BASIC "AT" COMMAND SET

Command			Function and description	Ref.
A/			Re-execute last command	
A>			Repeat last command once or last dial up to 9 times	
<any	key>		Terminate current connection attempt	
+++			Escape sequence code, entered in data state, wait for modem to return to command state	
ATA			Force answer mode on-line (See also S39b2)	
ATBn	Bn		Handshake option	S28b7
	B0	*	Select ITU-T V.22 for 1200 bps communication	
	B1		Select Bell 212A for 1200 bps communication	
ATD			Dial number and options that follow (see also S38b0, S35b4)	
	P		Pulse dial	S23b1
	T		Tone dial	S23b1
	,		Pause for a time specified in S8	
	;		Return to command state after dialing	
	!		Hook flash, call transfer	
	W		Wait for second dial tone	S6
	@		Wait for a 5-second silence before proceeding, otherwise return 'NO ANSWER'	
	R		Reverse dial (Originate a call in answer mode)	S17b5
ATDL			Dial last number	
ATDSn	n=0-9		Dial number stored in NVRAM at position n	
ATEn			Command mode local echo of keyboard commands	S23b0
	E0		Echo off	
	E1	*	Echo on	
ATHn			On/off hook control	
	H0	*	Hang up (on hook), same as ATH	
	H1		Go off hook	
ATIn			Display inquired information	
	I0		Display product code	
	I1		Display product information and ROM checksum	
	I2		Link status report	
ATLn	n=0-7	*4	Speaker volume control	S24b5
ATMn			Speaker control	S21b1
	M0		Speaker always Off	
	M1	*	Speaker On until carrier is detected	
	M2		Speaker always On	
	M3		Speaker On after last digit dialed, Off at carrier detect	
ATNn	n=0-7	*5	Ring volume control, n=0 disables the ring function	S24b1
ATOn	O0		Return to on-line state	
	O1		Retun to on-line state and force modem to request retrain	
ATP			Pulse dial	S23b1
ATQn			Result code displayed	S23b6
	Q0	*	Modem returns result code	
	Q1		Modem does not return result code	
	Q2		Return result code but quiet in answer mode (will not show in AT&Vn)	S40b1 S42b2
ATSr.b=n			Set bit b of S-register r to n (0 or 1)	
ATSr.b?			Inquiry bit b of S-register r	
ATSr=n			Set S-register r to value n, where n is a decimal number between 0-255	
ATSr?			Display value stored in S-register r	
ATT			Tone dial	S23b1
ATVn			Verbal/Numeric result codes	S23b6
	V0		Display result codes in numeric form	S35b7
	V1	*	Display result codes in verbose form	
ATXn	n=0-7	*5	Result code options, see the Options Table	S23b3
ATZn	n=0-4		Reset modem and set power-on profile	S15b5
	Zn		Reset modem and load user profile n (0-3)	
	Z4		Reset modem and load factory settings	
AT$			Help, Basic command summary	
AT&$			Help, Extended AT& command summary	
AT*$			Help, Extended AT* command summary	

EXTENDED "AT&" COMMAND SET

Command			Function and description	Ref.
&Bn			Data rate, terminal-to-modem (DTE/DCE)	S28b6
	&B0		DTE rate follows connection rate	S44b6
	&B1	*	DTE/DCE rate fixed at DTE setting (see also S18, S20, S44b6)	S44b6
&Cn			Carrier Detect (CD) operations	S21b4
	&C0		CD always on	S42b7
	&C1	*	CD tracks presence of carrier (see also S38b3, S42b7)	S38b3
&Dn			Data Terminal Ready (DTR) operations	S21b6
	&D0		Assume DTR is always on	
	&D1		DTR off-on transition causes dial of the default number	*Dn
	&D2	*	DTR off causes the modem to hang up	
	&D3		DTR off causes the modem to hang up and reset from profile 0	
&F			Load factory setting into RAM as active configuration	
&Gn			Guard tone option	
	&G0	*	No guard tone, U.S., Canada	S28b4
	&G1		Reserved	
	&G2		1800 Hz guard tone	
&Hn			Data flow control, DTE/DCE	S27b3
	&H0		Flow control disabled	
	&H3	*	Hardware (CTS/RTS) flow control	
	&H4		Software (XON/XOFF) flow control	
&Jn			Phone line type	S28b0
	&J0	*	Single phone line RJ11 phone jack	
	&J1		Multiple phone/modem lines RJ12 / RJ13 phone jack	
&Kn			Error control and data compression	S27b0
	&K0		No error control	
	&K1		MNP®4+MNP3 (See also S41b0)	S41b0
	&K2		MNP4+MNP5 (See also S38b5, S41b0)	S38b5
	&K3		V.42+MNP4	
	&K4	*	V.42+V.42bis (Compatible with &K2 see also S38b5)	
&Ln			Normal/Leased line operation	S14b2
	&L0	*	Normal 2-wire dial-up phone line	
	&L1		2-wire leased line	
	&L2		4-wire leased line	
&Mn			Sync/Asynchronous mode operation	S14b6
	&M0	*	Asynchronous mode with data buffering	
	&M1		Asynchronous command synchronous data	
	&M2		Direct asynchronous mode without data buffering	
	&M3		Synchronous mode	
&Nn			Modem link mode (DCE/DCE)	S19
	&N0	*	Multi-Auto, auto negotiate highest possible link rate; ZyX 19200 (Plus models only), ZyX 16800, V.32bis, V.32, V.22bis, V.22 and Bell 212A, G3 Fax	S38b4 S43b0 S43b1
	&N1		V.33 14000/12000	
	&N2		V.33 12000	
	&N3		V.32 9600T/9600/ 7200T/4800	
	&N4		V.32 9600/7200T/4800	
	&N5		V.32 4800	
	&N6		V.29 9600 (U1496 PLUS & U1496R only)	
	&N7		V.29 7200 (U1496 PLUS & U1496R only)	
	&N8		V.29 4800 (U1496 PLUS & U1496R only)	
	&N9		V.27bis 4800 (U1496 PLUS & U1496R only)	
	&N10		V.27bis 2400 (U1496 PLUS & U1496R only)	
	&N11		V.26bis 2400 (U1496 PLUS & U1496R only)	S35b2
	&N12		V.23 1200/75	
	&N13		V.23 600/75	
	&N14		V.22bis 2400/1200	
	&N15		V.22 1200	
	&N16		V.21 300	
	&N17		V.32bis 14400/12000/9600/7200/4800	
	&N18		V.32bis 12000/9600/7200/4800	
	&N19		V.32bis 7200/4800	
	&N24		BELL 212A 1200	
	&N25		BELL 103 300	
	&N32		ZyXEL FAX 14400/12000/9600/7200/ 4800/2400 (Use S42 bit 4 to disable V.17, 14400 in calling mode)	S42b4
	&N34		ZyXEL 19200[1]	
	&N35		ZyXEL 16800	
	&N36		ZyXEL 14400	
	&N37		ZyXEL 12000	
	&N38		ZyXEL 9600	
	&N39		ZyXEL 7200	
	&N42		ZyXEL CELL 14400	
	&N43		ZyXEL CELL 12000	
	&N44		ZyXEL CELL 9200	
	&N45		ZyXEL CELL 7200	
	&N46		ZyXEL CELL 4800	
	Note		[1] ZyXEL 19.2Kbps only available with Plus models	
&Pn			Pulse dial make/break ratio	S23b2
	&P0	*	Pulse dial make/break ratio= 39% / 61%	
	&P1		Pulse dial make/break ratio= 33% / 67%	
&Rn			RTS (Request To Send) function selection, used in synchronous mode only	S21b5
	&R0		CTS tracks RTS, response delay is set in S26	
	&R1	*	Ignore RTS, assumes RTS always on	
&Sn			Data Set Ready (DSR)	S21b3
	&S0	*	DSR overridden, DSR always on	S44b4
	&S1		According to ITU-T, modem controls DSR	S41b5
&Tn			Modem testing	
	&T0		Terminate test in progress	
	&T1		Initiate Analog Loopback test (ALB)	
	&T3		Initiate Local Digital Loopback test (Hardware test, LDL)	
	&T4		Grant Remote Digital Loopback request from remote modem	
	&T5	*	Deny Remote Digital Loopback request from remote modem	S14b1
	&T6		Initiate Remote Digital Loopback test (RDL)	
	&T7		Initiate Remote Digital Loopback with self test (RDL+ST)	

	&T8		Initiate Analog Loopback with self test (ALB+ST)	
&Vn			View profile settings	
	&V0		View current active settings	
	&Vn		View user profile # (n-1) settings (n=1-4)	
	&V5		View factory default settings	
&Wn	n=0-3		Write current settings to user profile # n in NVRAM	S35b6
&Xn			Synchronous mode timing source	S14b4
	&X0	*	Modem provides synchronous transmit clock signal (Internal clock, applies to pin 15 of RS232D)	
	&X1		Terminal provides synchronous transmit clock signal (External clock, applies to pin 24 of RS232D)	
	&X2		Received carrier provides synchronous transmit clock signal (Remote or Slave clock, applies to pin 15 of RS232D)	
&Yn			Break handling, Destructive Breaks clear the buffer; Expedited Breaks are sent immediately to the remote system	S28b2
	&Y0		Destructive, expedited	
	&Y1	*	Nondestructive, expedited	
	&Y2		Nondestructive, unexpedited	
&Zn=s	n=0-9		Write phone numbers to NVRAM at position n, use AT*Dn or ATS29=n to set default dial pointer	*Dn S29
&Z?			Display the phone numbers stored in NVRAM	

EXTENDED "AT*" COMMAND SET

Command			Function and description	Ref.
*Bn			Dial-backup	S30
	*B0	*	Disable dial-backup	
	*Bn		Enable dial-backup and set dial-backup pointer at telephone directory location (n-1)	S44b2
*Cn			Character length	
	*C0	*	10-bit character length	S15b3
	*C1		11-bit character length	
	*C2		9-bit character length	
	*C3		8-bit character length	
*Dn	n=0-9	*0	Set default dial pointer at telephone directory location n, use AT&Zn=s to store phone numbers (see also S35b4, &Zn, &D1)	
*En			Error control negotiation	S21b0
	*E0	*	If error control negotiation fails, keep the non-error control connection	
	*E1		If error control negotiation fails, terminate the call	
*Fn			Remote configuration	S36b0
	*F0	*	Deny remote configuration	
	*F1		Accept remote configuration (Remote Digital Loopback must be granted also, AT&T4)	&T4
*Gn			Security function	
	*G0	*	Disable security function	S36b5
	*G1		Enable type 1 security, with password check (ZyXEL to ZyXEL only)	
	*G2		Enable type 1 security, with password check and call-back (ZyXEL to ZyXEL only)	
	*G3		Enable type 2 security, with password check	
	*G4		Enable type 2 security, with password check and call-back	
	*G5		Enable type 2 security, with password check and call-back, remote site enters the call-back number	
*HS			Modify supervisory password (Default is "ZyXEL")	
*Hn	n=0-9		Modify user password table at location n	
*In			Command set	S17b6
	*I0	*	AT command set	
	*I1		V.25bis command set	
	*I2		Dumb mode	
*Ln			Panel lock function	S28b1
	*L0	*	Panel key normal	
	*L1		Panel key locked	
*Mn			Leased line auto handshake mode	
	*M0	*	Leased line auto handshake on Originate mode	S14b0
	*M1		Leased line auto handshake on Answer mode	
*Pn	n=0-15	*9	Leased line transmission power level, set to (-n) dBm, n=0 to 15	S17b1S35b3
*Qn			Action taken when line quality changes	S27b6
	*Q0		No response to poor signal quality	
	*Q1		Retrain action taken if signal quality is poor	S41b2
	*Q2	*	Adaptive rate (auto fall-back/forward)	
	*Q3		Disconnect for poor signal quality	
*Rab			Read remote user profile b to local user profile a	S36b1
	a=0-3		Local user profile number a	S37b4
	b=0-3		Remote user profile number b	S37b0
	b=4		Remote active configuration	
	b=5		Remote factory default	
*Sn	*S0	*	Secondary channel disabled	S17b0
	*S1		Secondary channel enabled	
*T			Recall the last CND (Caller ID) information	S40b2
*V			View password table	
*Wab			Write local user profile a to remote user profile b and reset remote modem from profile b	S36b1
	a=0-3		Local user profile number a	S37b4
	a=4		Local active configuration	
	a=5		Local factory default configuration	
	b=0-3		Remote user profile number b	S37b0

FAX, CLASS 2 "AT+F" COMMAND SET

Command		Function and description
+<command>=<value>		Execute a command or set a parameter
+<command>=?		Read permissible setting
+<command>?		Read current setting
+FAA=n		Auto answer mode parameter
	n=0	DCE to answer as set by +FCLASS
	n=1	DCE can answer and automatically determine calling type
+FBOR=n		Phase C data bit order
	n=0	Select direct bit order
	n=1	Select reversed bit order in receiving mode
+FCIG="string"		Local fax station ID string, for polling Rx
+FCLASS=n		Service class selection
	n=0	Set to modem mode
	n=2	Set to Class 2 mode
	n=2.0	Set to Class 2.0 mode
	n=6	Set to ZFAX mode
	n=8	Set to Voice mode
+FCON	DCE	DCE response, Fax connection made
+FCR=n		Capability to receive parameter
	n=0	DCE will not receive message data or poll a remote device
	n=1	DCE will receive message data
+FCQ=n		Copy quality checking parameter
	n=0	The DCE does not check copy quality
	n=1	The DCE can check 1-D phase C data
	n=2	The DCE can check 1-D and 2-D phase C data
+FDCC=vr,br, wd,ln,df,ec,bf,st		DCE capability parameters, refer to EIA pro.2388 for detailed descriptions
+FDCS=vr,br, wd,ln,df,ec,bf,st		Current session parameter, refer to EIA pro.2388 for detailed descriptions
+FDIS=vr,br, wd, ln,df,ec,bf,st		Current session negotiation parameters, refer to EIA pro.2388 for detail descriptions
+FDR		Receive phase C data command, initiates document reception
+FDT [=df,vr,wd,ln]		Transmit phase C data command, releases the DCE to proceed with negotiation
+FET=n		End the page or document command
	n=0	More pages, same document
	n=1	End of Document, another document follows
	n=2	No more pages or documents
	n=4	Procedure interrupt, another page follows
	n=5	Procedure interrupt, end of document, another document follows
	n=6	Procedure interrupt, end of document
+FK		Causes the DCE to terminate the session in an orderly manner
+FLID="string"		Local ID string parameter
+FLPL=n		Document polling command
	n=0	Indicates that the DTE has no document for polling
	n=1	Indicates a document is available for polling
+FMDL?		Request DCE model
+FMFR?		Request DCE manufacturer
+FMINSP=n		Minimum phase C speed
	n=0	2400bps
	n=1	4800bps
	n=2	7200bps
	n=3	9600bps
	n=4	12000bps
	n=5	14400bps
+FPTS=n		Page transfer status
	n=1	Received page good
	n=2	Page bad, retrain requested
	n=3	Page good, retrain requested
	n=4	Page bad, procedure interrupt requested
	n=5	Page good, procedure interrupt requested
+FREV?		Request DCE revision
+FSPL=n		Polling Command
	n=0	Disable polling
	n=1	Enable polling

FAX, CLASS 2.0 "AT+F" COMMAND SET

Command	Function and description
+FDT	Transmit Phase C data command, releases the DCE to proceed with negotiation
+FDR	Receive phase C data command, initiates document reception
+FKS	Causes the DCE to terminate session in an orderly manner

+FIP		Initialize all the parameters to the manufacturer determined default settings
+FCO		DCE Response. Group III fax connection made
+FCLASS=n	**0**	Set to data mode
	2	set to class 2 mode
	2.0	set to class 2.0 mode
	6	set to ZFAX mode
	8	set to voice mode
+FMI?		Request DCE Manufacturer
+FMM?		Request DCE Model
+FMR?		Request Modem Revision
+FCC=vr, br, wd, ln, df, ec, bf, st		DCE capability parameters, refer to Class 2.0 standard for detailed descriptions
+FCS=vr, br, wd, ln, df, ec, bf, st		Current Session parameter, refer to Class 2.0 standard for detailed descriptions
+FLI=<Local ID String>		Local ID string parameter
+FNS=<String>		Send non-standard frame FIF octet string
+FLP=n		Document Polling Command
	0	Indicates that the DTE has no document for polling
	1	Indicates a document is available for polling
+FSP=n		Polling Command
	0	Disable polling
	1	Enable polling
+FCR=n		Capability to receive parameter
	0	DCE will not receive messages or poll a remote station
	1	DCE will receive messages or poll a remote station
+FNR=<n>		Negotiation Message reporting. Report messages that are generated during T.30 phase B negotiations
<rpr>	**0**	Suppress the receiving (+FIS) parameter
	1	The receiving (+FIS) parameter is reported
<tpr>	**0**	Suppress the transmitting (+FCS) parameters
	1	The transmitting (+FCS) parameter is reported
<idr>	**0**	Suppress the reporting of the ID strings (+FCI)
	1	ID strings (+FCI) parameters are reported
<nsr>	**0**	Non standard frames (+FNF) are suppressed
	1	Non standard frames (+FNF) are reported
+FIE=n		Procedure Interrupt Enable
	0	Precedure interrupts from the remote station are ignored
	1	Procedure interrupts from the remote station are accepted
+FPS=n		Page Status
	1	Page Good
	2	Page Bad; Retrain requested
	3	Page Good; Retrain requested
	4	Page Bad; Interrupt requested
	5	Page Good; Interrupt requested
+FCQ=<n>		Copy Quality Checking and Correction
<rq>	**0**	DCE Receive Copy quality checking is disabled
	1	DCE Receive Copy quality checking is enabled
	2	DCE Receive Copy quality correction is enabled
<tq>	**0**	DCE Transmit Copy quality checking is disabled
	1	DCE Transmit Copy quality checking is enabled
	2	DCE Transmit Copy quality correction is enabled
+FRQ=<pgl>, <cbl>		Specifies the percentage of good lines (pgl) and the maximum tolerable number of consecutive bad lines (cbl). Used by the modem to do Copy Quality Checking and Correction
+FAA=n		Auto answer modem parameter
	0	DCE to answer as set by +FCLASS
	1	DCE can answer and automatically determine calling type (data/fax)
+FCT=n		The time period that the modem will wait for a command after completing the transmission of Phase C Data
+FMS=n		Limits the minimum phase C speed that is required to accept a fax connection
	0	2400bps
	1	4800bps
	2	7200bps
	3	9600bps
	4	12000bps
	5	14400bps
+FLO=n		Flow Control Select
	0	XON/XOFF and RTS/CTS flow control turned off
	1	XON/XOFF flow controlled in either direction
	2	Use RTS/CTS for flow control
+FPR=n		Serial Port Control rate
	0	Autobaud detect on (2400bps)
	>0	Serial rate is fixed at the value multiplied by 2400bps
+FBO=n		Data Bit Order
	0	Select direct bit order
	1	Select reversed bit order
+FEA=n		Phase C received EOL alignment
	0	T.4 EOL patterns are bit aligned
	1	T.4 EOL patterns are byte aligned by modem

FAX, ZyXEL "AT#" COMMAND SET

Command			Function and description
#Bn			"CONNECT FAX" response selection
	#B0	*	Parameters and data follow "CONNECT FAX" message, used in ZFAX mode, normal operation
	#B1		For BBS fax receiving application, modem waits after sending out "CONNECT FAX" message. This command also changes CONNECT 12000/ARQ to CONNECT 9600/ARQ. This setting will also send out external mail string "ZyXEL" when fax is connected, DCE will not send fax connection parameters until <DC2> is received from DTE.
	#B2		Enable Polling feature of Modem/Fax to send polling signal to remote fax machine.
	#B3		Display ring cadence
#Cn			Set minimum scan line time capability at the receiver
	#C0		20 ms at 3.85 line/mm, T(7.7)=T(3.85)
	#C1		5 ms at 3.85 line/mm, T(7.7)=T(3.85)
	#C2		10 ms at 3.85 line/mm, T(7.7)=T(3.85)
	#C3		20 ms at 3.85 line/mm, T(7.7)=1/2T(3.85)
	#C4		40 ms at 3.85 line/mm, T(7.7)=T(3.85)
	#C5		40 ms at 3.85 line/mm, T(7.7)=1/2T(3.85)
	#C6		10 ms at 3.85 line/mm, T(7.7)=1/2T(3.85)
	#C7		0 ms at 3.85 line/mm, T(7.7)=T(3.85)
#F			Set the U-1496 to ZyXEL fax mode, same as "AT&N32"
#Ln			Set maximum recording length
	#L0		Set maximum recording length, A4 (297mm)
	#L1		Set maximum recording length, B4 (364mm)
	#L2		Set maximum recording length, unlimited
#P<string>			Set the local ID string, 25 characters maximum
#Rn			Set recording width
	#R0		Set 1728 picture elements along a scan line length of 215mm
	#R1		Set 2048 picture elements along a scan line length of 255mm
	#R2		Set 2432 picture elements along a scan line length of 303mm
#Tn			Coding Scheme
	#T0		Set to one dimensional coding scheme

	#T1	Set to two dimensional coding scheme
#Vn		Vertical resolution
	#V0	Set to normal vertical resolution
	#V1	Set to high vertical resolution
Result Code		(With #B0) CONNECT FAX/SnnnnVnTnRnLnCnP<string> (With #B1) /SnnnnVnTnRnLnCnP<string> DISCONNECTxP<string>
Snnnn		First four digits of Fax connection speed
Vn		Vertical resolution; n =0-1
Tn		Coding scheme; n =0-1
Rn		Recording width; n =0-2
Ln		Recording length; n =0-2
Cn		Scan time; n =0-7
x		Disconnect with confirmation (x =0) or without (x =1)
P<string>		Remote Fax number

VOICE, "AT+V" COMMAND SET

Command		Function and description
+<command>=<value>		Execute a command or set a parameter
+<command>=?		Read permissible setting
+<command>?		Read current setting
+FCLASS=8		Set modem to Voice mode
+VBT=n	**n=0-255** ***10**	Set the DTMF tone generation duration at 0.1 sec. increments, used in conjunction with +VTS
VCON		DCE reports Voice connection made
+VDD=n	**n=0-255** ***6**	DTMF tone duration detection. This is in units of 5msec and will report the DTMF tone when it receives a continuous tone for the specified msecs.
+VDH=n	**n=0-31** ***16**	Sets the threshold of the DTMF tone detection. (Lowering the value increases the sensitivity)
+VGT=n	**n=0-255** ***192**	Set the gain when in play mode to either increase or decrease the volume
+VIP		Initialize all the Voice parameters to factory default
+VIT=n	**n=0-255** ***7**	Set the inactivity timer in 1 second units
+VLS=n		Voice I/O device selection
	n=0	Disconnect all I/O devices
	n=2	Dial-up line jack
	n=8	External mic. (Connect to Dial-up line jack)
	n=16	Connect to Internal Speaker
+VNH=n		Automatic hang-ups disable or enable
	n=0	DCE shall not disable automatic hang-ups
	n=1	DCE shall disable automatic hang-ups with ATH0
	n=2	DCE shall disable automatic hang-ups without ATH0
+VRA=n	**n=0-255** ***70**	Set length of time, in 0.1 sec. units, to wait between ringbacks before DCE assumes remote station has gone off hook
+VRN=n	**n=0-255** ***57**	Set length of time, in 0.1 sec. unit, to wait for ringback before assuming remote station has gone off hook
+VRX		Start the voice reception process
+VSD=<sds>, <sdi>		Set the silence detection sensitivity and the required period of silence
	<sds> ***15**	0-31, larger values imply that the DCE treats noisier conditions as silence, 0 to disable silence detection
	<sdi> ***70**	0-255, in units of 0.1 second, required period of silence
+VSM=n		Voice compression method selection
	n=1	9.6Kbps CELP (Code Excited Linear Prediction), only available in Plus (+) models
	***n=2**	19200bps 2-bit ADPCM

	n=3	28800bps 3-bit ADPCM	
	n=30	30720bps 3-bit ADPCM	
	n=4	38400bps 4-bit ADPCM	
+VSY=n	**n=0-255 *1**	Set Voice recording re-sync timer in 50ms units	S39b7
+VTS=<string>		Cause DCE to produce DTMF and other tones	
+VTX		Start the voice transmission process	
+VVT=n	**n=0-255 *16**	Sets VCON sensitivity, higher numbers decrease sensitivity	

* Manufacturer default (Except when used to represent "AT*" commands)
Snnbx Cross reference to S-register nn bit number x
n Reference Column, "AT" is omitted when AT command is referred to

EIA-232D INTERFACE

DB25 Pin# Signal	Signal description	Signal Flow DTE	ITU-T DCE	EIA Signal
1	Protective Ground	«--»	101	AA
2	Transmit Data (TXD)	--»	103	BA
3	Receive Data (RXD)	«--	104	BB
4	Request To Send (RTS)	--»	105	CA
5	Clear To Send (CTS)	«--	106	CB
6	Data Set Ready (DSR)	«--	107	CC
7	Signal Ground	«--»	102	AB
8	Carrier Detect (CD) (DCD)	«--	109	CF
15	Synchronous Transmitter Timing	«--	114	DB
17	Synchronous Receiver Timing	«--	115	DD
18	Local Analog Loopback Test	--»	141	
20	Data Terminal Ready (DTR)	--»	108/2 108/1	CD
21	Remote Digital Loopback Test	--»	140	
22	Ring Indicator (RI)	«--	125	CE
24	Synchronous Transmitter Timing	--»	113	DA
25	Test Indicator	«--	142	

Async. Hardware Flow Control Cable Connection

Modem (DCE) DB25	Signal	DTE DB 9	DCE (Null) DB25	MAC Mini 8	NeXT 68,040 Mini 8
2	TXD	3	3	3	3
3	RXD	2	2	5	5
4	RTS	7	5	1	6
5	CTS	8	4	2	8
6	DSR	6	20		
7	Ground	5	7	4,8	4
8	CD (DCD)	1	20		2
20	DTR	4	6,8	1	1
22	RI	9			

BASIC S-REGISTERS, "ATSn=x"

Command	Function and description	+Default/Reference
S0=	Set the number of rings on which the modem will answer. S=0 disables auto-answer	+000
S1=	Counts and stores number of rings from an incoming call	+000
S2=	Define escape code character, default "+" (43 dec.)	+043
S3=	Define ASCII Carriage Return	+013
S4=	Define ASCII Line Feed	+010
S5=	Define ASCII Backspace	+008
S6=	Set duration, in number of seconds, modem waits before dialing for X1 setting; modem waits for dial tone in this duration for X2-X7 setting. (see also S41b4)	+003
S7=	Set duration, in number of seconds, modem waits for a carrier	+060
S8=	Set duration, in seconds, for pause (,) option in Dial command and pause between command re-executions for Repeat (>) command	+002
S9=	Set duration, in tenths of a second, the remote carrier signal before recognition (Ignored if in non-FSK or half-duplex operation)	+006
S10=	Set duration, in tenths of a second, modem waits after loss of carrier before hanging up	+007
S11=	Set duration and spacing, in milliseconds, of dialed Touch-Tones	+070

EXTENDED S-REGISTERS, "ATSn=x"

Command				Function and description	+Default/Reference
S13=	**bit**	**dec**	**hex**	Bit-mapped register	+000
	1	**2**	**2**	Capture modem manufacturer information during V.42 handshake, can be displayed at ATI2 "Last Speed/Protocol" line if available (Flash or ZyXEL stands for ZyXEL connection)	
S14=	**bit**	**dec**	**hex**	Bit-mapped register:	+002
	0	**0**	**0**	Auto-handshake on Originate mode in leased line operation	*M0
		1	**1**	Auto-handshake on Answer mode in leased line operation	*M1
	1	**0**	**0**	Grant Remote Digital Loopback test request	&T4
		2	**2**	Deny Remote Digital Loopback test request	*&T5
	3,2	**0**	**0**	Dial-up line	&L0
		4	**4**	2-wire leased line	&L1
		8	**8**	4-wire leased line	&L2
	5,4	**0**	**0**	Internal clock	&X0
		16	**10**	External clock	&X1
		32	**20**	Remote clock	&X2
	7,6	**0**	**0**	Asynchronous data with buffering	&M0
		64	**40**	Asynchronous command, synchronous data	&M1
		128	**80**	Direct asynchronous no data buffering	&M2
		192	**C0**	Synchronous	&M3
S15=	**bit**	**dec**	**hex**	Bit-mapped register	+130
	1,0	**0**	**0**	Even parity	
		1	**1**	Odd parity	
		2	**2**	No parity	
	2	**0**	**0**	1 stop bit	
		4	**4**	2 stop bits	
	4,3	**0**	**0**	10 bit character length	*C0
		8	**8**	11 bit character length	*C1
		16	**10**	9 bit character length	*C2
		24	**18**	8 bit character length	*C3
	7-5	**0**	**0**	Profile 0 as active settings after power on	Z0
		32	**20**	Profile 1 as active settings after power on	Z1
		64	**40**	Profile 2 as active settings after power on	Z2
		96	**60**	Profile 3 as active settings after power on	Z3
		128	**80**	Factory default as active settings after power on	Z4
S16=		**dec**	**hex**	Test status register	+000
		0	**0**	No test in progress	
		1	**1**	Analog Loopback test in progress	
		3	**3**	Local Digital Loopback test in progress	
		6	**6**	Remote Digital Loopback test in progress	
		7	**7**	Remote Digital Loopback with self test in progress	
		8	**8**	Analog Loopback with self test in progress	
S17=	**bit**	**dec**	**hex**	Bit-mapped register	+018
	0	**0**	**0**	Disable Secondary Channel	*Sn
		1	**1**	Enable Secondary Channel	S42b0
	4-1	**0-30**	**0-1E**	Set leased line transmission power level, from 0 to -15dBm, or from -12 to -27dBm when S35b3 is set	*Pn S35b3
	5	**0**	**0**	Normal dial	
		32	**20**	Reverse dial, answer mode on line	DR
	7,6	**0**	**0**	AT command set	*I0
		64	**40**	V.25 bis command set	*I1
		128	**80**	Dumb mode	*I2
S18=		**dec**	**hex**	Force modem to use fixed baud rate when answering	+000
		0	**0**	Disable fixed baud rate function	&Bn
		1-15	**1-F**	Enable baud rate fixing at answering, baud rate value settings same as S20 value (dec) 1-15, S18=16 for 76800 baud	S44b6
S19=		**dec 0-49**	**hex 0-31**	Modem link mode, same setting value as &Nn	+000 &Nn
S20=		**dec**	**hex**	DTE speed (bps), auto detected from AT command	+002
		0	**0**	76800	
		1	**1**	57600 **dec** **hex** DTE	
		2	**2**	38400 **9** **9** 4800	
		3	**3**	19200 **10** **A** 3600	
		4	**4**	16800 **11** **B** 2400	
		5	**5**	14400 **12** **C** 1800	
		6	**6**	12000 **13** **D** 1200	
		7	**7**	9600 **14** **E** 600	
		8	**8**	7200 **15** **F** 300	
S21=	**bit**	**dec**	**hex**	Bit mapped register	+178
	0	**0**	**0**	Maintain non-error control connection when error control handshake fails	*E0
		1	**1**	Drop connection when error control handshake fails	*E1
	2,1	**0**	**0**	Speaker always Off	M0
		2	**2**	Speaker On until carrier is detected	M1
		4	**4**	Speaker always On	M2
		6	**6**	Speaker On after last digit is dialed out until carrier detected	M3
	3	**0**	**0**	DSR always On	&S0
		8	**8**	According to ITU-T (See also S44b4, S41b5)	&S1
	4	**0**	**0**	CD always On	&C0
		16	**10**	CD tracks presence of data carrier (See also S38b3)	&C1
	5	**0**	**0**	CTS follows RTS, in synchronous mode	&R0
		32	**20**	Ignore RTS (CTS always On), in synchronous mode	&R1
	7,6	**0**	**0**	Ignore DTR signal, assume DTR always On	&D0
		64	**40**	108.1, DTR Off-On transition causes dial of the default number	&D1
		128	**80**	108.2 Data Terminal Ready, DTR Off causes the modem to hang up and return to command state	&D2

Register	bit	dec	hex	Description	Command / Default
		192	C0	108.2, DTR off causes the modem to hang up and reset the modem to profile #0	&D3
S23=	bit	dec	hex	Bit mapped register	+105
	0	0	0	Command echo disabled	E0
		1	1	Command echo enabled	E1
	1	0	0	Tone dial	T
		2	2	Pulse dial	P
	2	0	0	Pulse dial make/break ratio=39% / 61%	&P0
		4	4	Pulse dial make/break ratio=33% / 67%	&P1
	3-5	0	0	ATX0 (See result code table)	
		8	8	ATX1 dec hex	
		16	10	ATX2 40 28 ATX5	
		24	18	ATX3 48 30 ATX6	
		32	20	ATX4 56 38 ATX7	
	6	0	0	Display result codes in numeric format (See S35b7)	V0
		64	40	Display result codes in verbose format	V1
	7	0	0	Modem returns result codes	Q0
		128	80	Modem does not return result codes (see also S40b1)	Q1
S24=	bit	dec	hex	Bit mapped register	+138
	3-1	0-14	0-E	Ring volume control, increments of 2 in decimal	N0-7
	7-5	32-240	20-F0	Speaker volume control, 32-240, increments of 32 in decimal value	L0-7
S25=		dec 255	hex 0-FF	Set time value for how long the DTR can stay dropped before a DTR drop is recognized	+000
S26=		dec 255	hex 0-FF	Set delay, in 10-millisecond units, between the RTS and modem's CTS response in synchronous mode	+000 &Rn
S27=	bit	dec	hex	Bit mapped register	+156
	2-0	0	0	No error control	&K0
		1	1	MNP4 + MNP3 (See also S41b0)	&K1
		2	2	MNP4 + MNP5 (See also S38b5, S41b0)	&K2
		3	3	V.42+MNP4	&K3
		4	4	V.42 + V.42bis (compatible with &K2)	&K4
	5-3	0	0	Flow control disabled	&H0
		24	18	Hardware (CTS/RTS) flow control	&H3
		32	20	Software (XON/XOFF) flow control	&H4
		40	28	Reserved	&H5
	7,6	0	0	No response to poor signal quality	*Q0
		64	40	Retrain action taken if signal quality is poor	*Q1
		128	80	Adaptive rate (Auto fall-back/forward) when signal quality changes	*Q2 S41b2
		192	C0	Disconnect when signal quality is poor	*Q3
S28=	bit	dec	hex	Bit mapped register	+068
	0	0	0	Single phone line, RJ-11 phone jack	&J0
		1	1	Multiple phones/modem lines, RJ12/RJ13 phone jack	&J1
	1	0	0	Panel key normal	*L0
		2	2	Panel key locked	*L1
	3,2	0	0	Destructive, expedited break	&Y0
		4	4	Non-destructive, expedited break	&Y1
		8	8	Non-destructive, unexpedited break	&Y2
	5,4	0	0	No guard tone	&G0
		16	10	Reserved	&G1
		32	20	1800 Hz guard tone	&G2
	6	0	0	DTE/DCE rate follows line rate (see also S18, S44b6)	&B0
		64	40	DTE/DCE rate fixed at DTE setting	&B1
	7	0	0	Select V.22 for 1200 bps communication	B0
		128	80	Select Bell 212A for 1200 bps communication	B1
S29=		dec 0	hex 0	Set default dial phone number pointer, use AT&Zn=s to store phone numbers	+000 *Dn
S30=		dec	hex	Set dial-backup phone number pointer	+000
		0	0	Disable dial-backup	*Bn
		1-9	1-9	Enable dial-backup, sets dial-backup phone # pointer at location (n -1) in the NVRAM.	S44b2
S31=		0-255	0-FF	Holds the ASCII decimal value of the XON	+017
S32=		0-255	0-FF	Holds the ASCII decimal value of the XOFF	+019
S34=		0-255	0-FF	Dial-Backup to restore look-back timer, in minutes	+030
S35=	bit	dec	hex	Bit mapped register	+000
	0	1	1	Use CELL 4800[2] trellis coded 4800 for V.32 4800	
	1	2	2	Disable aborting from terminal during modem handshaking	
	2	4	4	V.26 alternative A	&N11
	3	8	8	Extend the leased line transmission power by -12dBm, add -12dBm to *Pn (S17b1) or S49 low 4 bits. Extend the attenuation of 4W leased or cellular line	S17b1 *Pn
	4	16	10	When Data/Voice switch is pushed, modem will dial the default number, only for U-1496E & U-1496R	*Dn S29
	5	32	20	Enable Selective Reject in V.42	
	6	64	30	Enable password protection to profile saving, when "AT&Wn" is issued, and profile n in the memory has this bit set, supervisory password will be requested	&Wn
	7	128	60	Enable extended numerical result codes from 30-39 when an error correction connection is made, use with ATV0, see result code table	V0 S23b6
S36=	bit	dec	hex	Bit mapped register	+000
	0	0	0	Deny remote request for configuration	*F0
		1	1	Grant remote request for configuration	*F1
	1	0	0	Write from local profile to remote profile	*Wab
		2	2	Read from remote profile to local profile	*Rab
	7-5			Security function control	
		0	0	Disable security function	*G0
		32	20	Enable type 1 security, with password check (ZyXEL to ZyXEL only)	*G1
		64	40	Enable type 1 security, with password check and call-back (ZyXEL to ZyXEL only)	*G2
		96	60	Enable type 2 security, with password check	*G3
		128	80	Enable type 2 security, with password check and call-back	*G4
		160	A0	Enable type 2 security, with password check and call-back, remote site enters the call-back number	*G5
S37=	bit	dec	hex	Bit mapped register, for remote configuration using panel menu control	+000
	3-0	0-5	0-5	0-5, remote profile number	*Wab
	7-4	0-80	0-50	0-5, local profile number	*Rab
S38=	bit	dec	hex	Bit mapped register	+000
	0	1	1	Repeatedly dial the default number if not connected	*Dn S29
	3	8	8	DCD on/off sequence follows UNIX standard, DCD on before connect message is sent, DCD off after last DCE response	&C1 S21b4
	4	16	10	Auto-mode fax receiving disabled, hang up if a fax call is received	&N0
	5	32	20	Disable MNP5	&Kn
S39=	bit	dec	hex	Bit mapped register	+000
	2	4	4	Answer in originate mode	ATA
	3	8	8	Class 2 Fax with Bitfax compatibility: +FCON at 2400 and shift to 19200 at next phase	
	4	16	10	Class 2 Fax with DTE shifting: +FCON at current DTE, rate and shift to 19200 at next phase. QuickLink II fax	
	5	32	20	Disable scramble and descramble function in V.26 operation	
	6	64	40	When set, DTMF detection is enabled after the command "AT+VLS=2" is issued otherwise it will only be enabled during Play or Record voice mode	
	7	128	80	When set, re-synchronization information will be included in recorded voice data	
S40=	bit	dec	hex	Bit mapped register/Disable DTMF tone detection for EDR	+000
	1	2	2	No result code displayed in answer mode	Q2
	2	4	4	Enable Caller Number Delivery (See also S42b2)	*T
	3	8	8	Distinctive Ring Type #1: 1.2/2s on, 4s off or Enable "*" detection, and reported as a "RING"	
	4	16	10	Distinctive Ring Type #2: 0.8 s on,0.4 s off, 0.8 s on, 4 s off. Enable "0" detection, and report as "RING 1" or "RING" if only one type is enabled.	
	5	32	20	Distinctive Ring Type #3: 0.4 s on, 0.2 s off, 0.4 s on, 0.2 s off, 0.8 s on, 4 s off. Enable "#" detection, and report as "RING 2" or "RING" if only one type is enabled.	
	6	64	40	Distinctive Ring Type #4: 0.3 s on, 0.2 s off, 1 s on, 0.2 s off, 0.3 s on, 4 s off. Enables "*" detection, and reports it as "RING 3" (b4 priority).	
S41=	bit	dec	hex	Bit mapped register	+000
	0	1	1	Special MNP compatibility (See also S27b0, S38b5)	&Kn
	1	0	0	Flag idle in V.25bis HDLC	*I1
		2	2	Mark idle in V.25bis HDLC	S17b6
	2	4	4	Extend the retrain time-out timer to 5 min. for special satellite line condition	S27b6 *Qn
	3	8	8	Enable ITU-T signals 140 and 141 on EIA-232D interface	
	4	16	10	In X2-X7 setting, modem waits for S6 seconds before dialing and ignores dial tone detection	
	5	32	20	DSR is forced on but pulse off for 0.5 seconds, for DCD on-off transition (See also S44b4)	&Sn
	6	64	40	Force S0>=2	S0
	7	128	80	Ignore calling tone, not to be used as fax detection	
S42=	bit	dec	hex	Bit mapped register	+000
	0	0	0	Normal secondary channel, 75-2400 bps (U-1496SN, U-1496RN)	S17b0
		1	1	Special secondary channel, fixed 2400 bps (U-1496SN, U-1496R, U-1496RN, U-1496RN PLUS)	
	1	2	2	Throughput averaging	
	2	4	4	CND message will be forced on even if ATQ2 is set (See also S40b1)	Q2 S40b2
	3	8	8	Disable escape sequence code in answer mode	
	4	16	10	Disable V.17, 14400 Fax in calling mode, no effect on answering mode	&N32
	5	32	20	Disable Data/Voice button	
	6	64	40	Disable "RINGING" result code	Xn
	7	128	80	DCD forced on but pulse off for 0.5 seconds when "carrier loss"	&C
S43=	bit	dec	hex	Bit mapped register	+008
	0	1	1	Disable ZyXEL 16800 in Multi-Auto mode	&N0
	1	2	2	Disable ZyXEL 19200 in Multi-Auto mode	
	2	4	4	Disable automatic transmitting power adjustment in Cellular mode	
	3	8	8	Disable automatic cellular mode	
S44=	bit	dec	hex	Bit mapped register	+000
	2	4	4	Semi-auto dial backup, modem will wait for user's confirmation from Front Panel before dialing attempt	*Bn S30
	3	8	8	ATDSn initiates auto-dial of the stored numbers consecutively until a connection is made	&Zn S38b0
	4	16	10	DSR follows DTR (see also S41b5)	&Sn

Register	bit	dec	hex	Description	Reference
	5	32	20	Enable V.13, half duplex simulation in synchronous mode	
	6	64	40	When selected with &B0: DTE fixed at 19200 when the link speed is above 9600, DTE fixed at 9600 if link speed is 7200, otherwise, DTE follows link speed	&B0 S18
				When selected with &B1: DTE fixed at current rate when an ARQ connection is made, when non-ARQ connection is made, DTE follows the logic as when &B0 is set	&B1
	7	128	80	Enable Australian type short-short ring detection	
S45=	0-255		0-FF	Caller ID detection control, Guard Time, in 20ms unit, the time interval for the modem to inhibit the silence detection after ring detection.	+100
S46=	0-255		0-FF	Caller ID detection, Silence Interval, in 20ms unit, silence interval that the modem detects after ring, before CND is to be processed.	+28
S47=	1-255		1-FF	Caller ID detection control, CND gain, the gain of the modem's front-end while CND signal is processed, 1-255, 1 is the highest gain and 255 is no gain.	+64
S48=	bit	dec	hex	Bit mapped register	
	0	1	1	Set CND message in raw data format	
	1	2	2	Enables "DATA ONLY" mode. Autodetect ZyX/V.32bis/V.32/V.22/BELL 103/V.21	
	2	4	4	Enable data CNG calling tone transmission	
	3	0	0	For V.23, where the answer speed (send & receive) is 1200/75	
		8	8	For V.23, where the answer speed (send & receive) is 75/1200	
	4	16	10	When &D1 is set, DTR On will make the modem dial the default number and DTR Off will cause the modem to hang-up and reset to profile 0	
S49=	bit	dec	hex	Bit mapped register	+000
	3-0	0-15	0-F	Transmission power level setting used only with Cellular mode, low 4 bits used to set additional attenuation from 0 to -15dB	S35b3
	6-4			Reserved	
	7	0	0	For Cellular mode only, modem is installed in office	
	7	128	80	For Cellular mode only, modem is installed in mobile	
S50=n		n=0-255		Inactivity timer in ten-second units. When set, modem will disconnect the link if the duration of non-activity exceeds this timer. Set to 0 to disable.	+000
S51=	bit	dec	hex	Bit mapped register, please see register 40 for DTMF activation.	
	2-0	0	0	EDR disabled	
	0	1	1	EDR enabled, single "RING" or "RING n" will be reported 1 time	
	1	2	2	EDR enabled, "RING" or "RING n" will be reported 2 times	
	1-0	3	3	EDR enabled, "RING" or "RING n" will be reported 3 times	
	2	4	4	EDR enabled, "RING" or "RING n" will be reported 4 times	
	0-2	5	5	EDR enabled, "RING" or "RING n" will be reported 5 times	
	1-2	6	6	EDR enabled, "RING" or "RING n" will be reported 6 times	
	2-0	7	7	EDR enabled, "RING" or "RING n" will be reported 7 times	
	5-3	0	0	Disable CNG tone detection	
	3	8	8	Enable CNG tone detection, reports as "RING"	
	4	16	10	Enable CNG tone detection, reports as "RING 1"	
	3-4	24	18	Enable CNG tone detection, reports as "RING 2"	
	5	32	20	Enable CNG tone detection, reports as "RING 3"	
	1-5	40	28	Enable CNG tone detection, reports as "RING 4"	
	4-5	48	30	Enable CNG tone detection, reports as "RING 5"	
	5-3	56	38	Enable CNG tone detection, reports as "RING 6"	
S52=	bit	dec	hex		
	7	128	80	Select SPACE or MARK as first signal of the V.23 handshake signal.	
S56=n		n=0-255		Adjust hook flash timer in 10ms units	

In Reference Column, "AT" is omitted when references are made to AT command

+nnn	Manufacture default, when listed in Reference Column
bit	S-register bit number, *b*, used in ATS*r.b*=*n*, ATS*r.b*=?
dec	Decimal value, *x*, used in ATS*n*=*x*
hex	Hex value, *h*, used in U-1496 and U-1496R for setting "STATUS REGISTER" manually from front panel

RESULT CODES OPTIONS TABLE

Result codes		Commands								
ATV0	**ATV1**	**AT**	**X0**	**X1**	**X2**	**X3**	**X4**	**X5**	**X6**	**X7**
0	OK		V	V	V	V	V	V	V	V
1	CONNECT		V	V	V	V	V	@	$	#
2	RING**		V	V	V	V	V	V	V	V
3	NO CARRIER		V	V	V	V	V	V	V	V
4	ERROR		V	V	V	V	V	V	V	V
5	CONNECT 1200			%	%	%	%	@	$	#
6	NO DIAL TONE				V		V	V	V	V
7	BUSY					V	V	V	V	V
8	NO ANSWER					V	V	V	V	V
9	RINGING*					V	V	V	V	V
10	CONNECT 2400			%	%	%	%	@	$	#
11	CONNECT 4800			%	%	%	%	@	$	#
12	CONNECT 9600			%	%	%	%	@	$	#
14	CONNECT 19200			%	%	%	%	@	$	#
15	CONNECT 7200			%	%	%	%	@	$	#
16	CONNECT 12000			%	%	%	%	@	$	#
17	CONNECT 14400			%	%	%	%	@	$	#
18	CONNECT 16800			%	%	%	%	@	$	#
19	CONNECT 38400			%	%	%	%	@		
20	CONNECT 57600			%	%	%	%	@		
21	CONNECT 76800			%	%	%	%	@		

Use ATS35 bit 7 (ATS35.7=1) to enable the following numerical result codes. When "NONE" error control connection is made, use the above table.

Numerical Code	Connect speed w/ Error Correction	Numerical Code	Connect speed w/ Error Correction
30	CONNECT	35	CONNECT 9600
31	CONNECT 1200	36	CONNECT 12000
32	CONNECT 2400	37	CONNECT 14400
33	CONNECT 4800	38	CONNECT 16800
34	CONNECT 7200	39	CONNECT 19200

Note:

V	Supported
%	Reporting DTE rate
@	CONNECT DTE speed/Protocol Link speed/Error control level Example: CONNECT 38400/V.32bis 14400/V.42bis
$	CONNECT Link speed/Error control (ARQ), Example: CONNECT 14400/ARQ
#	CONNECT Link speed/Error control (ARQ)/Error control level Example: CONNECT 14400/ARQ/MNP5
**	When more than one type of Distinctive Ring is turned on (S40b3-6) "RINGn" will be reported, n = Ring Type#
*	Use S42b6 to disable "RINGING" result code

ZyXEL

HIGH SPEED MODEM/FAX/VOICE

ZyXEL U-SERIES

QUICK-REFERENCE GUIDE

U-1496	**U-1496 Plus**
U-1496E	**U-1496E Plus**
U-1496B	**U-1496B Plus**
U-1496RE	**U-1496RE Plus**
U-1496R	**U-1496P Portable**

ZyCellular

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The Intelligent Modem

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