

SBD Practices



Iridium Proprietary and Confidential

The information and statements in this presentation are Iridium Proprietary and Confidential Information and, consistent with your agreement with Iridium, you may not disclose them to others. This information is also subject to change without notice. Statements made in and during this presentation are not warranties, and IRIDIUM EXPRESSLY DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, except as expressly set forth in the product's Limited Warranty and the Iridium Product Sales Terms and Conditions that are part of your agreement with Iridium. See www.iridium.com for further details.

Included in this presentation is non-public information that is only being communicated to Iridium partners. This presentation and any related oral discussion or information ("Presentation") is strictly Proprietary and Confidential to Iridium. Consistent with your Partner Agreement with Iridium, you may not disclose the Presentation to others without express written permission from Iridium. Any violation of your Agreement's Proprietary and Confidentiality obligations shall result in remedies to the fullest extent available to Iridium at law or in equity. Please review your Partner Agreement and the Iridium Product Sales Terms and Conditions that govern your relationship with Iridium. Statements made in this Presentation are not warranties, and IRIDIUM EXPRESSLY DISCLAIMS ALL WARRANTIES, IMPLIED WARRANTIES, WARRANTIES OF MERCHANTABILITY AND WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE, except as expressly set forth in the relevant Iridium Limited Warranty and the Iridium Product Sales Terms and Conditions. For copies of the Limited Warranty and Product Sales Terms and Conditions, see: [Links](#)

The views and opinions expressed in this Presentation are solely those of the presenter and do not necessarily represent those of Iridium which makes no warranty as to accuracy or completeness of the information provided or the views or opinions presented. The information in this Presentation is subject to change without notice.

Read and understand the Iridium User Manual and the safety warnings and information contained in that Manual before using any Iridium product.



Iridium Proprietary and Confidential

Agenda

- SBD Definition
 - Service Description
 - Required Hardware
- SBD Best Practices
 - Power On/Off
 - Network Satellite Availability
 - Initiating SBD Sessions
 - Attaching an ISU to the Gateway
 - Automatic Ring Alert
 - Recognizing and Responding to Ring Alert
 - Interpreting Command Response Codes
 - Adaptive Retry
 - DirectIP Suggestions
- Features Not Supported on Iridium SBD Services
- FAQ

SBD Service Description

Short Burst Data

SBD Service Description

What is it?

- Packet-based data service that allows customers to transmit short data messages between equipment and centralized host computer systems.

How Does it work?

- Remote applications send Mobile Originated SBD (MO-SBD) messages from an Iridium transceiver. The application communicates with the transceiver via AT commands. The application then loads the message into the transceiver and instructs it to send the messages, which traverses the Iridium satellite network via inter-satellite links to reach the Iridium Gateway. From there, the message is transferred to the Internet and onto a host computer system where it is stored in a database for further data processing. Mobile Terminated SBD (MT-SBD) messages are sent to the Iridium Gateway via the Internet from the host computer system.

What are the components?

- Data host
- Iridium Subscriber Unit - SBD module, LBT or handsets
- Device interface to Iridium Network (field device)

Who is it intended for?

- Customers who need short data message transmissions.

SBD - Required Hardware

The following hardware supports SBD service:

HANDSETS

- 9500
- 9505
- 9505A
- 9555
- Iridium Extreme™



L-BAND TRANSCEIVERS

- 9601
- 9602
- 9522
- 9522A
- 9522B
- 9523



SBD BASED PARTNER PRODUCTS

Follow us



SBD BEST PRACTICES



Powering On/Off

- Iridium Subscriber Unit (ISU) should be powered on/off in a prescribed sequence
- Iridium 9601 and 9602 have an ON/OFF pin to control the power on off sequence.
 - The unit will boot up when power is applied to the pin
 - When power is removed it executes an orderly shutdown
 - For the Iridium 9601 this is pin 7 and the Iridium 9602 it is pin 5
 - The device is ON if 2.0 V or more is applied and is OFF if 0.5V or less.
- Removing power from the ISU while powering down of the ISU, is not recommended
 - This action does not guarantee the buffers are flushed and the variables are written to non-volatile memory
 - User needing to power down the ISU by removing power, must first issue the AT*F command
 - The AT*F command flushes all pending writes to non-volatile memory, shuts down the radio, and prepares the ISU to be powered down
 - The ISU can then be powered down by removing power or de-asserting the ON/OFF line.
- At power ON, the ISU executes a sequence of power on and memory tests
 - Interrupting this sequence can cause problem with the ISU
 - It is recommended that an application wait at least 2 seconds between initiating a power ON sequence and powering OFF the unit

Network Satellite Availability

- Iridium operates with line of sight communications and requires that the antenna maintain a clear view of the satellite
- The ISU contains features that indicate to the application that a satellite is within view of the antenna.
- These are the Network Available pin, +CSQ / +CSQF and +CIER / CIEV AT commands
 - +CSQ / +CSQF - Returns the Relative Signal Strength Indicator value to the application.
 - The +CSQ results are not 'instantaneous' and the calculation may take seconds.
 - The +CSQF command immediately returns the results of the last RSSI calculation to the user.
 - The user must keep in mind this value may be 'old', perhaps 15 seconds.
 - +CIER / CIEV - Enables 'Indicator Event Reporting' which sends the unsolicited +CIEV result codes to the application.
 - The command affects two parameters; the RSSI value and the Network Availability.
 - When the parameter is enabled, the ISU sends the new value to the field application.
 - This is an unsolicited response and is delivered as long as the data port to the ISU is available.
 - For the signal quality, it returns the latest RSSI value; 0 to 5.
 - For the network, 'service availability' the ISU returns a 0 or 1. The +CIEV, is the unsolicited text string returned with the +CIER value
- The Network Available pin is asserted when the satellite is within view of the device and the device is powered to receive a signal from the satellite. The pin is not asserted if the device is powered off.

Initiating SBD Session

- There are three commands available for initiating a SBD session: +SBDI, +SBDIX and +SBDIXA.
 - +SBDI- the legacy command from the initial release of the SBD service
 - Used for sending SBD messages but in the current system design
 - The +SBDI will detach the ISU from the gateway.
 - If the application uses, or intends to use, automatic Ring Alert feature, the +SBDI command cannot be used.
 - The status response codes from the +SBDI command are limited and not useful in diagnosing possible connectivity problems.
 - Iridium recommends using the +SBDIX command rather than the +SBDI.
 - +SBDIX - the recommended command for initiating a SBD session.
 - It ensures the ISU won't become detached inadvertently
 - Command maintains the current geo-location for the RA
 - Provides a more extensive set of response codes.
 - +SBDIXA - Used when an application is initiating a SBD session in response to Ring Alert

Attaching an ISU to the Gateway

- Attaching an ISU to the gateway...
 - Indicates to the gateway that an ISU is configured to receive the Ring Alert
 - Updates the geo-location of the ISU on the gateway so the Ring Alert signal can be routed to the device
- Attaching to the gateway can occur using the +SBDREG and/or the +SBDIX command
 - +SBDREG
 - Command notifies the gateway that an IMEI is configured to receive the Ring Alert and updates the geo location.
 - SBDREG only needs to be executed one time
 - Unit remains attached until it is 'detached' by the field application
- Detaching an ISU from the gateway can be performed by the field application using the +SBDDDET and/or SBDI AT command
 - +SBDDDET command detaches a device from the gateway so it no longer can receive the automatic Ring Alerts
 - Returns status information to the ISU with indicates if an MT-SBD message is queued at the gateway from this device

Automatic Ring Alert

- Automatic Ring Alert feature notifies the ISU when a MT-SBD message is queued for the IMEI
- When ISU receive Ring Alert, a number of unsolicited events occur
 - Verbose mode - ISU sends the ASCII string SBDRING across the data port to the field application
 - Not in Verbose mode - ISU sends the string 126. The RI bit (9601 in 24, 9602 pin 19) is asserted and Ring Alert bit in the ISU is set
- These events notify the application that a MT-SBD message is waiting and the field application can then send a +SBDIXA 'mailbox check' to retrieve the message
- When application does not reply with a +SBDIXA 'mailbox check' within 20 seconds, the gateway sends a second Ring alert to the ISU
- When there is still no response, the Ring Alerts are cancelled and the ISU will not receive another Ring Alert until another MT-SBD is queued for the device or the host 'forces' a Ring Alert using Direct IP

Recognizing and Responding to the Ring Alert

- Recognizing a ring alert has be received by the ISU
 - Field application looks for the unsolicited ASCII string SBDRING or 126
 - On the 9601 the RI pin, 17 and on the 9602 pin 12.
- Developer can check status of the Ring Alert pin using two commands; +CRIS and +SBDSX
 - +CRIS - Ring Indication Status
 - The +CRIS returns the reason for the most recent assertion of the Ring Indicate signal.
 - There are separate indications for telephony and SBD.
 - For the Iridium 9601 / 9602, the SBD indicator is the only valid response.
 - +SBDSX - Status Extended commands.
 - The +SBDSX returns the status of the last successful SBD session and the Ring Alert flag.
 - The Ring Alert flag indicates whether an SBD ring alert has been received and still needs to be answered.
 - This flag is cleared by a successful SBD session, including 'mailbox checks'.
- If not using unsolicited ASCII strings, the field application can periodically check the Ring Alert status with either of these commands instead to determine if a Ring Alert was received.
- Once the field application has determined that the ISU received a Ring Alert, it can initiate a SBD session to retrieve the queued message.
 - This can be initiated with a 'mailbox check' which is a MO-SBD message with a 0-byte payload.
 - The MT-SBD message waiting at the gateway is delivered as part of the SBD session.
 - A MO-SBD message with a valid payload also retrieves the pending message.
- The application should use the +SBDIXA command when responding to the Ring Alert.

Interpreting Command Response Codes

- Each AT command returns to the application a result code that indicates the disposition of the command.
- Depending on the command, the codes may indicate status, condition or other related information.
- It is important to program the application to interpret these commands and properly execute logic based on these results.
- Occasionally, a new command is introduced which provide additional features and may be used in place of exiting commands, such as +SBDIX and +SBDI.
- The +SBDIX can be used in place of the +SBDI, and is recommended, however, the response codes for the commands are different.
- Replacing the one command with the other and not modifying how the codes are interpreted can introduce a major bug.
- When a command is used, check the possible response codes and how to interpret them.

Adaptive Retry

- There are a variety of reasons why a SBD message may not get through from the ISU to the satellite.
 - These include obstruction, inter-satellite handoff or contention for satellite resources.
 - Response codes indicate that the message failed, but do not always give a precise reason.
- When a SBD session fails, the exception logic in the application should determine what action to take.
 - The application immediately initiates another session.
 - If the resends fail beyond this, and a satellite is in view, there may be an issue with contention for satellite resources.
 - In this case, it is better to incrementally adjust the time interval between the resend attempts.
- A suggested retry scheme might be:
 - Initiate SBD session
 - If that fails attempt resend within a random time of 0-5 seconds (2x)
 - If still unsuccessful wait a random time of 0-30 before attempting a resend (2x)
 - If these attempts fail, increment the delay to 5 minutes.
- This logic should cover almost any anomaly with the network.

DirectIP Suggestions

For DirectIP MO messages

- When sizing network capacity one IP address, port pair can support a delivery rate of 100 messages per minute from the Iridium server to the partner server.
- A developer may configure the number of IP address, port pairs based on expected path throughput levels for any given day.

For DirectIP MT messages

- Developers must immediately disconnect their socket connection after the data has been transferred and an acknowledgement is received from the Iridium server.
- There should be a timeout period of 5 seconds once the partner server has sent the SBD payload data to the Iridium server, and is awaiting a response back from the Iridium server.
- All developers need to configure their server to allow a maximum of 20 simultaneous connections to the Iridium server. This will ensure access for all partners.

Features Not Supported on SBD

Data After Voice

- Iridium partners are advised that this feature is not supported by Iridium.
- Partners will not find any reference to it on our public website as Iridium does not offer any type of troubleshooting or support for this service.
- Future modifications to gateway network elements or the satellite constellation could unexpectedly and permanently render DAV inoperable.

SBD FAQs

What is the Iridium source IP address that Mobile Originated deliveries will come from?

- 12.47.179.11

What is the Iridium domain name for DirectIP Mobile Terminated messages?

- directip.sbd.iridium.com / port 10800

What is the current policy regarding DirectIP Mobile Originated TimeToLive setting?

- TimeToLive is 12hours

What is the Iridium Mobile Terminated queue policy, before MT messages are purged?

- Mobile Terminated messages that are 'queued' for 5 days - (all messages for the destination will be purged at this time)

What's the maximum # of Mobile Terminated messages for a single IMEI?

- Max. of 50 messages per IMEI

For SBD DirectIP Mobile Terminated, does the customer need to inform Iridium of the source IP address that will be utilized?

- Yes, the source IP address that will be utilized to connect to the Iridium gateway needs to be included within the Iridium network firewalls, to allow for successful connection.. This request for DMT access needs to be sent to the partners Iridium Account Manager.

What happens if the host server is not available to receive messages?

- MO-SBD messages are queued at the GSS. The GSS can store 10,000 messages per server application. If the number of MO-SBD messages exceeds the 10,000 limit, the oldest message is discarded and the newest added to the queue. The expiry for the queued message is 12 hours. (ties in with #3)