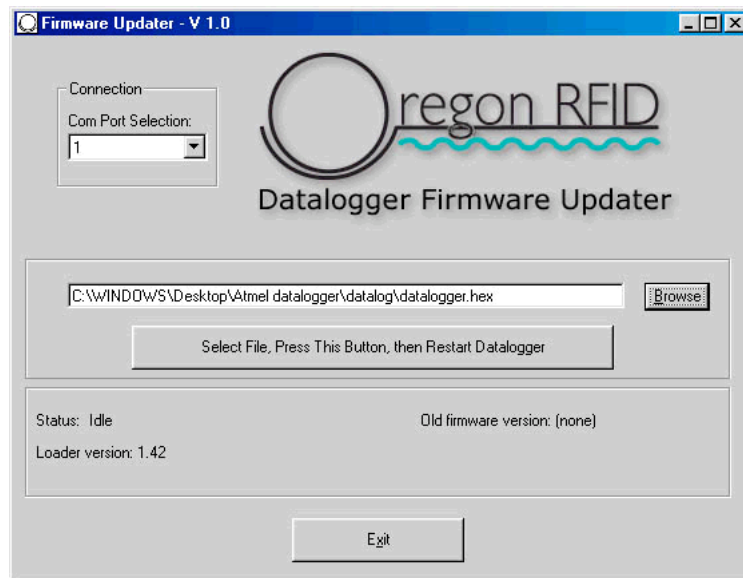
## Update datalogger firmware

---

The firmware in the datalogger uses a Firmware Updater program that runs under Windows. You only need to download and install that once.

The Firmware Updater accepts update files that are uploaded from the Oregon RFID web site.

*<http://www.oregonrfid.com/software/>*



- Download the latest update (.upd) file
- Connect the RFID reader to the PC or laptop serial port
- Start the Firmware Updater program
- Browse to find the update (.upd) file
- Start the Updater by pressing the button in the center
- Turn on the reader (if it's on already, turn it off, then on)
- The LEDs will flash in a repeating cycle
- Wait until the updater to complete

If the procedure gets interrupted, it can be repeated as often as necessary.



