# SBD WARRIOR CONFIGURATION TOOL GUIDE

## Introduction

This document describes a PC based graphical user interface developed for configuring the SBD WARRIOR[1] controller from SATELLIGENT; a GPS enabled, Iridium satellite Short Burst Data (SBD) modem based communication device.

## Communication setup

External UART available on the SBD WARRIOR controller is a 3.3V three-wire serial interface. If you are using an RS232 port on the PC, ensure that an appropriate convertor such as Texas Instruments MAX232 is used. A USB to serial device such as the Future Technology Devices FT231 can also be used.

Communication port (COM Port) number can be set using the drop-down menu available on this screen. Baud rate of the SBD WARRIOR external UART interface is fixed at 57600 bps, with data size of 8 bits, no parity and no flow control.



Once communication is established with the controller, the hardware and firmware revision information as well as SBD transceiver IMEI; if available is displayed as shown in the next screen.

**Operational mode setup**

The SBD WARRIOR controller can be operated as a stand-alone device or as a slave device.

In the free running mode, the SBD WARRIOR device operates as a master controller and runs in a continuous loop, acquiring sensor samples and transmitting the payload at a fixed frequency. The payload information and timing parameters can be modified, and are available in the next screens.

In the slave mode, the SBD WARRIOR device responds to extended AT commands[2], developed for the Iridium product line from SATELLIGENT. Extended AT commands are issued to the SBD WARRIOR controller through the external UART. This mode can be used for operating the device using a third party controller.

## Payload setup

Sensor data is encoded and grouped into eight fields as shown below, and can be included in the transmitted payload using this screen. A header byte is created based on the user input, and can be prefixed to the payload data if required. Header information allows easy message decoding, when different types of payload information is present. If this overhead is not desired, a dropdown menu option to disable header information in the payload is also available on this screen.

| Bit Number | Data Field Selection |
| :---: | :--- |
| 0 | Basic GPS. This includes only latitude and longitude information. |
| 1 | Extended GPS. This includes GPS year, day hour and minute. |
| 2 | Supply Voltage ADC reading. This corresponds to ADC channel 1. |
| 3 | ADC Channel 2 reading. |
| 4 | ADC Channel 3 reading. |
| 5 | GPIO states of channel 0 and channel 1. |
| 6 | Accelerometer data and temperature data from inertial sensor. |
| 7 | Gyroscope data from inertial sensor. |
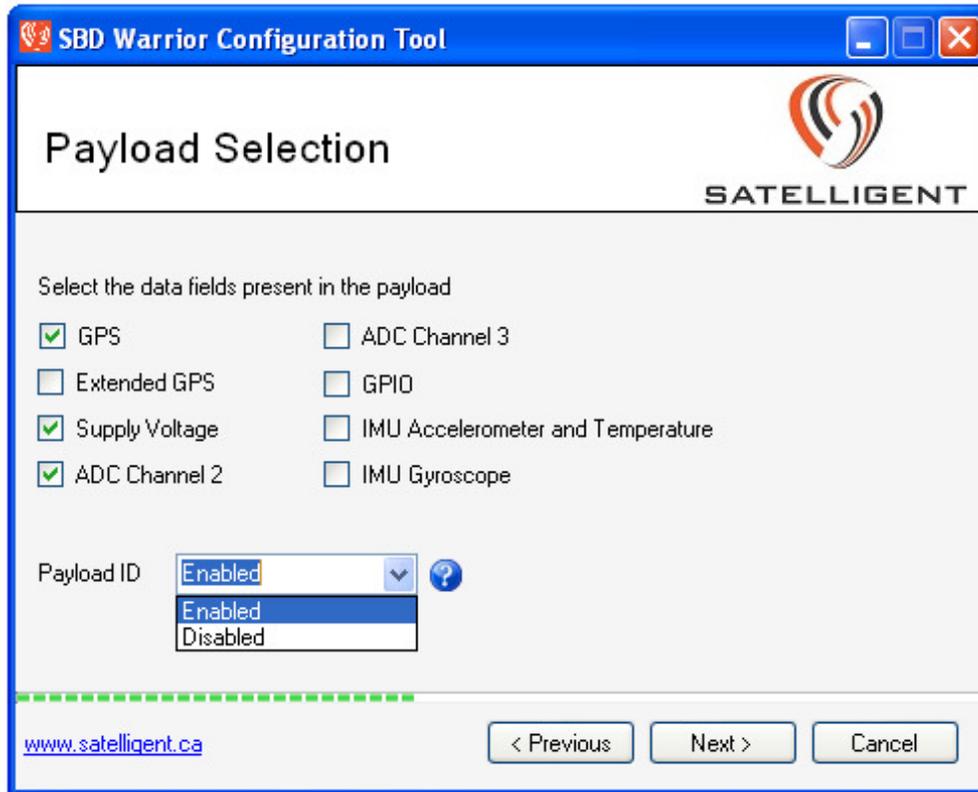
## Timing setup

The following time settings can be set or modified in this screen. The GPS and SBD timeouts are applicable to both the free running and slave modes of operation.

- Sensor sampling interval.

  In the standalone mode, this is the time interval in seconds between successive cycles of activity. Each cycle includes sensor sampling, followed by data transmission if configured to do so. If the device is configured to acquire more than one sample prior to data transmission, this setting corresponds to the time interval between successive samples. For reliable operation, the sensor sampling interval must be greater than the sum of GPS and SBD activity timeouts described below.

- GPS acquisition timeout.

  This is the amount of time in seconds, the GPS receiver on-board the SBD WARRIOR is allowed to get a location fix. The GPS receiver enters a low power mode if a valid fix is acquired within the timeout period. If a valid fix is not acquired within the timeout period, the GPS acquisition process is terminated and will be reattempted during the next sampling cycle. The minimum recommended GPS timeout is 60 seconds, especially for cold starts.

- SBD activity timeout.

  This is the amount of time in seconds, the SBD transceiver is kept active in session with the Iridium gateway. Multiple sessions or instances of the AT+SBDIX command between the SBD transceiver and the Iridium gateway might occur during this time. This can happen if there are multiple messages queued in the SBD WARRIOR controller mobile originated message buffer or if there was an unsuccessful data transmission/reception, up on which the controller will attempt a new session as determined by the retry count parameter. In the event that all mobile originated messages in the SBD WARRIOR controller buffer have been successfully transmitted and all mobile terminated messages at the Iridium gateway have been received before the SBD timeout, the transceiver is then shut off.

- SBD retry count.

  This is the number of retry attempts made by the SBD WARRIOR controller to transmit and receive SBD messages. A single instance of the Iridium AT+SBDIX command is executed during each retry. The minimum recommended value for retry count is 1.
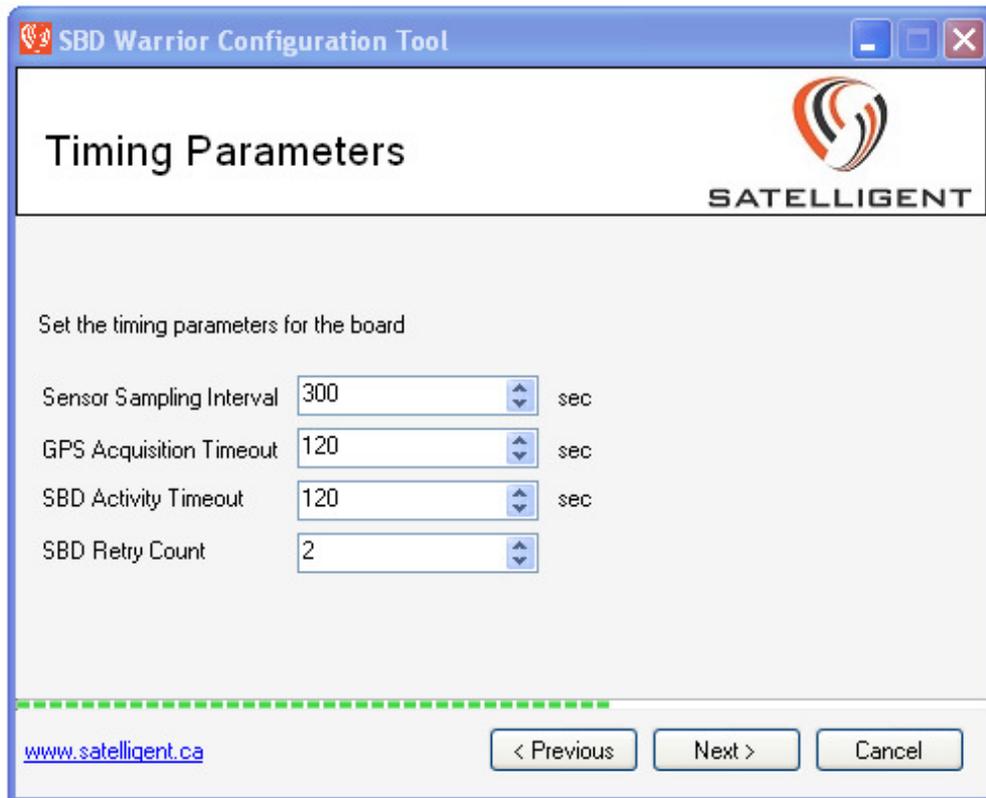
## GPS setup

Settings on this screen allow the user to select GPS antenna type used, whether active of passive. If active antenna is selected, a 5V DC supply is made available on the centre pin of the RF connector for as long as the GPS receiver is kept on.

The stream output setting enables GPS sentence streams to be displayed through the external UART of the SBD WARRIOR controller device. The steams are output at a baud rate of 57600 bps. If enabled, the GGA, GSA, RMC and GSV sentences are output on the external UART. This is especially useful for third party controllers that can parse GPS steam data.
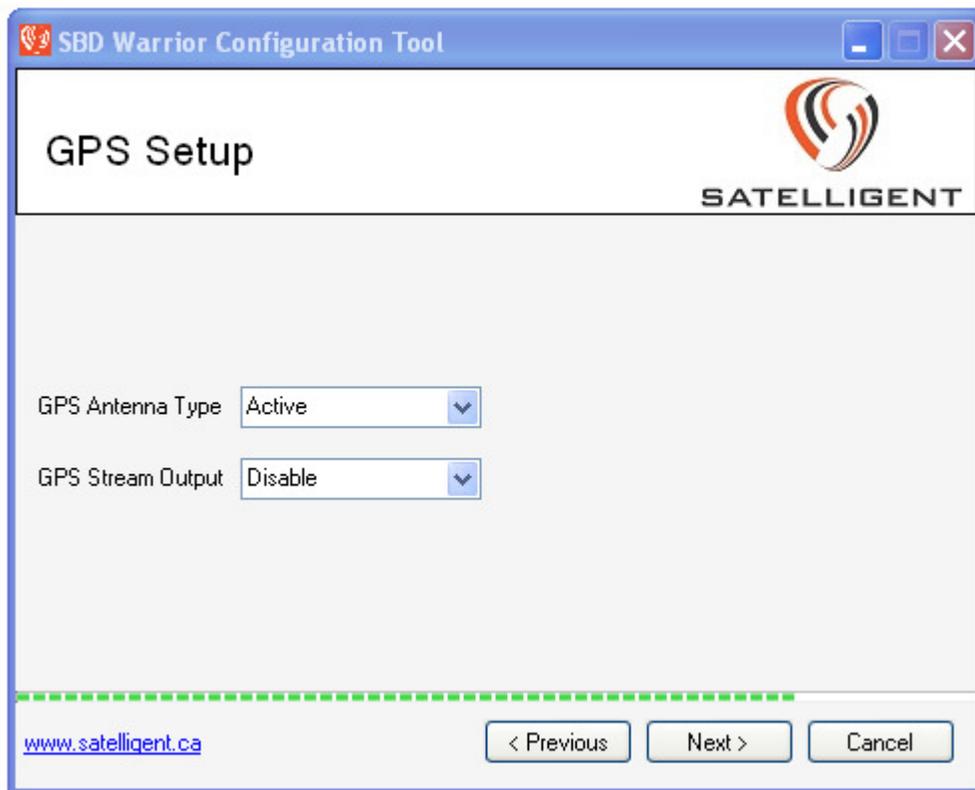


## Advanced settings

Settings on this screen offer the ability to configure several advanced features of the SBD WARRIOR controller board.

- Multiple samples per transmission cycle.

  In the standalone mode, this field determines the number of sensor samples that are taken prior to SBD data transmission. Messages are queued in the SBD WARRIOR controller buffer, and will be transmitted once the set number has been

reached. Care must be taken to allow sufficient amount of time for the SBD WARRIOR controller to transmit all queued messages. A rule of thumb is to allow at least 40 seconds for each message. The actual amount of time taken is dependent on satellite visibility and message size.

- Check sum for UART SBD data entry.

  This setting allows the user to enable/disable checksum requirements for specific extended AT commands involving SBD data entry from external controllers. This setting only applies in the slave operational mode of the SBD WARRIOR controller. Please refer to the extended AT command guide for commands that can be configured to require checksum.

- Individual SBD session timeout

  This setting allows the user to set the amount of time allowed for each SBD session with the Iridium gateway. Each SBD session involves an instance of the AT+SBDIX command being executed by the SBD WARRIOR controller. The recommended setting is 40 seconds.

- Delay before sleep mode when inactive.

  This parameter roughly dictates the amount of time the external UART interface is immediately available for accepting data, before the device goes into a sleep mode. Once the device enters sleep mode, the UART will have to be enabled before the SBD WARRIOR controller can accept data from the external UART. This is primarily intended for manual testing of the device, where human keyboard speeds may not be enough to keep the device from entering sleep mode. It is intended for power conservation, and can be set accordingly for automated applications.

- Switched power supply enable duration per cycle.

  This is the amount of time in milliseconds; the switched supply (5V DC) is made available on pin 6 of the DB15 connector, in each acquisition cycle. The 5V supply is switched on immediately following sensor sampling in each cycle for the amount of time entered here. The 5V supply can be used for powering third party sensors attached to the SBD WARRIOR controller. When enabled, up to 100 mA can be sourced from this pin.
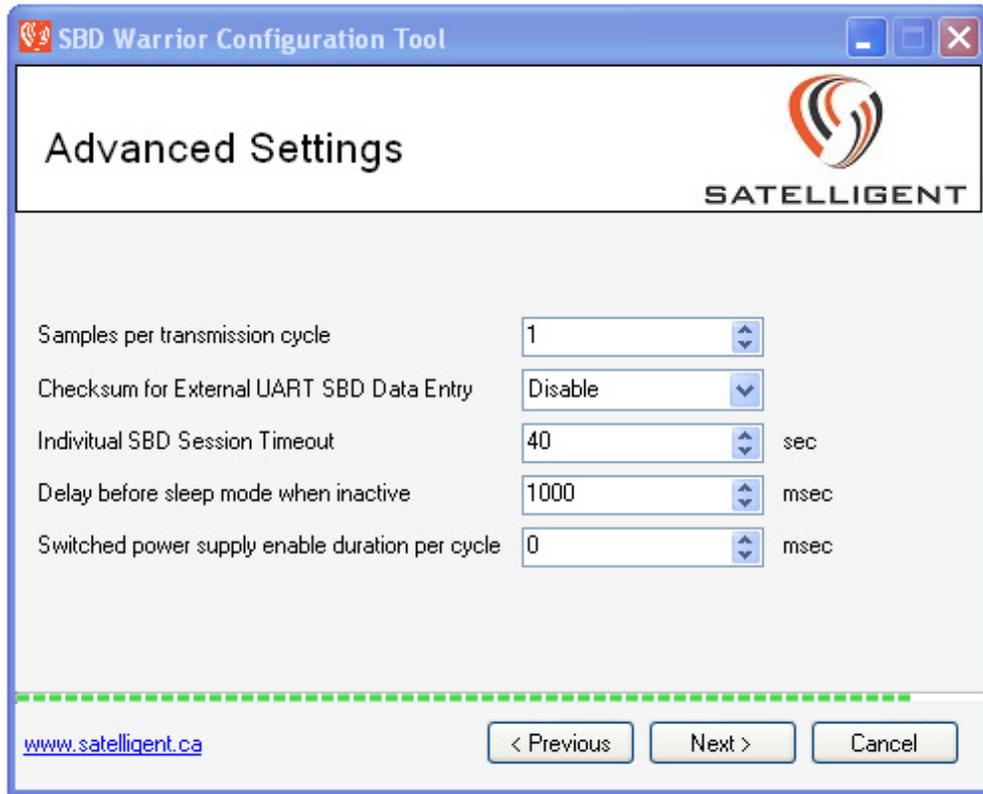
## Panic message setup

The SBD WARRIOR controller can be configured to send an emergency "Panic" message, up on receiving a valid hardware trigger.

- Panic message transmission type.

  Sensor data can be sent as panic messages by the SBD WARRIOR controller, upon receiving a valid interrupt signal. Settings on this screen allow the user to configure panic messages similar to the payload section by checking appropriate boxes.

  The following six options are available on this drop-down menu,
    1. Panic messaging is disabled.
    2. A text message is transmitted.
    3. A new sensor sample is transmitted as panic message, as per the settings.
    4. Both text message and new sensor sample are transmitted.
    5. Only the last known valid sensor data is transmitted as panic message.
    6. Both last known valid sensor data and text message are transmitted.

- Panic text message.

  This allows the user to set a special "panic" text message, which can be triggered when a valid interrupt is received by the SBD WARRIOR controller.

- Panic hardware input channel.

  One of the two GPIO lines available on the SBD WARRIOR controller DB15 interface can be configured to accept hardware interrupts, in order to trigger the panic message.

- Panic message interrupt type.

  This allows the user to set the GPIO line selected for panic operations to trigger on either a rising or falling edge transition.

- Panic message payload type.

  These settings similar to the earlier payload selection screen allow configuring a separate payload for panic messages. The user can set different settings for the panic and regular payloads.

## References

[1] SBD WARRIOR – Iridium 9603 Controller
[2] SATELLIGENT Extended AT command Guide

## Revision History

| Version | Date | Comments |
|---------|------|----------|
| 1.0 | 02-May-2014 | Initial Release. |
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