

# SirPic

## *Serial & Infra-Red Data Terminal*

### *Palm PDA User Guide v2.02*



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# 1 Introduction

SirPic is a Serial and Infra-red data terminal application for the Palm PDA. It is a versatile tool for sending and receiving data traffic via a wired (RS232) or wireless (infra-red) communication channel.

SirPic is ideal for PIC developers who require a portable wired or wireless display unit for their custom PIC project.

## 1.1 Features

SirPic provides the following functional features:

- Supports both Serial (RS232) and Infra-red (SIR/Framed/IrComm) modes of communication.
- Transmit and Receive capability, for terminal or data logging application.
- 32KB Scrollable history buffer.
- Real-time display of incoming data.
- Optional Hex mode or Text mode display of data.
- Optional time stamping of data.
- Optional byte count stamping of data.
- Optional Cyclic buffer mode.
- Optional logging of data errors.
- Optional local echo for transmit characters
- Optional end of line handling for CR/LF/CR+LF.
- Configurable bucket buffer size
- Ability to enter transmit data as a hex byte.
- Ability to Export data to Palm MemoPad (and HotSync to PC).
- Supports both standard and custom baud rates (custom baud rates for PIC developers).
- Session Statistics for incoming data traffic.
- Auto-save on exit

SirPic is available as two variants (both with the same version numbering scheme):

- SirPic Lite: This is the "light" variant, with restricted functionality.
- SirPic Full: This is the "full" functionality variant.

The table below summarises the restricted features:

Functionality	SirPic Lite	SirPic Full
History Buffer	1KB or 13 lines (no scrollback history)	32KB or 2000 lines (scrollable history)
Export Captured Data to MemoPad	No	Yes
Customisable Non-Standard Baud Rate	No	Yes

## 2 Compatability

SirPic runs on the Palm PDA platform with the following requirements.

### 2.1 Minimum OS requirements

SirPic requires:

- ❑ Palm OS 3.5 or later
- ❑ Application storage space: approximately 35kb (SirPic.prc)
- ❑ Database storage space: Minimum: 3kb, Maximum: 45kb (SirPicDb)
- ❑ Runtime memory requirements: Minimum:0, Maximum :32kb (depending on configured bucket buffer size)

### 2.2 Compatible Palm PDAs

SirPic provides data logging for both Serial and Infra-red data sources.

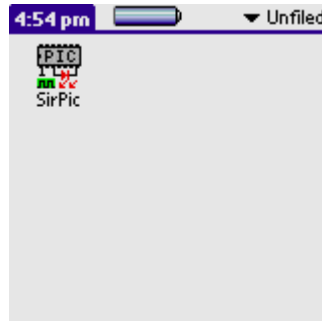
In order to use the Serial logging capability of SirPic, the Palm PDA must be equipped with a Serial port and hotsync cable. Some Palm PDAs only support a USB hotsync cable connection, and do not provide a serial RS232 connection. On these Palm PDAs it will not be possible to log serial RS232 data, as no physical serial RS232 connection port exists on this device.

All Palm PDA's for OS3.5 or later support infra-red ports. However, some of the Palm devices have hardware restrictions on incoming infra-red data. These Palm devices only accept incoming data which contain framed data (SOF/EOF encapsulated data). If the PDA being used does not support raw SIR (slow-infra-red) mode, the PIC code will need to be modified encapsulate the data packet with a start-of-frame (SOF=0xC0) and end-of-frame (EOF=0xC1) character.

Please check the SirPic website Compatability page for the latest list of serial and infra-red (SIR raw mode) compatible PDAs.

### 3 Installation

SirPic is installed on the Palm PDA, using the Palm Desktop Manager, Install tool. Simply add the SirPic.prc file for installation on the next hotsync. This is followed by a Palm HotSync, after which the SirPic application will appear on the Palm Launcher (Unfiled category).



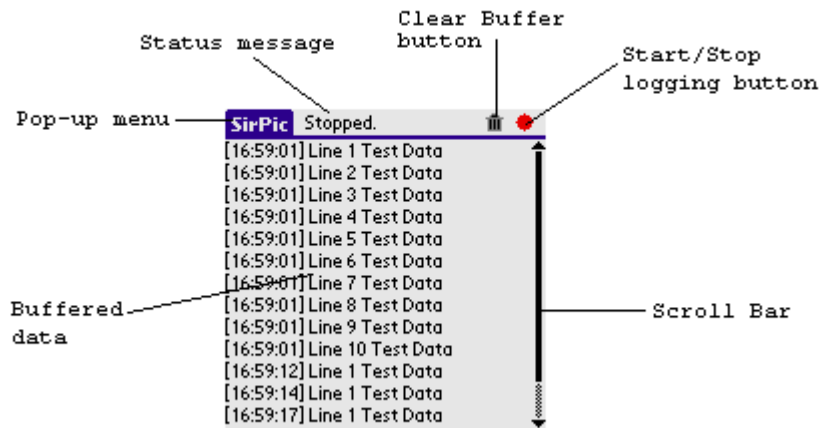
#### 3.1 Launching SirPic

Simply select the SirPic icon from the installed Launcher category, and SirPic will launch and display the main Startup Screen.



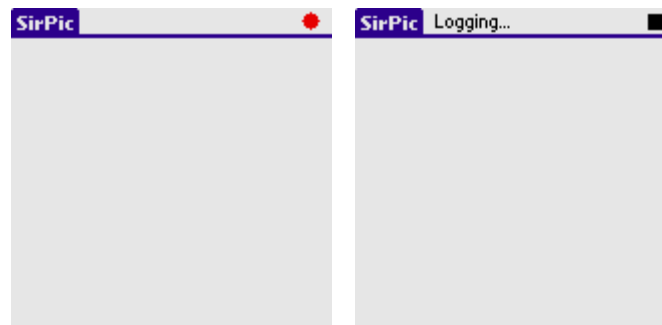
## 4 Startup Screen

The following screenshots displays the main startup screen with annotations.



### 4.1 Start Logging Data

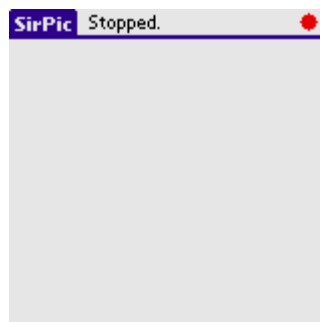
To start logging data, simply press the red round "record" button icon in the top right corner.



The status will change to "Logging...", to confirm the action. Also note that the record button will be replaced by a black square stop icon button.

### 4.2 Stop Logging Data

To stop logging data capture, once logging has commenced, simply press the black square stop icon button in the top right corner. The status will correspondingly change from "Logging" to "Stopped", and the "stop" button will be toggled to the "record" button.



### 4.3 Scrolling Data buffer.

If the logged data exceeds the screen display area, a vertical scroll bar will automatically appear on the right hand side of the screen.

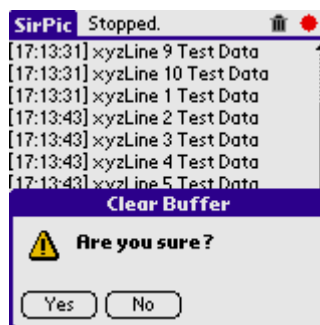
A scrollable history buffer is only available in the Full version.



To scroll through the history buffer, simply slide the scroll bar, or press the up and down scroll direction arrows as required. To scroll up and down a page at a time, the user may also press the up and down navigation buttons on the PDA.

### 4.4 Clearing Data buffer

When data exists in the buffer, and data logging has been stopped, a "wastebasket" icon will be displayed in the top toolbar.



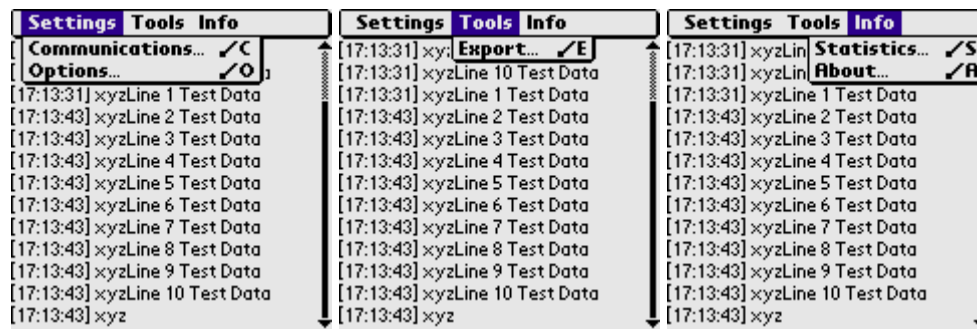
Pressing the "wastebasket" button will prompt the user for confirmation. After confirming deletion, the data buffer will be emptied, and session statistics will also be reset to zero.

The status bar message will display "Data deleted", and the wastebasket icon will disappear.

### 4.5 Menu bar

The menu bar can be launched by pressing the "menu button" in the graffiti panel, or by pressing the "SirPic" tab label on the top left hand corner. A pop-up menu bar will appear in the toolbar/status area, from which the user can make a menu selection.

The various sub-menus are displayed below with their corresponding hot-keys.



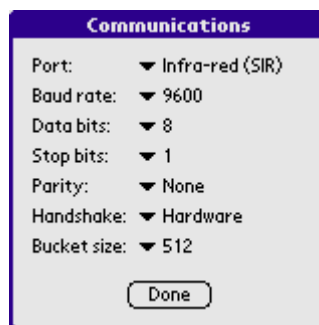
Note: Activating the menu bar whilst logging data, will automatically stop data capture.

## 5 Settings

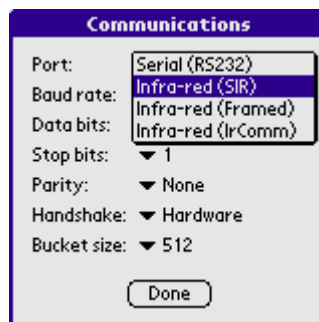
The *Settings* menu allows configurable options to be set. These are split into two sub-menus *Communications* and *Options*.

### 5.1 Communications

The communications settings form is shown below:



#### 5.1.1 Port



The Port parameter specifies the source port of the incoming data to be logged. This can be set to:

- **Serial (RS232)**: for hardwired serial RS232 connection.
- **Infra-Red (SIR)**: for wireless infra-red (slow infra red) raw connection. This is the lowest layer of infra-red communication, and is typically used for PIC/PDA infra-red communication.
- **Infra-Red (Framed)**: for wireless infra-red data encapsulated in start (SOF) and end (EOF) framing characters. This mode is primarily intended to enable users with Palm PDAs which do not support the lower level SIR mode, due to PDA hardware restrictions. By encapsulating the data packet with SOF (hex:0xC0) and EOF(hex:0xC1) framing characters, the PDA hardware allows the data packet to be passed on to the software (instead of blocking the data). In the "Framed" mode, SirPic then filters out the SOF and EOF characters, to display the contained data packet.

To allow the SOF, and EOF characters to be contained within the data packets (as well as the frame), SirPic recognises 0x7D as the escape character. Any byte following the escape byte, is XOR'ed with 0x20, and is displayed as the resultant single byte.

eg 0xC0 in the data packet = 0x7D, 0xE0 = displayed as 0xC0

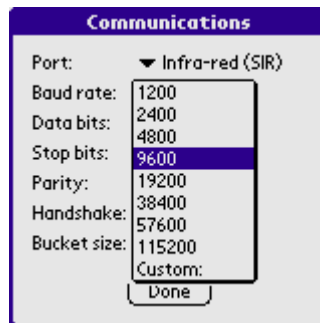
eg 0x7D in the data packet = 0x7D, 0x5D = displayed as 0x7D

eg 0xC1 in the data packet = 0x7D, 0xE1 = displayed as 0xC1

- ❑ **Infra-Red (IrComm):** for use with wireless Infra-red communication to other IrDA devices which also support the full IrComm protocol stack. The IrComm protocol essentially allows serial and parallel port devices to communicate over a half-duplex channel. An example use of an IrComm connection would be to communicate with an IrDA enabled mobile phone.

### 5.1.2 Baud Rate

The baud rate specifies the expected incoming data bit rate in bits per second. This should be set to the same baud rate as that of the transmitting device. This applies to both serial and infra-red sources.

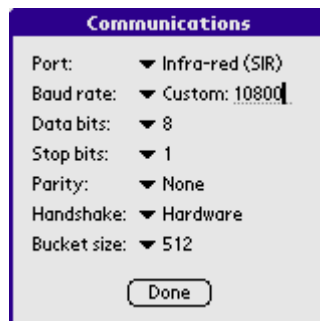


The user can select between a list of pre-defined standard baud rates (1200,2400,4800,9600,19200,38400,57600,115200) or a custom baud rate.

*Custom baud rates can only be configured in the SirPic Full version.*

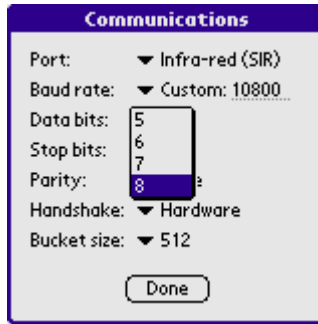
Custom baud rates are particularly useful to PIC developers who may be restricted to a specific baud rate due to a particular clock speed on their transmitting device. Some serial device vendors or PIC developers also use custom baud rates for security reasons. This prevents the common PC with a serial port from listening to their transmitted data. As most PC serial ports can only listen to standard baud rates, this results in garbage data being received.

To configure SirPic to use a custom baud rate, simply select the "Custom" item from the corresponding pop-up list. A field box with dotted line and custom baud rate value will appear next to the pop-up item as shown below. The user can edit this value using the standard palm methods for numerical data entry (grafitti pad, keyboard etc).



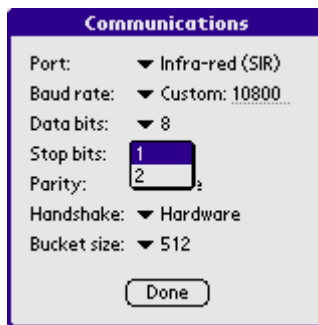
### 5.1.3 Data bits

This specifies the number of data bits (between the start and stop bits). This should be configured the same as the communicating device. To switch between the possible settings the user simply makes a selection from the corresponding pop-up list.



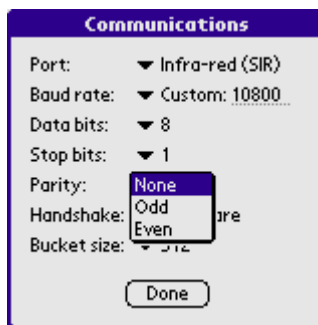
### 5.1.4 Stop bits

This specifies the number of stop bits (trailing after data bits). This should be configured the same as the communicating device. To switch between the possible settings the user simply makes a selection from the corresponding pop-up list.



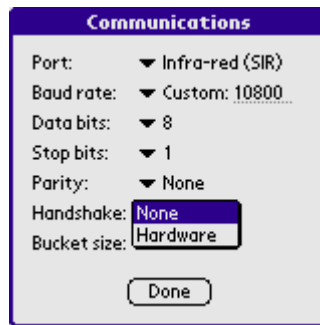
### 5.1.5 Parity

This specifies whether the data transmitted by the data source, contains a parity bit. Parity can be "None", "Odd" or "Even". The Parity bit can be used to detect transmission errors. This should be configured the same as the transmitting device. To switch between the possible settings the user simply makes a selection from the corresponding pop-up list.



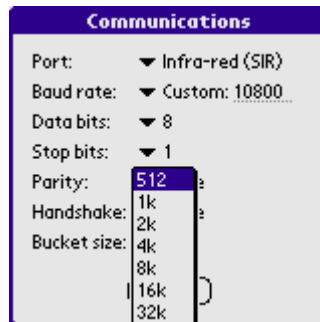
### 5.1.6 Handshake

Handshaking allows a means of data flow control for Wired serial devices. This option has no effect for Infra-red data sources. Some Palm devices allow "hardware" flow control via means of wired RTS and CTS signals. These can be used to signal to the data source to start and stop sending data, in order to prevent data loss due to overflow.



### 5.1.7 Bucket Size

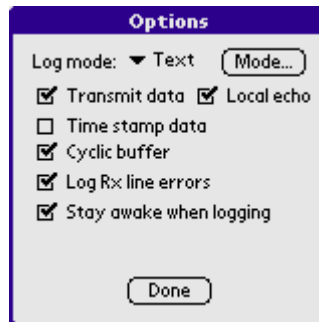
A bucket buffer is a temporary buffer used to store incoming data before it is processed and added to the display buffer. Do not confuse the buffer bucket size with the display buffer size. A 512 byte bucket buffer is usually adequate for data baud rates of 9600. If the data baud rate is set higher and/or data traffic (throughput) is very high, a larger bucket buffer may be required to prevent buffer overruns (causing possible data loss). This is particularly useful when no flow control is possible. The Statistics provided by SirPic give some useful statistics associated with the bucket size.



To switch between the bucket sizes the user simply makes a selection from the corresponding pop-up list. Users should use the minimum setting possible to reduce memory consumption whilst the application is active.

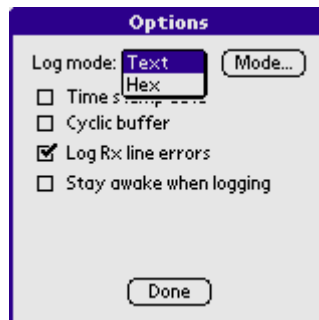
## 5.2 Options

The options settings form is shown below:



### 5.2.1 Log mode

The log mode allows the user to switch between "Text" and "Hex" mode of logging data. Switching between modes after capturing data, will only take effect for new incoming data.



#### 5.2.1.1 Text mode

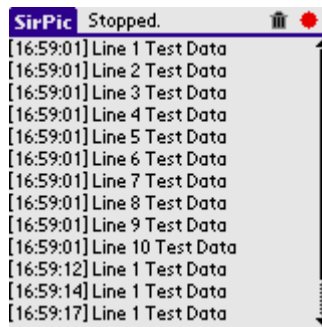
Text mode displays the stream of incoming data bytes as a string of characters.

Text mode begins logging to a new line in the following conditions:

- When the string of character exceeds the width of the display area, the following text characters are displayed on the following display line.
- Text display can also be forced to begin on a new display line by terminating the preceeding data with a Line Feed character (LF=Hex:0D, Decimal 13) or Carriage Return character (CR= Hex:0A, Decimal:10). Please ensure the Text Mode Options for *New Line On* are set accordingly.

As additional features in Text Mode, it is possible to:

- **Clear Screen (CLS):** The entire display buffer and screen is cleared, on receiving the single character code (Hex:01, Decimal:01).
- **Bell Sound (BEL):** A short beep is sounded on receiving this character (Hex:07, Decimal:07). To keep performance impact to a minimum, a maximum of only one bell character is sounded for every bucket of data.

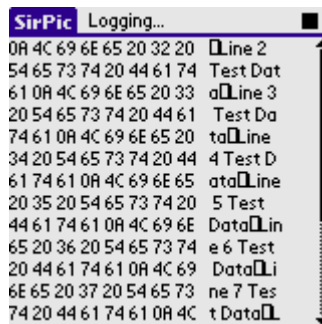


### 5.2.1.2 Hex mode

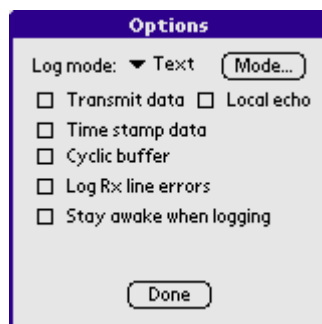
Hex mode displays the stream of incoming data bytes as a typical hex dump view. This is displayed as a stream of up to 8 hex bytes, followed by a text string of the character codes.

Hex mode begins logging to a new line in the following conditions:

- The previous line has 8 bytes of data
- Bucket stamping is enabled, and a new bucket of data is received
- Time stamping is enabled, and the time stamp differs from the previous timestamp

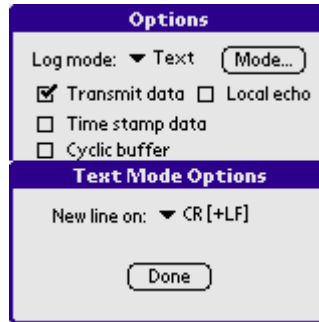


## 5.2.2 Mode Option Settings



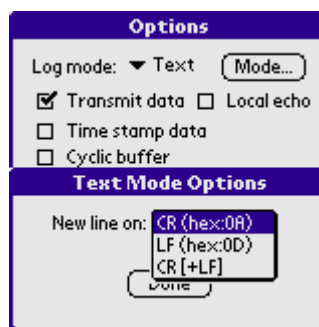
The “Mode...” button launches the corresponding advanced options dialog for the selected log mode (*Text Mode Options* or *Hex Mode Options*).

### 5.2.2.1 Text Mode Options



The *Text Mode Options* dialog is launched by selecting the *Text* log mode, and then pressing the "Mode..." button.

#### 5.2.2.1.1 New Line On

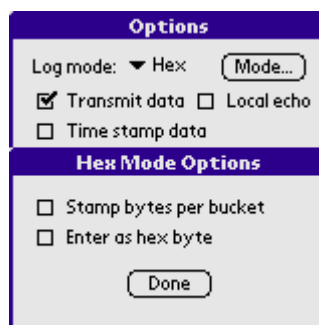


The *New Line On* checkbox option specifies which character(s) are to be interpreted as a new line. This can be set to:

- CR (Carriage Return character hex:0A, decimal:10)
- LF (Line Feed character hex:0D, decimal:13)
- CR+[LF] Carriage Return character followed by an optional Line Feed character.

Note: When transmitting data, sending a "return" also sends the above configured byte(s).

### 5.2.2.2 Hex Mode Options



The *Hex Mode Options* dialog is launched by selecting the *Hex* log mode, and then pressing the "Mode..." button.

#### 5.2.2.2.1 Stamp bytes per bucket

This is also referred to as bucket stamping. Bucket stamping displays the number of bytes which have been read, in a single poll-read of the port. This option only applies when logging in hex mode. The bucket stamp string appears as "[X bytes]".

If bucket stamping is enabled with the time stamping option, the bucket stamp is displayed after the time stamp.

```

SirPic Logging...
[17 bytes]
4C 69 6E 65 20 31 20 54 Line 1 T
65 73 74 20 44 61 74 61 est Data
0A
[18:07:09][17 bytes]
4C 69 6E 65 20 31 20 54 Line 1 T
65 73 74 20 44 61 74 61 est Data
0A

```

A new bucket stamp entry is logged under Hex mode for the following conditions:

- Whenever a new timestamp is logged (assuming time stamping option is enabled)
- Data is received in a new bucket (consecutive poll read).

### 5.2.2.2 Enter as hex byte

This option allows the user to transmit characters, by their hex code value, when logging data in Hex mode. For example, If the user wished to transmit the hex byte “A9” (decimal:169), this could be entered on the graffiti pad as “A” followed by “9”. If the “Enter as hex byte” check box was unchecked, this would be transmitted as two bytes “A” (hex:41) followed by “9” (hex:39).

## 5.2.3 Transmit data

Checking this option, allows the user to transmit data, via entering of characters on the graffiti pad. Un-checking this option disables transmission of characters, and SirPic acts purely as a data logging application.

## 5.2.4 Local echo

This option is used in conjunction with transmitting data. It provides a local echo of transmitted characters. The user may wish to uncheck this option, if the communicating device provides a return echo of the transmitted character.

## 5.2.5 Time stamp data

When time stamping is enabled, a time stamp string "[hh:mm:ss]" is logged at the beginning of a new line with the current time for the received data, which follows.

A new time stamp is logged in the following conditions:

- For text mode: when data is received following a end-of-line character (as configured in “Text mode options”).
- For hex mode: When data is received at a new time stamp (differing from the previous timestamp by at least 1 second).

```

SirPic Stopped.
[18:00:40] Line 1 Test Data
[18:01:08]
4C 69 6E 65 20 31 20 54 Line 1 T
65 73 74 20 44 61 74 61 est Data
0A

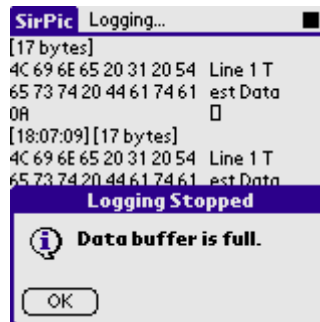
```

## 5.2.6 Cyclic buffer

The cyclic buffer option allows the display buffer to be continuously filled cyclically. If this option is not enabled, data logging is automatically stopped under any of the following conditions:

- 32KB of data has been logged to the display buffer,
- 2000 scrollable lines of data have been logged to the display buffer.

If the cyclic buffer is not enabled, and any one of the conditions above are true, the following alert is displayed:



## 5.2.7 Log Rx line errors

This option enables logging of received line error messages to the display buffer:

A message of the format "[Rx Error Flags: <flags\_string>]" is logged to the display history buffer. Where <flags\_string> may contain any of the following status flag characters:

- **F**: Framing error
- **P**: Parity error
- **C**: Carrier Lost error (not applicable)
- **L**: Line Error Handshake
- **B**: Break error
- **H**: Hardware overrun error
- **S**: Software overrun error.

Typical errors encountered due to bad communication settings are: Framing error, Parity error and Break error.

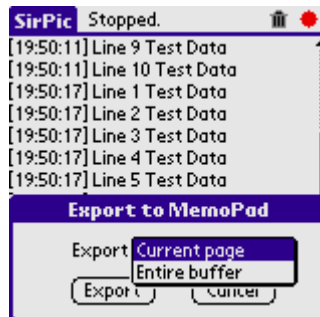
## 5.2.8 Stay awake when logging

This option ensures that the Palm device does not power off on timeout whilst logging. Enabling this setting may cause excessive battery drain, so should be used only when required. If this setting is disabled, the Palm will auto-power off on timeout even whilst actively logging data.

## 6 Export

The Export menu option allows buffered data to be exported to Memo Pad. SirPic allows the entire data buffer or a single display page to be exported to Memo Pad.

*The Export feature is only available in the Full version.*



MemoPad restricts each memo item to 4kbytes. If the entire SirPic display buffer is being exported, and it exceeds 4Kbytes, the exported data will be split into multiple memo items.

To view the memo pad items, the user should launch MemoPad from the Launcher, and open the corresponding exported memo pad item.

Exported data will contain data as displayed in the SirPic buffer display. Certain control-code characters which MemoPad cannot display, will be converted to the box character '□'.

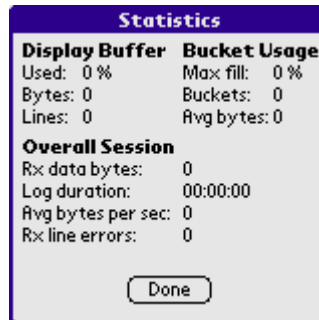
SirPic exported MemoPad documents can be HotSynced to the PC as per normal for other Memo Pad documents.

## 7 Statistics

SirPic collates statistics for received data for the following categories:

- Overall Session Usage
- Display Buffer Usage
- Bucket Usage

The Statistics form is available from the *Info->Statistics* menu item.



### 7.1 Overall Session Usage

The Overall Session is a measure of statistics since the data buffer was last cleared. A session may consist of multiple start/stop data logs.

- **Rx data bytes:** This is the total number of data bytes received from the port in bytes
- **Log duration:** This is the total duration of active logs. An active log is the time interval between a start and stop of logging activity.
- **Avg bytes per Sec:** This is = (Rx data bytes / Log duration)
- **Rx line errors:** This is the total number of line errors encountered during the session.

### 7.2 Display Buffer

The statistics for the display buffer are:

- **Percentage Used:** This is the percentage of the display buffer which has been filled. If you are using the cyclic buffer option, this will approach 100% and then remain at 100%. For the Full version, the SirPic display buffer is limited to 32KB of buffered data, or 2000 history lines of buffered data (whichever limit is hit first). For the Lite version, the SirPic display buffer is limited to 1KB of buffered data, or 13 history lines of buffered data (single screen buffer).

As an example, consider the following Full Version scenario:

Display buffered bytes = 16000 bytes implies 50% data buffer used

Display buffered lines = 1500 lines implies 75% history line buffer used

The percentage used always displays the greater of the two percentages, in this case 75% used.

- **Bytes:** This displays the number of bytes held in the display history buffer
- **Lines:** This displays the number of history lines held in the display buffer

### 7.3 Bucket Usage

A bucket can be considered as the amount of data read in a single polled read.

The bucket usage statistics are:

- **Maximum percentage filled:** This is the maximum (bytes per bucket/bucket size in bytes \*100%) for the log session. Where the bucket size is configured in the Communications settings.

- **Buckets:** This is the number of buckets (polled reads with data present).
- **Average bytes per bucket:** This is equal to (total number of received data bytes/ number of buckets).

## 8 About SirPic

The About box displays the following information:

- Product Version Number
- Whether this is a Full or Lite version of the product
- Website address



## 9 APPENDIX

### 9.1 SirPic Alert Messages

SirPic displays 3 severities of alert messages (Information, Warning and Error). The severity is indicated by the icon in the alert message box.

Severity	Alert Title	Alert Message
Error	Memory Allocation Error	Failed to allocate <bytes> bytes for <memory_descriptor>
Error	Open Port Error	<reason> (Error:<error_code>)
Error	Assertion Failure	Cond:<condition> Loc:<location_id>
Error	ROM Version	PalmOs v3.5 or later required.
Error	Serial Manager Version	Serial Manager 1 or later required (found: <ver>)
Warning	Record Failure	Failed to open/create <rec_id> record. Error: <error_code>
Warning	Corrupt Record	SirPicDb <rec_id> record corrupt. (<size1> != <size2>). Using empty buffer.
Warning	Close Port Error	Failed to close (Error:<error_code>)
Warning	Clear Buffer	Are you sure? [Yes] [No]
Information	Export Stopped	There is no data to Export.
Information	Logging Stopped	Data buffer is full.
Information	Export to MemoPad	Lite feature disabled.
Information	Custom Baud Rate	Lite feature disabled.
Information	Logging Stopped	Data buffer is full.