AT COMMANDS FOR MODELS 9602-I/9602-N

Version 1.0

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1.0 PURPOSE

This document is intended as a reference guide to the usage of AT command set for the 9602-I and 9602-N modems. The term 9602 used in this manual is referenced to both models. The 9602 is compatible with all previous 9601 with the exception of +CCLK. The +CCLK command is still supported but the value returned is now the Iridium system time while the 9601 returned its internal "real time clock" time. A new AT command has been added for the 9602, +SBDGW, and it returns the default gateway on which the modem is programmed to operate.

The 9602 is configured and operated through the use of AT commands. Only AT commands that are relevant to the 9602 are included. AT commands related to functionality of the 9522 and 9522A LBTs are not included. Note that AT commands may be periodically modified, removed or added and, therefore, users should always check for the latest revision by logging on NAL Research's anonymous ftp site (under RESOURCE CENTER of website www.nalresearch.com).

2.0 AT COMMANDS

2.1 AT – ATtention Code

This is the prefix for all commands except A/. When entered without any parameter, the 9602 will respond with OK.

2.2 A/ – Repeat Last Command

Repeat the last command issued to the 9602 unless the power was interrupted or the unit is reset. A/ is not followed by <CR>.

2.3 En – Echo

Echo command characters.

0	Characters are not echoed to the DTE.
1	Characters are echoed to the DTE (default).

2.4 In – Identification

Requests the 9602 to display information about itself.

0	"2400" (for compatibility only)
1	"0000" (for compatibility only)
2	"OK" (for compatibility only)
3	"XXXXXXXX" (Software revision level)
4	"IRIDIUM 9600 Family" (Product description)
5	"8816" (for compatibility only)
6	"XXX" (Factory identity)
7	"XXXXXXXX" (Hardware specification)

2.5 Qn – Quiet Mode

Control 9602 responses.

0	9602 responses are sent to the DTE (default).
1	9602 responses are NOT sent to the DTE.

2.6 Vn – Verbose Mode

Set the response format of the 9602, which may be either numeric or textual.

0   Numeric responses.

1   Textual responses (default).

2.7 Zn – Soft Reset

Reset the 9602's data port to a user-stored configuration that has been previously stored using &Wn.

0   Restores user configuration 0.

1   Restores user configuration 1.

2.8 &Dn – DTR Option

Set the 9602 reaction to the DTR signal.

0   DTR is ignored. A DTR signal input is not needed when set to &D0.

1–3   DTR must be ON. If DTR transitions from ON to OFF, the data port will be locked after approximately 10 seconds to enter the UART test mode. The data port will resume when DTR is restored to ON.

         There is no distinction between settings 1–3. (Default is 2)

2.9 &Fn – Restore Factory Settings

Recall factory default configuration without resetting the data port.

0   Recall factory default 0.

2.10 &Kn – Flow Control

Select the flow control method between the 9602 and DTE. Flow control is only applied to the transfer of SBD message data; it does not apply to AT commands and their responses.

0   Disables flow control.

3   Enables RTS/CTS flow control (default).

2.11 &V – View Active and Stored Configuration

View the current active configuration and stored profiles.

2.12 &Wn – Store Active Configuration

Store the active profile in non-volatile memory. This is used to store user configurations for later use.

0   Store current (active) configuration as profile 0.

1   Store current (active) configuration as profile 1.

2.13 &Yn – Designate Default Reset Profile

Select profile for use after power-up.

0   Select profile 0 (default).

1   Select profile 1.

2.14 %R – Display Registers

Display all the S-registers in the system.

2.15 *F – Flush to EEPROM

Flush all pending writes to EEPROM, shut down the radio, and prepare the 9602 to be powered down. The command returns OK upon completion, at which point it is safe to remove the power without losing non-volatile data.

NOTE: This command stops the 9602 from responding to any more commands, but does not actually power it down. The only way to power down the 9602 is for the DTE to remove the power or to de-assert the on/off control line.

NOTE: After an SBD session, the new SBD MOMSN is always flushed to EEPROM before the +SBDI result is issued.

2.16 *Rn – Radio Activity

Control radio activity.

    0   Disable radio activity.

    1   Enable radio activity (default).

While the radio is disabled: SBD sessions cannot be initiated; they will fail immediately. No SBD Automatic Notifications will be issued for automatic-MT messages. No registration, i.e. location updates will be performed. The baseband circuitry is still active and the 9602 still accepts AT commands.

This command allows the DTE to reduce detectable emissions from the RF circuitry during the idle periods between SBD sessions, and also provides some, limited, power saving in cases where it may be inconvenient for the DTE to power down the 9602.

2.17 +CCLK – Real Time Clock

Exec Command: +CCLK

Query the 9602 for Iridium system time if available.

2.18 +CGMI – Manufacturer Identification

Exec Command: +CGMI

Query the 9602 manufacturer.

2.19 +CGMM – Model Identification

Exec Command: +CGMM

Query the 9602 model.

2.20 +CGMR – Revision

Exec Command: +CGMR

Query the 9602 revision.

2.21 +CGSN – Serial Number

Exec Command: +CGSN

Query the 9602 IMEI.

2.22 +CIER – Indicator Event Reporting

Set Command: +CIER=[<mode>[,<sigind>[,<svcind>]]]

The set command enables or disables sending of the +CIEV unsolicited result code from the 9602 to the DTE in case of indicator state changes. <mode> controls the processing of the +CIEV unsolicited result codes.

<mode>:

0   Disable indicator event reporting; do not send +CIEV unsolicited result codes to the DTE; buffer the most recent indicator event for each indicator in the 9602 (default).

1   Enable indicator event reporting; buffer the most recent +CIEV unsolicited result code for each indicator when the data port is reserved (e.g. in SBD data mode) and flush them to the DTE after reservation; otherwise forward them directly to the DTE.

<sigind>:

Control reporting of "signal quality" indicator changes:

0   No "signal quality" indicator reporting.

1   Enable "signal quality" indicator reporting using result code +CIEV:0,<rssi> where <rssi> is:

    0   0 bar on the signal strength indicator

    1   1 bar on the signal strength indicator

    2   2 bars on the signal strength indicator

    3   3 bars on the signal strength indicator

    4   4 bars on the signal strength indicator

    5   5 bars on the signal strength indicator

The reported signal strength is the same value that would be returned by the +CSQ command. When enabled, the signal quality indicator is reported only when the signal strength changes.

<svcind>:

Control reporting of "service availability" indicator changes:

0   No "service availability" indicator reporting.

1   Enable "service availability" indicator reporting using result code +CIEV:1,<value> where <value> is:

    0   Network service is currently unavailable.

    1   Network service is available.

Network service availability is equivalent to a signal strength greater than 0. The service availability indicator provides a way for the DTE to wait until the 9602 can start an SBD session without receiving continual notifications of changes in signal strength.

Read Command: +CIER?

Query the current indicator event reporting settings. The response is of the form:
+CIER:<mode>,<sigind>,<svcind>,<antind>

where <antind> is not used and is included for compatibility only.

Test Command: +CIER=?

List the supported settings. The response is in the form: +CIER:(supported <mode>s),(supported <sigind>s),(supported <svcind>s) ,(supported <antind>s)

NOTE: In <mode> 1, the DTE may miss some indicator state changes if they occur while the data port is reserved. However, the buffering mechanism ensures that the most recent change for each indicator during reservation will be flushed to the DTE after reservation; thus the DTE is always made aware of the latest state of each indicator.

NOTE: The DTE may initiate an SBD session even if service is unavailable; in this case, the 9602 makes an immediate search for the network and, if successful, starts the SBD session, otherwise the SBD session fails.

2.23 +CRIS – Ring Indication Status

Exec Command: +CRIS

Query the ring indication status, returning the reason for the most recent assertion of the Ring Indicator. The response contains separate indications for telephony and SBD ring indications. The response is in the form: +CRIS:<tri>,<sri>

where <tri> indicates the telephony ring indication status (for compatibility):

0   No telephony ring alert received.

and <sri> indicates the SBD ring indication status:

0   No SBD Ring Alert received.
1   SBD Ring Alert received.

NOTE: The <tri> response is included for compatibility with 9522A applications. The results in the <tri> response should be ignored for 9602 applications. For the 9602 only the <sri> response should be evaluated.

2.24 +CSQ – Signal Quality

Exec Command: +CSQ[F]

Execution command returns the received signal strength indication <rssi> from the 9602. Response is in the form: +CSQ:<rssi>

where <rssi>:

0   Equivalent to 0 numbers displayed on the signal strength indicator.
1   Equivalent to 1 number displayed on the signal strength indicator.
2   Equivalent to 2 numbers displayed on the signal strength indicator.
3   Equivalent to 3 numbers displayed on the signal strength indicator.
4   Equivalent to 4 numbers displayed on the signal strength indicator.
5   Equivalent to 5 numbers displayed on the signal strength indicator.

Test Command: +CSQ=?

List the supported signal strength indications. The response is in the form: +CSQ:(supported <rssi>s)

Each number represents about 2dB improvement in link margin over the previous value. A reading of 0 is at or below the minimum receiver sensitivity level. A reading of 1 indicates about 2dB of link margin. A reading of 5 indicates 10dB or more link margin. These are not calibrated output and provides relative information about the units receive signal, and not an absolute receiver level or even a calibrated signal to noise ratio.

NOTE: A signal strength response may not be immediately available, but will usually be received within two seconds of issuing the command. If the 9602 is in the process of acquiring the system, a delay in response of up to 50 seconds may be experienced.

NOTE: The +CSQF form of the command returns immediately, reporting the last known calculated signal strength. Note that the signal strength returned by this command could be different from the current actual signal strength if the +CSQ form is used. This form is included for Product Developer application compatibility as it provides a Fast response.

2.25 +CULK – Unlock

Exec Command: +CULK=<unlock key>

Unlock the 9602 after it has been locked by the Gateway. The unlock key must be obtained by contacting Iridium's customer support.

<unlock key>:

0000000000000000 .. FFFFFFFFFFFFFFFF A string of 16 hexadecimal digits.

While the 9602 is locked, it is unable to perform any SBD sessions. Any attempts to start a session will return an error code indicating that the 9602 is locked.

Command Response: +CULK:<status>

where <status> indicates the lock status of the 9602 following the unlock attempt:

0   Unlocked – 9602 is not locked and is permitted to perform SBD sessions.
1   Locked – 9602 is locked and unable to perform SBD sessions. It must be unlocked by supplying the correct unlock key to the +CULK command.
2   Permanently locked – 9602 is locked and unable to perform SBD sessions. It cannot be unlocked and must be returned to the supplier.

Read Command: +CULK?

Query the current lock status of the 9602. The response is of the form: +CULK:<status>

<status>:

0   Unlocked
1   Locked
2   Permanently locked

2.26 +GMI – Manufacturer Identification

Exec Command: +CGMI

Query the 9602 manufacturer.

2.27 +GMM – Model Identification

Exec Command: +CGMM

Query the 9602 model.

2.28 +GMR – Revision

Exec Command: +CGMR

Query the 9602 revision.

2.29 +GSN – Serial Number

Exec Command: +CGSN

Query the 9602 IMEI.

2.30 +IPR – Fixed DTE Rate

Set Command: +IPR=<rate>

Set the data rate at which the 9602 will accept commands. The change in data rate takes into effect after the result code (e.g., OK) is received by the DTE.

where <rate>:

1	600 bps
2	1200 bps
3	2400 bps
4	4800 bps
5	9600 bps
6	19200 bps (default)
7	38400 bps
8	57600 bps
9	115200 bps

Read Command: +IPR?

Query the current data rate. The response is in the form: +IPR:<rate>

Test Command: +IPR=?

List the supported data rates. The response is in the form: +IPR:(supported <rate> settings)

2.31 +SBDWB – Short Burst Data: Write Binary Data to the 9602

Exec Command: +SBDWB=<SBD message length>

This command is used to transfer a binary SBD message from the DTE to the single mobile originated buffer in the 9602. The mobile originated buffer can contain only one message at any one time.

- Once the command is entered, and the message length is acceptable, the 9602 will indicate to the DTE that it is prepared to receive the message by sending the ASCII encoded string "READY<CR><LF>" (hex 52 45 41 44 59 0D 0A) to the DTE.

- The <SBD message length> parameter represents the length, in bytes, of the SBD message not including the mandatory two-byte checksum.
- The maximum mobile originated SBD message length is specified at 340 bytes. The minimum mobile originated SBD message length is 1 byte. If the <SBD message length> parameter is out of range, the 9602 issues response 3 (see below).
- Once the DTE receives the READY indication from the 9602, the SBD message must be sent from the DTE formatted as follows: {binary SBD message} + {2-byte checksum}
    - The checksum is the least significant 2-bytes of the summation of the entire SBD message. The high order byte must be sent first. For example if the DTE were to send the word "hello" encoded in ASCII to the 9602 the binary stream would be hex 68 65 6c 6c 6f 02 14.
- The mobile originated buffer will be empty upon power-up.
- If any data is currently in the mobile originated buffer, it will be overwritten.

Command Response:

0   SBD message successfully written to the 9602.

1   SBD message write timeout. An insufficient number of bytes were transferred to 9602 during the transfer period of 60 seconds.

2   SBD message checksum sent from DTE does not match the checksum calculated by the 9602.

3   SBD message size is not correct. The maximum mobile originated SBD message length is 340 bytes. The minimum mobile originated SBD message length is 1 byte.

2.32 +SBDRB – Short Burst Data: Read Binary Data from the 9602

Exec Command: +SBDRB

This command is used to transfer a binary SBD message from the single mobile terminated buffer in the 9602 to the DTE. The mobile terminated buffer can contain only one message at any one time.

- The SBD message is transferred formatted as follows: {2-byte message length} + {binary SBD message} + {2-byte checksum}
- The {2-byte message length} field represents the length, in bytes, of the SBD message not including the length field or the mandatory two-byte checksum. The high order byte will be sent first.
- The maximum mobile terminated SBD message length is length is specified at 270 bytes (and may be increased following actual performance testing).
- The checksum is the least significant 2-bytes of the summation of the entire SBD message. The high order byte will be sent first. For example if the 9602 were to send the word "hello" encoded in ASCII to the DTE the binary stream would be hex 00 05 68 65 6c 6c 6f 02 14.

- If there is no mobile terminated SBD message waiting to be retrieved from the 9602, the message length and checksum fields will be zero.
- The mobile terminated message buffer will be empty upon power-up.

Command Response:

There are no response codes generated by the 9602 for this command.

2.33 +SBDWT – Short Burst Data: Write a Text Message to the 9602

Exec Command: +SBDWT[=<text message>]

This command is used to transfer a text SBD message from the DTE to the single mobile originated buffer in the 9602. The text message may be entered on the command line:

- For example, "AT+SBDWT=hello".
- The length of <text message> is limited to 120 characters. This is due to the length limit on the AT command line interface.
- The message is terminated when a carriage return is entered.

Alternatively, the text message may be entered separately:

- Upon entering the command "AT+SBDWT", the 9602 will indicate to the DTE that it is prepared to receive the message by sending the string "READY<CR><LF>" (hex 52 45 41 44 59 0D 0A) to the DTE.
- Once the DTE receives the READY indication, the text message must be sent, terminated by a carriage return.
- The length of the text message entered in this way is limited only by maximum mobile-originated SBD message length of 340 bytes.
- The mobile originated buffer will be empty upon power-up.
- If any data is currently in the mobile originated buffer, it will be overwritten.

Command Response:

For the "AT+SBDWT" form:

0   SBD message successfully written to the 9602.

1   SBD message write timeout. An insufficient number of bytes were transferred to 9602 during the transfer period of 60 seconds.

For the "AT+SBDWT=<text message>" form:

OK: SBD message successfully stored in mobile originated buffer.

ERROR: An error occurred storing SBD message in mobile originated buffer.

2.34 +SBDRT – Short Burst Data: Read a Text Message from the 9602

Exec Command: +SBDRT

This command is used to transfer a text SBD message from the single mobile terminated buffer in the 9602 to the DTE. This command is similar to +SBDRB but does not provide a length indicator or checksum. The intent of this command is to provide a human friendly interface to SBD for demonstrations and application development. It is expected that most usage of SBD will be with binary messages.

- Once the command is entered, the SBD message in the mobile terminated buffer is sent out of the port.

- This command is similar to +SBDRB except no length or checksum will be provided.

- The maximum mobile terminated SBD message length is 270 bytes.

- The mobile terminated message buffer will be empty upon power-up.

Command Response:

+SBDRT:<CR> {mobile terminated buffer}

2.35 +SBDI – Short Burst Data: Initiate an SBD Session

NOTE: The +SBDI command is provided for backwards compatibility with existing DTEs which do not use SBD Automatic Notification functionality. For SBD calls invoked with this command:

- The SBD Session Type is fixed at type 0 – MO call.
- The SBD Delivery Short Code will be the value specified by the +SBDDSC command.
- The Detach/Attach flag is fixed at the Detach setting.
- The Location Update flag is fixed at the No Update setting.

DTEs requiring SBD Automatic Notification functionality should use the extended +SBDIX command.

Exec Command: +SBDI

This command initiates an SBD session between the 9602 and the GSS. If there is a message in the mobile originated buffer it will be transferred to the GSS. Similarly if there is one or more messages queued at the GSS the oldest will be transferred to the 9602 and placed into the mobile terminated buffer.

- The message, if any, in the mobile originated buffer will be sent from the 9602 to the GSS.

- If there is a MT-SBD message queued at the GSS it will be transferred to the 9602 and placed into the mobile terminated buffer.

Command Response: +SBDI:<MO status>,<MOMSN>,<MT status>,<MTMSN>,<MT length>,<MT queued>

<MO status>: MO session status provides an indication of the disposition of the mobile originated transaction. The field can take on the following values:

0   No SBD message to send from the 9602.

1   SBD message successfully sent from the 9602 to the GSS.

2   An error occurred while attempting to send SBD message from 9602 to GSS.

<MOMSN>: The Mobile Originated Message Sequence Number (MOMSN) is a value assigned by the 9602 when sending a mobile-originated message to the GSS. This value is incremented each time an SBD session is successfully completed between the 9602 to the GSS. This wrap around counter can range from 0 to 65535.

<MT status>: The MT status provides an indication of the disposition of the mobile terminated transaction. The field can take on the following values:

0   No SBD message to receive from the GSS.

1   SBD message successfully received from the GSS.

2   An error occurred while attempting to perform a mailbox check or receive a message from the GSS.

<MTMSN>: The Mobile Terminated Message Sequence Number (MTMSN) is assigned by the GSS when sending a message to the 9602. This value is indeterminate if the field <MT status> is zero. This wrap around counter can range from 0 to 65535.

<MT length>: The MT length is the length in bytes of the mobile terminated SBD message received from the GSS. If no message was received, this field will be zero.

<MT queued>: MT queued is a count of mobile terminated SBD messages waiting at the GSS to be transferred to the 9602.

2.36 +SBDDET – Short Burst Data: Detach

Exec Command: +SBDDET

Initiates an SBD session to stop sending SBD Ring Alerts to the 9602 from the Gateway (detach).

Command Response: +SBDDET:<status>,<error>

<status>:

0   Detach successfully performed

1   An error occurred while attempting the detach

<error>:

Gateway-reported values

0   No error.

1..4   Reserved, but indicate success if used.

5..14   Reserved, but indicate failure if used.

15   Access is denied.

9602-reported values

16   9602 has been locked and may not make SBD calls (see +CULK command).

17   Gateway not responding (local session timeout).

18   Connection lost (RF drop).

19..31 Reserved, but indicate failure if used.

32   No network service, unable to initiate call.

33   Antenna fault, unable to initiate call.

34   Radio is disabled, unable to initiate call (see *Rn command).

35   9602 is busy, unable to initiate call (typically performing auto-registration).

36..   Reserved, but indicate failure if used.

This command instructs the GSS to stop sending SBD Ring Alerts (detach) for the calling 9602. Successful completion of the detach command implies that the GSS has performed the requested detach action and the 9602 will no longer receive any notifications of queued MT Messages from the GSS. This session does not transfer any MO or MT messages.

NOTE: A user can send an MO-SBD message and request a detach at the same time by using the +SBDI command. The +SBDI command always requests a detach.

2.37 +SBDDSC – Short Burst Data: Delivery Short Code

Set Command: +SBDDSC=<dsc>

Set the Delivery Short Code (DSC), which provides some additional options for control of MT messages. This is an 8-bit value providing the ability to set individual fields. Value 0x80 (hexadecimal) sets the most significant bit. Value 0x01 sets the least significant bit. Flag values can be added together to achieve a combination of settings. Some fields may be "locked" when the 9602 is in a special mode (e.g. Autoregistration locks the flag values 0x80 and 0x40).

<dsc>:

0x00 to 0xFF	DSC to be used for subsequent uploaded messages (0x00 is default)
0x80	Hold MT message delivery
0x40	Leave MT message in queue after delivery

Read Command: +SBDDSC?

Query the current Delivery Short Code. The response is of the form: +SBDDSC:<dsc>

2.38 +SBDIX – Short Burst Data: Initiate an SBD Session Extended

NOTE: The +SBDIX command must be used in place of the +SBDI command for DTEs wishing to make use of SBD Automatic Notification functionality.

Exec Command: +SBDIX[A][=<location>]

This command initiates an SBD session between the 9602 and the GSS, setting the SBD Session Type according to the type of command +SBDIX or +SBDIXA, Delivery Short Code according to the value specified by the +SBDDSC command, and the type of location according to whether the optional location value is provided. If there is a message in the mobile originated buffer it will be transferred to the GSS. Similarly if there is one or more MT messages queued at the GSS the oldest will be transferred to the 9602 and placed into the mobile terminated buffer.

- The message, if any, in the mobile originated buffer will be sent from the 9602 to the GSS.
- If there is a MT message queued at the GSS it will be transferred to the 9602 and placed into the mobile terminated buffer.
- This command will always attempt an SBD Network Registration, consisting of attach and location update, during the SBD session in order to support SBD Automatic Notification. If this is not desired, the +SBDI command should be used.

- The DTE should append an "A" to the command, i.e. +SBDIXA, when the SBD session is in response to SBD Ring Alert. If this option is not used, more than one SBD Ring Alert may be received.

<location> has format: [+|-]DDMM.MMM,[+|-]dddmm.mmm

where

DD	Degrees latitude (00-89)
MM	Minutes latitude (00-59)
MMM	Thousandths of minutes latitude (000-999)
ddd	Degrees longitude (000-179)
mm	Minutes longitude (00-59)
mmm	Thousandths of minutes longitude (000-999)

The optional sign indicators specify latitude North (+) or South (−), and longitude East (+) or West (−). If omitted, the default is +. For example, AT+SBDIX=5212.483,-00007.350 corresponds to 52 degrees 12.483 minutes North, 0 degrees 7.35 minutes West.

NOTE: The <location> feature is a future capability and has not been implemented.

Command Response: +SBDIX:<MO status>,<MOMSN>,<MT status>,<MTMSN>,<MT length>,<MT queued>

<MO status>: MO session status provides an indication of the disposition of the mobile originated transaction. The field can take on the following values:

Gateway-reported values

0	MO message, if any, transferred successfully.
1	MO message, if any, transferred successfully, but the MT message in the queue was too big to be transferred.
2	MO message, if any, transferred successfully, but the requested Location Update was not accepted.
3..4	Reserved, but indicate MO session success if used.
5..8	Reserved, but indicate MO session failure if used.
10	Gateway reported that the call did not complete in the allowed time.
11	MO message queue at the Gateway is full.
12	MO message has too many segments.
13	Gateway reported that the session did not complete.
14	Invalid segment size.
15	Access is denied.

9602-reported values

16	9602 has been locked and may not make SBD calls (see +CULK command).
17	Gateway not responding (local session timeout).

18	Connection lost (RF drop).
19..31	Reserved, but indicate MO session failure if used.
32	No network service, unable to initiate call.
33	Antenna fault, unable to initiate call.
34	Radio is disabled, unable to initiate call (see *Rn command).
35	9602 is busy, unable to initiate call (typically performing auto-registration).
36..	Reserved, but indicate failure if used.

<MOMSN>: The Mobile Originated Message Sequence Number (MOMSN) is a value assigned by the 9602 when sending a mobile-originated message to the GSS. This value is incremented each time an SBD session is successfully completed between the 9602 to the GSS. This wrap around counter can range from 0 to 65535.

<MT status>: The MT status provides an indication of the disposition of the mobile terminated transaction. The field can take on the following values:

0	No MT SBD message to receive from the Gateway.
1	MT SBD message successfully received from the Gateway.
2	An error occurred while attempting to perform a mailbox check or receive a message from the Gateway.

<MTMSN>: The Mobile Terminated Message Sequence Number (MTMSN) is assigned by the GSS when forwarding a message to the 9602. This value is indeterminate if the field <MT status> is zero. This wrap around counter can range from 0 to 65535.

<MT length>: The MT length is the length in bytes of the mobile terminated SBD message received from the GSS. If no message was received, this field will be zero.

<MT queued>: MT queued is a count of mobile terminated SBD messages waiting at the GSS to be transferred to the 9602.

2.39 +SBDMTA – Short Burst Data: Mobile-Terminated Alert

Set Command: +SBDMTA=<mode>

Enable or disable the 9602 to listen for SBD Ring Alerts.

<mode>:

0	Disable SBD Ring Alert indication
1	Enable SBD Ring Alert ring indication (default)

When SBD Ring Alert indication is enabled, the 9602 asserts the RI line and issues the unsolicited result code SBDRING when an SBD Ring Alert is received.

Read Command: +SBDMTA?

Query the current ring indication mode. The response is of the form: +SBDMTA:<mode>

Test Command: +SBDMTA=?

List the supported mode settings. The response is of the form: +SBDMTA:(supported <mode> settings)

NOTE: There are a number of required steps in both the 9602 and the GSS in order to successfully enable SBD Automatic Notifications. Consult the SBD Developers Guide section on Automatic Notifications for Mobile Terminated Messages.

2.40 +SBDREG – Short Burst Data: Network Registration

Exec Command: +SBDREG[=<location>]

Triggers an SBD session to perform a manual SBD Network Registration.

This command initiates an SBD session to perform a manual SBD Network Registration, consisting of an attach and location update. The session type will be set to 2 – registration. This session does not transfer any MO or MT message(s).

NOTE: The 9602 restricts the number of manual and automatic registrations to one every 3 minutes. Successive attempts within 3 minutes will return an error code indicating that the FA should try later (see error 36 below).

NOTE: A user can send an MO SBD message and perform a SBD Network Registration at the same time by using the +SBDIX command. The +SBDIX command always performs a SBD Network Registration attempt and should be used for an application requiring SBD Automatic Notification. The +SBDI command never includes an SBD Network registration and should be used for an application that does not require SBD Automatic Notification.

NOTE: If you are not using MT-SBD messages there is no requirement or benefit to using this command.

<location> has format: [+|-]DDMM.MMM,[+|-]dddmm.mmm

where:

DD	Degrees latitude (00-89)
MM	Minutes latitude (00-59)
MMM	Thousandths of minutes latitude (000-999)
ddd	Degrees longitude (000-179)
mm	Minutes longitude (00-59)
mmm	Thousandths of minutes longitude (000-999)

The optional sign indicators specify latitude North (+) or South (-), and longitude East (+) or West (-). If omitted, the default is +. For example, AT+SBDIX=5212.483,-00007.350 corresponds to 52 degrees 12.483 minutes North, 0 degrees 7.35 minutes West.

NOTE: The <location> feature is a future capability and has not been implemented.

Command Response: +SBDREG:<status>,<reg err>

<status> indicates the resulting registration status of the 9602

0   Detached – 9602 is detached as a result of a successful +SBDDET or +SBDI command.

1   Not registered – 9602 is attached but has not provided a good location since it was last detached.

2   Registered – 9602 is attached with a good location. Note that this may be the case even when the most recent attempt did not provide a good location.

3   Registration denied – The gateway is denying service to the 9602.

<reg err>:

Gateway-reported values

    0   No error.

    2   Session completed but the requested Location Update was not accepted.

    3..14   Reserved, but indicate Location Update failure if used.

    15   Access is denied.

9602-reported values

    16   9602 has been locked and may not make SBD calls (see +CULK command).

    17   Gateway not responding (local session timeout).

    18   Connection lost (RF drop).

    19..31 Reserved, but indicate failure if used.

    32   No network service, unable to initiate call.

    33   Antenna fault, unable to initiate call.

    34   Radio is disabled, unable to initiate call (see *Rn command).

    35   9602 is busy, unable to initiate call (typically performing auto-registration).

    36   Try later, must wait 3 minutes since last registration.

    37..   Reserved, but indicate failure if used.

Read Command: +SBDREG?

Query the current SBD registration status of the 9602. The response is of the form: +SBDREG:<status>

<status>:

    0   Detached

    1   Not registered

    2   Registered

    3   Registration denied

    4   Unknown

The SBD Network Registration status is stored in 9602 non-volatile memory, and can therefore be queried by the DTE after powering up. Note that if the 9602 is powered off and then moved any significant distance (> 150 Km) that the location information will be incorrect when the 9602 is subsequently powered on. It is recommended that Product Developers initiate a SBD Network Registration following power on if the application is using Mobile Terminated Messages in conjunction with SBD Ring Alerts.

NOTE: There are a number of required steps in both the 9602 and the GSS in order to successfully enable SBD Automatic Notifications. Consult the SBD Developers Guide section on Automatic Notifications for Mobile Terminated Messages.

2.41 +SBDAREG – Short Burst Data: Automatic Registration

Set Command: +SBDAREG=<mode>

Set the 9602's automatic SBD Network Registration mode.

<mode>:

0	Disable Automatic SBD Network Registration (default)
1	Set the Automatic SBD Network Registration mode to "Automatic"
2	Set the Automatic SBD Network Registration mode to "Ask"

When Automatic SBD Network Registration is enabled, mode 1 or 2, the 9602 monitors its current location and triggers an Automatic SBD Network Registration when it determines that the 9602 has moved sufficiently far away from its last registered location. Note that Automatic SBD Network Registration runs only while the 9602 is attached to the gateway, i.e. the registration status is "Not registered" or "Registered".

A registration status is "Not registered" when the 9602 has not yet attempted communications with the gateway. The registration status is "Registered" when (1) the device has been provisioned and (2) is ready to communicate and (3) if the Ring Alert has been configured then the application will get notification of messages waiting for subscriber terminated delivery. If a registration is denied the device is prohibited from communications on the network (most likely a provisioning issue.) If in a detached state the unit will not receive ring alerts. This may be due to unknown location at the gateway or because the unit has been reconfigured to not receive alerts.

Automatic SBD Network Registration may only be used with system-provided location. If the DTE is providing its own location (e.g. GPS) and the DTE should use the manual SBD Network Registration command, +SBDREG.

Upon triggering in mode 1, "Automatic", the 9602 autonomously initiates an SBD session in order to perform a SBD Network Registration with the updated location of the 9602, with the session type set to 3 – auto-registration. This session does not transfer any MO or MT messages.

Upon triggering in mode 2, "Ask", the 9602 reports to the DTE that it should register with the system because the 9602 location has changed (see <event> below); it is then the responsibility of the DTE to register via +SBDREG or +SBDIX. +SBDIX allows the DTE to register while including an MO message and/or retrieving an MT message that is pending at the Gateway.

When auto-registration is enabled, mode 1 or 2, the 9602 reports relevant events to the DTE by issuing an unsolicited result code +AREG:<event>,<reg error>.

<event>:

0	Suggest DTE makes a registration attempt (mode 2 only)

1	Auto-registration has been performed successfully (mode 1 only)	
2	Auto-registration has failed and will be retried after a delay (mode 1 only)	

<reg error>:

Gateway-reported values

0	No error.
2	Session completed but the requested Location Update was not accepted.
3..14	Reserved, but indicate Location Update failure if used.
15	Access is denied.

9602-reported values

16	9602 has been locked and may not make SBD calls (see +CULK command).
17	Gateway not responding (local session timeout).
18	Connection lost (RF drop).
19..31	Reserved, but indicate failure if used.
32	No network service, unable to initiate call.
33	Antenna fault, unable to initiate call.
34	Radio is disabled, unable to initiate call (see *Rn command).
35	9602 is busy, unable to initiate call (typically performing auto-registration).
36	Try later, must wait 3 minutes since last registration.
37..	Reserved, but indicate failure if used.

Read Command: +SBDAREG?

Query the current automatic MT registration mode. The response is of the form: +SBDAREG:<mode>

Test Command: +SBDAREG=?

List the supported mode settings. The response is of the form: +SBDAREG:(supported <mode> settings)

NOTE: There are a number of required steps in both the 9602 and the GSS in order to successfully enable SBD Automatic Notifications. Consult the SBD Developers Guide section on Automatic Notifications for Mobile Terminated Messages.

2.42 +SBDD – Short Burst Data: Clear SBD Message Buffer(s)

Exec Command: +SBDD<Delete type>

This command is used to clear the mobile originated buffer, mobile terminated buffer or both. The <Delete type> parameter identifies which buffers are cleared.

0	Clear the mobile originated buffer.
1	Clear the mobile terminated buffer.

2 Clear both the mobile originated and mobile terminated buffers. Using this command or power cycling the 9602 are the only means by which both buffers are cleared. The mobile terminated buffer will be cleared when an SBD session is initiated. Sending a message from the 9602 to the ESS does not clear the mobile originated buffer. Reading a message from the 9602 does not clear the mobile terminated buffer.

Command Response:

0 Buffer(s) cleared successfully.

1 An error occurred while clearing the buffer(s).

2.43 +SBDC – Short Burst Data: Clear SBD MOMSN

Exec Command: +SBDC

This command will clear (set to 0) the mobile originated message sequence number (MOMSN) stored in the 9602. The MOMSN is maintained even after power cycle.

Command Response:

0 The MOMSN was cleared successfully.

1 An error occurred while clearing the MOMSN.

2.44 +SBDS – Short Burst Data: Status

Exec Command: +SBDS

This command returns current state of the mobile originated and mobile terminated buffers.

Command Response: +SBDS:<MO flag>,<MOMSN>,<MT flag>,<MTMSN>

<MO flag>: The MO flag indicates the existence of a message in the mobile originated buffer. The response from the 9602 is one of the following numeric codes:

0 No message in mobile originated buffer

1 Message in mobile originated buffer

<MOMSN>: The MOMSN identifies the sequence number that will be used during the next mobile originated SBD session.

<MT Flag>: The MT flag indicates the existence of a message in the mobile terminated buffer. The response from the 9602 is one of the following numeric codes:

0 No message in mobile terminated buffer

1 Message in mobile terminated buffer

<MTMSN>: The MTMSN identifies the sequence number that was used in the most recent mobile terminated SBD session. This value will be –1 if there is nothing in the mobile terminated buffer.

2.45 +SBDSX - Short Burst Data: Status Extended

Exec Command: +SBDSX

This command returns current state of the mobile originated and mobile terminated buffers, and the SBD ring alert status.

Command Response: +SBDSX: <MO flag>, <MOMSN>, <MT flag>, <MTMSN>, <RA flag>, <msg waiting>

<MO flag>: The MO flag indicates the existence of a message in the mobile originated buffer. The response from the 9602 is one of the following numeric codes:

    0   No message in mobile originated buffer.

    1   Message in mobile originated buffer.

<MOMSN>: The MOMSN identifies the sequence number that will be used during the next mobile originated SBD session.

<MT Flag>: The MT flag indicates the existence of a message in the mobile terminated buffer. The response from the 9602 is one of the following numeric codes:

    0   No message in mobile terminated buffer.

    1   Message in mobile terminated buffer.

<MTMSN>: The MTMSN identifies the sequence number that was used in the most recent mobile terminated SBD session. This value will be −1 if there is nothing in the mobile terminated buffer.

<RA flag>: The RA flag indicates whether an SBD Ring Alert has been received and still needs to be answered.

    0   No SBD ring alert.

    1   SBD ring alert has been received and needs to be answered.

NOTE: The RA flag is set whenever the 9602 receives an SBD Ring Alert; this happens even if the +SBDMTA setting specifies that SBD ring indications are disabled.

The RA flag is cleared only on successful completion of an SBD mailbox check, i.e. an SBD session invoked with +SBDI[X[A]] in which the returned MT status indicates that no error occurred.

The value of the RA flag is stored in non-volatile memory so it is preserved across power cycling of the 9602.

<msg waiting>: The message waiting flag indicates how many SBD Mobile Terminated messages are currently queued at the gateway awaiting collection by the 9602. This flag is updated after every SBD session, including +SBDI, +SBDIX, +SBDIXA, and +SBDREG.

2.46 +SBDTC – Short Burst Data: Transfer MO Buffer to MT Buffer

Exec Command: +SBDTC

This command will transfer the contents of the mobile originated buffer to the mobile terminated buffer. Product Developers of DTE can use this command to test reading and writing to the 9602 without actually initiating SBD sessions with the ESS.

Command Response:

The command produces a response of the form "SBDTC: Outbound SBD copied to Inbound SBD: size = <size>" followed by "OK", where:

<size>: The length of the message in bytes.

2.47 +SBDGW – Short Burst Data: Gateway

Exec Command: +SBDGW

This command will read back the Iridium gateway that the Short Burst Data messages are being sent to.

Command Response:

The command produces a response of the form "SBDGW: <Gateway>" where <Gateway> is either EMSS or non-EMSS.

2.48 -MSSTM – Request System Time

Exec Command: -MSSTM

Query the latest system time received from the network. The response is the form: -MSSTM:<system_time>

<system_time> can take one of the following forms:

no network service	The 9602 has not yet received system time from the network.
XXXXXXX	Where XXXXXXXX is the current Iridium system time available from the network. The system time as received through the Iridium Air Interface, is a 32 bit integer count of the number of 90 millisecond intervals that have elapsed since the epoch. The return value is formatted as an ASCII hexadecimal number. The counter will rollover approximately every 12 years.

Iridium system time epoch: Mar 8, 2007, 03:50:35 (GMT):

Iridium system time source: The system time is available and valid only after the 9602 has found the network and has received the Iridium system time from the network. Once the time is received, the 9602 uses its internal clock to increment the counter. In addition, at least every 8 hours, or on location update or other event that requires re-registration, the 9602 will obtain a new system time from the network.

Time localization: None. The system time value is always expressed in GMT time.

Resolution and accuracy: The resolution of the system time is one Iridium frame tick, or 90 ms. Accuracy as measured by the difference between the time reported and the actual time it is sent out the 9602 serial port should not exceed 4 frame ticks (.36 seconds) and in most cases will be one frame tick (.09 seconds) or less.

3.0 S-REGISTER DEFINITIONS

S-registers allow control over specific 9602 operations. Some S-registers contain a single numeric value, other S-registers are bit-mapped where individual bits, or set of bits, control specific functions. Table 1 defines the S-registers used for 9602 transceiver. Some legacy S-registers from the 9522A are obsolete for 9602, and 9602 requires a few new S-registers. To prevent reallocation of obsolete S-registers, they

are reserved and shaded out in the table, and the new S-registers are registers that are unused in 9522A and are marked as "new for 9602 transceiver."

All S-registers, from S0 to S127, are readable. All write permissions remain unchanged from 9522A transceiver, even where a writable register is not used in 9602 transceiver. Writable registers are highlighted in the "Sr=n writable?" column. A DTE could use the unused writable S-registers to store application-specific data.

The final column in the table indicates which S-registers are stored in non-volatile memory as part of a user profile; the 9602 can be reset to a stored profile using the Zn command.

3.1 S-Register Commands

Commands allow S-registers to be read, written, or simply referenced (i.e. set a pointer to designate the current, referenced S-register). S-register commands are described in the following subsections.

3.1.1 Sr – Direct S-Register Reference

Set a pointer to reference S-register r.

3.1.2 Sr? – Direct S-Register Read

Read the value of S-register r.

3.1.3 Sr=n – Direct S-Register Write

Set the value of S-register r to n, where n is a decimal value in the range 0 to 255.

3.1.4 ? – Referenced S-Register Read

Read the value of the current referenced S-register. The current referenced S-register is that which was last acted upon by a direct reference (ATSr), read (ATSr?), or write (ATSr=n) command.

3.1.5 =n – Referenced S-Register Write

Set the value of the current referenced S-register to n. The current referenced S-register is that which was last acted upon by a direct reference (ATSr), read (ATSr?), or write (ATSr=n) command.

3.2 S-Registers

Table 1 below defines the S-registers used for 9602 transceiver. To prevent reallocation of obsolete S-registers, they are reserved and shaded out in the table, and the new S-registers are registers that are unused in 9522A Transceiver and are marked as "new for 9602 Transceiver."

Register	Range	Default	Description	Sr=n Writable?	Profile Setting?
S0			Not Applicable to 9602		
S1			Not Applicable to 9602		
S2	0–255	43	Not applicable to 9602 Escape code character	X	X
S3	0–127	13	Carriage return character	X	

S4	0–127	10	Line feed character	X	
S5	0–32	8	Backspace character	X	
S6			Not Applicable to 9602		
S7			Not Applicable to 9602		
S8			Not Applicable to 9602		
S9			Not Applicable to 9602		
S10			Not Applicable to 9602		
S11			Not Applicable to 9602		
S12			Not Applicable to 9602		

S13	0–255	49	Bitmap register:
			  Bits 0–1: DCE data bits
			  Bits 2–3: DCE stop bits
			  Bits 4–6: DCE parity setting
					X

S14	0–255	170	Bitmap register:
			  Bit 1: En setting (echo)
			  Bit 2: Qn setting (quiet)
			  Bit 3: Vn setting (verbose)
			  Bit 5: Not Application to 9602
				X	X

S21	0–255	48	Bitmap register:
			  Bit 0: Not Application to 9602
			  Bit 2: Not Application to 9602
			  Bits 3–4: &Dn setting (DTR operation)
			  Bit 5: Not Application to 9602
			  Bit 6: Not Application to 9602
					X

S22			Not Applicable to 9602		

S23	0–255	61	Bitmap register:
			  Bits 1–4: +IPR setting (DTE baud rate)
			  Bits 6–7: Not Applicable to 9602
					X

S25			Not Applicable to 9602		
S27			Not Applicable to 9602		
S28			Not Applicable to 9602		
S30			Not Applicable to 9602		
S31			Not Applicable to 9602		
S34			Not Applicable to 9602		
S35			Not Applicable to 9602		
S36			Not Applicable to 9602		
S37			Not Applicable to 9602		
S39	0–255	3	Bitmap register: Bits 0–2: &Kn setting (flow control)		X
S40			Not Applicable to 9602		
S41			Not Applicable to 9602		
S42			Not Applicable to 9602		
S43			Not Applicable to 9602		
S44			Not Applicable to 9602		
S45			Not Applicable to 9602		
S47			Not Applicable to 9602		
S49			Not Applicable to 9602		
S51			Not Applicable to 9602		
S52			Not Applicable to 9602		
S54			Not Applicable to 9602		

S58			Not Applicable to 9602		
S95			Not Applicable to 9602		
S96			Not Applicable to 9602		
S98			Not Applicable to 9602		
S99			Not Applicable to 9602		
S100			Not Applicable to 9602		
S102			Not Applicable to 9602		
S103			Not Applicable to 9602		
S104			Not Applicable to 9602		
S106			Not Applicable to 9602		
S107			Not Applicable to 9602		
S110			Not Applicable to 9602		
S111			Not Applicable to 9602		
S112	0–255	0	SBD upload message sequence number (high byte)		
S113	0–255	0	SBD upload message sequence number (low byte)		

S121	0–15	1	New for 9602 transceiver
			Bitmap register:
			  Bit 0: +SBDMTA setting (ring indication)
			  Bits 1–2: +SBDAREG setting (automatic registration)
					X

S122	0–31	1	New for 9602 transceiver
			Bitmap register:
			  Bit 0: *R setting (radio activity)
			  Bits 1–4: +CIER setting (indicator event reportin)
					X

S123			Not Applicable to 9602		
S124			Not Applicable to 9602		
S125			Not Applicable to 9602		
S126			Not Applicable to 9602		
S127			Not Applicable to 9602		

4.0 SUMMARY OF RESULT CODES

Numeric (V0)	Verbose (V1)	Description
0	'OK'	Acknowledges execution of command
126	'SBDRING'	MT-SBD message(s) present a gateway (unsolicited if enabled)
4	'ERROR'	Command not accepted
127	'HARDWARE FAILURE: <subsys>,<error>'	Issued at initialization in case of a hardware failure
As verbose	'READY'	Ready to receive binary message data from DTE
As verbose	'+AREG:<event>,<reg error>'	Auto-registration event report
As verbose	'+CIEV:<sig>,<value>'	Indicator event report (unsolicited if enabled)

5.0 INFORMATIVE EXAMPLES

5.1 Setting the Default Configuration

The DTE sets the 9602's default configuration to no handshaking, no flow control, radio enabled, SBD automatic notifications enabled.

To 9602 (from DTE)	To DTE (from 9602)	Description
AT&K0		Disable RTS/CTS flow control
	OK	
AT*R1		Enable the radio
	OK	
AT+SBDMTA=1		Enable SBD ring indications
	OK	
AT&W0		Store the configuration as profile 0
	OK	
AR&Y0		Select profile 0 as the power-up default
	OK	

5.2 Power-On to Sending a Message

The DTE will power up the 9602, wait for the 9602 to acquire the network, and send a 70-byte message.

To 9602 (from DTE)	To DTE (from 9602)	Description
		Apply power to 9602
		Wait for DSR to become asserted
AT+CIER=1,0,1,0		Enable service indication reporting (note that this can be stored in the default configuration)
	OK	
	+CIEV: 1,1	Wait for the 9602 to acquire the network
AT+SBDWB=70		Transfer message to 9602
	READY	
<binary transfer>		
	0	
AT+SBDIX		Perform SBD session
	+SBDIX: 0,23,0,−1,0,0	
AT+SBDD0		Clear the MO message buffer
	OK	

5.3 Automatic Notification Registration

The DTE verifies its registration state, performs a registration in order to be able to receive automatic notifications, and enables automatic notification indications.

To 9602 (from DTE)	To DTE (from 9602)	Description
AT+SBDREG?		Query the 9602 registration status
	+SBDREG:0	9602 is detached; i.e. un-registered
AT+SBDREG		Tell 9602 to register for automatic notification
	+SBDREG:2,0	9602 is now registered
AT+SBDREG?		Query the 9602 registration status
	+SBDREG:2	9602 is registered

To 9602 (from DTE)	To DTE (from 9602)	Description
AT+SBDMTA=1		Enable SBD ring indications from 9602 to DTE
	OK	

5.4 Automatic Notification Message Reception

The DTE verifies its registration state. Upon receiving a automatic notification the DTE initiates an SBD session to receive an MT message.

To 9602 (from DTE)	To DTE (from 9602)	Description
AT+SBDREG?		Query the 9602 registration status
	+SBDREG:2	9602 is registered
	…	Application sends an MT message to the GSS
	+SBDRING	9602 indicates incoming message. RI line toggles.
AT+SBDIXA		DTE initiates an SBD session in answer to the automatic notification
	+SBDIXA:0,23,1,237,90,2	9602 informs DTE that a 90-byte message was successfully received with MTMSN 237 and that two further MT messages are queued at the GSS
AT+SBDRB		DTE retrieves the received message from the 9602
	OK	

5.5 Automatic Notification Automatic Registration

The DTE verifies its registration state and enables automatic registration using the "Ask" mode.

To 9602 (from DTE)	To DTE (from 9602)	Description
AT+SBDREG?		Query the 9602 registration status
	+SBDREG:2	9602 is registered
AT+SBDAREG=2		DTE sets the automatic registration to "Ask" mode
	OK	
	…	9602 is moved
	+AREG:0,0	9602 notifies DTE that that needs to register
AT+SBDREG		DTE instructs the 9602 to register
	+SBDREG:2,0	Registration is successful

5.6 Sending a Message with Minimal Radio Activity

Assuming that service indication events have been turned on with AT+CIER=1,0,1, and the radio has been disabled with AT*R0.

To 9602 (from DTE)	To DTE (from 9602)	Description
AT+SBDWB=70		Transfer message to 9602
	READY	
<binary transfer>		
	0	

To 9602 (from DTE)	To DTE (from 9602)	Description
AT*R1		Activate the radio and wait for the 9602 to acquire the network
	OK	
	+CIEV:1,1	9602 has acquired the network
AT+SBDI		Perform SBD session
	+SBDI: 0,23,0,−1,0,0	
AT*R0		Deactivate radio
	OK	
AT+SBDD0	OK	Clear the MO message buffer

5.7 Powering Down

The DTE flushes any pending EEPROM writes before powering down the 9602.

To 9602 (from DTE)	To DTE (from 9602)	Description
AT*F		DTE tells 9602 to flush pending writes to EEPROM and waits for completion
	OK	
<binary transfer>		DTE may now safely disconnected the 9602 power supply

6.0 SUPPORTED AT COMMANDS

Table below lists the AT commands supported by the 9602 module. This list of supported commands is a subset of commands taken from Iridium's AT Command Specification.

Command	Description	Note
AT	Attention code	
A/	Repeat last command	
En	Echo	
In	Identification	
Qn	Quiet mode	
Vn	Verbose mode	
Zn	Soft reset	
&Dn	DTR option	
&Fn	Restore factory settings	
&Kn	Flow control	
&V	View active and stored configuration	
&Wn	Store active configuration	
&Yn	Designate default reset profile	
%R	Display register	
*F	Flush to EEPROM	
*Rn	Radio activity	
+CCLK	Real-time clock	Read Iridium network time if available
+CGMI	Manufacturer identification	
+CGMM	Model identification	
+CGMR	Revision	

+CGSN	Serial number	
+CIER	Indicator event reporting	
+CRIS	Ring Indicator status	
+CSQ	Signal quality	
+CULK	Unlock	
+GMI	Manufacturer identification	
+GMM	Modem identification	
+GMR	Revision	
+GSN	Serial number	
+IPR	Fixed DTE rate	
+SBDAREG	Short burst data: Automatic registration	
+SBDC	Short burst data: Clear SBD MOMSN	
+SBDD	Short burst data: Clear SBD message buffers	
+SBDDET	Short burst data: Detach	
+SBDDSC	Short burst data: Delivery short code	
+SBDI	Short burst data: Initiate an SBD session	
+SBDIX	Short burst data: Initiate an SBD session extended	
+SBDIXA	Short burst data: Initiate an SBD session extended	
+SBDMTA	Short burst data: Mobile-terminated alert	Manual
+SBDRB	Short burst data: Read binary data from 9602	
+SBDREG	Short burst data: Automatic registration	
+SBDRT	Short burst data: Read a text message from the 9602	
+SBDS	Short burst data: Status	
+SBDSX	Short burst data: Status extended	
+SBDTC	Short burst data: Transfer MO buffer to MT buffer	
+SBDWB	Short burst data: Write binary data to the 9602	Manual
+SBDWT	Short burst data: Write a text message to the 9602	
-MSSTM	Request system time	