



SATELLIGENT

SBD WARRIOR DATA SHEET



Features

- Controller for Iridium® 9603N SBD transceiver
- 48 channel SiRFstarIV™ chipset based GPS
- Serial interface for 3rd party equipment or PC control
- Wide supply voltage range (7– 28 VDC)
- Fused 5V switched power output for external devices
- Two 12 bit Analog to Digital (ADC) inputs
- Two Digital I/O's (configurable as panic input)
- Transient voltage protection
- Ultra-low standby power consumption (< 100 μ A)
- OEM and standalone versions available
- Extremely small solution size (2L x 1.4W x 0.75H inch)
- Easy integration into OEM products with a convenient DB15 interface
- Application Programming Interface support through extended AT commands



Description

The SBD WARRIOR is a GPS enabled device that allows reliable pole to pole communication. It is a controller for the 9603N from Iridium®, the world's smallest commercially available satellite transceiver. A high-performance 32 bit microcontroller enables control of various on-board peripherals such as a 48 channel industry leading GPS, 12-bit analog-to-digital convertor, general purpose digital input/output channels etc. all accessible through a convenient DB15 female connector. The SBD WARRIOR can be used in harsh automotive environments thanks to the in-built transient voltage protection. An on-board monitor allows accurate measurement of the input supply voltage allowing adaptive GPS and sensor acquisition as well as data transmission schemes. Application Programming Interface (API) support is provided for developers through an extended AT command set, which allows easy integration of the SBD WARRIOR into third party products.



Specifications

Parameter	Min	Typ	Max	Unit
Input Voltage (V_{in})	7	-	28	V
Peak Current during SBD transmission (@ 12V)		0.6		A
Sleep Current (@ 12V)		100		μ A
Operating Temperature	-40	-	85	$^{\circ}$ C

Multi Interface Connector Pin Description

The SBD WARRIOR features a DB15 female connector that enables all power, digital and analog signals to be on the same physical interface. The pinout of the connector is as shown below.

Pin	Name	Primary Function	Input/Output	Special Function Available
1	EXT_UART_TXD	UART Transmit	O	Y
2	GND	Ground		N
3	OC_1	Open Collector Output 1	O	N
4	GND	Ground		N
5	VIN	Input Supply Positive		N
6	EXT_5V_SUPPLY	Switched 5V Supply	O	N
7	GND	Ground		N
8	GND	Ground		N
9	GPIO_2	General Purpose Digital I/O 2	I/O	Y
10	ADC_2	Analog to Digital 2	I	N
11	EXT_UART_RXD	UART Receive	I	Y
12	GND	Ground		N
13	OC_2	Open Collector Output 2	O	N
14	GPIO_1	General Purpose Digital I/O 1	I/O	Y
15	ADC_3	Analog to Digital 3	I	N

* The pin designation is defined as looking into the DB15 towards the SBD WARRIOR as a Data Communication Equipment.

Power Supply

Operational power supply range of the SBD WARRIOR is 7 – 28 VDC. To ensure reliable operation, the power supply should be able to handle peak currents of up to 1.5A during Iridium transmission bursts.

Switched Supply (5V)

Pin 6 (EXT_5V_SUPPLY) of the DB15 connector could be used to provide 5 VDC supply for applications such as powering an external sensor. This supply is current limited to 100 mA. This supply can be controlled through the serial interface using the extended AT commands.



Low Power Mode

When idle, the SBD WARRIOR controller enters a very low power mode. In this mode, current consumption can be brought down to less than 100 μ A. The GPS receiver is put in hibernation allowing warm start up on wakeup, thereby reducing the overall power consumption of the system.

GPS Receiver

A 48 channel SiRFstarIV™ chipset based GPS receiver is incorporated into the SBD WARRIOR controller board. Various options such as standard location updates, GPS stream output and hibernation mode support are provided and can be accessed through the serial interface using the extended AT commands. The GPS receiver consumes less than 40 mA in full power tracking mode, and consumes less than 20 μ A in hibernate mode. Active or passive antenna support is enabled, and can be configured through the serial communication interface.

Iridium® Transceiver (9603N)

In addition to a pass through mode allowing access to the 9603N transceiver, extended AT commands are provided for SBD data packet creation, transmission and reception. Both binary and text modes are supported, as well as the option to buffer messages. Parameters such as SBD retries and timeout are also accessible through the serial communication interface.

General Purpose Digital I/O

There are four dedicated pins available on the DB15 connector, comprising of two general-purpose digital I/Os and two open collector outputs. Each I/O can be configured separately as a digital input or output. When used as outputs, they can be configured in either open-drain or push-pull modes. Optional internal pull-up and pull-down configurations are available when they are used as inputs. Each I/O pin can source or sink up to a maximum of 8mA. The I/O pins can be configured through the serial interface and extended AT commands are provided to read and write the I/O lines.

Special function GPIO

GPIO_1 or GPIO_2 can be configured for a special "Panic" mode, which when activated initiates a preset emergency sequence. The panic mode can be configured to send a user defined payload, such as a stored message, location information etc. If payload information is not configured, the default setting is used, being the last known GPS location information. When used in panic mode applications, the GPIO pin will be defined as an input with the internal pull up enabled. Pulling the pin low will trigger a panic message. Setting up panic messages can be done through the serial interface.

Analog Functions

The microcontroller on the SBD WARRIOR features a 12-bit, 1 Msps, multi-channel Analog-to-Digital convertor (ADC). Analog voltages can be read on pin 10 (ADC_2) and pin 15 (ADC_3). The reference voltage of the ADC is set to 3.3V. Resistive voltage dividers are provided at the ADC front-end, allowing the user to scale the input voltage to suit their needs. In addition, provisions are made to measure the main supply voltage to the SBD WARRIOR board. ADC measurements can be read using the extended AT commands.



Serial Communication Interface

The SBD WARRIOR has a 3-wire UART interface, which enables communication with external devices such as third party sensors. The UART operates at 3.3V logic level. The communication settings are 57600 bps, 8-bit data size with no parity. The serial interface can also be used for custom application development through an API provided. The API is implemented as an extension of the AT commands used by the 9603N transceiver. The pins corresponding the transmit (Pin 1) and receive (pin 11) could also be configured as I²C data and clock lines by hardware modifications on the SBD WARRIOR board.

RF connectors

The on board RF connector for GPS is an SMA female type, with support for active and passive antennas. A separate on board antenna port for SBD is not provided, since the 9603N has a U.FL connector built into it. The user can select any termination for the antenna as long as a U.FL termination adapter is available. Only passive antenna support is available for SBD.

Memory

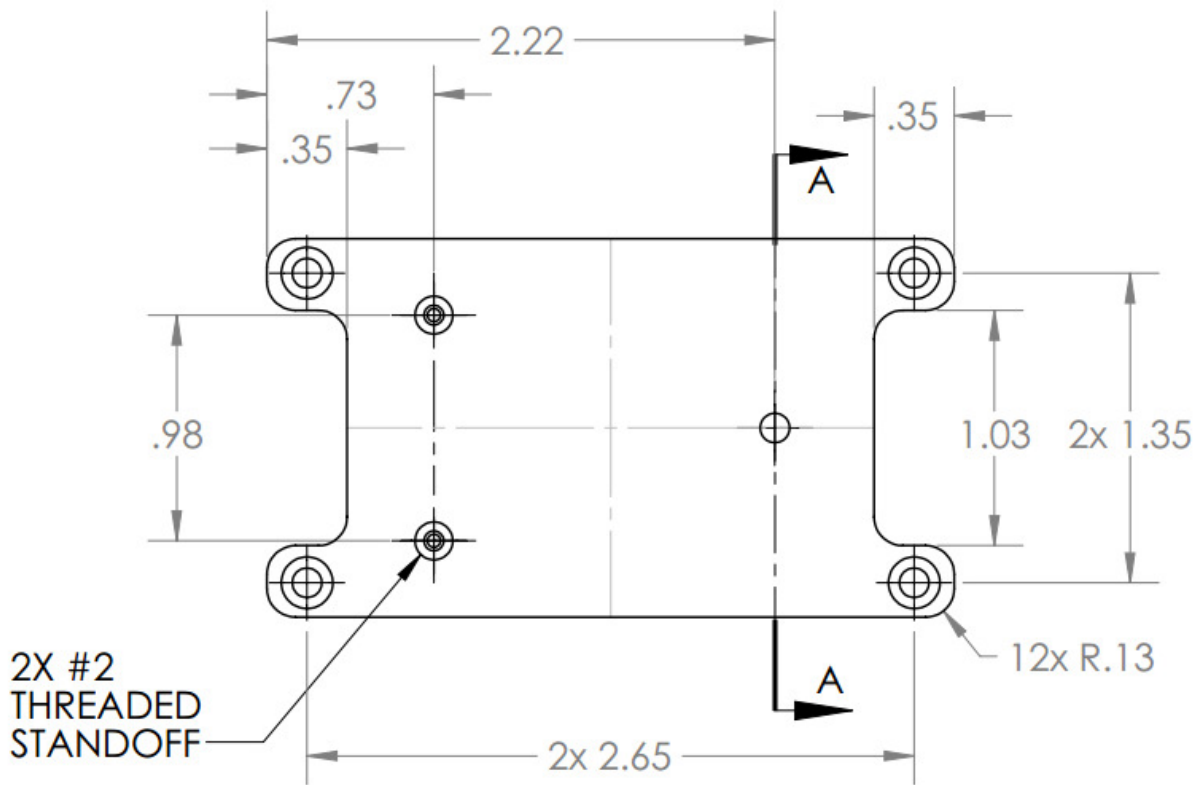
The SBD WARRIOR board features on board flash memory of up to 256 Mbit. This is used to store configuration parameters as well as to buffer incoming and outgoing SBD messages. The user is also allowed to store non-SBD data on this flash. Access to this memory is through the serial communication interface by means of the extended AT commands.

LED

A single LED is provided, which can be controlled through the extended AT commands.

Mechanical Footprint

The mechanical footprint of the SBD WARRIOR device is shown below. #4 mounting screws can be used for securing the device using the mounting feet.



* Dimensions are in inches.

Revision History

Version	Date	Comments
1.0	14-Jan-2013	Initial Release.
1.1	25-Nov-2013	Updated for Rev 2.0 hardware.
1.2	24-Mar-2014	Updated sleep current values. Updated maximum operational ratings. Revised ADC channel identifiers.
1.3	11-Aug-2014	Formatting updates. Serial communication details added.
1.4	02-Nov-2015	Updated operational parameters for 9603N.
1.5	26-Sep-2016	Updated for Rev 4.0 hardware.