

AT Commands for Quicksilver QS-100

Version A

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Revision History

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Reference Documents

The latest revisions of the NAL documents are available from the NAL Research website at <https://www.nalresearch.com/support/documentation-downloads/>.

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Acronym List

AESAdvance Encryption Standard
DTEData Terminal Equipment
TCPTransmission Control Protocol
URC.....Unsolicited Result Code

1 INTRODUCTION

This document describes the AT command interface for the Quicksilver QS-100. The AT command interface was developed mainly to support backwards compatibility with user applications that work with data calls. Therefore, all lot of the commands are only for backwards compatibility, and do not perform any function. The commands related to data calls do not actually deal with calls, but rather they deal with Transmission Control Protocol (TCP) connections.

2 SETTINGS

2.1 PROFILE SETTINGS

A subset of settings are part of a group of settings known as the profile. When the device starts up, it will load and apply settings from one of two (2) saved profiles, determined by the **AT&Y** command. The current in use settings are referred to as the active profile. AT commands that modify the profile settings only affect the active profile. The **AT&W** command can be used to persist the active profile to one of the two saved profiles. The factory default profile can be loaded at any time through use of the **AT&F** command. In similar fashion, the saved profiles can be loaded through use of the **ATZ** command.

2.2 VOLATILE SETTINGS

Some settings are not persisted and revert to their default after a power cycle. Some of these settings will also revert to their default when loading a profile with the **AT&F** command **or** **ATZ** command.

2.3 NON-PROFILE PERSISTED SETTINGS

Some settings are persisted, but do not belong to a profile. When changing these settings, they are persisted immediately. A change settings command is listed below.

- Add Admin User (^ADDADMIN)
- Incoming Calls Port (^ANSPORT)
- Change Crypto Officer Password (^CCOP)
- Constellation State Reporting (^CONSR)
- Data Call Destinations (^DEST)
- Iridium Epoch (^IRDEPOCH)
- Key for Decryption (^KD)
- Key for Encryption (^KE)
- Use Encryption (^UE)

3 INTERFACE PROTOCOL

3.1 RESULTS CODES

There are two types of result codes - command result codes and unsolicited result codes. The term "result codes" in this document may refer to either or both of these types. The context should make it clear.

3.2 UNSOLICITED RESULT CODES (URCs)

When the device needs to notify of events, it will send what is known as unsolicited result codes. If the interface is reserved due to in-progress command entry, command execution, or data mode, the device will buffer the URCs until the interface is no longer reserved and then send them. When executing a command string, the buffered URCs are sent right before the result code of the command string.

3.3 COMMAND EXECUTION

The device will not accept commands at startup until the command interface is ready and the "COMMAND MODE: Ready for Input" URC is sent.

Commands can be entered by sending **AT** (or **at**) followed by zero or more commands, each with its parameters. Individual commands can be surrounded with spaces and semicolons for clarity. Backspace can be used to edit the command string and Ctrl-x (ASCII 18) can be used to abort command entry. When carriage return is entered, the commands in the command string will be executed one by one. As the commands are executed, commands that return information will output this information in what is known as "information responses". Once all of the commands in the command string have been executed successfully an OK result code will be sent. If any of the commands fail, the appropriate error result code will be sent and the remaining commands will not be executed.

The last command string issued to the device since power on can be rerun by sending **A/** without a carriage return.

3.4 OPTIONAL PARAMETERS

Some commands have optional parameters, indicated by []. If the command only has one parameter and does not use an equals sign (=) to separate the parameter from the command body, 0 is assumed when the parameter is omitted. Otherwise, omitted parameters imply the current value should be left unchanged. When optional parameters are omitted, trailing commas may also be omitted.

3.5 TEST COMMANDS (=?)

All commands support being run with =?. This is considered testing the command. When run in this way, a command may output some helpful text about the usage of the command, the accepted values, or it may not output any info and will only result in **OK**. Since testing is supported with all commands, it is not documented for each individual command.

3.6 OUTPUT

Echoing of command string characters during command entry can be controlled with the ATE command. Most, but not all, command result codes and unsolicited result codes can be suppressed using the **ATQ** command. Result codes, that support it, may be configured to display as numeric with the **ATV** command. The table below shows the difference in format between numeric and verbose.

	Numeric (ATV0)	Verbose (ATV1)
Result Codes	\<numeric>\r	\r\n\<textual>\r\n
Informational Responses	\<text>\r\n	\r\n\<text>\r\n

3.7 DATA MODE

When a data call is established, either by dialing or answering a call successfully, the interface enters data mode. In this mode, any data sent to the device will be transferred to the remote party and only data received from the remote party will be output. However, AT commands can still be entered while a data call is connected by escaping to in-call command mode. To do this, send +++ followed by a pause in input of at least 800 milliseconds. When the device

sees this sequence of characters, it will output an OK result code and enter in-call command mode. The ATO command can be used to return the interface back to data mode from in-call command mode.

4 ADMINISTRATIVE COMMANDS

4.1 ^ADDADMIN – ADD ADMIN USER

Adds a new user with the Admin role.

Execute: ^ADDADMIN=<name>,<password>

<name>: New user's name. Double quoted string.

<password>: New user's password. Single quoted string.

5 ENCRYPTION COMMANDS

5.1 ^CCOP – CHANGE CRYPTO OFFICER PASSWORD

Execute: ^CCOP=<old>,<new>

Change the Crypto Officer's password from factory-set/old value to new value. The password must consist only of printable keyboard characters. The password will not be reset by AT&F. When the A3LA-RM is set to echo, characters entered between single quotes are echoed as asterisks (*) instead of the actual typed value. The password must be between 8 and 16 characters in length. The factory set password is 'temp password' and must be changed before encryption can be used.

<old>: Old password and must be enclosed by two single quotes ('old password')

<new>: New password and must be enclosed by two single quotes ('new password')

5.2 ^KD – KEY FOR DECRYPTION

Execute: ^KD=<password>,<key>

Allow entering the 32 bytes for the Advance Encryption Standard (AES) decryption key. These bytes must be entered with mandatory leading 0s, where each byte is represented by 2 hexadecimal uppercase characters for a total of 64 digits. The password and key will not be reset by &F. The password and key will not be echoed. This command must be entered twice before an update is made.

NOTE: The decryption key must match the encryption key used on the sending end.

<password>: The Crypto Officer Password must be enclosed by two single quotes (' '). The Crypto Officer Password must be changed from its factory-set value before this command will work.

<key>: The key that must be enclosed by two single quotes (' ') and consist of exactly 64 hex characters (0-9, A-F, a-f). For example,
'0102030405060708090A0B0C0D0E0F101112131415161718191A1B1C1D1E1F20'.

5.3 ^KE – KEY FOR ENCRYPTION

Execute: ^KE=<password>,<key>

Allow entering the 32 bytes for the AES encryption key. These bytes must be entered with mandatory leading 0s, where each byte is represented by 2 hexadecimal uppercase characters for a total of 64 digits. The password and key will not be reset by **&F**. The password and key will not be echoed. This command must be entered twice before an update is made.

NOTE: The encryption key must match the decryption key used on the receiving end.

<password>: The Crypto Officer Password must be enclosed by two single quotes (' '). The Crypto Officer Password must be changed from its factory-set value before this command will work.

<key>: The key that must be enclosed by two single quotes (' ') and consist of exactly 64 hex characters (0-9, A-F, a-f). For example,
'0102030405060708090A0B0C0D0E0F101112131415161718191A1B1C1D1E1F20'.

5.4 ^KZ – KEY ZEROIZATION

Execute: ^KZ=<password>

Reset or zeroize the encryption and the decryption keys and stops encryption. The keys will need to be set again before encryption can be re-enabled.

<password>: The Crypto Officer Password must be enclosed by two single quotes (' '). The Crypto Officer Password must be changed from its factory-set value before this command will work.

NOTE: Unlike the A3LA-RM, the device does not need to be power cycled for enabling encryption to take effect. Enabling encryption takes effect immediately.

5.5 ^UE – USE ENCRYPTION

Execute: ^UE=<password>,<n>

Sets whether to use encryption or not. The factory-default setting is not to use encryption. This command will return an error if the encryption password has not been set. Unlike the A3LA-RM, the Quicksilver does not need to be power cycled to enable encryption to take effect.

<password>: The Crypto Officer Password which must be enclosed by two single quotes ('')

<n>:

0 is not to use encryption and 1 is to use encryption

Read: ^UE?

Returns whether <n> is set to 0 or 1 and then the following messages will appear:

One of: - "Encryption Disabled No Keys Entered" - "Encryption Currently Enabled" -
"Encryption Currently Disabled"

One of: - "Set to be Enabled Next Power Cycle" - "Set to be Disabled Next Power Cycle"

5.6 ^STR – SELF TEST RUN

Execute: ^STR

Cause the modem to run a self-test.

6 PROTOCOL COMMANDS

6.1 ^PKTRT – PACKET RESEND TIMER

Execute: ^PKTRT=<timer>

Sets the timeout interval for when to resend a packet if an acknowledgement has not been received. Applies only to packet mode.

<timer> 1..200. Timeout value in 10th of seconds.

Read: ^PKTRT?

Queries the current setting. Response is in the form: ^PKTRT: <pktrt>

Test: ^PKTRT=?

List the supported values. Response is in the form: ^PKTRT: (supported <timer>s)

6.2 ^PKTS – PROTOCOL SELECTION

Execute: ^PKTS=<pkts>

Sets the protocol to use during a data connection.

<pkts>

- | | |
|---|---|
| 0 | Raw / No protocol. (will be overridden to use packets when encryption is enabled) |
| 1 | Use packets |
| 2 | Use streaming encryption (will be overridden to raw when encryption is not enabled) |

Read: ^PKTS?

Queries the current setting. Response is in the form: ^PKTS:

Test: ^PKTS=?

List the supported values. Response is in the form: ^PKTS: (supported s)

6.3 ^PKTST – PACKET SEND TIMER

Execute: ^PKTST=<timer>

Sets the timeout interval for when to send a packet if the packet threshold size has not been reached.

<timer> 1..600. Timeout value in 10th of seconds

Read: ^PKTST?

Queries the current value. Response is in the form: ^PKTST: <timer>

Test: ^PKTST=?

List the supported <timer> Response is in the form: ^PKTST: (supported <timer>s)

6.4 ^PKTTH – PACKET SEND THRESHOLD

Execute: ^PKTTH=<threshold>

Set the threshold size in bytes of the payload of a packet. Applies only to packet mode.

<threshold> 1..112. Size in bytes of the payload of a packet.

6.5 READ: ^PKTTH?

Queries the current setting. Response is in the form: ^PKTTH: <threshold>

Test: ^PKTTH=?

List the supported values. Response is in the form: ^PKTTH: (supported <threshold>s)

6.6 ^RLE – USE RUN LENGTH ENCODING

Execute: ^RLE=<rle>

Set the modem to utilize run length encoding for data transfers. The other side of the connection must also be configured to use run length encoding in order to decode.

<rle>

0 Do not use run length encoding

1 Use run length encoding

Read: ^RLE?

Queries the current setting. Response is in the form: ^RLE: <rle>

Test: ^RLE=?

List the supported values. Response is in the form: ^RLE: (supported <rle>s)

6.7 ^ASE – CONFIGURE STREAMING ENCRYPTION

Execute: ^ASE=<imei>,<blocks>,<timeout>

Configures settings used for the streaming encryption protocol for data connections.

<imei>: Whether or not to send the unencrypted IMEI at the beginning of the call.

0 Do not send IMEI (Default)

1 Send IMEI

<blocks>: Max number of encrypted blocks to send before a sync byte is required.
Allowable range is 1 - 255. Default is 1.

<timeout>: Milliseconds to wait before sending a partial block. Allowable range is 1 – 65535 in units of milliseconds. Default is 1000.

Read: ^ASE?

Read command returns the current streaming encryption settings. Response is in the form:

^ASE:<imei>,<blocks>,<timeout>

7 PROFILE COMMANDS

7.1 Z – SOFT RESET

Execute: Z[<n>]

Load and apply a stored profile.

<n>:

- | | |
|---|-----------|
| 0 | Profile 0 |
| 1 | Profile 1 |

7.2 &F – RESTORE FACTORY SETTINGS

Execute: &F[<n>]

Recall factory defaults.

<n>:

- | | |
|---|--------------------------|
| 0 | Recall factory default 0 |
|---|--------------------------|

7.3 &V – VIEW ACTIVE AND STORED CONFIGURATION

View the current active configuration and stored profiles.

7.4 &W – STORE ACTIVE CONFIGURATION

Execute: &W[<n>]

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

<n>:

- | | |
|---|---|
| 0 | Store current (active) configuration as profile 0 (default) |
| 1 | Store current (active) configuration as profile 1 |

7.5 &Y – DESIGNATE DEFAULT RESET PROFILE

Execute: &Y[<n>]

Select profile for use after power-up.

<n>:

- 0 Select profile 0 (default)
- 1 Select profile 1

8 BASIC INFO COMMANDS

8.1 I – IDENTIFICATION

Execute: I[<n>]

Requests the device to display information about itself.

<n>:

- | | |
|---|--|
| 0 | Traffic channel rate for IRIDIUM data/fax. Hardcoded as “2400” |
| 1 | ROM checksum. Hardcoded as “0000” |
| 2 | Result of ROM checksum verification. Hardcoded as “OK” |
| 3 | Product version number |
| 4 | Product description: Hardcoded as “NAL Research Corporation: QS-100” |
| 5 | Country code: Hardcoded as “8816” |
| 6 | Factory identity: Hardcoded as “000” |
| 7 | Hardware specification: Hardcoded as “00000000” |

8.2 +CGMI/+GMI – MANUFACTURER IDENTIFICATION

Execute: +CGMI/+GMI

Query board manufacturer.

8.3 +CGMM – MODEL IDENTIFICATION

Execute: +CGMM/+GMM

Query board model.

8.4 +CGMR – REVISION

Execute: +CGMR/+GMR

Query board revision.

8.5 +CGSN – SERIAL NUMBER

Execute: +CGSN/+GSN

Query IMEI.

8.6 +CICCID – READ ICC ID FROM SIM

Execute: +CICCID

Query the ICC ID of the SIM. This returns the 19 or 20 digit Integrated Circuit Card Identification of the SIM.

9 TIME COMMANDS

9.1 +CCLK – REAL-TIME CLOCK

Execute: +CCLK=<time>

Sets the real-time clock (system time) of the Quicksilver.

<time>: Double quoted string with format “yy/MM/dd,hh:mm:ss±zz”, where characters indicate year two last digits, month, day, hour, minutes, seconds and time zone. There is no blank space between the two double quotes. Since time zone feature is not supported in Iridium, this particular field (±zz) is ignored if it is entered. The range of valid years is between 1970 and 2058. For example, May 15, 2011, 22:10:00 can be set using +CCLK="11/05/15,22:10:00"..

Read: +CCLK?

Returns the current setting of the clock in the format: +CCLK: <time>

9.2 -MSSTM – REQUEST SYSTEM TIME

Execute: -MSSTM

Queries the Quicksilver’s real-time clock (system time). The response is the form: -MSSTM: <system_time>

<system_time>: Can take one of the following forms: - “no network service” - The Quicksilver failed to read the system time. - “XXXXXXXX” - The current system time expressed as a 32 bit integer count of the number of 90 millisecond intervals that have elapsed since the epoch set by AT^IRDEPOCH. The value is displayed formatted as an ASCII hexadecimal number. The counter will rollover approximately every 12 years after the epoch. Therefore the epoch should be updated to prevent a rollover using ^IRDEPOCH.

The system time will not be accurate until the Quicksilver has obtained it from one of its external time sources (currently only GPS). Once the time is

received, the Quicksilver uses its internal clock to increment the counter until it is resynchronized by getting an updated time from an external time source.

9.3 ^IRDEPOCH – IRIDIUM EPOCH

Set / reads the time that the AT-MSSTM time offset is relative to.

Execute: ^IRDEPOCH=<seconds>

Entered as seconds since unix epoch.

<seconds>: Defaults to 1399818235, which represents May 11, 2014 14:23:55.

Read: ^IRDEPOCH?

Prints the current value.

10 HARDWARE INTERFACE COMMANDS

10.1 +IPR – BAUD RATE

Execute: +IPR=<rate>,<auto>]

Sets the baud rate for the interface. The result code (e.g. OK) is sent using the previous baud rate.

<rate>:

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

<auto>: Accepts all values for compatibility, but can't be changed. - 0 - Fixed rate – automatic rate adjustment is disabled (default) - 1 - Automatic rate adjustment is enabled

Read: +IPR?

Returns the current setting in the format: +IPR: <rate>,<auto>.

10.2 &D – DTR OPTION

Execute: &D[<n>]

Sets the Quicksilver's reaction to DTR signal.

- 0 DTR is ignored. A DTR signal input is not needed when set to &D0.
- 1 If DTR transitions from ON to OFF during a data call and is not restored ON within approximately 10 seconds, the call will be dropped.
- 2 If DTR transitions from ON to OFF during a data call, the call will be dropped (default).

10.3 &K – FLOW CONTROL

Execute: &K[<n>]

Selects the flow control method used for the AT serial interface when in data mode. No flow control is used when not in data mode.

- 0 Disables flow control (default)
- 3 Enables hardware (RTS/CTS) flow control
- 4 Enables software (xon/xoff) flow control
- 6 Enables both hardware and software flow control

11 OUTPUT CONFIGURATION COMMANDS

11.1 E – ECHO

Execute: E[<n>]

Sets whether to echo command characters to the DTE.

<n>:

- | | |
|---|-----------------------|
| 0 | Disable echo |
| 1 | Enable echo (default) |

Read: E?

Returns the current setting in the format: <n>

11.2 Q – QUIET

Execute: Q[<n>]

Sets whether to suppress output of certain [result codes](#).

<n>:

- | | |
|---|---|
| 0 | Responses are sent to the DTE (default) |
| 1 | Responses are NOT sent to the DTE |

Read: Q?

Returns the current setting in the format: <n>.

11.3 V – VERBOSE

Execute: V[<n>]

Sets the format for information responses and result codes.

<n>:

- | | |
|---|-------------------|
| 0 | Numeric |
| 1 | Textual (default) |

Read: V?

Returns the current setting in the format: <n>.

11.4 X – EXTENDED RESULT CODES

Execute: X[<n>]

Selects the response set to be used by the Quicksilver when informing the DTE of the results of a command or data call.

- | | |
|---|--|
| 0 | OK, CONNECT, RING, NO CARRIER, NO ANSWER and ERROR |
| 1 | Same as X0 plus CONNECT x, where x is the DTE speed |
| 2 | Same as X1 plus NO DIALTONE |
| 3 | Same as X2 plus BUSY |
| 4 | Same as X3 plus CARRIER x, PROTOCOL: and COMPRESSION:, where x is the line speed (default) |

NOTE: The Wn command limits which connection related responses will be reported.

11.5 +CMEE – REPORT MOBILE EQUIPMENT ERROR

Execute: +CMEE=[<x>]

Sets the mobile equipment error reporting level.

<x>:

- | | |
|---|---|
| 0 | Disable error reporting (use ERROR result code) (default) |
| 1 | Enable numeric error reporting |
| 2 | Enable verbose error reporting |

An example of an error report is:

+CME ERROR: <y>

where \<y> can be the number or text listed below.

Note: Currently only error 100 (unknown) will occur:

0	phone failure
1	no connection to phone
2	phone-adaptor link reserved
3	operation not allowed
4	operation not supported
5	PH-SIM PIN required
6	PH-FSIM PIN required
7	PH-FSIM PUK required
10	SIM not inserted
11	SIM PIN required
12	SIM PUK required
13	SIM failure
14	SIM busy
15	SIM wrong
16	incorrect password
17	SIM PIN2 required
18	SIM PUK2 required
20	memory full
21	invalid index
22	not found
23	memory failure

24	text string too long
25	invalid characters in text string
26	dial string too long
27	invalid characters in dial string
28	number is SIM fixed dialing restricted
30	no network service
31	network timeout
32	emergency calls only
40	network personalization PIN required
41	network personalization PUK required
42	network subset personalization PIN required
43	network subset personalization PUK required
44	service provider personalization PIN required
45	service provider personalization PUK required
100	unknown

Read: +CMEE?

Query mobile equipment error reporting level. The response is in the form: +CMEE: <x>

Test: +CMEE=?

List the supported error reporting level. The response is in the form: +CMEE: (supported <x>s)

12 NETWORK COMMANDS

12.1 *S – DATA MODE STATE

Execute: *S<n>

Puts the Quicksilver into either data mode or inactive mode.

<n>:

- | | |
|---|---------------|
| 0 | Inactive mode |
| 1 | Data mode |

12.2 +CIER – INDICATOR EVENT REPORTING

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

Enables or disables sending of the +CIEV unsolicited result code by the Quicksilver 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 Quicksilver. (default) |
| 1 | Enable indicator event reporting; buffer the most recent +CIEV unsolicited result code for each indicator when the data port is not in command mode, and flush them to the DTE on return to command mode; otherwise forward events 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,<rsssi> where <rsssi> is:
<table><tbody><tr><td>0</td><td>Equivalent to 0 bars displayed on the signal strength indicator</td></tr></tbody></table> | 0 | Equivalent to 0 bars displayed on the signal strength indicator |
| 0 | Equivalent to 0 bars displayed on the signal strength indicator | | |

- 1 Equivalent to 1 bar displayed on the signal strength indicator
- 2 Equivalent to 2 bars displayed on the signal strength indicator
- 3 Equivalent to 3 bars displayed on the signal strength indicator
- 4 Equivalent to 4 bars displayed on the signal strength indicator
- 5 Equivalent to 5 bars displayed on the signal strength indicator

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 currently unavailable
 - 1 Network service is available

NOTE: In <mode> 1, the DTE may miss some indicator state changes if they occur while the data port is reserved (not in command mode). However, the buffering mechanism ensures that the most recent change for each indicator during reservation will be flushed to the DTE on return to command mode; thus the DTE is always made aware of the latest state of each indicator.

Read: +CIER?

Queries the current settings. The response is of the form:

+CIER:<mode>,<sigind>,<svcind>

Test: +CIER=?

List the supported settings.

12.3 +CREG – NETWORK REGISTRATION

Execute: +CREG=<n>

Controls the presentation of an unsolicited result code when there is a change in the registration status of the Quicksilver.

<n>:

- 0 disable network registration unsolicited result code (default)
- 1 enable network registration unsolicited result code +CREG: <stat>
- 2 enable network registration and location information unsolicited result code +CREG: <stat>[,<lac>,<ci>]. <lac> indicates the location area code in string format and is hardcoded as “0000”; <ci> is in the cell identifier which is not applicable to IRIDIUM and is hardcoded as “ffff”.

<stat> can be one of the following:

- 0 data services not registered
- 1 registered for data services
- 2 unused - not applicable to Quicksilver
- 3 unused - not applicable to Quicksilver
- 4 registration status unknown
- 5 unused - not applicable to Quicksilver

Read: +CREG?

Read command returns the status of result code presentation and an integer <stat> which shows the network registration status of the Quicksilver. Location information elements <lac> and <ci> are returned only when <n>=2 and the Quicksilver is registered in the network.

Response is in the form:

+CREG: <n>,<stat>[,<lac>,<ci>]

Test: +CREG=?

Lists the supported settings.

12.4 +CSQ[F] – SIGNAL QUALITY

Execute: +CSQ[F]

Returns the received signal strength indication from the Quicksilver in the form: +CSQ: \<rssi>
where \<rssi> is:

- | | |
|---|---|
| 0 | Equivalent to 0 bars displayed on the signal strength indicator |
| 1 | Equivalent to 1 bar displayed on the signal strength indicator |
| 2 | Equivalent to 2 bars displayed on the signal strength indicator |
| 3 | Equivalent to 3 bars displayed on the signal strength indicator |
| 4 | Equivalent to 4 bars displayed on the signal strength indicator |
| 5 | Equivalent to 5 bars displayed on the signal strength indicator |

NOTE: The +CSQ form of the command waits for an updated signal strength reading to become available whereas the +CSQF form of the command returns immediately, reporting the last known signal strength.

Test: +CSQ=?

List the supported signal strength indications.

12.5 ^CONS - CONSTELLATION STATE

Returns the constellation state in the format:

^CONS:\<visible>,\<signal>,\<bars>. Example response: ^CONS:1,-30,5.

\<visible>: Visible flag

\<signal>: Signal strength as dBm

\<bars>: Signal bars (0-5)

Read: ^CONS?

Returns the last known state immediately.

Execute: ^CONS

Queries the latest state and returns it.

12.6 ^CONSR - CONSTELLATION STATE REPORTING

Execute: ^CONSR=<enable>

Enables the **^CONSV** (Constellation State Values) URC which shows the same info as **^CONS** whenever it changes.

13 CALL CONTROL COMMANDS

13.1 +++ – ESCAPE SEQUENCE

The escape sequence is used to transfer from in-call data mode to in-call command mode without disconnecting. After a pause, the Quicksilver will respond with “OK”.

13.2 A – ANSWER

Answer immediately. This causes the Quicksilver to answer the incoming data call.

13.3 D – DIAL

Execute: D<number>

Causes the Quicksilver to attempt to establish a connection to endpoint indicated by <number>.

<number>: May be one of the following:

- L Redials the last number since device power up.
- x..x A phone number used to lookup the actual destination IP address and port in the list of destination mappings set by **AT^DEST**. The number must consist of the following characters: 0123456789*#ABC. If a destination mapping does not exist and the number is exactly 17 digits, the number will attempt to be parsed in order to obtain the IP address and port directly from the phone number. In order to be successfully parsed, the number must encode the IP address and port as aaabbbccdddppppp, where aaa.bbb.ccc.ddd is the IP address and ppppp is the port. Add leading 0s where needed.

NOTE: Any character received from the DTE during the call establishment phase will cause the call attempt to be terminated and “OK” will be displayed.

13.4 H – HANGUP

Execute: H[<n>]

Hangs up a data call connection.

<n>:

0 Place the Quicksilver on hook.

13.5 O – ONLINE

Execute: O[<n>]

Returns to in-call data mode from in-call command mode. An error is reported if not in in-call data mode.

<n>: Any unsigned integer accepted.

13.6 S0 – AUTO-ANSWER

Execute: S0=[<n>]

Sets the number of rings to automatically answer an incoming data call after.

<n>:

0 Disable auto-answer.

n > 0 Enable auto-answer after n rings

13.7 +CHUP – HANGUP CALL

Hangs up a data call connection or rejects an incoming data call.

13.8 ^ANSPORT - INCOMING CALLS PORT

Execute: ^ANSPORT=<port>

Sets the port for listening for incoming data calls.

When set to 0, listening is disabled.

13.9 ^DEST – DATA CALL DESTINATIONS

Execute: ^DEST=<action>[...]

Lists, adds, modifies, or deletes phone number to destination mappings for use with the ATD command.

<action>: The action determines what additional parameters are needed.

0 List the mappings one per line in the form: ^DEST:<phone>,<ip>,<port>

1 Add / modify: <phone>,<ip>,<port>. <ip> and <port> are both required when adding.

2 Delete: <phone>

<phone>: Double quoted phone number. 1-30 characters.

<ip>: Double quoted IP address in dotted decimal form. 7-15 characters.

<port>: 1-65535

Test: ^DEST=?

Prints usage info.

14 CALL INFO COMMANDS

14.1 +CEER – EXTENDED ERROR REPORT

Execute: +CEER

Returns information text <report> which offers the user an extended report of the reason of the failure in the last unsuccessful call setup (originating or answering), or the reason for last call release. The response is in the form:

+CEER: <report>

<report>: Currently, only “Normal call clearing” is reported.

14.2 +CLCC – REQUEST CURRENT CALL STATUS

Execute: +CLCC

Returns the current call status of the Quicksilver. The response is a comma separated list of call states. The number of call states in the response depends on the number of active call instances e.g. incoming calls and held calls.

+CLCC: <stat>[,<stat>[,<stat>]]

<stat>:

000	Active
001	Call Held
002	Dialing (MO Call)
004	Incoming (MT Call)
006	Idle

NOTE: <stat> of 001 or 002 will never be seen.

14.3 +CPAS – MODEM ACTIVITY STATUS

Execute: +CPAS

Query activity status. The response is in the form: +CPAS: <x>

<x>:

- | | |
|---|---|
| 0 | Ready (allows commands) |
| 1 | Unavailable (does not allow commands) |
| 2 | Unknown (may not respond to commands) |
| 3 | Data Call Ringing (allows commands) |
| 4 | Data Call In Progress (allows commands) |

NOTE: <x> of 1 or 2 will never be seen.

14.4 +CRIS – RING INDICATION STATUS

Execute: +CRIS

Query the ring indication status, returning the reason for the most recent assertion of the Ring Indicate signal. The response contains separate indications for telephony and SBD ring indications.

The response is in the form:

+CRIS:<tri>,<sri>

<tri>: Indicates the telephony ring indication status.

- | | |
|---|-------------------------------------|
| 0 | No telephony ring alert received |
| 1 | Incoming voice call (not supported) |
| 2 | Incoming data call |
| 3 | Incoming fax call (not supported) |

<sri>: Indicates the SBD ring indication status (always 0)

- | | |
|---|----------------------------|
| 0 | No SBD ring alert received |
| 1 | SBD ring alert received |

15 CALL URC CONFIGURATION COMMANDS

15.1 +CLIP – CALLING LINE IDENTIFICATION PRESENTATION

Execute: +CLIP=<n>

This command controls the presentation of the identity of the calling party in a mobile terminated call via the **+CLIP** unsolicited result code.

<n>:

- 0 Disable the +CLIP unsolicited result code. (default)
- 1 Enable the +CLIP unsolicited result code to be sent to the DTE following the RING URC when a mobile terminated call is received. The unsolicited result code has the format: +CLIP:<number>,<type>

<number> The IP address and port of the calling party in “quotes”, in the format aaabbbccddppppp, where aaa.bbb.ccc.ddd if the IP address and ppppp is the port with leading zeros.

<type> Indicates the type of number. Always 129.

Read: +CLIP?

Query the current CLI Presentation provisioning status and the status of the **+CLIP** unsolicited result code. The response is of the form:

+CLIP:<n>,<m>

<m>:

- 0 CLIP not provisioned
- 1 CLIP provisioned
- 2 Unknown (e.g. no network, etc.)

15.2 +CR – SERVICE REPORTING CONTROL

Execute: +CR=[<mode>]

Set the service reporting level.

<mode>:

- 0 Disable reporting (default)
- 1 Enable sending the +CR: REL ASYNC URC before entering data mode.

Read: +CR?

Query the current service reporting level setting.

Test: +CR=?

List the supported reporting levels.

15.3 +CRC – CELLULAR RESULT CODES

Execute: +CRC=[<mode>]

Set the extended format of the incoming data call indication.

<mode>:

- 0 Disable extended format (default)
- 1 Enable extended format. +CRING: REL ASYNC will be used in place of RING.

Read: +CRC?

Queries the current result code setting.

Test: +CRC=?

List the supported result code settings.

15.4 +DR – DATA COMPRESSION REPORT LEVEL

Execute: +DR=[<mode>]

Set the data compression reporting level.

<mode>:

- 0 Disable data compression reporting (default)
- 1 Enable sending +DR: NONE URC before entering data mode.

Read: +DR?

Query the current reporting level setting.

Test: +DR=?

List the supported parameter settings.

16 HARDCODED COMMANDS

These commands may accept a range of values and return OK depending on whether the parameters were valid. However the values are not stored and hardcoded values are reported when the commands are queried. These commands do not affect the functioning of the Quicksilver in any way.

B	Communication Standards
C	Carrier Control
F	Line Modulation
N	Automode Enable
P	Pulse Dial
T	Tone Dial
W	Error Correction Message Control
&C	DCD Option
&L	Leased Line Operation
&M	Asynchronous/Synchronous Mode
\A	MNP Block Size
\B	Transmit Break
\G	XON/XOFF Flow Control
\J	DTE Auto Rate
\K	Control Break
\N	Link Type
%C	Compression Control
%E	Auto Retrain

*F	Flush to Eeprom
+CBC	Battery Charge
+CMOD	Call Mode
+COPS	Operator Select
+CSCB	Select Cell Broadcast Message Types
+CSCS	Select TE Character Set
+DS	Set Data Compression Function
+GCAP	General Capabilities
+WIRLP	Iridium Radio Link Protocol

17 GENERAL PROFILE READ BACK ONLY COMMANDS

The values set by these commands are remembered and can be read back. However, the values are not used by the system and therefore do not affect the functioning of the device.

L	Loudspeaker Volume
M	Speaker Control
Y	Long Space Disconnect
&G	Guard Tone
&J	Jack Control
&P	Pulse Dial Make/Break Ratio
&Q	Sync/Async Mode
&R	RTS/CTS Option
&S	DSR Override
&X	Select Synchronous Clock
+CBST	Select Bearer Service Type
+CSTA	Select Type of Address for ATD

18 VOLATILE PROFILE READ BACK ONLY COMMANDS

The values set by these commands are remembered until the next power cycle or ATZ or AT&F is run (unless otherwise noted) and can be read back. However, the values are not used by the system and therefore do not affect the functioning of the device.

+CLIR Calling Line Identification Restriction

 Only reset by power cycle.

+WDLDM IRLP Dynamic Link Delay Measurement

+WFRNG Force IRLP Renegotiation

+WTM IRLP Test

19 RESULT CODES

The following table lists the result codes that can be returned.

Numeric	Verbose	Description
0	OK	Acknowledges successful execution of command.
1	CONNECT	Data call connection has been established.
2	RING	Incoming data or voice call received (unsolicited).
3	NO CARRIER	Data or voice call connection terminated.
4	ERROR	Command not accepted.
5	CONNECT 1200	Data call connection established at 1200 bps.
6	NO DIALTONE	No dial tone detected.
8	NO ANSWER	Data or voice call connection completion timeout.
9	CONNECT 0600	Data call connection established at 600 bps.
10	CONNECT 2400	Data call connection established at 2400 bps.
11	CONNECT 4800	Data call connection established at 4800 bps.
12	CONNECT 9600	Data call connection established at 9600 bps.
13	CONNECT 7200	Data call connection established at 7200 bps.
14	CONNECT 12000	Data call connection established at 12000 bps.
15	CONNECT 14400	Data call connection established at 14400 bps.
16	CONNECT 19200	Data call connection established at 19200 bps.
17	CONNECT 38400	Data call connection established at 38400 bps.
18	CONNECT 57600	Data call connection established at 57600 bps.
19	CONNECT 115200	Data call connection established at 115200 bps.
67	COMPRESSION: V.42bis	Data call connected with V.42bis compression enabled.
69	COMPRESSION: NONE	Data call connected with no data compression.
as verbose	+DR: NONE	Data call connected with no data compression.
as verbose	+CR: REL ASYNC	Asynchronous non-transparent data
as verbose	+CME ERROR: <error>	Command not accepted
as verbose	+CREG: <stat>[,<lac>,<ci>]	Registration indication status (unsolicited if enabled)
as verbose	+CRING: REL ASYNC	Asynchronous non-transparent data

as +CIEV:<sig>,<value> Indicator event report.
verbose