

RockBLOCK+

Developer guide

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Introduction

Thanks for choosing RockBLOCK! This developer guide refers to the RockBLOCK+product.

What is RockBLOCK?

RockBLOCK makes it easy to use Iridium Short-Burst Data services with your project. The product hosts an Iridium 9602 transceiver, simplifies it's power requirements, and provides a UART interface to your project. Finally, RF considerations are taken care of by RockBLOCK's built-in patch antenna.

About Short Burst Data

SBD is a bandwidth-limited messaging system, capable of transmitting packets of up to 340 bytes, and receiving packets of 270 bytes. With a good view of the sky, it is possible to send/receive approximately once every 40 seconds.

It is suitable for applications which need to regularly send or receive small amounts of information - typically these would include tracking, telemetry, system control and monitoring applications.

It is not suitable if very low latency is required (< 1 minute), or if the data to be transmitted is larger than a few thousand bytes. Sending images, or GRIB files, is usually not sensible.

About Iridium

"The Iridium constellation of 66 cross-linked Low Earth Orbit (LEO) satellites, plus several in-orbit spares, means truly global coverage and real mobility everywhere.

The network is considered a meshed constellation of interconnected, cross-linked satellites so that each satellite "talks" with the other nearby satellites in adjacent orbits.

Unique to Iridium, this architecture provides inherent advantages in performance and reliability over other mobile satellite services providers."

(from www.iridium.com)

Importantly, Iridium operates in the microwave L-band, which means that successful data transmission relies on having an unobstructed line-of-sight view of a satellite. Satellites travel quite quickly - from horizon to horizon in under 10 minutes - so with sensible application design, it is possible to transmit data, even with a heavily obstructed view of the sky.

The Iridium website (www.iridium.com) has more information.

Rock Seven has been an Iridium Partner since 2008.

Getting Help

If you need any help at all, either with your RockBLOCK device, or with any of our associated web services, please just drop us an email.

support@rock7.com

Functional Description

Power supply

RockBLOCK includes a power regulator which allows you to use any voltage between 9v and 30v DC.

RS-232

Serial communications is provided by a 3-wire RS-232 interface. Signals are available on colour-coded wires for easy connection.

Antenna

RockBLOCK+ has an integral Iridium patch antenna. This faces upwards, through the domed top of the product.

Product Photographs



RockBLOCK+ unit

Physical Specification

Dimensions

Maximum dimensions	
Diameter	130.0 mm
Height	40.0 mm

Electrical Specification

How RockBLOCK manages power

When connected to a DC power supply, the RockBLOCK+ limits current consumption. At 12v it will draw a maximum of 225mA when charging.

On initial connection to a power supply, the on-board charge store must charge. This can take up to 20 seconds to reach full charge.

The Iridium 9602 modem will not be 'switched on' until the accumulated charge reaches a level at which it will be able to successfully transmit. This is typically around 10 seconds after initial power-up.

Once charged, the idle current (with the Iridium 9602 'awake') will be around 16mA (at 12V). In this mode, network 'ring-alerts' will be received.

It is possible to enter a low-power 'sleep' mode, by switching off the Iridium 9602. This is done using the sleep pin on the direct header. In this mode, RockBLOCK+ will only require about 20uA. The internal charge will be maintained, so it will be possible to transmit almost immediately on wake-up.

Input Current

	Sleep	Idle	Charging (max)
12v DC power supply	20 uA	16 mA	225 mA

Communications Interfaces

Your application will be communicating directly with the Iridium 9602 module within RockBLOCK+.

The data serial interface is an RS-232 3-wire interface at (at RS-232 voltage levels) over which the 9602 and FA transfer commands, responses, and SBD message data. With respect to this interface, the 9602 behaves as a DCE (Data Communication Equipment), and the FA behaves as a DTE (Data Terminal Equipment).

The baud rate can be set via the AT+IPR command. The default rate is 19200 bps.

A very important note about signal directions!

- ★ **TXD** is an **INPUT** TO RockBLOCK+
- ★ **RXD** is an **OUTPUT** FROM RockBLOCK+

Input Signal Interface

Colour	Description
Brown	+ 9v-30v DC
Grey	0v GND
Blue	RS-232 TX (input to RockBLOCK+)
Yellow	RS-232 RX (output from RockBLOCK+)
Pink	Iridium 9602 on/off control line
Green	Iridium RingAlert signal line
White	Iridium Network Availability signal line

RockBLOCK 'Hello World' Example

With your RockBLOCK+ connected to a suitable power supply, check that your serial communications are established (default 19200, 8N1), by issuing the command:

```
AT\r
```

Which will produce the response:

```
OK\r
```

Now, these commands will transmit your first message:

```
AT&K0\r
```

```
OK\r
```

```
AT+SBDWT=Hello World\r
```

```
OK\r
```

```
AT+SBDIX\r
```

```
+SBDIX: 0, 0, 0, 0, 0, 0\r
```

The SBDIX response tell you that it was transmitted successfully, and that there were no MT messages downloaded during this SBD session.

Please refer to the [Iridium AT Command Reference](#) for further detail.

Note that RockBLOCK+ expects commands to be terminated with a **carriage return (\r)** character. This is hex **0x0D**.

Using a **line-feed (\n)** 0x0A character will not work!

RockBLOCK Gateway Commands

In general, the RockBLOCK gateway will simply transfer your MO payload directly to your chosen destination addresses (see Web Services User Guide for configuration details).

There are some specially-formatted payload that will be intercepted by the gateway to request specific functions.

Flush the MT queue

This command causes an MT message to be queued in reply, with a flag set to instruct the Iridium gateway to clear any MT messages queued, but not yet downloaded. This is very useful if you suspect that there may be hundreds of queued messages for your device, but you don't wish to download them all. Note that you are still charged for the queued MT messages, regardless of whether or not you download them.

This behaviour will be triggered if your MO payload is equal to "FLUSH_MT" (Hex: 46 4c 55 53 48 5f 4d 54).

The resultant MT reply will contain the same payload, indicating that the queue has been flushed. In this example, there were 10 MT messages queued. They were Hello1, Hello2, Hello3... etc.

```
AT&K0           (turns off flow control, as we are running in 3-wire mode)
OK
AT+SBDIX
+SBDIX: 0, 4, 1, 2, 6, 9
OK
AT+SBDRT
+SBDRT:
Hello1
OK
AT+SBDWT=FLUSH_MT
OK
AT+SBDIX
+SBDIX: 0, 5, 1, 3, 6, 8
OK
AT+SBDRT
+SBDRT:
Hello2
OK
AT+SBDD0
0
OK
AT+SBDIX
+SBDIX: 0, 6, 1, 8, 8, 0
OK
AT+SBDRT
+SBDRT:
FLUSH_MT
OK
```