

# Iridium Edge Communication Protocol

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## Communication Protocol

### SBD Packet structure

Timestamp	Longitude	Latitude	SBD AVL ID and flags	DIN/DOUT info	Reserved	Speed
4 bytes	3 bytes	3 bytes	1 bytes	1 bytes	1 bytes	1 bytes

### Definitions

- Timestamp - Indicates when record was generated
- Longitude - encoded in 3 bytes data. Server which gets this data should divide result from 46603,375 and subtract 180 in order to get actual longitude value. This coefficient is got in following way: 16777215(maximum 3 bytes value) divided from 360 (maximum longitude value then 180 is added). This calculation is used to fit negative and positive values to 3 bytes width variable.
- Latitude - Latitude is calculated in same way as longitude but since latitude maximum value is two times smaller than longitude it can produce a bit more accurate data. Coefficient for latitude is 93206,75. This coefficient is got in following way: 16777215(maximum 3 bytes value) divided from 180 (maximum latitude value then 90 is added). This calculation is used to fit negative and positive values to 3 bytes width variable.
- SBD AVL ID and flags - Custom id that will indicate what caused the record to be generated (as only periodic records are generated, id is not used)
- Din/Dout info - Displays configured IO elements in parameter id 99422
- Reserved - Not used anywhere, but left due to compatibility with fm6 project.
- Speed - Indicates the speed of the vehicle if configured. If not (or in case of no gps) - will display 255

# Data Sending Parameters

Information here includes the data sending parameters which identifies the naming of the parameter in accordance to it's number.

Parameter ID	Parameter name	Min values		Max values	Default values	Description
99420	Iridium Edge	0		1	0	This parameter enables or disables Iridium Edge functionality
99421	Save/Send period	0		1440	1440	This parameter lets to configure Iridium Edge sending period
99422	SBD IO source	0		10	0	SBD IO elements which when enabled are included into the SBD record
151	RS232 Mode	0		26	0	Implement ability to select "Satellite backup"
99423	SBD Upload Limit	0		30000	8000	Limit to save user from exceeding the monthly plan. Max limit of 30000 due to 30KB plan. If set to 0 - limit will be off.

## SBD IO source

Configures IO source which can trigger SBD record saving. 10 elements can generate Alarm for SDB sending. These elements are:

- Byte 1 - Din1
- Byte 2 - Din2
- Byte 3 - Din3
- Byte 4 - Din4
- Byte 5 - Dout1
- Byte 6 - Dout2
- Byte 7 - Dout3
- Byte 8 - Dout4
- Byte 9 - Speed
- Byte 10 - CrashDetect

By setting the appropriate bits you'll get a hex number that can be sent to the device to configure. additionally you can set via the configurator and use getparam command to get the correct value.

Configurator parameter IDs and their explanation:

Parameter ID	Parameter name	Values			Explanation
		Min	Max	Default	
99420	Iridium Edge	0	1	0	This parameter enables or disables Iridium Edge functionality
99421	Save/Send period	0	1440	1440	This parameter lets to configure Iridium Edge sending period
99422	SBD IO source*	0	10	0	SBD IO elements which when enabled are included into the SBD record
99423	SBD UploadLimit	0	30000	8000	Limit to save user from exceeding the monthly plan. Max limit of 30000 due to 30KB plan. If set to 0 - limit will be off.
99424	Power control DOUT	1	5	0	Device DOUT which can control ON/OFF pin of the Iridium Edge
151	RS232 Mode	0	23	0	RS-232 mode selection. "Satellite backup" - 15

In order to configure parameter 99422 manually users must simply set the appropriate values of bit positions, according to their needs:

- Byte 1 - Din1
- Byte 2 - Din2
- Byte 3 - Din3
- Byte 4 - Din4
- Byte 5 - Dout1
- Byte 6 - Dout2
- Byte 7 - Dout3
- Byte 8 - Dout4
- Byte 9 - Speed
- Byte 10 - CrashDetect

## SDB record structure

SDB Record which will be sent through the Iridium satellites network will be different than the regular record. It will contain 4 bytes timestamp, 3 bytes longitude, 3 bytes latitude, 1 byte record generation info, 1 byte DIN,DOUT info, 1 byte Speed value.

Timestamp	Longitude	Latitude	SDB AVL ID and flags	DIN/DOUT info	Reserved	Speed
4B	3B	3B	1B	1B	1B	1B

**Timestamp** - Indicates when record was generated.

**Longitude** - In this packet is encoded in 3 bytes data. The server that gets this data should divide the result from 46603,375 and subtract 180 to get the actual longitude value. This coefficient is got in the following way: 16777215(maximum 3 bytes value) divided by 360 (maximum longitude value then 180 is added). This calculation is used to fit negative and positive values to 3 bytes width variable.

Example:

Longitude: 910DA0 (in hexadecimal) → 9506208 (in decimal)

To convert Longitude:

$$(9506208 / 46603,375) - 180 = 23.9811065$$

**Latitude** - Is calculated in the same way as longitude but since latitude maximum value is two times smaller than longitude it can produce a bit more accurate data. The coefficient for latitude is 93206,75. This coefficient is got in the following way: 16777215(maximum 3 bytes value) divided by 180 (maximum latitude value then 90 is added). This calculation is used to fit negative and positive values to 3 bytes width variable.

Example:

Latitude: CE1AEB (in hexadecimal) → 13507307 (in decimal)

To convert Latitude:

$$(13507307 / 93206.750) - 90 = 54.91769$$

**Din/Dout info** - Displays configured IO elements in parameter id 99422 (only din/dout). If IO is not set, it will send be replaced by 0.

**Reserved** - Not used anywhere.

**Speed** - Indicates the speed (from GNSS) of the vehicle if configured. If not (or in case of no gps) - will display 255.

**SBD AVL ID and flags** - Custom ID that will indicate what caused the record to be generated This byte is divided in two parts of four bits, as shown in table below:

ID	0	1	2	24	179	247
IO element	Periodic rec.	Digital Input 1	Digital input 2	Speed	DOUT1	Crash

## SBD packet example

**Unparsed data:**

01004C01001CF99DD263333030323334303634303730383330000018000059282DBC03000B0036A  
2B8193D120000000302001C  
59282BA391F5ABCDDBFDD0180000059282BA891F5ABCDDBFDD0180000059282BA391F5AB

{01} - Protocol revision number

{00}{4C} - overall message length

{01} - MO header IEI

{00}{1C} - MO header length

{F9}{9D}{D2}{63} - CDR Reference

{33}{30}{30}{32}{33}{34}{30}{36}{34}{30}{37}{30}{38}{33}{30} - IMEI of the device

{00} - Session status (Transfer OK in this case)

{00}{18} - MOMSN

{00}{00} - MTMSN

{59}{28}{2D}{BC} - Time of session

{03} - MO Location information IEI

*The location values included in this IE provide an estimate of the originating IMEI's location. The inclusion of this information in an MO message delivery is optional. Whether or not it is included is established when the IMEI is provisioned and may be changed at any time via SPNet. The CEP radius provides the radius around the center point within which the unit is located. While the*

*resolution of the reported position is given to 1/1000th of a minute, it is only accurate to within 10Km 80% of the time.*

{00}{0B} - MO Location information length

{00}{36}{A2}{B8}{19}{3D}{12} - MO latitude and longitude as described in Iridium documentation.

{00}{00}{00}{03} - CEP radius

{02} - Payload IEI

{00}{1C} - Payload length

{59}{28}{2B}{A3}{91}{F5}{AB}{CD}{BF}{DD}{01}{80}{00}{00} - Record 1

{59}{28}{2B}{A8}{91}{F5}{AB}{CD}{BF}{DD}{01}{80}{00}{00} - Record 2

There blue part of record is satellite device generated data and green is actual record payload which was sent to server from . Information of the first record should be parsed like this:

{59}{28}{2B}{A3} - Timestamp of record generation in GMT0;

{91}{F5}{AB} - Longitude (recalculated value is 25,255756)

{CD}{BF}{DD} - Latitude (recalculated value is 54,832396)

{01} - DIN1 generated event

{80} - DIN1 on, while DIN2, DOUT1, - off

{00} - Reserved byte

{00} - Vehicle was stopped when the record was generated