

## AT COMMAND QUICK REFERENCE

### Modem AT Commands

#### Basic AT Command Set

Command	Options	Function & Description
A/		Re-execute the last command string
<any key>		Terminate the current connection attempt when entered in handshaking state
All the following commands require an "AT" prefix		
A		Go off-hook and attempt to establish a connection without waiting for a ring
Bn		Line modulation options
	B0	Select V.22 mode for 1200 bps connection
	B1 *	Select Bell 212A for 1200 bps connection
	B2	Select V.23 1200 bps for receiving, 75 bps for transmitting in originate mode; 75 bps for receiving and 1200 bps for transmitting in answer mode
	B3	Select V.23 75 bps for receiving, 1200 bps for transmitting in originate mode; 1200 bps for receiving and 75 bps for transmitting in answer mode
	B15	Select V.21 for 300 bps connection
	B16	Select Bell 103 for 300 bps connection
Dn		Dial command, beginning the dialing sequence. The string "n" (telephone number and modifiers) listed as follows is entered after the "D" command
	L	Re-dial last number. Should be the first character following ATD, ignored otherwise
	P	Pulse dial.
	R	Reverse dial. Originate call in answer mode (go on-line in answer mode)
	S=n	Dial the phone number stored in NVRAM at location "n" (n=0, 1, 2, 3)
	T	DTMF tone dial.
	W	Wait for second dial tone. The modem waits for the second dial tone before processing the dial string
	,	Pause. Cause the modem to pause for a time before processing the next character in the dial string (specified by S8 register)
	!	Hook Flash (for call transfer). Cause the modem to go on-hook for 0.5 second then return to off-hook
	@	Wait for 5 seconds of silence after dialing number
	;	Return to command state after dialing a number without disconnecting the call
En		AT command echo options
	E0	Echo disabled
	E1 *	Echo enabled
Hn		Switch-hook control
	H0 *	Modem goes on-hook
	H1	Modem goes off-hook
Mn		Speaker control
	M0	Speaker always off
	M1 *	Speaker on until carrier present
	M2	Speaker always on
	M3	Speaker off during dialing and on until carrier present
Nn		Select negotiate handshake
	N0	When originating or answering, handshake only at the communication rate specified by S37 register and "ATBn" and no fallback
	N1 *	When originating or answering, start handshaking only at the communication standard specified by S37 register and "ATBn" During handshake, fallback to a lower speed may occur.
On		Go on-line
	O0	Return modem to a previously established state (return to data mode).
	O1	Begin a retrain sequence, then return to on-line state.
	O3	Issue a rate re-negotiation, then return to on-line state.

P		Enable pulse dialing (Disabled in CTR 21 approved models)
Qn		Result code display options
	Q0 *	Result code enabled
	Q1	Result code disabled
T		Enable tone dialing
Vn		Result code form
	V0	Display result code in numeric form (see also the result code options table)
	V1 *	Display result code in verbose (text) form
Wn		Select extended result code options
	W0*	CONNECT result code reports DTE speed. Disable protocol result codes. (see also the "Result Code Options Table")
	W1	CONNECT result code reports DTE speed. Enable protocol result codes.
	W2	CONNECT result code reports DCE speed. Enable protocol result codes.
Xn		Select result codes/call progress options
	X0	Display CONNECT or "1" for all speeds. Ignore dial tone and busy tone detection.
	X1	Display connect message and the modem's data rate, and an indication of the modem's error correction and data compression. Ignore dial tone and busy tone detection.
	X2	Display connect message and the modem's data rate, and an indication of the modem's error correction and data compression. Check dial tone before proceeding dialing, ignore busy tone detection.
	X3	Display connect message and the modem's data rate, and an indication of the modem's error correction and data compression. Ignore dial tone before proceeding dialing, check busy tone after making dialing.
	X4 *	Display connect message and the modem's data rate, and an indication of the modem's error correction and data compression. Check dial tone and busy tone.
	X5	Same as X4.
	X6	Same as X4.
	X7	Display CONNECT or "1" for all speeds. Check dial tone and busy tone.
Zn		Recall stored profile
	Z0	Reset and recall user profile 0. Either Z0 or Z1 restores the same single profile.

\* Manufacturer default

### Extended "AT&" (Ampersand) Command Set

Command	Options	Function & Description
&Cn		Data carrier detect option
	&C0	State of carrier from remote modem is ignored. DCD circuit is always on
	&C1 *	DCD turns on when the remote modem's carrier signal is detected, and off when the carrier signal is not detected.
&Dn		Data Terminal Ready (DTR) option.
	&D0	DTR ignored
	&D1	Go to command mode on on-to-off DTR transition
	&D2 *	Hang up and go to command mode on on-to-off DTR transition. Auto-answer is disabled if DTR is low
	&D3	Hang up and reset from user profile 0 on the on-to-off DTR transition
&F		Recall factory default setting as active configuration
&Gn		V.22bis guard tone option
	&G0 *	No guard tone
	&G1	550 Hz guard tone
	&G2	1800 Hz guard tone
&Kn		Set local flow control
	&K0	Disable flow control
	&K3 *	Enable bi-directional hardware flow control (CTS/RTS)

	&K4	Enable bi-directional software flow control (XON/XOFF)
&Pn		Pulse dialing make/break ratio selection
	&P0	Make=39%, Break=61%, international version (Default) Make=33%, Break=67% for use in 20 pps, Japanese version
	&P1	Make=33%, Break=67%, international version Make=33%, Break=67% for use in 10 pps, Japanese version (Default)
&Qn		Async communications mode options
	&Q0	Async mode, buffered (same as "AT\N0")
	&Q5 *	Error control mode, buffered (same as "AT\N3")
	&Q8	MNP error control mode. If an MNP error control protocol is not established, the modem will fallback according to the current setting in S36 register.
	&Q9	V.42 or MNP error control mode. If neither error control protocol is established, the modem will fallback according to the current setting in S36 register.
&Sn		Data Set Ready (DSR) option
	&S0 *	DSR always on
	&S1	DSR on during handshake and on-line, off in test mode or idle mode
&Tn		Self-test commands
	&T0	Terminate any test in progress
	&T1	Local analog loopback test
	&T3	Local digital loopback (LDL) test
	&T6	Remote digital loopback test, in normal mode
&V		View active file and stored phone numbers
&W		Store active configuration into the modem's NVRAM
&Zn=x		Store telephone number n=0 to 3 x=<string> see also the dial modifier in "ATDn" command The max. number of digits per string is 40.

\* Manufacturer default

### Extended "AT\" (Back Slash) Command Set

Command	Options	Function & Description
\Jn		Constant DTE speed option
	\J0 *	DCE and DTE rates are independent
	\J1	Force the DTE interface speed to the DCE connection rate (line speed) after on-line
\Nn		Error control mode options
	\N0	Buffered mode, no error control (flow control is allowed).
	\N1	Direct mode, no error control (no flow control is allowed).
	\N2	MNP reliable mode. If MNP 2-4 error control establishment fails, the modem disconnects.
	\N3 *	V.42, MNP or buffer mode. The modem attempts to connect in V.42 mode. If this fails, the modem attempts to connect in MNP mode. If this fails, the modem connects in buffer mode.
	\N4	V.42 or disconnect. The modem attempts to connect in V.42 mode. If this fails, the call will be disconnected.
\Qn		Local flow control options
	\Q0	Disable flow control (same as "AT&K0")
	\Q1	XON/XOFF software flow control (same as "AT&K4")
	\Q3 *	RTS/CTS hardware flow control (same as "AT&K3")
\Tn		Set inactive timer (for buffer mode only)
	n=0 *	Disable inactive timer
	n=1 - 255	Enable inactive timer. Length in minutes
\Vn		Protocol result codes
	\V0	Disable protocol result code appended to DCE speed
	\V1 *	Enable protocol result code appended to DCE speed

\* Manufacturer default

**Extended “AT%” (Percent) Command Set**

Command	Options	Function & Description
%B		View numbers in blacklist. If blacklisting is in effect, this command displays the numbers for which the last call attempted in the past two hours failed. The ERROR result code appears in the countries that do not require blacklisting.
%Cn		Data compression control
	%C0	No data compression
	%C1 *	V.42bis/MNP 5 data compression enabled.

\* Manufacturer default

**Extended “AT-” (Dash) Command Set**

Command	Options	Function & Description
-Cn		Data calling tone options
	-C0 *	Disable data calling tone
	-C1	Enable data calling tone (the freq. is 1,300 Hz with a cadance of 0.5 sec. ON and 2 sec. OFF)

\* Manufacturer default

**Result Code Options****Result Code Options Table**

AT V0	ATV1	X0	X1	X2	X3	X4	X7
0	OK	✓	✓	✓	✓	✓	✓
1	CONNECT	✓	✓	✓	✓	✓	✓
2	RING	✓	✓	✓	✓	✓	✓
3	NO CARRIER	✓	✓	✓	✓	✓	✓
4	ERROR	✓	✓	✓	✓	✓	✓
5	CONNECT 1200 EC*	@	@	@	@		
6	NO DIAL TONE		✓		✓	✓	
7	BUSY				✓	✓	✓
8	NO ANSWER	✓	✓	✓	✓	✓	✓
10	CONNECT 2400 EC *	@	@	@	@		
11	CONNECT 4800 EC *	@	@	@	@		
12	CONNECT 9600 EC *	@	@	@	@		
13	CONNECT 14400 EC *	#	#	#	#		
14	CONNECT 19200 EC *	@	@	@	@		
18	CONNECT 57600 EC *	%	%	%	%		
24	CONNECT 7200 EC *	#	#	#	#		
25	CONNECT 12000 EC *	#	#	#	#		
28	CONNECT 38400 EC *	%	%	%	%		
40	CONNECT 300 EC *	@	@	@	@		
55	CONNECT 21600 EC *	#	#	#	#		
56	CONNECT 24000 EC *	#	#	#	#		
57	CONNECT 26400 EC *	#	#	#	#		

58	CONNECT 28800 EC *	# # # #
59	CONNECT 31200 EC *	# # # #
60	CONNECT 33600 EC *	# # # #
70	CONNECT 32000 EC *	# # # #
71	CONNECT 34000 EC *	# # # #
72	CONNECT 36000 EC *	# # # #
73	CONNECT 38000 EC *	# # # #
74	CONNECT 40000 EC *	# # # #
75	CONNECT 42000 EC *	# # # #
76	CONNECT 44000 EC *	# # # #
77	CONNECT 46000 EC *	# # # #
78	CONNECT 48000 EC *	# # # #
79	CONNECT 50000 EC *	# # # #
80	CONNECT 52000 EC *	# # # #
81	CONNECT 54000 EC *	# # # #
82	CONNECT 56000 EC *	# # # #
86	CONNECT 16800 EC *	# # # #
87	CONNECT 115200 EC *	% % % %
88	DELAYED **	
89	BLACKLISTED **	
90	BLACKLIS FULL **	
100	CONNECT 28000	# # # #
101	CONNECT 29333	# # # #
102	CONNECT 30666	# # # #
103	CONNECT 33333	# # # #
104	CONNECT 34666	# # # #
105	CONNECT 37333	# # # #
106	CONNECT 38666	# # # #
107	CONNECT 41333	# # # #
108	CONNECT 42666	# # # #
109	CONNECT 45333	# # # #

110	CONNECT 46666	# # # #
111	CONNECT 49333	# # # #
112	CONNECT 50666	# # # #
113	CONNECT 53333	# # # #
114	CONNECT 54666	# # # #

@ DTE/DCE speed

# DCE speed (line speed)

% DTE speed

\* EC only appears when the Extended Result Code options are enabled

\*\* For Blacklisting function enabled countries only

**Extended Result Code Options Table**

AT V0	ATV1	W 0	W 1	W 2	W2V 0
5	CONNECT 1200	✓			✓
5	CONNECT 1200 EC*		✓	✓	
10	CONNECT 2400	✓			✓
10	CONNECT 2400 EC *		✓	✓	
11	CONNECT 4800	✓			✓
11	CONNECT 4800 EC *		✓	✓	
12	CONNECT 9600	✓			✓
12	CONNECT 9600 EC *		✓	✓	
13	CONNECT 14400				✓
13	CONNECT 14400 EC *			✓	
14	CONNECT 19200	✓			✓
14	CONNECT 19200 EC *		✓	✓	
18	CONNECT 57600	✓			
18	CONNECT 57600 EC *		✓		
24	CONNECT 7200				✓
24	CONNECT 7200 EC *			✓	
25	CONNECT 12000				✓
25	CONNECT 12000 EC *			✓	
28	CONNECT 38400	✓			✓
28	CONNECT 38400 EC *		✓	✓	
40	CONNECT 300	✓			✓
40	CONNECT 300 EC *		✓	✓	

55	CONNECT 21600	✓
55	CONNECT 21600 EC *	✓
56	CONNECT 24000	✓
56	CONNECT 24000 EC *	✓
57	CONNECT 26400	✓
57	CONNECT 26400 EC *	✓
58	CONNECT 28800	✓
58	CONNECT 28800 EC *	✓
59	CONNECT 31200	✓
59	CONNECT 31200 EC*	✓
60	CONNECT 33600	✓
60	CONNECT 33600 EC *	✓
70	CONNECT 32000	✓
70	CONNECT 32000 EC*	✓
71	CONNECT 34000	✓
71	CONNECT 34000 EC*	✓
72	CONNECT 36000	✓
72	CONNECT 36000 EC*	✓
73	CONNECT 38000	✓
73	CONNECT 38000 EC*	✓
74	CONNECT 40000	✓
74	CONNECT 40000 EC*	✓
75	CONNECT 42000	✓
75	CONNECT 42000 EC*	✓
76	CONNECT 44000	✓
76	CONNECT 44000 EC*	✓
77	CONNECT 46000	✓
77	CONNECT 46000 EC*	✓
78	CONNECT 48000	✓
78	CONNECT 48000 EC*	✓
79	CONNECT	✓

	50000	
79	CONNECT 50000 EC*	✓
80	CONNECT 52000	✓
80	CONNECT 52000 EC*	✓
81	CONNECT 54000	✓
81	CONNECT 54000 EC*	✓
82	CONNECT 56000	✓
82	CONNECT 56000 EC*	✓
86	CONNECT 16800	✓
86	CONNECT 16800 EC *	✓
87	CONNECT 115200	✓
87	CONNECT 115200 EC *	✓

\* EC is replaced by one of the following symbols.

V.42bis V.42 error control and V.42bis data compression  
V.42 V.42 error control only  
MNP5 MNP 4 error control and MNP 5 data compression  
MNP4 MNP 4 error control only  
NoEC No error control and data control protocols



## S-REGISTERS QUICK REFERENCE

### Modem S-Registers

#### S-Registers, TSn=x”

Register	Dec.	Function & Description	Default
S0=	0 - 255	Set the number of the rings required before the modem automatically answers a call. Set "0=0" to disable auto-answer mode	000
S1=	0 - 255	Count the incoming rings and store the value to this register. The value of this register is incremented with each ring. If no rings occur over an 8 sec. interval, this register is cleared. User can read but should not change this value	000
S2=	0 - 255	S2 holds the decimal value of the ASCII character used as the escape character. The default value (043) corresponds to an ASCII character "+". A value of 128 to 255 disables the escape process, i.e., no escape character will be recognized	043
S3=	0 - 127	Hold the decimal value of the Carriage Return <CR> character used as the command line and result code terminator. Pertain to asynchronous operation only	013
S4=	0 - 127	Hold the decimal value of the character recognized as a line feed. The line feed control character is output after the carriage return control character if verbose result code are used.	010
S5=	0 - 32, 127	Hold the decimal value of the character recognized as a backspace. The modem will not recognize the backspace character if this register is set to a value greater than 32	008
S6=	2 - 65 4 - 65	Set the length of time, in seconds, that the modem must wait (minimum 2 seconds even if the value is less than 2) after going off-hook before dialing the first digit of the telephone number For international version	002
		For Japanese version	004
S7=	1 - 255 35 - 59	Set the time, in seconds, that the modem must wait before hanging up because carrier is not detected For international version	050
		For Japanese version	050
S8=	0 - 65	Set the time, in seconds, that the modem must pause when the "," dial modifier is encountered in the dial string	002
S10=	1 - 255	Set the length of time, in tenths of a second, that the modem waits before hanging up after a loss of carrier	020
S11=	50 - 150	DTMF duration and inter digit delay. Set the duration and spacing, in mini-seconds, in DTMF touch tone dialing	095
S12=	0 - 255	Define the maximum period, in 2-hundredths of a second, allowed between consecutive asynchronous escape character "+" (plus) for the escape sequence to be considered valid	050
S28=	0 - 255	V.34 modulation en-/disabler 0: disabled 1- 255: enabled	001
S30=	0 - 90	Inactivity timer. Set the length of time, in minutes, that the modem counts when there is no data flow in or out the DTE serial port. A connection is disengaged when the counter reaches the preset value. Set S30 =0 to disable the inactivity timer. For buffer mode only.	000
S36=		Negotiation fallback options	007
	0, 2	Hang up	
	1, 3	Fall back to an async connection	

	4, 6	Attempt MNP mode. If MNP fails, hang up.	
	5, 7	Attempt MNP mode. If MNP fails, fallback to async connection.	
S37=		Desired DCE speed (line speed)	000
	0	Maximum modem speed	
	2	Attempt 1200/75 bps connection	
	3	Attempt to a 300 bps connection	
	5	Attempt to a 1200 bps connection	
	6	Attempt to a 2400 bps connection	
	7	Attempt to a 4800 bps connection	
	8	Attempt to a 7200 bps connection	
	9	Attempt to a 9600 bps connection	
	10	Attempt to a 12000 bps connection	
	11	Attempt to a 14400 bps connection	
	12	Attempt to a 16800 bps connection	
	13	Attempt to a 19200 bps connection	
	14	Attempt to a 21600 bps connection	
	15	Attempt to a 24000 bps connection	
	16	Attempt to a 26400 bps connection	
	17	Attempt to a 28800 bps connection	
	18	Attempt to a 31200 bps connection	
	19	Attempt to a 33600 bps connection	
S38=		56K Dial Line Rate Options. Set the max. 56K downstream speed that the modem attempts to connect (Selection for K56flex mode)	001
	0	56K disabled	
	1	56K enabled, auto-speed selection, max. modem speed	
	2	32000 bps	
	3	34000 bps	
	4	36000 bps	
	5	38000 bps	
	6	40000 bps	
	7	42000 bps	
	8	44000 bps	
	9	46000 bps	
	10	48000 bps	
	11	50000 bps	
	12	52000 bps	
	13	54000 bps	
	14	56000 bps	
S38=		56K Dial Line Rate Options. Set the max. 56K downstream speed that the modem attempts to connect. (Selection for V.90 mode)	001
	0	V.90 Disabled	
	1	V.90 auto-speed selection max. modem speed	
	2	28800 bps	
	3	29333 bps	
	4	30666 bps	
	5	32000 bps	
	6	33333 bps	
	7	34666 bps	
	8	36000 bps	
	9	37333 bps	
	10	38666 bps	
	11	40000 bps	
	12	41333 bps	
	13	42666 bps	
	14	44000 bps	
	15	45333 bps	
	16	46666 bps	
	17	48000 bps	
	18	49333 bps	

	19	50666 bps	
	20	52000 bps	
	21	53333 bps	
	22	54666 bps	
	23	56000 bps	
S48=	7, 128	<p>LAPM error control and feature negotiation.  S48=7 Negotiation enabled  S48=128 Negotiation disabled. Force immediate fallback options specified in S36</p> <p>S36=0 or 2, and S48=7  LAPM or hang up  S36=0 or 2 and S48= 128  Don't use  S36=1 or 3, and S48=7  LAPM or async  S36=1 or 3, and S48=128  Async  S36=4 or 6, and S48=7  LAPM, MNP or hang up  S36=4 or 6, and S48=128  MNP or hang up  S36=5 or 7, and S48=7  LAPM, MNP or async  S36=5 or 7, and S48=128  MNP or hang up</p>	
S89=	0, 5 - 60	<p>Sleep mode control timer. Specify the number of seconds of inactivity (no character sent from DTE, no RING) in the off-line command state before the modem places itself into standby mode. A value of "0" prevents standby mode.  If a number between 1 and 4 is entered for this register, it will set the value to 5</p>	030
S91=	6 - 15	<p>Transmitting power level adjustment (Japanese version only)  Range: -6 dBm to -15 dBm  Default: -15 dBm</p>	014