Table 20. Basic AT Command Set

Command	Action	
$	Display Basic AT command mode settings (see text for details).	
A	Answer incoming call.	
A/	Re-execute last command (executes immediately—not preceded by “AT” or followed by <CR>).	
Dn	Dial The dial command, which may be followed by one or more dial command modifiers, dials a phone number:	
	Modifier	**Function**
	! or &	Flash hook-switch for U4F (FHT) ms (default: 500 ms)
	, or <	Pause before continuing for S8 seconds (default: 2 seconds)
	;	Return to AT command mode after verifying dialtone and dialing any digits.
	G	Telephone voting mode. This modifier, intended for use in Japan, enables a special dial-in voting mode that may be used with certain automated voting systems. When this modifier is placed anywhere in the dial string (e.g, ATDG), the Si2493/57/34/15/04 dials the phone number and waits S7 seconds (60 by default) to detect a busy tone. When the busy tone is detected, the Si2493/57/34/15/04 reports whether a polarity reversal occurs between the time the last digit is dialed and the detection of the busy tone. If the S7 timeout occurs prior to a busy tone detect, “NO CARRIER” will be reported. Polarity reversal monitoring begins after the last digit is dialed and ends when a busy tone is detected or S7 times out. The Si2493/57/34/15/04 reports either “POLARITY REVERSAL” or “NO POLARITY REVERSAL”. It is not possible to establish a modem connection when using this command.
	L	Radial Last Number
	P	Pulse (rotary) dialing—pulse digits: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9
	T	Tone (DTMF) dialing—DTMF digits: *, #, A, B, C, D, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9
	W	Wait for dial tone before continuing for S14 seconds (default: 12 seconds). Blind dialing modes X0, X1, and X3 do not affect the W command. If the DOP bit (U7A, bit 7) is set, the “ATDTW” command causes the Si2457/34/15 to pause dialing and either report an “OK” if a dialtone is detected or “NO DIALTONE” if a dial tone is not detected.
En	Local DTE echo.	
E0	Disable.	
E1	**Enable.**	
Hn	Hook-switch.	
H0	Go on-hook (hang up modem).	
H1	Go off-hook.	
In	Identification and checksum.	

Table 20. Basic AT Command Set (Continued)

Command	Action	
I0	Display Si2493/57/34/15/04 revision code. A = Revision A. B = Revision B, etc.	
I1	Display Si2493/57/34/15/04 firmware revision code (numeric).	
I3	Display line-side revision code. 18(10)C = Si3018/10 revision C.	
I6	Display the ISOmodem model number. 2404 = Si2404 2415 = Si2415 2434 = Si2434 2457 = Si2457 2493 = Si2493	
I7	Diagnostic Results 1. **Format** RX <rx_rate>,TX <tx_rate> PROTOCOL: <protocol> LOCAL NAK <rre> REMOTE NAK <rte> RETRN/RR <rn> DISC REASON <dr>	 **Description** Receive/transmit data rate in bps Error correction/data compression protocol. Number of V.42 receive errors Number of V.42 transmit errors Number of retrains/rate renegotiations Disconnect reason code (see Table 25)
I8	Diagnostic Results 2. **Format** RX LEVEL <rx_level> TX LEVEL <tx_level> EFFECTIVE S/N <esn> RESIDUAL ECHO <re>	 **Description** Receive level power in dBm Transmit level power in dBm. Effective signal-to-noise ratio in dB Ratio of residual echo to signal in dB
Ln	Speaker Volume	
L1	Low	
L2	Medium	
L3	High	
Mn	Speaker operation (via AOUT).	
M0	**Speaker is always off.**	
M1	Speaker is on while dialing and handshaking; off in data mode.	
M2	Speaker is always on.	
M3	Speaker is off while dialing; on during handshaking and retraining.	
On	Return to data mode from command mode.	
O0	Return to data mode.	
O1	Return to data mode and perform a full retrain (at any speed except 300 bps).	
O2	Return to data mode and perform rate renegotiation.	
Qn	Response mode.	
Q0	**Enable result codes.** (See Table 24.)	

Table 20. Basic AT Command Set (Continued)

Command	Action
Q1	Disable result codes. (Enable quiet mode.)
Sn	S-Register operations. (See Table 32.)
S$	List contents of all S-registers.
Sn?	Display contents of S-register n.
Sn=x	Set S-register n to value x. (n and x are decimal values.)
Vn	Result code type. (See Table 24.)
V0	Numeric result codes.
V1	**Verbal result codes.**
Xn	Call Progress Monitor (CPM)—This command controls which CPM signals are monitored and reported to the host from the Si2493/57/34/15/04. (See Table 24.)
X0	Basic results; disable CPM—Blind dial (does not wait for dial tone). CONNECT message does not include speed.
X1	Extended results; disable CPM—Blind dial. CONNECT message includes speed.
X2	Extended results and detect dial tone only. X1 with dial tone detection.
X3	Extended results and detect busy only. X1 with busy tone detection.
X4	**Extended results, full CPM. X1 with dial and busy tone detection.**
X5	Extended results—Full CPM enabled including ringback detection. X4 with ring back detection.
Yn	Long space disconnect—Modem hangs up after 1.5 seconds or more of continuous space while on-line.
Y0	**Disable.**
Y1	Enable.
Z	Hard Reset—This command is functionally-equivalent to pulsing the RESET pin low.
:E	Read from serial EEPROM. The format is AT:Eaaaa where aaaa = EEPROM address in hexadecimal.
:I	Interrupt Read—This command causes the ISOmodem to report the lower eight bits of the interrupt register U70 (IO0). The CID, OCD, PPD, and RI bits of this register are cleared, and the $\overline{\text{INT}}$ pin (INT bit in parallel mode) is deactivated on this read.
:M	Write to serial EEPROM. The format is AT:Maaaa,xxxx where aaaa = EEPROM address in hexadecimal, and xxxx = EEPROM data in hexadecimal.
:P	Program RAM Write—This command is used to upload firmware supplied by Silicon Labs to the Si2493/57/34/15/04. The format for this command is AT:Paaaa,xxxx,yyyy,.... where aaaa is the first address in hexadecimal, and xxxx,yyyy,.... is data in hexadecimal. Only one :P command is allowed per AT command line. No other commands can be concatenated in the :P command line. This command is ***only*** for use with special files provided by Silicon Laboratories. Do not attempt to use this command for any other purpose. Use &T6 to display checksum for patch verification.
:R	U-Register Read—This command reads U-Register values in hexadecimal. The format is AT:Raa, where aa = A particular U-Register address in hexadecimal. The AT:R command displays all U- register values. Only one :R command is allowed per AT command line.

Table 20. Basic AT Command Set (Continued)

Command	Action
:U	U-Register Write—This command writes to the 16-bit U-Registers. The format is AT:Uaa,xxxx,yyyy,zzzz,..., where aa = user-access address in hexadecimal. xxxx = data in hexadecimal to be written to location aa. yyyy = data in hexadecimal to be written to location (aa + 1). zzzz = data in hexadecimal to be written to location (aa + 2). etc. Only one :U command is allowed per AT command line.
+DR=X	Data compression reporting. X Mode **0 Disabled** 1 Enabled If enabled, the intermediate result code is transmitted at the point after error control negotiation. The format of this result code is as follows: Result code Mode +DR:NONE Data compression is not in use +DR:V42B Rec. V.42bis is in use in both directions +DR:V42B RD Rec. V.42bis is in use in receive direction only +DR:V42B TD Rec. V.42bis is in use in transmit directions only +DR:V44 Rec. V.44 is in use in both directions +DR:V44 RD Rec. V.44 is in use in receive direction only +DR:V44 TD Rec. V.44 is in use in transmit directions only
+DS= A,B,C,D	Controls V.42bis data compression function. A Direction 0 No compression (V.42bis P0 = 0) 1 Transmit only 2 Receive only 3 Both Directions (V.42bis P0 = 11) B Compression_negotiation 0 Do not disconnect if Rec. V.42 is not negotiated. 1 Disconnect is Rec. V.42 is not negotiated. C Max_dict 512 to 65535 D Max_string 6 to 250

Table 20. Basic AT Command Set (Continued)

Command	Action
+DS44 = A,B,C,D,E,F,G,H,I	Controls V.44 data compression function*. A Direction 0 No compression (V.42bis P0 = 0) 1 Transmit only 2 Receive only 3 Both Directions (V.42bis P0 = 11) B Compression_negotiation 0 Do not disconnect if Rec. V.42 is not negotiated 1 Disconnect is Rec. V.42 is not negotiated C Capability 0 Stream method 1 Packet method 2 Multi-packet method D Max_codewords_tx 256 to 65536 E Max_codewords_rx 256 to 65536 F Max_string_tx 32 to 255 G Max_string_rx 32 to 255 H Max_history_tx ≥ 512 I Max_history_rx ≥ 512 ***Note:** Si2493 only
+ES = A, B, C	Enable synchronous access mode **A – specifies the mode of operation when initiating a modem connection** **D = Disable synchronous assess mode** 6 = Enable synchronous access mode when connection is completed and data state is entered. **B – This parameter should not be used.** **C – Specifies the mode of operation when answer a modem connection** **D = Disable synchronous assess mode** 8 = Enable synchronous access mode when connection is completed and data state is entered.

Table 20. Basic AT Command Set (Continued)

Command	Action
+ESA = A,B,C,D,E,F,G	Synchronous access mode control options **A – Specifies action taken if an underrun condition occurs during transparent sub-mode** **0 = Modem transmits 8-bit SYN sequences (see +ESA[G]) on idle.** **B – Specifies action taken if an underrun condition occurs after a flag during framed sub-mode** **0 = Modem transmits 8-bit HDLC flags on idle.** C – Specifies action taken if an underrun or overrun condition occurs after a non-flag during framed sub-mode **0 = Modem transmits abort on underrun in middle of frame.** 1 = Modem transmits flag on underrun in middle of frame and notifies host of underrun or overrun. D – Specifies V.34 half duplex operation. This parameter should not be used. E – Specifies CRC polynomial used while in framed sub-mode **0 = CRC generation checking disable** 1 = 16-bit CRC generation and checking is performed by the modem F – Specifies NRZI encoding and decoding **0 = NRZI encoding and decoding disabled** G – Defines 8-bit SYN 255 = Fixed at 255 (marks)
+FCLASS = X	Class 1 Mode Enable. X Mode **0 Off** 1 Enables support for V.29 Fast Connect mode. 256 SMS mode
+FRM = X	Class 1 Receive Carrier. X Mode 2 Detect V.21 (980 Hz) tone for longer than 100 ms, then send answer tone (2100/2225 Hz) for 200 ms. 95 V.29 short synchronous. 96 V.29 full synchronous. 200 Returns to data mode prepared to receive an SMS message.
+FTM = X	Class 1 Transmit Carrier. X Mode 2 Transmit V.21 (980 Hz) tone and detect (2100/2225 Hz). Stop transmit 980 Hz when (2100/2225 Hz is detected. 53 Same as &T4, but transmit V.29 7200 bps. Data pattern set by S40 register. AT + FCLASS = 0 must be sent to restore the ISOmodem to normal operation after test. 54 Same as &T4, but transmit V.29 9600 bps. Data pattern set by S40 register. AT + FCLASS = 0 must be sent to restore the ISOmodem to normal operation after test. 95 V.29 short synchronous. 96 V.29 full synchronous. 201 Returns to data mode prepared to transmit an SMS protocol 1 message. 202 Returns to data mode prepared to transmit an SMS protocol 2 message.

Table 20. Basic AT Command Set (Continued)

Command	Action
+GCI = X	Country settings - Automatically configure all registers for a particular country. X Country 9 Australia A Austria F Belgium 16 Brazil 1B Bulgaria 20 Canada 26 China 27 Columbia 2E Czech Republic 31 Denmark 35 Ecuador 3C Finland 3D France 42 Germany 46 Greece 50 Hong Kong 51 Hungary 53 India 57 Ireland 58 Israel 59 Italy 0 Japan 61 South Korea 69 Luxembourg 6C Malaysia 73 Mexico 7B Netherlands 7E New Zealand 82 Norway 87 Paraguay 89 Philippines 8A Poland 8B Portugal 9C Singapore 9F South Africa A0 Spain A5 Sweden A6 Switzerland B8 Russia FE Taiwan B4 United Kingdom **B5 United States** **Note:** U-Registers are configured to Silicon Laboratories' recommended values. Changes may be made by writing individual registers after sending the AT+GCI command. The +GCI command resets U registers through U86, S7, and S6 (in Japan) to default values before setting country-specific values. Refer to the chart and setup tables beginning with the "Silicon Labs Country Parameter Index" on page 128.
+GCI?	List current country code setting (response is: + GCI:<setting>)

Table 20. Basic AT Command Set (Continued)

Command	Action
+GCI = ?	List all possible country code settings.
+IFC Options +IFC = A +IFC = A,B	Specifies the flow control to be implemented. A Specifies the flow control method used by the host to control data from the modem 0 None 1 Local XON/OFF flow control. Does not pass XON/XOFF character to the remote modem. 2 Hardware flow control (RTS) B Specifies the flow control method used by the modem to control data from the host 0 None 1 Local XON/OFF flow control. 2 Hardware flow control (CTS).
+ITF Options +ITF = A +ITF = A,B +ITF = A,B,C	Transmit flow control threshold. A Threshold above which the modem will generate a flow off signal <0 to 511> bytes B Threshold below which the modem will generate a flow on signal <0 to 511> bytes C Polling interval for <EM><BNUM> indicator 0 to 300 in 10 msec units.
+MR=X	Modulation reporting control. X Mode **0 Disabled** 1 Enabled If enabled, the intermediate result code is transmitted at the point during connect negotiation. The format of this result code is as follows: +MCR: <carrier> e.g. +MCR: V32B +MRR: <rate> e.g. +MRR: 14400
+MS Options +MS = A +MS = A,B +MS = A,B,C +MS = A,B,C,D +MS = A,B,C,D,E +MS = A,B,C,D,E,F	Modulation Selection. A Preferred modem carrier V21 ITU-T V.21 V22 ITU-T V.22 V22B ITU-T V.22bis **(default for Si2404)** V32 ITU-T V.32 V32B ITU-T V.32bis **(default for Si2415)** V34 ITU-T V.34 **(default for Si2434)** V90 ITU-T V.90 **(default for Si2457)** **V92 ITU-T V.92 (default for Si2493)** B Automatic modulation negotiation 0 Disabled 1 Enabled C,D Min Tx rate/Max Tx rate are optional numeric values that specify the lowest value at which the DCE may establish a connection. If unspecified (set to 0), they are determined by the carrier and automode settings. E,F Min Rx rate/max Rx rate are optional numeric values which specify the highest value at which the DCE may establish a connection. If unspecified (set to 0), they are determined by the carrier and automode settings.

Table 20. Basic AT Command Set (Continued)

Command	Action
+PCW = X	Controls the action to be taken upon detection of call waiting. X Mode 0 Toggle $\overline{RI}$ and collect type II Caller ID if enabled by +VCID. 1 Hang up. **2 Ignore call waiting.**
+PIG=X	Controls the use of PCM upstream in a V.92 DCE. X Mode **0 Enable PCM upstream.** 1 Disable PCM upstream.
+PMH=X	Controls the modem-on-hold procedures. X Mode **0 Enables V.92 MOH.** 1 Disables V.92 MOH.
+PMHF=X	V.92 MOH hook flash. This command causes the DCE to go on-hook and then return off-hook. If this command is initiated and the modem is not On Hold, Error is returned.
+PMHR=X	Initiate MOH. Requests the DCE to initiate or to confirm a MOH procedure. Valid only if MOH is enabled. X Mode 0 V.92 MOH request denied or not available. 1 MOH with 10 s timeout granted. 2 MOH with 20 s timeout granted. 3 MOH with 30 s timeout granted. 4 MOH with 40 s timeout granted. 5 MOH with 1 min. timeout granted. 6 MOH with 2 min. timeout granted. 7 MOH with 3 min. timeout granted. 8 MOH with 4 min. timeout granted. 9 MOH with 6 min. timeout granted. 10 MOH with 8 min. timeout granted. 11 MOH with 12 min. timeout granted. 12 MOH with 16 min. timeout granted. 13 MOH with indefinite timeout granted. 14 MOH request denied. Future request will also be denied.

Table 20. Basic AT Command Set (Continued)

Command	Action
+PMHT=X	Controls access to MOH request and sets the timeout value. X Mode 0 Deny V.92 MOH request. 1 Grant MOH with 10 s timeout. 2 Grant MOH with 20 s timeout. 3 Grant MOH with 30 s timeout. 4 Grant MOH with 40 s timeout. 5 Grant MOH with 1 min. timeout. 6 Grant MOH with 2 min. timeout. 7 Grant MOH with 3 min. timeout. 8 Grant MOH with 4 min. timeout. 9 Grant MOH with 6 min. timeout. 10 Grant MOH with 8 min. timeout. 11 Grant MOH with 12 min. timeout. 12 Grant MOH with 16 min. timeout. 13 Grant MOH with indefinite timeout.
+PQC=X	V.92 Phase 1 and Phase 2 Control. X Mode **0 Enable Short Phase 1 and Short Phase 2.** 1 Enable Short Phase 1. 2 Enable Short Phase 2. 3 Disable Short Phase 1 and Short Phase 2.
+PSS=X	Selection of full or short startup procedures. X Mode **0 The DCEs decide to use short startup procedures.** 1 Forces the use of short startup procedures on next and subsequent connections. 2 Forces the use of full startup procedures on next and subsequent connections.
+VCDT = n	Caller ID Type. n Mode **0** = **After ring only (Bellcore)** 1 = Always on (Bellcore) 2 = UK 3 = Japan
+VCID = n	Caller ID Enable. n **0** = **Off** 1 = Formatted caller ID enabled. 2 = Raw data caller ID enabled.
+VCIDR?	Type II caller ID information—"+VCIDR:" will be followed by raw caller ID information including checksum. "No Data" will be displayed if no Type II data is available.

Extended AT Commands

The extended AT commands, described in Tables 21–23, are supported by the Si2493/57/34/15/04.

Table 21. Extended AT& Command Set

Command	Action
&$	Display AT& current settings (see text for details).
&D0	ESC (pin 22) is not used
&D1	**ESC (pin 22) escapes to command mode from data mode if also enabled by HES U70, bit 15.**
&D2	ESC (pin 22) assertion during a modem connection causes the modem to go on-hook and return to command mode.
&D3	ESC (pin 22) assertion causes ATZ command (reset and return OK result code).
&Gn	Line connection rate limit—This command sets an upper limit on the line speed that the Si2493/57/34/15/04 can connect. Note that the &Hn commands may limit the line speed as well (&Gn not used for &H0 or &H1). Not all modulations support rates given by &G. Improper settings are ignored.
&G3	1200 bps max
&G4	2400 bps max
&G5	4.8 kbps max.
&G6	7.2 kbps max.
&G7	9.6 kbps max.
&G8	12 kbps max.
&G9	**14.4 kbps max** (default for Si2415).
&G10	16.8 kbps max.
&G11	19.2 kbps max.
&G12	21.6 kbps max.
&G13	24 kbps max.
&G14	26.4 kbps max.
&G15	28.8 kbps max.
&G16	31.2 kbps max.
&G17	**33.6 kbps max** (default for Si2457 transmit and Si2434).
&Hn	Switched network handshake mode—&Hn commands must be on a separate command line from ATD, ATA, or ATO commands.
&H0	**V.90 with automatic fallback (56 kbps to 300 bps)** (default for Si2457).
&H1	V.90 only (56 kbps to 28 kbps).
&H2	**V.34 with automatic fallback (33.6 kbps to 300 bps)** (default for Si2434).

Notes:

1. The initial number attempted to test for an outside line is controlled by S51 (default = 1).
2. AT&$ reflects the last AT&P command issued but does not reflect any subsequent changes made by writing U-registers with AT:U.

Table 21. Extended AT& Command Set (Continued)

&H3	V.34 only (33.6 kbps to 2400 bps).
&H4	**ITU-T V.32bis with automatic fallback (14.4 kbps to 300 bps)** (default for Si2415).
&H5	ITU-T V.32bis only (14.4 kbps to 4800 bps).
&H6	**ITU-T V.22bis only (2400 bps or 1200 bps)** (default for Si2404).
&H7	ITU-T V.22 only (1200 bps).
&H8	Bell 212 only (1200 bps).
&H9	Bell 103 only (300 bps).
&H10	ITU-T V.21 only (300 bps).
&H11	V.23 (1200/75 bps).
&H12	**V.92 with automatic fallback** (default for Si2493)
&Pn	Japan pulse dialing*
&P0	Configure Si2493/57/34/15/04 for 10 pulse-per-second pulse dialing. For Japan.
&P1	Configure Si2493/57/34/15/04 for 20 pulse-per-second pulse dialing. For Japan.
&Tn	Test mode.
&T0	Cancel Test Mode (Escape to Command mode to issue AT&T0). This command also reports the number of bit errors encountered on the previous &T4 or &T5 test.
&T2	Initiate ITU-T V.54 (ANALOOP) test. Modem mode set by &H. Test loop is through the DSP and DAA interface section of the Si2493/57/34/15/04 only. ISOmodem echoes data from TX pin (Register 0 in parallel mode) back to RX pin (Register 0 in parallel mode). *This test mode is typically used during board-level debug.*
&T3	Initiate ITU-T V.54 (ANALOOP) test. Modem mode set by &H. Test loop is through the DSP (Si2493/57/34/15/04), DAA interface section (Si2493/57/34/15/04), ISOcap™ interface (Si3018/10), and analog hybrid circuit (Si3018/10). ISOmodem echoes data from TX pin (Register 0 in parallel mode) back to RX pin (Register 0 in parallel mode). Phone line termination required as in Figure 10. In order to test only the ISOcap link operation, the hybrid and AFE codec can be removed from the test loop by setting U62[1] (DL) = 1.
&T4	Initiate transmit as originating modem with automatic data generation. Modulation, data rate, and symbol rate are set by &H, &G, and S41. Data pattern is set by the S40 register. Continues until the ATH command is sent after an escape into command mode. Data is also demodulated as in ANALOOP, and any bit errors are counted to be displayed after the test using &T0.
&T5	Initiate transmit as answering modem with automatic data generation. Modulation, data rate, and symbol rate are set by &H, &G, and S41. Data pattern is set by the S40 register. Continues until the ATH command is sent after an escape into command mode. Data is also demodulated as in ANALOOP, and any bit errors are counted to be displayed after the test using &T0.
&T6	Compute checksum for firmware-upgradeable section of program memory. If no firmware upgrade is installed, &T6 returns C:4474.
&Xn	Automatic determination of telephone line type.
&X0	Abort &x1 or &x2 command.

Notes:

1. The initial number attempted to test for an outside line is controlled by S51 (default = 1).
2. AT&$ reflects the last AT&P command issued but does not reflect any subsequent changes made by writing U-registers with AT:U.

Table 21. Extended AT& Command Set (Continued)

&X1	Automatic determination of telephone line type. Result code: WXYZn W: 0 = line supports DTMF dialing. 1 = line is pulse dial only. X: 0 = line supports 20 pps dialing. 1 = line supports 10 pps dialing only. Y: 0 = extension network present (PBX). 1 = outside line (PSTN) connected directly. Z: 0 = continuous dialtone. 1 = make-break dialtone. n: 0–9 (number required for outside line if Y = 0).[1]
&X2	Same as &X1, but Y result (PBX) is not tested.
Y2A[2]	Produce a constant answer tone (ITU-T) and return to command mode. The answer tone continues until the ATH command is received or the S7 timer expires.
&Z	Enter low-power wake-on-ring mode.

Notes:
1. The initial number attempted to test for an outside line is controlled by S51 (default = 1).
2. AT&$ reflects the last AT&P command issued but does not reflect any subsequent changes made by writing U-registers with AT:U.

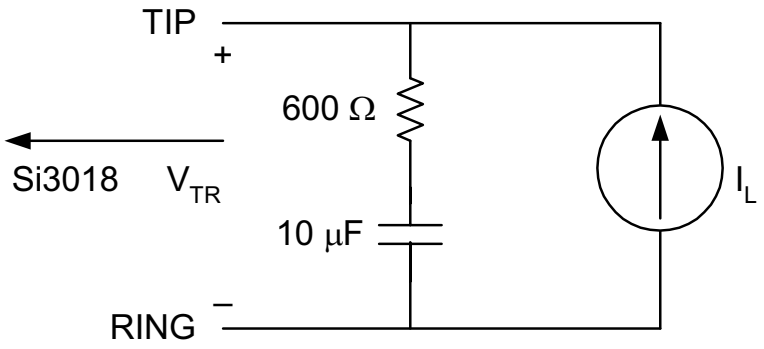

Figure 10. Phone Line Termination Circuit

Table 22. Extended AT% Command Set

Command	Action
%$	Display AT% command settings (see text for details).
%B	Report blacklist. See also S42 register.
%Cn	Data compression.
%C0	Disable V.42bis and MNP5 data compression.
%C1	**Enable V.42bis in transmit and receive paths.** If MNP is selected (\N2), %C1 enables MNP5 in transmit and receive paths.
%C2	Enable V.42bis in transmit path only.
%C3	Enable V.42bis in receive path only.
%On	Answer mode.
%O1	**Si2493/57/34/15/04 answers a call in answer mode.**
%O2	Si2493/57/34/15/04 answers a call in originate mode.
%Vn	Automatic Line Status Detection. After the %V1 and %V2 commands are issued, the Si2493/57/34/15/04 automatically checks the telephone connection for whether a line is present. If a line is present, the Si2493/57/34/15/04 automatically checks if the line is already in use. Finally, the Si2493/57/34/15/04 checks line status both before going off-hook and again before dialing. %V1 uses the fixed method, and %V2 uses the adaptive method. %V0 (default) disables this feature.
%V0	**Disable automatic line-in-use detection.**
%V1	Automatic Line Status Detection - Fixed Method. Description: Before going off-hook with the ATD, ATO, or ATA commands, the Si2493/57/34/15/04 compares the line voltage (via LVCS) to registers NOLN (U83) and LIUS (U84): Loop Voltage — Action $0 \leq LVCS \leq NOLN$ — Report “NO LINE” and remain on-hook. $NOLN \leq LVCS \leq LIUS$ — Report “LINE IN USE” and remain on-hook. $LIUS \leq LCVS$ — Go off-hook and establish a modem connection. Once the call has begun, the off-hook intrusion algorithm (described in "Intrusion Detection—Off-Hook Condition" on page 147) operates normally. In addition, the Si2493/57/34/15/04 reports “NO LINE” if the telephone line is completely disconnected. If the HOI bit (U77, bit 11) is set, “LINE IN USE” is reported upon intrusion.

Table 22. Extended AT% Command Set (Continued)

%V2	Automatic Line Status Detection - Adaptive Method. Description: Before going off-hook with the ATD, ATO, or ATA commands, the Si2493/57/34/15/04 compares the line voltage (via LVCS) to the NLIU (U85) register: Loop Voltage — Action $0 \leq LVCS \leq (0.0625 \times NLIU)$ — Report “NO LINE” and remain on-hook. $(0.0625 \times NLIU) < LVCS \leq (0.85 \times NLIU)$ — Report “LINE IN USE” and remain on-hook. $(0.85 \times NLIU) < LCVS$ — Go off-hook and establish a modem connection. The NLIU register is updated every 1 ms with the minimum non-zero value of LVCS in the last 30 ms. This allows the Si2493/57/34/15/04 to eliminate errors due to 50/60 Hz interference and also adapt to relatively slow changes in the on-hook dc reference value on the telephone line. This algorithm does not allow any non-zero values for NLIU below 0x0007. The host may also initialize NLIU prior to issuing the %V2 command. Once the call has begun, the off-hook intrusion algorithm (described in "Intrusion Detection—Off-Hook Condition" on page 147) operates normally. In addition, the Si2493/57/34/15/04 reports “NO LINE” if the telephone line is completely disconnected. If the HOI (U77, bit 11) bit is set, “LINE IN USE” is reported upon intrusion.

The connect messages shown in Table 23 are sent when link negotiation is complete.

Table 23. Extended AT\ Command Set

Command	Action
\$	Display AT\ command settings (see text for details).
\Bn	Character length is automatically set in autobaud mode.
\B0	6N1—six data bits, no parity, one stop bit, one start bit, eight bits total (\N0 only)
\B1	7N1—seven data bits, no parity, one stop bit, one start bit, nine bits total (\N0 only)
\B2	7P1—seven data bits, parity optioned by \P, one stop bit, one start bit, 10 bits total
\B3	**8N1—eight data bits, no parity, one stop bit, one start bit, 10 bits total**
\B5	8P1—eight data bits, parity optioned by \P, one stop bit, one start bit, 11 bits total (\N0 only)
\B6	8X1—eight data bits, one escape bit, one stop bit, one start bit, 11 bits total (enables ninth-bit escape mode)
\Nn	Asynchronous protocol.
\N0	Wire mode (no error correction, no compression).
\N2	MNP reliable mode. The Si2493/57/34/15/04 attempts to connect with the MNP protocol. If unsuccessful, the call is dropped. Compression is controlled by %Cn.
\N3	**V.42 auto-reliable—The Si2493/57/34/15/04 attempts to connect with the V.42 protocol. If unsuccessful, the MNP protocol is attempted. If unsuccessful, wire mode is attempted. Compression is controlled by %Cn.**
\N4	V.42 (LAPM) reliable mode (or drop call)—Same as \N3 except that the Si2493/57/34/15/04 drops the call instead of connecting in MNP or wire mode. Compression is controlled by %Cn.
\N5	V.42 and MNP reliable mode - The Si2493/57/34/15/04 attempts to connect with V.42. If unsuccessful, MNP is attempted. If MNP is unsuccessful, the call is dropped. Wiremode is not attempted. Compression is controlled by %Cn.
\Pn	Parity type is automatically set in autobaud mode.
\P0	**Even**
\P1	Space[1]
\P2	Odd

Notes:

1. When in autobaud mode, \B0, \B1, and \P1 is not detected automatically. The combination of \B2 and \P3 is detected. This is compatible with seven data bits, no parity, two stop bits. Seven data bits, no parity, one stop bit may be forced by sending AT\T17\B1.
2. When changing rates, the result code “OK” is sent at the old DTE rate. Subsequent commands must be sent at the new rate. When the Si2493/57/34/15/04 is configured in autobaud mode, \T0 through \T15 lock the new baud rate and disable autobaud. To eliminate any possibility of a race condition between the receipt of the result code and the changing of the UART speed, CTS is de-asserted while the result code is being sent until after the rate has been successfully changed. The host should send the \T command and wait for the “OK” response. After the “OK” has been received, the host may send data at the new rate as soon as CTS is asserted. The \T command should be the last command sent in a multi-command line and may not be used on the same command line as :U or :R commands. If it is not, the “OK” from the \T command is sent at the old DTE rate, and any other result codes are sent at the new DTE rate.
3. The autobaud feature does not detect this rate.
4. Default is \T16 (autobaud); otherwise, \T9 (19.2 kbps) if a pulldown is connected to pin 18.

Table 23. Extended AT\ Command Set (Continued)

\P3	Mark.
\Qn	Modem-to-DTE flow control.
\Q0	Disable all flow control—This may only be used if the DTE speed and the line (DCE) speed are guaranteed to match throughout the call.
\Q2	**Use CTS only.**
\Q3	Use RTS/CTS.
\Q4	Enable XON/XOFF flow control for modem-to-DTE interface. Does not enable modem-to-modem flow control.
\Tn	DTE rate.[2]
\T0	300 bps.
\T1	600 bps.
\T2	1200 bps.
\T3	2400 bps.
\T4	4800 bps.
\T5	7200 bps.
\T6	9600 bps.
\T7	12.0 kbps.[3]
\T8	14.4 kbps.
\T9	**19.2 kbps.[4]**
\T10	38.4 kbps.
\T11	57.6 kbps.
\T12	115.2 kbps.
\T13	230.4 kbps.
\T14	245.760 kbps.[3]
\T15	307.200 kbps.

Notes:

1. When in autobaud mode, \B0, \B1, and \P1 is not detected automatically. The combination of \B2 and \P3 is detected. This is compatible with seven data bits, no parity, two stop bits. Seven data bits, no parity, one stop bit may be forced by sending AT\T17\B1.
2. When changing rates, the result code “OK” is sent at the old DTE rate. Subsequent commands must be sent at the new rate. When the Si2493/57/34/15/04 is configured in autobaud mode, \T0 through \T15 lock the new baud rate and disable autobaud. To eliminate any possibility of a race condition between the receipt of the result code and the changing of the UART speed, CTS is de-asserted while the result code is being sent until after the rate has been successfully changed. The host should send the \T command and wait for the “OK” response. After the “OK” has been received, the host may send data at the new rate as soon as CTS is asserted. The \T command should be the last command sent in a multi-command line and may not be used on the same command line as :U or :R commands. If it is not, the “OK” from the \T command is sent at the old DTE rate, and any other result codes are sent at the new DTE rate.
3. The autobaud feature does not detect this rate.
4. Default is \T16 (autobaud); otherwise, \T9 (19.2 kbps) if a pulldown is connected to pin 18.

Table 23. Extended AT\ Command Set (Continued)

\T16	**Autobaud On.[4]**
\T17	Autobaud Off. Lock at current baud rate.
\U	Serial mode—causes a low pulse (25 ms) on $\overline{RI}$ and $\overline{DCD}$. $\overline{INT}$ to be the inverse of ESC. $\overline{RTS}$ to be inverse of $\overline{CTS}$. Parallel mode—causes a low pulse (25 ms) on $\overline{INT}$. This command terminates with a $\overline{RESET}$ and does not generate an “OK” message.
\Vn	Connect message type.
\V0	**Report connect and protocol message.**
\V2	Report connect message only (exclude protocol message).
\V4	Report connect and protocol message with both upstream and downstream connect rates.

Notes:

1. When in autobaud mode, \B0, \B1, and \P1 is not detected automatically. The combination of \B2 and \P3 is detected. This is compatible with seven data bits, no parity, two stop bits. Seven data bits, no parity, one stop bit may be forced by sending AT\T17\B1.
2. When changing rates, the result code “OK” is sent at the old DTE rate. Subsequent commands must be sent at the new rate. When the Si2493/57/34/15/04 is configured in autobaud mode, \T0 through \T15 lock the new baud rate and disable autobaud. To eliminate any possibility of a race condition between the receipt of the result code and the changing of the UART speed, CTS is de-asserted while the result code is being sent until after the rate has been successfully changed. The host should send the \T command and wait for the “OK” response. After the “OK” has been received, the host may send data at the new rate as soon as CTS is asserted. The \T command should be the last command sent in a multi-command line and may not be used on the same command line as :U or :R commands. If it is not, the “OK” from the \T command is sent at the old DTE rate, and any other result codes are sent at the new DTE rate.
3. The autobaud feature does not detect this rate.
4. Default is \T16 (autobaud); otherwise, \T9 (19.2 kbps) if a pulldown is connected to pin 18.