Introduction

The goal of this manual is to provide general information for the developers on evaluation of the USB Modem. The USB provide a 12Mbps high bandwidth for virtually unlimited data throughput instead of the legacy 16550 UART bottleneck with the traditional modems.
USB Modem is a very flexible modem that has one of the smallest real estate and power consumption out on the market. Because of the simplicity of the modem design, the time to market is quick and less overhead. With this modem, all future driver releases will be a simple software update.
USB modem provides an easy installation and a strong performance that reduces the Total Cost of Ownership.

Features

Data Protocols
V.90, V.34bis, V.34, V.32bis, V.32, V.22bis, V.22, Bell 212A, Bell 103

Data Speed
V.90 up to 56000, V.34bis up to 33600

Data Compression
V.42bis, MNP5

Error Correction
V.42 LAPM, MNP2,3,4

Fax Protocols
Group 3 compatible, V.17, V.29, V.27ter, V.21, Class1 commands

Fax Speed
14400, 12000, 9600, 7200, 4800, 2400, 300

General
Standard AT commands
V.8 and Automode
V.80
Virtual UART (460.8kpbs)

Hardware Requirements

Pentium 166MMX
16 MB RAM
USB port
Win98 or NT5.0
No power supply needed for the ST USB Modem

Software Installation

1. Start your PC as usual, then plug in USB Modem to any spare USB port on your system. Windows will report that it has found a new hardware and will open the *Add New Hardware Wizard* reporting that it searches for the new drivers for an *Unknown Device*.
2. Click on the *Next* button.
3. Windows will propose to search for the best drivers for your device.

4. Click on the *Next* button. Insert USB Modem software CD-ROM or USB Modem driver diskette.
5. Select *CD-ROM drive* or *Floppy disk drive* in the *Add New Hardware Wizard* window and click the *Next* button. If installing from CD-ROM, specify the *drivers* directory when
6. The *driver for USB Modem* will be proposed.
7. Click on the *Next* button. Windows will build a database for this device.
8. Click again on the *Next* button to finish the installation of the USB driver.
9. Windows will then detect again a *New Hardware* and will install the Modem drivers.
10. At the end of this installation process, the *Device Manager* panel of the *System Properties* will show the addition of *USB Modem* in the Modem section and the *driver for USB Modem* in the USB section:
11. Finally, double click on the *USB Modem* and choose the *modem* folder as shown below.
12. In the *Configuration* section you can choose the country that you are calling from. This way you can take the USB modem and be able to dial from any country worldwide.

AT Commands

Modem operation is controlled by AT commands. These AT commands include the following:

- Basic AT commands, for example ATDT123
- Extended AT Commands for example AT&E,AT\A,AT%C,AT+MS
- S-Register commands, for example ATS32=8
- Fax Class 1 commands, for example AT+FTM
- Voice commands, for example AT#VTX

The command syntax and operation guidelines for each command category are described in the following sections.

A command line is a string of characters sent from a DTE (Terminal or Data Terminal Equipment) to the DCE while the DCE is in command state. Command lines have a prefix, a body and a terminator. The prefix consists of the ASCII characters **AT** or **at**. The body consists of printable ASCII characters. Space characters other than <CR> (See register S3), and <BS> (See register S5) are ignored. <CR> is command terminator.

Characters preceding the AT prefix are ignored.

AT Command Guidelines

- Basic AT commands consist of single ASCII characters, which may be preceded by a prefix character, for example **&**, and followed by a decimal number, for example **AT&W1**.
- Missing decimal parameters are interpreted as 0. For example, if you type **ATH**, the command **ATH0** is assumed.
- Fax commands are preceded with the **+F** characters and terminated by semicolon (**;**) or <CR> character.
- The modem supports editing command lines by recognizing the <BS> character.
- The AT command sequence may be followed by any number of commands in sequence, with the exception of commands Z, D or A, where all characters following on the same command line will be ignored.
- When a syntax error is found in the command line, an ERROR response will be returned to the DTE. Execution of commands D and A will be aborted if another character is entered before completion of the handshake.
- When the modem has entered on-line data mode, it is possible to break the data transmission in order to issue more AT commands. This is done by the DTE sending a sequence of three escape characters (defined in S2, '+' by default).

AT Command Set

The modem will comply with the commands listed below. Parameters applicable to each command are listed below.
Default factory configuration settings are marked by an asterisk *.
Features marked with (-) are not yet available in the current version.

Basic AT Commands

A/ Re-execute Command

The modem repeats the last command line sent by the DTE. Usually used for re-dialing.

Note: This command should **not** be terminated by <CR>.

A Answer

The modem will go off-hook and attempt to answer an incoming call. Upon successful completion of handshake, the modem will go on-line in answer mode.

Notes:

If +FCLASS=0 is selected, the modem will enter the connect state after exchanging carrier with the remote system. If no carrier is detected within the period specified in S7, the modem hangs up. Any character entered while connecting will abort the connection process.

If +FCLASS=1, the modem will go off-hook in V21 answer mode. It will generate the V21 2100 Hz answer tone for 3 +/- 0.5 seconds, and following a delay of 70 ms, will proceed as if the +FTH=3 command were issued. At any stage up to (but excluding) the +FTH=3 command state, any character will abort the communication.

If +FCLASS=8 (#CLS=8), the modem will go off-hook and a voice session will take place.

Related S-Reg: S0

Bn CCITT Control

B0 Connect at V.22 1200 bps

Result codes:

OK n=0

Error Otherwise

Dn Dial

Directs the modem to go on-line, dial according to the string entered, and attempt to establish a connection.

The Dial String may consist of any of the characters described below:

* T Tone dialing (first character in the string)

P Pulse dialing (first character in the string)

L Redial last dialed number (first character in the string)

0-9 Digits 0 to 9.

* Asterisk (tone only)

Hash (tone only)

W Wait for dial tone; the modem will wait for dial tone before dialing the digits following "W". S6 register will be used for timeout. (X3 or higher)

, (Comma); Pause for the time specified by S8 before resuming the dialing

; (Semicolon) Return to command mode after dialing. This allows the user to issue additional AT commands while remaining off-hook. Actual call progress will be entered only after a dial command issued without the ";" terminator.

S=n Dial the number stored in the directory; n=0-3 (see &Z).

! Flash; The modem will go on hook for a time defined by S24.

@ Wait for silence; The modem will wait for at least 5 seconds of silence before resuming the dialing. If no such silence is detected before the expiration of the call abort timer (S7), the modem will terminate with NO ANSWER response (or BUSY if applicable). If answer tone arrives during execution of this parameter, the modem handshakes. (X3 or higher)

(),< > (space) String format characters - ignored

<i> any other character - ignored.

Notes:

If +FCLASS=0 is selected, the modem will attempt to connect with another data modem. The modem will use the time period specified in S6 and S7 as time-outs in the handshake process. If a timeout expires, the modem will go on-hook and respond with NO CARRIER response. The command will be aborted in progress is a DTE character is entered before completion of the handshake.

If +FCLASS=1, the modem will attempt to connect with a fax machine (or modem) by entering the HDLC V21 channel 2 receive state (as if +FRH=3 had been issued).

The command will be aborted upon receipt of a DTE character if the modem has not finished dialing. In this case the modem will go on-hook and return to command mode responding with NO CARRIER message. If the modem has finished dialing, It proceeds as if +FRH=3 command has been issued.

If +FCLASS=8 (#CLS=8), the modem will go off-hook in V21 answer mode. It will decide (based on timers) when the other side answers in voice and a voice session will take place.

Related S-Reg: S5,S6,S7,S16,S22,S28,S56

En Set local echo

The modem enables/disables echo of characters to DTE.

Parameter value is written to S13.

E0 Disable command echo.

* E1 Enable command echo.

Result codes:

OK n=0 or 1

Error Otherwise

Related S-Reg: S13

Hn Set ON/OFF hook

H0 Modem hangs up (goes on-hook).

* H1 Modem goes off hook.

Result codes:

OK n=0 or 1

Error Otherwise

In Identification/Information

I1 Modem Name, Vendor Name, Modem Version,
for example **:**
ModemX
ModemWorks Ltd.
Ver 1.10

I2 SW Provider /SW Version, for example
Smart Link Ltd.
Ver 1.20

I3 Chipset Vendor/Chipset ID, for example
Chip Vendor Ltd.
XY4220

I4 Modem active profile for example,
Active Profile:
S00=000 S01=000 S02=000 S03=000 S04=000 S05=000 S06=000 S07=000 S08=000
S00=009 S10=000 S11=000 S12=000 S13=000 S14=000 S15=000 S16=000 S17=000
S18=000 S01=019 S20=000 S21=000 S22=000 S23=000 S24=000 S25=000 S26=000
S27=000 S28=000 S29=000 S30=000 S31=000 S32=000 S33=000 S34=000 S35=000
S36=000 S37=000 S38=000 S39=000 S40=000 S41=000 S42=000 S43=000 S44=000
S45=000 S46=000 S47=000

I5 Stored profile 0
Active Profile 0:
(Same format as above)

I6 Stored profile 1
Active Profile 1:
(Same format as above)

I7 Display stored pone numbers
(See &Z command)

Ln Speaker volume
Select speaker volume.
L0 Low
L1 Low
* L2 Medium
L3 High
Result codes:
OK n=0-3
Error Otherwise
Related S-Reg: S30

Mn Speaker control
Select when the speaker is On/Off.
M0 Speaker always OFF
* M1 Speaker ON from start of dialing until receiving carrier
M2 Speaker always ON
M3 Speaker OFF from end of dialing until receiving carrier
Result codes:
OK n=0-3
Error Otherwise
Related S-Reg: S29

Nn Automode control
Enable/Disable Automode detection.
N0 Automode detection disabled. A subsequent handshake will be conducted according to the contents of S32.
* N1 Automode enabled. A subsequent handshake will be conducted according to the Automode algorithm.
Result codes:
OK n=0 or 1
Error Otherwise
Related S-Reg: S31

On Returns to on-line data mode

This command is normally used to connect the DTE back after an escape (+++) has been issued.

O0 Return to on-line data mode.

O1 Return to on-line data mode, retrain first.

Result codes:

OK n=0-1

Error Otherwise

P Pulse dialing

Forces pulse dialing. Applies to subsequent dialing commands.

This command holds until the next T dial modifier or T command is received.

The modem will go off hook and attempt to answer an incoming call. Upon successful completion of handshake, the modem will go on-line in answer mode.

Related S-Reg: S16

Q Quiet result codes control

* Q0 Enable sending result codes to DTE.

Q1 Disable sending result codes to DTE.

Result codes:

OK n=0 or 1

Error Otherwise

Related S-Reg: S14

S Read/Write S-Register

This command has a few derivatives:

Sn=v Sets the value v (decimal) to S-register n (v=0-255)

Sn? Displays the value of S-register in decimal format (3 digits)

Note: Some registers are read-only

Result codes:

OK All parameters valid

Error Invalid S register or value. Trying to write to a read-only register

T Tone dialing

Forces tone dialing. Applies to subsequent dialing commands.

This command holds until the next T dial modifier or T command is received.

This command changes S14 to reflect the current dialing mode.

Related S-Reg: S16

Vn Verbose/Numeric result codes

Select the time of result messages sent to the DTE.

For a list of result codes and verbal messages see X command.

V0 Short form (numeric) result codes to be sent to DTE.

* V1 Long form (verbose) result codes to be sent to DTE.

Result codes:

OK n=0 or 1

Error otherwise

Related S-Reg: S15

Xn Extended result codes

Select the subset of result codes to be used by the modem to the DTE.

If the modem is in fax mode (+FCLASS=1), the only message sent to indicate connection is "CONNECT" without a speed indication.

X0 Supported messages: OK, CONNECT, RING, NO CARRIER and ERROR, Blind call enabled.

X1 Supported messages: OK, CONNECT xxxx, RING, NO CARRIER and ERROR, Blind call enabled.

X2 Same as X1 + NO DIAL TONE message, Blind call disabled

X3 Same as X1 + BUSY message, Blind call enabled.

* X4 All messages supported, Blind call disabled (see list below).

Notes:

W,@ dial modifiers are ignored in X1, X2

S6 (Wait before dial) is ignored in X2, X4 if no W is specified in dial string

S6 is set to 0 means a blind call

Table 1 - Result Codes

Result Code	Message	X0	X1	X2	X3	X4
0	OK	*	*	*	*	*
1	CONNECT	*	*	*	*	*
2	RING	*	*	*	*	*
3	NO CARRIER	*	*	*	*	*
4	ERROR	*	*	*	*	*
5	CONNECT 1200	1	*	*	*	*
6	NO DIAL TONE	3	3	*	3	*
7	BUSY	3	3	3	*	*
8	NO ANSWER	3	3	3	*	*
9	CONNECT 0300	1	*	*	*	*
10	CONNECT 0600	1	*	*	*	*
11	CONNECT 2400	1	*	*	*	*
12	CONNECT 4800	1	*	*	*	*
13	CONNECT 7200	1	*	*	*	*
27	CONNECT 9600	1	*	*	*	*
14	CONNECT 12000	1	*	*	*	*
15	CONNECT 14400	1	*	*	*	*
16	CONNECT 16800	1	*	*	*	*
17	CONNECT 19200	1	*	*	*	*
18	CONNECT 21600	1	*	*	*	*
19	CONNECT 24000	1	*	*	*	*
20	CONNECT 26400	1	*	*	*	*
21	CONNECT 28800	1	*	*	*	*
22	CONNECT 31200	1	*	*	*	*
23	CONNECT 33600	1	*	*	*	*
24	CONNECT 34800	1	*	*	*	*

25	CONNECT 40000	1	*	*	*	*
26	CONNECT 42000	1	*	*	*	*
28	CONNECT 44000	1	*	*	*	*
29	CONNECT 46000	1	*	*	*	*
30	CONNECT 48000	1	*	*	*	*
31	CONNECT 50000	1	*	*	*	*
32	CONNECT 52000	1	*	*	*	*
33	CONNECT 54000	1	*	*	*	*
34	CONNECT 56000	1	*	*	*	*
35	CONNECT 57600	1	*	*	*	*
36	CONNECT 115200	1	*	*	*	*

Result Code	Message	X0	X1	X2	X3	X4
37	CONNECT 230400	*	*	*	*	
38	CONNECT 460800	1	*	*	*	*
39	CONNECT 921600	1	*	*	*	*
40	CONNECT 32000	*	*	*	*	
41	CONNECT 34000	1	*	*	*	*
42	CONNECT 36000	1	*	*	*	*
43	CONNECT 38000	*	*	*	*	*
44	CONNECT 58000	*	*	*	*	*
45	CONNECT 60000	*	*	*	*	*
46	CONNECT 28000	*	*	*	*	*
47	CONNECT 29333	*	*	*	*	*
48	CONNECT 30666	*	*	*	*	*
49	CONNECT 33333	*	*	*	*	*
50	CONNECT 34666	*	*	*	*	*
51	CONNECT 37333	*	*	*	*	*
52	CONNECT 38666	*	*	*	*	*
53	CONNECT 41333	*	*	*	*	*
54	CONNECT 42666	*	*	*	*	*
55	CONNECT 45333	*	*	*	*	*
56	CONNECT 46666	*	*	*	*	*
57	CONNECT 49333	*	*	*	*	*
58	CONNECT 50666	*	*	*	*	*
59	CONNECT 53333	*	*	*	*	*
60	CONNECT 54666	*	*	*	*	*
70	FAX	*	*	*	*	*
71	DATA	*	*	*	*	*
100	VCON	4	4	4	4	*
101	DELAYED	4	4	4	4	*
102	BLACKLISTED	4	4	4	4	*
66	COMPRESSION: CLASS 5	-	*	*	*	*
67	COMPRESSION: V.42BIS	-	*	*	*	*
69	COMPRESSION: NONE	-	*	*	*	*

76	PROTOCOL: NONE	-	*	*	*	*
77	PROTOCOL: LAPM	-	*	*	*	*
78	PROTOCOL: MNP	-	*	*	*	*
1021	MODULATION: V.21	-	*	*	*	*
1022	MODULATION: V.22	-	*	*	*	*
1032	MODULATION: V.32	-	*	*	*	*
1034	MODULATION: V.34	-	*	*	*	*
1103	MODULATION: B103	-	*	*	*	*
1122	MODULATION: V.22BIS	-	*	*	*	*
1132	MODULATION: V.32BIS	-	*	*	*	*
1134	MODULATION: V.34BIS	-	*	*	*	*
1212	MODULATION: B212	-	*	*	*	*
+F4	+FCERROR	*	*	*	*	*

<*> message will be generated when n has been selected

<i> message will be replaced by message <I> when n has been selected

<-> message will not be generated when n has been selected.

Related S-Reg: S56

Yn Select default configuration

Select the default user defined configuration.

Note: The default configuration is not loaded by Yn (See Zn)

Y0 Select user template 0

Y1 Select user template 1

* Y2 Select factory setting 0

Y3 Select factory setting 1

Related S-Reg: S161

Zn Select user defined configuration

Select the user defined configuration.

Z0 Select default user template (as defined by Yn)

Z1 Select user template 0

Z2 Select user template 1

Z3 Select factory setting 0 (&F0)

Z4 Select factory setting 1 (&F1)

Result codes:

OK n=0-5

Error Otherwise

Related S-Reg: S59

AT& Commands

&An Connect message format

Select the format of the CONNECT message.

* &A0 no extra messages besides CONNECT xxxxx

&A1 Add Modulation indicator:

V.21/ V.22/ V.22BIS/ V.32/ V.32BIS/ V.34/ V.34BIS/ B103/ B212

For example:

Modulation: V.34

&A2 Add Error Detection Protocol and Data Compression indicators.

For example:

Protocol: LAPM/MNP/NONE

Compression: CLASS 5/V.42BIS/NONE

&A3 Add Modulation Indicator + Error Detection Protocol + Data Compression indicators (see above).

Related S-Reg: S70, S71

&Cn Control Carrier Detect (CD,RLSD) behavior

Controls the RLSD output behavior.

&C0 RLSD is assumed to be ON all the time

* &C1 RLSD follows the carrier state

Result codes:

OK n=0 or 1

Error Otherwise

Related S-Reg: S60

&Dn Controls DTR behavior (NA)

Controls the DTR output behavior.

Note: This command is supported for compatibility.

It has no significance in Modio environment.

* &D0 DTR is taken to be ON all the time

&D1 DTR drop causes entry to command mode without disconnect

&D2 DTR follows DTR circuit definition

&D3 DTR drop causes software reset (as in Z0)

Result codes:

OK n=0-3

Error Otherwise

Related S-Reg: S63

&En Connect message speed source

Select the requested source for the speed field in the CONNECT message.

&E0 DCE Speed

* &E1 DTE Speed

Note: Since a virtual port is involved, the DTE is not bound by any UART limitation, and may be theoretically set as high as 921600.

DTE speed is supported for compatibility only. It bears little significance in Modio environment.

Related S-Reg: S71

&Fn Sets factory configuration
Select one of the factory settings.
&F0 Select factory setting 0
&F1 Select factory setting 1
Result codes:
OK n=0-1
Error Otherwise
Related S-Reg: S59

&Hn Sets flow control
Select the user defined configuration.
&H0 Flow control disabled (NA)
* &H1 "HW" flow control RTS/CTS (emulation)
Result codes:
OK n=0-1
Error Otherwise
Related S-Reg: S62

&Kn Same as %Cn

&Pn Set pulse dial make/break ratio
* &P0 US & Canada 39%/61% (10 pps)
&P1 UK & Hong Kong 33%/67% (10 pps)
&P2 Same as 0, except at 20 pps
&P3 Same as 1, except at 20 pps
Result codes:
OK n=0-3
Error Otherwise
Related S-Reg: S28

&Rn Controls RTS behavior
Controls the RTS output behavior.

Note: This command is supported for compatibility.
It has no actual effect

&R0 RTS ignored
&R1 Modem receives data only on RTS (NA)
Result codes:
OK n=0 or 1
Error Otherwise
Related S-Reg: S61

&Sn Controls DSR behavior

Note: This command is supported for compatibility.
It has no actual effect.

&S0 DSR override (is assumed to be ON all the time)
&S1 DSR follows circuit definition
Result codes:
OK n=0 or 1
Error Otherwise
Related S-Reg: S64

&V Display Active profile, Stored Profiles, Stored Phone Numbers (Equivalent to I4-I7 combined)

&Wn Writes current configuration
&W0 Write to template 0
&W1 Write to template 1
Result codes:
OK n=0-1
Error Otherwise
Written to registry.

&Zn Stores dial string
Stores/Displays dial string (up to 47 characters)
&Zn=s Store dial string (n=0-4)
&Zn=L Store the last dialed string (n=0-4)
&Zn? Display the nth string
&ZL? Display the last dialed string
Written to registry.

AT\ Commands - Error correction control

\An Maximum MNP block Size
\A0 64 characters maximum block size
* \A1 128 characters maximum block size
\A2 192 characters maximum block size
\A3 256 characters maximum block size
Result codes:
OK n=0-3
Error Otherwise
Related S-Reg: S<basereg+1> of V.42 registers

\Bn Transmit break to remote (-)
In non-error correction mode, the modem will transmit a break signal to the remote modem with a length of n*100ms. If a number above 9 is entered, 9 is used.
Result codes:
OK if connected in data modem mode
Error if not connected or if connected in fax modem mode

\Kn Break Control (-)
Controls the response of the modem to a break received from DTE or a remote modem or the \Bn command.
The behavior parameter is written to Sxx
\K0 Enter on-line command mode, no break sent to remote modem
\K1 Clear data buffers and send break to remote modem

\K2 Same as 0
\K3 Send break to remote modem immediately
\K4 Same as 0
* \K5 Send a break to remote modem in sequence with transmitted data
Related S-Reg: S<basereg+x> of V.42 registers
Result codes:
OK n=0-5
Error Otherwise

\Nn Error correction operating mode
\N0 Normal (Speed buffering) - No error correction
\N1 Direct (pass-through) 128 characters maximum block size
\N2 Reliable (error correction) mode. The Modem will attempt LAPM and then MNP
* \N3 Auto reliable mode. Same as \N2, but will fall back to Normal
\N4 LAPM error correction mode only, hang up upon failure.
\N5 MNP error correction mode only, hang up upon failure.
Result codes:
OK n=0-5
Error Otherwise
Related S-Reg: S<basereg> of V.42 registers

AT% Commands

%Cn Compression control
%C0 Disable data compression
%C1 Enable MNP5 data compression
%C2 Enable V.42bis data compression
* %C3 Enable MNP5/V.42bis data compression
Result codes:
OK n=0-3
Error Otherwise
Related S-Reg: S<basereg+2> of V.42 registers

%En Line quality monitor control
Controls whether or not the modem will automatically monitor the line quality and request a retrain (%E1), or fall back when quality is insufficient or fall forward when line quality improves (%E2).

%E0 Disable line quality control
* %E1 Enable line quality control and auto retrain
%E2 Enable line quality control and fallback/forward

Result codes:
OK n=0-3
Error Otherwise
Related S-Reg: S39

%Tn	**Test mode**		**Auxiliary Registers Setup**
	%T23	Generate DTMF 0-9	
	-		
	%T32	Generate DTMF *	
	%T33	Generate DTMF #	
	%T34	Generate DTMF A-D	
	%T35		
	-	V.25 Answer Tone (2100Hz)	
	%T38	V.25 Calling Tone (1300Hz)	
	%T39	Fax Calling Tone (1100Hz)	
	%T40	1800Hz Guard Tone	
	%T41		
	%T42		
	%T90	V.21 Channel 1 mark origin	S53=3, S143=0 S53=3, S143=0
	%T91	V.21 Channel 1 mark answer	
	%T90	V.23 Channel mark origin	S53=2 S53=2
	%T91	V.23 Channel mark answer	
	%T90	V.22 1200 origin	S53=5 S53=5
	%T91	V.22 1200 answer	
	%T90	V.22bis/V.34 origin (<=19200)	S53=6, S52=0/1 S53=6, S52=0/1
	%T91	V.22bis/V.34 answer (<=19200)	
	%T90	V.32/V.34 origin	S53=7, S52=0/1 S53=7, S52=0/1
	%T91	V.32/V.34 answer	
	%T90	V.32bis/V.34 origin	S53=9, S52=0/1 S53=9, S52=0/1
	%T91	V.32bis/V.34 answer	
	%T91	V.21 channel 2 mark	S53=3, S143=1
	%T76	V.27 2400 signaling	
	%T77	V.27 4800 signaling	
	%T78	V.29 7200 signaling	
	%T79	V.29 9600 signaling	
	%T80	V.17 12000 signaling	
	%T81	V.17 12000 signaling	
	%T90	V.34 org signaling (>=21600)	S53=14 S53=14
	%T91	V.34 ans signaling (>=21600)	
	%T90	V.34bis org signal (>=31200)	S53=18 S53=18
	%T91	V.34bis ans signal (>=31200)	

Note: For running AT%T Commands, The test DP driver must be present (This driver is supplied for OEM qualification usage)

AT+MS Command

+MS Modulation select

This command selects the modulation, optionally enables/disables Automode, and optionally specifies the lowest and highest connection rates.

The command format is:

AT+MS= [<mod>][,[<automode>][,[<min_rate>][,[<max_rate>]]]]

<mod> a decimal number specifying the preferred modulation (automode enabled), or the modulation (automode disabled).

<automode> 0/1 Automode disabled/enabled

<min_rate> minimum rate for connection. If lower than the actual minimum rate for the selected modulation, the actual lowest supported rate will be taken.

<max_rate> maximum rate for connection. If higher than the actual maximum rate for the selected modulation, the actual highest supported rate will be taken.

Table 2 - +MS command parameters

<mod>	Modulation	Possible rates
22	V.22	1200
122	V.22bis	2400,1200
32	V.32	9600, 4800
132	V.32bis	14400, 12000, 9600, 7200, 4800
34	V.34	33600, 31200, 28800, 26400, 24000, 21600, 19200,16800, 14400, 12000, 9600
56	K56Flex	32000,34000,36000 ..... ,56000
90	V.90	29333, 30666,32000 .....,56000
212	Bell 212	1200
103	Bell 103	300

Examples:

AT+MS=34,0,4800,33600 V.34, No Automode, Min. speed 4800, Max speed 33600

AT+MS=,1 Automode

AT+MS=32,1,,14400 V.32 Automode, Max speed 14400 (min speed as before)

Factory Settings: 90,1,300,56000

The requested modulation scheme will be written to S32

The requested min rate will be written to S33

The requested max rate will be written to S34

The actual rate may be read from S35

The actual modulation scheme may be read from S37

(The codes as specified in the Xn command)

Other derivatives of the +MS command:

AT+MS? report current MS settings (e.g. 34,1,9600,33600)

AT+MS=? list the supported values +MS:(22,122.....), (0,1), (300-33600), (300-33600)

Result codes:

OK Syntax OK

Error Otherwise

Related S-Reg: S31-S37

AT+F Commands - Fax Support

+FCLASS =<value>

Sets Data/Fax Class1/Voice (0,1,8) mode.
+FCLASS=<value>
[<value> - 0,1,8 (Data/Fax Class1/Voice]
Result codes:
OK Syntax OK
Error Otherwise
+FCLASS? Returns the current setting
Related S-Regs: S32, S150

+FAE

Data/Fax Auto Answer
+FAE=<value> [<value> - 0,1 (Data/Fax Class1)]
+FAE? Returns the current setting
Related S-Regs: S151

+FTS= <value>

Stops transmission and waits.
Terminates transmission and waits for <value>*10ms interval before responding with OK. ERROR is issued if the modem is on-hook.
+FTS? Returns the current setting

+FRS= <value>

Receives Silence.
Report back to DTE with OK after <value>*10ms silence interval has been detected. The command is aborted if any character is received from the DTE (The response will still be OK). ERROR is issued if modem is on-hook.
+FRS? Returns the current setting

+FTM= <value>

Transmits data according to the defined modulation. ERROR is issued if modem is on-hook.

Value	Modulation
24	V.27 ter 2400 bps
48	V.27 ter 4800 bps
72	V.29 7200 bps
73	V.17 7200 bps long
74	V.27 7200 bps short
96	V.29 9600 bps
97	V.17 9600 bps long
98	V.17 9600 bps short
121	V.17 12000 bps long
122	V.17 12000 bps short
145	V.17 14400 bps long
146	V.17 14400 bps short

+FTM=? Return “24, 48, 72, 73, 74, 96, 97, 98, 121, 122, 145, 146”

+FRM= <value>

Receives data according to the defined modulation
(See Values above)
ERROR is issued if modem is on-hook.
+FRM=? Return “24, 48, 72, 73, 74, 96, 97, 98, 121, 122, 145, 146”
see +FTM

+FRH= <value>
Receives data using HDLC protocol and the defined modulation .
ERROR is issued if modem is on-hook.
<value> - 3 (V.21 channel 2 300 bps)
+FRH=? Return "3"

+FTH= <value>
Transmits data using HDLC protocol and the defined modulation .
ERROR is issued if modem is on-hook.
<value> - 3 (V.21 channel 2 300 bps)
+FTH=? Return "3"

AT* Commands – Black List Support

Note: The following command will always return OK as a result code.

*B Return Blacklisted numbers

Blacklisting is a country dependent parameter.

When no time-out is defined:
When a number is unsuccessfully called x successive times, it is blocked altogether, until next system reset.
Further calls will return ***BLACKLISTED*** code.

When time-out is defined:
When a number is unsuccessfully called x successive times, it is blocked temporarily until the time-out expires.
Calls within the time-out period will return ***DELAYED*** code.

Format:

No.	**Called**	**Blocked**	**Phone**
Index	# of calls	' ' (blank) - not blocked (number still candidate for blacklist) or '*' (asterisk) - blacklisted/blocked or 'Xmin' - # of min to time-out – delayed	Phone number

Example 1: No time-out defined. Full blocking occurs

No.	**Called**	**Blocked**	**Phone**
1	5	*	t1234
2	3		t5678

Example 2: Time-out defined. Delay scheme used.

No.	**Called**	**Blocked**	**Phone**
1	5	2min	t1234
2	3		t5678

AT# Commands - Voice Modem Support

Note: All the following commands will return OK as a result code (or ERROR if the parameters are faulty), unless stated otherwise.

#BDR=<value>	Sets DTE Baud Rate <value> - DTE Baud rate (0-48) *2400
#CID=<value>	Enables the Caller ID feature in any mode #CID=0 - Disable Caller ID #CID=1 - Enable Caller ID (Verbose) #CID=2 - Enable Caller ID (Numeric) Writes the value to Sreg Related S-Reg: S75
#RG=<value>	Sets receive gain level (effects the AUDIO IN level) <value> - 0-7fff
#TL=<value>	Sets transmit level (effects the AUDIO OUT level) <value> - 0-7fff
#CLS=<value>	Same as +FCLASS=<value> Sets Data/Fax Class1/Voice (0,1,8) mode. Related S-Regs: S32, S150
#VBS	Bits per sample (ADPCM or PCM). #VBS=<value> [<value> - 2,4 (ADPCM), 8,16 (PCM)] #VBS? Returns the current setting #VBS=? Returns “2,4,8,16” Related S-Regs: S76
#VBT	Sets Beep tone timer for generating tones and DTMF. #VBT=<value> [<value> - 0-40 (* 1/10 ms)] #VBT? Returns the current setting #VBT=? Returns “0-40” Related S-Regs: S77
#VIP	Initializes Voice Parameters Related S-Regs: S75-S89
#VIT	Sets Inactivity timer. #VIT=<value> [0-255 (* 1/10 ms)] #VIT? Returns the current setting #VIT=? Returns “0-255” Related S-Regs: S19
#VLS	Voice Source selection. #VLS=<value> 0 - Telephone Line Select (Go on hook) 2 - Speakers

3 - Microphone
4 - Telephone Line Select + Samples routed to/from
Speakers/Mic in TX/RX modes
6 - Speakerphone
#VLS? Returns the current setting
#VLS=?Returns “0,2,3,4,6”
Result codes:
OK n=0, 4, 6
VCON n=2, 3
ERROR Otherwise
(For 0, 4, 6, VCON will be issued upon line connection)
Related S-Regs: S78

#VRA Ringback Goes Away Timer (originate).
This value is used during call progress to detect a voice answer.
This is the interval between ringback ending and voice answer determined.
#VRA=<value> [0-255 (*1/10 MS)]
#VRA? Returns the current setting
#VRA=? Returns “0-255”
Related S-Regs: S79

#VRN Ringback Never Came Timer (originate)
This value is used during call progress to detect a voice answer.
This is the interval without detection of ringback before voice answer is determined.
#VRN=<value> [0-255 (*1/10 MS)]
#VRN? Returns the current setting
#VRN=? Returns “0-255”
Related S-Regs: S80

#VRX Go to Voice Receive Mode.
Result codes:
CONNECT Data may be sent
ERROR VLS=0, 4, 6 and line not connected
Note: Any input from the terminal will abort Voice Receive Mode

#VSD Enables/Disables silence deletion (voice receive, ADPCM) (-)
#VSD=<value> [0,1 - Disable/Enable]
#VSD? Returns the current setting
#VSD=? Returns “0,1”
Related S-Regs: S81

#VSP Sets Silence Period (voice receive, ADPCM)
#VSP=<value> [0-255 (*1/10 ms)]
#VSP? Returns the current setting
#VSP=? Returns “0,255”
Related S-Regs: S83

#VSR Sets Sample Rate (PCM, ADPCM)
#VSR=<value> [7200, 11025, 8000]
#VSR? Returns the current setting

#VSR=? Returns “7200, 11025, 8000”
Only 7200 is currently supported
Related S-Regs: S91

#VSS Sets Silence Sensitivity (voice receive, ADPCM) (-)
#VSS=<value> [0-3] (0-Disable, 3-allow noisy conditions
#VSS? Returns the current setting
#VSS=? Returns “0-3”
Related S-Regs: S82

#VTD Sets DTMF reporting capabilities in Voice Transmit, Receive, and Voice Online Command Modes.
#VTD=<value><value><value> [0-3F]
#VTD? Returns the current setting
#VTD=? Returns “<0-3F>,<0-3F>,<0-3F>”

Bit Settings

Bit	Description
0	Disable/Enable DTMF detection
1	Disable/Enable V.25 1300 Hz detection
2	Disable/Enable T.30 1100 Hz detection (Fax)
3	Disable/Enable V.25/T.30 2100 Hz detection (Modem)
4	Disable/Enable Bell 2225 Hz detection
5	Disable/Enable Busy/Dial tone detection
6-7	reserved

Related S-Regs: S84-S86

#VTM Enables timing mark placement.
#VTM=<value> [0-10 (* 1/10 ms)]
#VTM? Returns the current setting
#VTM=? Returns “0-10”
Related S-Regs: S87

#VTS Generates a tone signal.
#VTS= [x,y,z] | {x,z} | x, ...

[x,y,z]
x represents the first frequency (Hz)
y represents second frequency (Hz)
z represents the duration (in 100 ms units)

{x,z}
DTMF Digits with Variable Duration.
x represents the DTMF digit (0-9,A-D,*,#)
z represents the duration (in 100 ms units)

DTMF Digits, with duration defined by #VBT. This is represented by a value x (non-bracketed) corresponding to a DTMF digit (0-9,A-D,*,#, !).
Note: ‘!’ stands for flash.

#VGT Sets Playback Volume [Default 192]
#VGT=<value> [0-255 (*1/10 ms)]
#VGT? Returns the current setting

#VGT=? Returns “0-255”
Related S-Regs: S74

#VTX Go to Voice Receive Mode
Result codes:
CONNECT Data may be sent
ERROR VLS=0, 4, 6 and line not connected

#SPK Sets Full Duplex Speakerphone parameters
#SPK=<mute>,<speaker>,<mic>
<mute> 0 Microphone Mute
* 1 Microphone On (default)
2 Room Monitor (mic on Max, Speaker off)
<speaker> 0-15 - 2-30 dB attenuation
* 5 - (Default)
16 - speaker mute
<mic> 0 - 0 dB gain
* 1 - 6 dB gain (Default)
2 - 9 dB gain
3 - 12 dB gain
Related S-Regs: S88-S90

AT#UD Command - Modem Diagnostics Support

Note: All the following commands will return OK
#UD Returns diagnostics data
Format:
TBD

S-Registers

The S-Registers are summarized in the following table. Registers denoted with a * may be customized using the PTT Wizard Tool.

Factory defaults

Factory defaults are stored in the Windows OS registry. They are loaded at initialization time or by AT commands (&F,Z). In addition the designated default profile (as specified by the Yn command) is subsequently loaded.
The defaults shown are of the Smart Link factory settings 0 and 1.

S-Register Summary

Note: This S-register List is not to be used as is by End Users and in End User’s manuals. For end users the contents of the first 24 S-registers should suffice.

S#	Function	Range	Units	PW	Default	AT Command
S0	Rings to Auto-Answer	0-255	rings		0	A
S1	Ring Counter	0-255	rings		0	
S2	Escape Character	0-255	ASCII		43	
S3	CR Character	0-255	ASCII		13	
S4	LF Character	0-255	ASCII		10	
S5	BS Character	0-255	ASCII		8	
S6	Wait Time for Dial Tone (Also wait before Blind Dialing)	2-255	s	*	2	D
S7	Wait Time for Carrier	1-255	s	*	60	D
S8	Pause Time for Dial (,)	0-255	s		2	D
S9	Carrier Detect Response Time	1-255	0.1s		6	
S10	Carrier Loss Disconnect Time	1-255	0.1s	*	7	
S11	DTMF Tone duration	50-255	0.001s	*	100	D
S12	Reserved					
S13	Echo	0-1			1	E
S14	Quiet	0-1			0	Q
S15	Verbose	0-1			1	V
S16	Pulse/ Tone	0-1		*	1	T,P,D
S17	Reserved					
S18	Test Timer	0-255	s		0	&T
S19	System Inactivity Timer	0-255	min		0	
S20	Reserved					
S21	Break Length	0-9	100ms		9	\B
S22	Origin/Answer	0-1			0	
S23	XOFF Character (NA)	0-127	ASCII		19	
S24	Flash Timer	0-255	10 ms		20	

Important Note: The following S-register List is only to be used by OEMs.
For end users, the contents of the first 24 S-registers should suffice.

S#	Function	Range	Units	PW	Default	AT Command
S25	Delay to DTR Off (NA)	0-255	0.01ms		5	
S26	RTS to CTS delay (NA)	0-255	0.01ms		1	
S27	Auto Answer clear timeout	0-255	s		8	
S28	Pulse Set/Break Ratio	0-4			0	&P,P,D
S29	Speaker Control	0-3			1	M
S30	Speaker Volume	0-3			2	L
S31	Automode Select	0-1			1	+MS
S33	Requested MIN Speed		bps Code			+MS
S34	Requested MAX Speed		bps Code			+MS
S35	Actual Speed after CONNECT (See Xn)		bps Code			
S36	Current Data Pump Status		Mod Code			

S#	Function	Range	Units	PW	Default	AT Command
S37	Actual Modulation (DP)		Mod Code			
S38	Actual Rx Speed		Bps Code			
S39	Line Quality Control	0-2			2	%E
S40	Reserved					
S41	Received Signal Level				0	
S42	SNR		dB			
S43	Result Codes control				0	X
S44	Reserved					
S45	Transmit Gain Level	0-10	-dBM		3	
S46-S49	Reserved					
S50-S55	Reserved for Test					&T
S56	Extended Code	0-4			4	X
S57	Reserved					
S58	Reserved					
S59	Current Setting	0-5			3	Z, &F
S60	CD	0-1			1	&C
S61	RTS	0-1			0	&R
S62	Flow Control	0-3			1	&H
S63	DTR	0-3			0	&D
S64	DSR	0-1			0	&S
S65	Reserved					
S66	Circuit 106 (RTS)	0-1			0	
S67	Circuit 107 (DSR)	0-1			0	
S68	Circuit 109 (CD)	0-1			0	
S69						
S70	CONNECT message format	0-1			0	&A
S71	CONNECT msg speed source (DCE/DTE)	0-1			0	&E
S72	Handset Record Gain	0 - 255		*	80	
S73	Reserved				3	
S74	Playback Volume	0-255			153	#VGT
S75	CID Enable	0,1			0	#CID
S76	ADPCM Bits Per Sample	4,8,16			4	#VBS
S77	Beep Tone Timer	0-40	1/10 s		10	#VBT
S78	Line Selection Duration		0,2,3,6		0	#VLS
S79	Ring Goes Away Timer	0-255	1/10 s		70	#VRA
S80	Ring Never Came Timer	0-255	1/10 s		70	#VRN
S81	Silence Detect Enable	0,1			0	#VSD
S82	Silence Detect Sensitivity	0-3			2	#VSS
S83	Silence Detect Duration	0-255	1/10 s		55	#VSP
S84	Dtmf Tone Reports Cap0	0-3F			0	#VTD

S#	Function	Range	Units	PW	Default	AT Command
S85	Dtmf Tone Reports Cap1	0-3F			0	#VTM
S86	DTMF Tone Reports Cap2	0-3F			0	#VTM
S87	Time Mark Placement	0-255	1/10 s		0	#VTM
S88	SPK <mute>	0-2			1	#SPK
S89	SPK <speaker>	0-15			5	#SPK
S90	SPK <mic>	0-3			1	#SPK
S91	Voice Sample Rate	1,2		1	0	#VSR
S92	Answer Delay	0-255	s	*	2	
S93-S99	Reserved for Diagnostics					
S100-S137	Reserved for V42					\A,\N, %C
S138	Mic Gain	0-255				
S139	Line record Gain	0-255				
S140-S142	Reserved					
S143	Reserved for Test					
S141-S143	Reserved					
S143	Test auxiliary	0-1			0	%T
S144-S145	Reserved					
S146	Pulse make Ratio	0-100	%	*	39	&P
S147	Pulse PPS	10,20	pps	*	10	&P
S148	Pulse Pause	0-255	10ms	*	80	
S149	Pulse Refresh	0-100	ms	*	0	
S150	FCLASS Value	0,1,8			0	+FCLASS
S151	FAE Value	0,1			0	+FAE
S152	Line Out Gain	0-255				
S153	Spk Out Gain	0-255				
S154	HSet Out Gain	0-255				
S155-S160	Reserved					
S161	Default Setting	0-1			2	Y
S162	Country Type	0-25			1	
S163-S169	Reserved					
S170-S174	Debug Registers					
S175-S179	Reserved					
S180-S191	Reserved for Diagnostics					
S192	Reserved					
S193	Processor Type	0-100			0	

S#	Function	Range	Units	PW	Default	AT Command
S194-S196	Reserved				2	
S197	HW Diag					
S198	STRM Diag	0/1			0	*B
S199	Port Diag	0/1			0	*B
S200	Blacklist Enable	0/1		*	0	*B
S201	Blacklist Dial Attempts	0-255		*	5	*B
S202	Min Time between calls	0-255	Sec	*	5	*B
S203	Blacklist Time Out	0/1		*	0	*B

FCC Notice

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures :

- Reorient of relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio / TV technician for help.

This unit was tested with shielded cables on the peripheral devices. Shielded cables must be used with the unit to insure compliance. This statement can be deleted if unit was not tested with shielded cables.

The manufacture is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. Such modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC rules. Operation is subject to the following two condition:(1) This device may not cause harmful interference, and (2) This device must accept any interference that may cause undesired operation.

FCC Requirement

This equipment complies with Part 68 of the FCC Rules. On the base unit of this equipment is a label that contains, among other information, the FCC Registration Number and Ringer Equivalence Number(REN) for this equipment. If requested, this information must be given to telephone company.

The REN is useful to determine the quantity of devices you may connect to your telephone line and still have all of those devices ring when your telephone number is called. In most, but not all area, the sum of the REN's of all devices connected to one line should not exceed

five(5.0). To be certain of the number of devices you may connect to your line, as determined by the REN, you should contact your local telephone company to determine the maximum REN for your calling area.

If your equipment causes harm to the telephone network, the telephone company may discontinue your service temporarily. If possible, they will notify you in advance. But if advance notice is not practical, you will be notified as soon as possible. You will be informed of your right to file a complain with the FCC. Your telephone company may make changes in its facilities, equipment, operations or procedures that could affect the proper functioning of your equipment. If they do, you will be notified in advance to give you an opportunity to maintain uninterrupted telephone service. The equipment may not be used on coin service by the telephone company. Connection to party lines is subject to state tariffs.