S-REGISTERS

Most modem configuration information is stored in a part of memory called status (S) registers. During operation this information is used to determine modem functions.

The information stored in the S-registers can be changed by the AT or V.25 command sets and by pushbuttons in response to the LCD prompt. These are the preferred methods. Some software programs also access the S-registers via the AT command set, but this action is transparent to the user. The command indicates which memory bit(s) to alter to select a particular option or to perform a certain function. The S-register values comprise the configuration profile.

⚠️ **Caution**

The purpose of this tutorial is to show the versatility of option selection and register function. It is strongly recommended that the preferred methods of option selection be used. This tutorial uses S22 as the example register. Certain modems may use S22 differently or may not have an S22.

Generally the user should not directly alter S-register values. However, the user has the option of entering S-registers via ATS commands and directly altering the register value. This is called "writing" to the S-register. Writing to an S-register is not a preferred method and should only be used by programmers who need to manipulate S-registers so they can interact with a software program under development or some other similar action.

Certain S-registers cannot be altered by the ATS command series. These are called "read only" S-registers. Appendix E contains a listing of S-registers and indicates if they are read only or read and write.

Figure 10-1 illustrates how the different inputs to an S-register (*S22* in this case) are used to select a particular option. Bits 3 and 2 of *S22* control speaker options. Some communication software packages may use the AT command set. For example purposes bit values are arbitrary.

Bit values for S-registers must not be confused with the total register value. Bit values are counted separately for each option group, called bit mapping, while the register value is the cumulative decimal or hexa-decimal total. The decimal value counts all eight bits as a single group. Hexadecimal values split the bits into two groups of four each. Writing to an S-register changes the total value. Figure 10-2 illustrates the difference between decimal calculation and hexadecimal calculation.
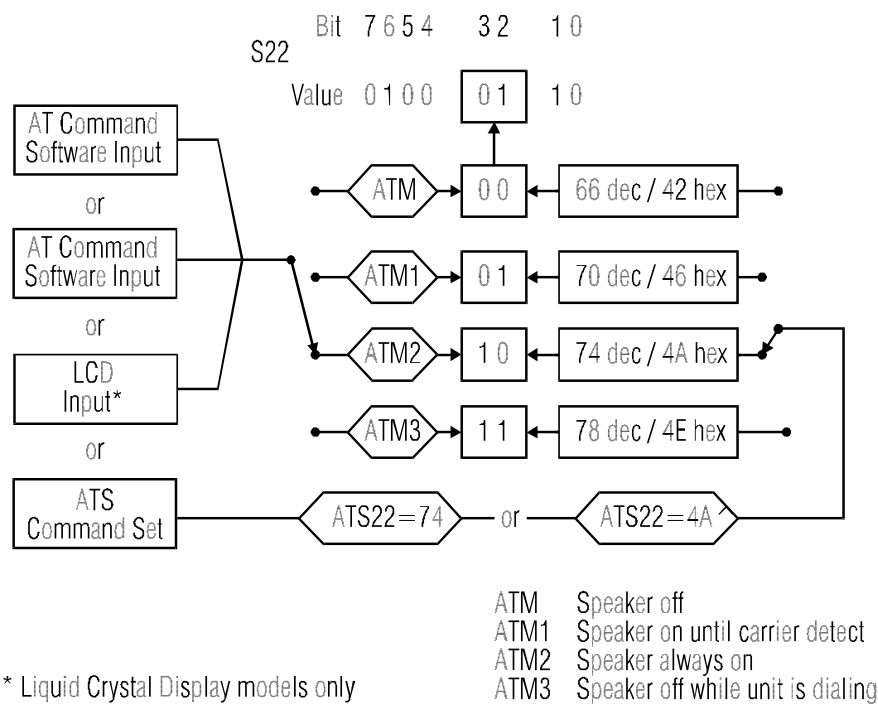

Figure 10-1 Changing S-Register Values

Bit	7	6	5	4	3	2	1	0	
Decimal Value	128	64	32	16	8	4	2	1	
S22 Value	0	1	0	0	0	1	1	0	
Decimal Total		64			+	4 +	2		= 70 dec
Hexidecimal Value	8	4	2	1	8	4	2	1	
S22 Value	0	1	0	0	0	1	1	0	
Hexidecimal Total		4			and	4 +	2		= 46 hex

Figure 10-2 Calculating S-Register Values

S-REGISTER OPERATION   Sn?, Sn?^

Enter *ATSn?* to read a register value, where *n=r*egister number for a decimal value; or *ATSn?^* for a hexadecimal value.

For example, to determine the current backspace character enter

ATS5?

The screen will show the ASCII value of the backspace character stored in register *S5*.

Changing Register Values   Sn=v, Sn=^v

To change an option using *ATS* commands requires the operator to precalculate the revised decimal (or hexadecimal) total. Because of the chance of miscalculating the bit sum, causing unplanned option changes, writing to an S-register is discouraged. For operators who prefer this method of option selection a much simplified command that eliminates the decimal calculation is explained in the *Individual Bit Command* section.

Enter *ATSn=v* to change a register value, where *n* = register number and *v* = decimal value; or *ATSn=^v* , where *^v* = hexadecimal value.

☞ **Note**

Not all registers can be set by the ATSn=v (or ^v) command. Some registers are for reference only.

To change the escape character from + to the Esc key (ASCII value of 27)

       Enter   ATS2=27

To return the modem to the command mode press the Esc key three times:

       (pause) Esc Esc Esc (pause)

Individual Bit Command   S*n* . # =*v*

Some operators use AT commands as the primary method of changing S-register options. However, some options stored in registers do not have an associated AT command. For these options, the individual bit AT command can be used to change the setting of the bit controlling the option.

To change a single bit value within a register

       Enter ATSn . # = v

where *n* = register number *#* = bit position 0 through 7 *v* = bit value 1 or 0

Example:

       S-register 27, bit 2 selects between dial-up or leased line operation.

AT command method:

       AT&L selects dial-up operation (sets S27 bit 2 to 0)

AT&L1 selects leased line operation (sets S27 bit 2 to 1)

Individual bit method:

ATS27.2=0 selects dial-up operation (sets S27 bit 2 to 0)

ATS27.2=1 selects leased line operation (sets S27 bit 2 to 1)

☞ **Note**
This way of selecting options can be used on all S-registers except read only registers.

Autoanswer   S0

This register turns the option on or off. Set the register to 0 to turn autoanswer off.

Set the register to any value other than zero (1-255) to turn autoanswer on. The number selected is the ring count the modem answers on. For example, if *S0* equals 4, the modem answers the call on the fourth ring. The default value is 1.

Ring Count   S1

This register contains the ring count for a current incoming call and should not be changed. If developing communications software, the program can read the register to determine the ring total.

Escape Character   S2

The standard escape character is a + sign (ASCII value of 43). To change the character, set *S2* to the desired ASCII value (0-255).

To disable the escape command, set *S2* to any value greater than 127.

End-of-Line Character   S3

The standard end of line character is the carriage return (ASCII value of 13). This character ends each command as it is sent to the modem. It is also sent by the modem after each status message or number code.

To change the character, set *S3* to the desired ASCII value (0-127).

Line Feed Character   S4

The standard character is the line feed (ASCII value of 10). This character is sent by the modem after each status message. To change it, set *S4* as desired (0-127).

Backspace Character   S5

The standard character is the backspace (ASCII value of 8). To change it, set *S5* to the desired value (0-127).

Pause Before Dialing   S6

When dial tone detection is disabled (command *X*, *X1*, or *X3* in effect), the modem waits the number of seconds (0-255) stored in this register before dialing. The default value is 2 (seconds).

Pause for Ringback and Carrier Detection /
Wait for 2nd Dial Tone   S7

If no ringback is detected in the number of seconds in *S7* (1-255), the modem disconnects and sends the NO CARRIER message or code. If ringback is detected, the modem begins to look for a carrier.

If no carrier is detected within the number of seconds in *S7*, the modem hangs up and sends the NO CARRIER message or code.

Values between 1 and 255 may be used. The default value is 30 (seconds).

Pause Interval for Comma   S8

When a dial command contains a comma, the modem pauses the number of seconds in *S8*.

Change *S8* to change the basic pause interval (0-255), or use several commas in a row for greater delay during dialing.

The default value is 2 (seconds).

Carrier Detect Time   S9

S9 contains the amount of time (0-255) in 0.1 second increments the carrier must be present to be recognized. The default value is 6 (0.6 second). This timer can be extended to lessen the likelihood of false detection of carrier.

Lost Carrier Detect Time   S10

S10 contains the amount of time (0-255) in 0.1 second increments carrier must be absent to be recognized as a loss of carrier. The default value is 14 (1.4 seconds).

DTMF Tone Duration   S11

S11 determines the length of DTMF tones. The period of silence is equal to the duration of the tone. The value of this register must be entered in multiples of 10. Default value is 80 (80 ms).

Escape Sequence Pause   S12

Using the escape sequence to return to command mode from data mode requires two pauses, one before and one after the escape characters.

The pauses prevent the modem from responding to a character sequence which might contain the escape sequence as part of its normal data transmission.

S12 contains the pause interval in 0.02 second increments. The factory setting is 50, equivalent to 1 second (50 x 0.02 sec). When *S12* is 0 then timing is not a factor.

The timing between the 3 escape characters must be less than the pause interval or the escape sequence will not be detected. The data rate also affects the timing and must be taken into account when changing the pause interval.

To disable the escape command, set *S2* to a value greater than 127 instead of changing *S12*. Values between 15 and 255 may be used for *S12*.

☞ **Note**
When S-registers have parallel AT commands, the commands are listed in the register tables as a cross refer-ence. If no command exists for the option the column is left blank.

S13

Not used

Bit Mapped   S14

Bit	Value	Command	Description
0	---	---	Reserved
1	0 1	E E1	Local character echo off Local character echo on *
2	0 1	Q Q1	Response messages on * Response messages off
3	0 1	V V1	Response messages as digit codes Response messages as words *
4	0 1	 Q2	Ignore * Response messages in originate mode only
5	0 1	T P	Tone dial * Pulse dial
6	0 1	H2 --	Normal hang up * Not used
7	0 1	*OR1 *OR	Forced answer Normal originate *

* default

☞ **Note**
Registers that contain more than one option are called "bit mapped" registers.

S15
Reserved

System Tests   S16

This register contains the status of system test options.

Bit	Value	Command	Description
0	0 1		Analog loopback inactive Analog loopback in progress
1			Reserved
2	0 1		Digital loopback inactive Digital loopback in progress
3	0 1		Remote digital loopback requested by other modem inactive Remote digital loopback requested by other modem in progress
4	0 1		Remote digital loopback inactive Remote digital loopback in progress
5	0 1		Self test remote digital loopback inactive Self test remote digital loopback in progress
6	0 1		Self test analog loopback inactive Self test analog loopback in progress
7			Reserved

S17

Not used

Test Timeout   S18

The amount of time, in 1 second increments, that a diagnostic test will run is determined by the value assigned to *S18* (0-255). A value of 0 disables the timer allowing a test to run indefinitely. The default value is 0.

S19, 20

Not used

Bit Mapped   S21

Bit	Value	Command	Description
6, 0	00 10 01 11	&S &S1 &S2 &S3	DSR forced on * DSR on when online DSR off 5 seconds after disconnect DSR follows off hook (OH)
5, 1	00 10 01 11	&C &C1 &C2 &C3	DCD always on * DCD on while carrier present DCD on except for 5 seconds after disconnect DCD follows RTS on remote modem; not valid in reliable mode
2	0 1	&R &R1	CTS follows RTS by S26 delay CTS always on *
4, 3	00 01 10 11	&D &D1 &D2 &D3	Modem ignores DTR * Modem assumes command mode when DTR turns off Modem hangs up when DTR turns off Modem resets when DTR turns off
7	0 1	Y Y1	Long space disconnect disabled Long space disconnect enabled *

* default

Bit Mapped   S22

Bit	Value	Command	Description
1, 0	00	L	Speaker volume low
	01	L1	Speaker volume low
	10	L2	Speaker volume medium *
	11	L3	Speaker volume high
3, 2	00	M	Speaker off
	01	M1	Speaker on until carrier detect *
	10	M2	Speaker always on
	11	M3	Speaker off when modem is dialing
6-4	000	X	CONNECT message only, blind dials, no busy detect
	001	X1	CONNECT / appropriate code for rate, blind dials, no busy detect
	010	X2	CONNECT / appropriate code for rate, waits for dial tone, no busy detect
	011	X3	CONNECT / appropriate code for rate, blind dials, reports BUSY
	100	X4	CONNECT / appropriate code for rate, waits for dial tone, reports BUSY *
7	0	&P	Make / break ratio (US) 39/61 *
	1	&P1	Make / break ratio (UK) 33/67

* default

Bit Mapped   S23

Bit	Value	Command	Description
0	0	&T5	Remote digital loop request denied
	1	&T4	Remote digital loop request granted *
5-1	---	---	Reserved
7, 6	00	&G	No guard tones *
	01	&G1	550 Hz guard tone
	10	&G2	1800 Hz guard tone
	11	--	Not used

* default

S24
Not used

DTR State Recognition   S25

The *S25* register specifies the amount of time (0-255) in 0.01 second (10 ms) increments that DTR must stay high or low in order to be recognized as such. The default value is 5 (0.05 second).

RTS/CTS Delay   S26

The *S26* register specifies the amount of time (0-255) in 0.01 second (10 ms) increments between the RTS signal and the CTS signal. The default value is 0.

Bit Mapped   S27

Bit	Value	Command	Description
1, 0	00 01 10 11	&M &M1 &M2 &M3	Async * Sync data / async dial Sync data / dial through DTR Sync data / manual dial
2	0 1	&L &L1 and &L2	Dial-up line * Leased line
3	--	--	Reserved
5, 4	00 01 10 11	&X &X1 &X2 --	Internal clock * External clock Receive clock Not used
6	1 0		Enable async DTR dialer Disable async DTR dialer *
7	--	--	Reserved

* default

Lookback Timer   S28

The *S28* register specifies the amount of time in 1.0 minute increments that the modem will remain in dial backup mode before retrying leased line mode. A zero will disable automatic lookback to leased line. The default value is 15 minutes.

Bit	Value	Command	Description
7- 0	0-255		Time in 1 minute increments (0=disabled)

Bit Mapped   S29

Bit	Value	Command	Description
0	0 1	*NT1 *NT	Enable AT command set * Disable AT command set
1	0 1	*RO *RO1	Options retained at disconnect * Options restored at disconnect
2	0 1	*FT *FT1	Disable V.32 fast train * Enable V.32 fast train
6, 3	--	--	Reserved
7	0 1	*FB *FB1	DTE fallback disabled * DTE fallback enabled

* default

Bit Mapped   S30

Bit	Value	Command	Description
0	--	--	Reserved
1	0 1		V.25 ASCII * V.25 EBCDIC
2	0 1		V.25 VAL enabled * V.25 VAL disabled
4, 3	--	--	Reserved
5	0 1		NRZ V.25 * NRZI V.25
7, 6	00 01 10 11	&M &M4 &M5 &M6	V.25 disabled * V.25 bisync enabled V.25 SDLC enabled V.25 Async enabled

* default

S31
Reserved

Bit Mapped   S32

Bit	Value	Command	Description
0	0 1	&L1 &L2	2-wire (leased line only) * 4-wire (leased line only)
1	0 1	*LC1 *LC2	Line current disconnect = short Line current disconnect = long *
2	0 1	*LC *LC1 *or* *LC2	Line current disconnect = disable Line current disconnect = enable *
3	0 1	*DB *DB1	Dial backup = manual * Dial backup = automatic
7-4	--	--	Reserved

* default

S33
Reserved

Bit Mapped   S34

Bit	Value	Command	Description
0	0 1	*AN *AN1	Bilateral analog = disable * Bilateral analog = enable
1	0 1	*DG *DG1	Bilateral digital = disable * Bilateral digital = enable
2	0 1	*LA *LA1	DTE commanded LAL = disable * DTE commanded LAL = enable
3	0 1	*RD *RD1	DTE commanded RDL = disable * DTE commanded RDL = enable
7-4	--	--	Reserved

* default

DTR / Dial Backup Number to Dial   S35
Select the number to automatically dial (1-9 of stored numbers) for the modem to dial in DTR dialing or autodial backup.

S36-S38
Reserved

Bit Mapped   S39

Bit	Value	Command	Description
0-4			Reserved
5	0 1	DCE DCE	Connect MSG disabled * Connect MSG enabled
6-7			Reserved

* default

S40-S43
Reserved

XON Character from DTE   S44
Select the XON character (0-127) to be sent from the DTE. The default value is 17.

XOFF Character from DTE   S45
Select the XOFF character (0-127) to be sent from the DTE. The default value is 19.

S46-48
Reserved

XON Character to DTE   S49
Select the XON character (0-127) to be sent to the DTE. The default value is 17.

XOFF Character to DTE   S50
Select the XOFF character (0-127) to be sent to the DTE. The default value is 19.

S51
Reserved

Bit Mapped   S52

The *S52* register selects leased line transmit level from 0 to -30 dBm in 1 dB increments.

Bit	Value	Command	Description
4-0	0 to 30	*TLn (n=0-30)	Transmit level in dB (0 through -30 dBm) *
7-5	--	--	Reserved

* default

Automatic Rate Adaption Threshold   S53

Bit	Value	Command	Description
1, 0	--	--	Reserved
3, 2	00 01 10 11	%R %R1 %R2 %R3	Automatic rate adaption threshold disabled * Low BER Medium BER High BER
4	--	--	Reserved
5	0 1		Protocol Neg status disabled * Protocol Neg status enabled
6-7	--	--	Reserved

* default

Flow Control   S54

The *S54* register selects the flow control options.

Bit	Value	Command	Description
1, 0	00 01 10 11	\Q \Q1 \Q2 \Q3	Disable DTE flow control Enable DTE XON/XOFF flow control * Enable CTS flow control to the DTE Enable bilateral CTS/RTS flow control
2	--	--	Reserved
3	0 1	\G \G1	Disable modem port flow control * Enable modem port XON/XOFF flow control
4	0 1	\X \X1	No XON/XOFF characters to remote * Pass XON/XOFF characters to remote
6, 5	00 01 10 11	\Q4 \Q5 \Q6 \Q7	Disable flow control from DCE Enable XON/XOFF flow control * Enable CTS flow control to the DTE Enable CTS flow control to the DTE
7	--	--	Reserved

* default

S55

Reserved

V.42 Compression Control   S56

Bit	Value	Command	Description
1, 0	00 01 10 11	%C %C2 %C3 %C1	Compression disabled Compression enabled on transmit data only Compression enabled on receive data only Compression enabled on transmit and receive data *
7-2	--	--	Reserved

* default

Bit Mapped   S57

Bit	Value	Command	Description
0	0	*RC	Standard number codes * 15 - 4800 bps 18 - 9600 bps
	1	*RC1	Alternate number codes 11 - 4800 bps 12 - 9600 bps
4-1	--	--	Reserved
5	0 1		Busy out disabled * Busy out enabled during LAL test mode (for private PBX use only)
7, 6	--	--	Reserved

* default

Inactivity Timer   S58

The *S58* register specifies the number of minutes the modem waits before terminating a call when no data is sent or received. This register is active when in error control mode. 0 disables timer. Issue the *Tn* command to load inactivity timer, *n*=0-255 minutes.

Bit	Value	Command	Description
7-0	0 1-255	\T \T (n=1-255)	Disable * Timer value in minutes

* default

Break Control   S59

The *S59* register determines the action taken when a break is encountered. Refer to Break Control section in Chapter 6 for further explanation.

Bit	Value	Command	Description
2-0	000 001 010 011 100 101	\K \K1 \K2 \K3 \K4 \K5	Break option 0 Break option 1 Break option 2 Break option 3 Break option 4 Break option 5 *
7-3	--	--	Reserved

* default

Bit Mapped   S60

Bit	Value	Command	Description
0	0	%E	Disable auto retrain
	1	%E1	Enable auto retrain *
1	0		MNP compression disabled
	1		MNP compression enabled *
2	0	\C	Disable auto-reliable data buffer *
	1	\C1	Buffer data for 4 seconds or 200 characters
5- 3	--	--	Reserved
6	0	\R	RI blinks for ring and remains on for duration of call
	1	\R1	RI blinks for ring and turns off when call is answered *
7	0	\V	Disable protocol response messages *
	1	\V1	Enable protocol response messages

* default

DTE Options   S61

The *S61* register indicates the character size and parity. This register is for reference only.

Bit	Value	Command	Description
2-0	--	--	Reserved
3	0		7 bit word length
	1		8 bit word length
5, 4	00		Mark parity
	01		No parity
	10		Odd parity
	11		Even parity
7, 6	--	--	Reserved

* default

Disconnect Buffer Delay   S62

The *S62* register determines the delay before disconnect, to allow buffers to empty, when disconnect conditions exist.

Bit	Value	Command	Description
7-0	0	%D	Buffer disabled *
	1-255	%Dn	Disconnect buffer delay value (seconds)

* default

Maximum Transmit Block Size   S63

The *S63* register sets the maximum transmit block size.

Bit	Value	Command	Description
7-0	63	\A	Maximum block size = 64
	127	\A1	Maximum block size = 128
	191	\A2	Maximum block size = 192
	255	\A3	Maximum block size = 256 *

* default

Auto-Reliable Fallback Character   S64

The *S64* register stores the selected ASCII value of the auto-reliable fallback character.

Bit	Value	Command	Description
7-0	0	%A	Disable auto-reliable fallback character *
	1-127	%An	ASCII value 1-127

* default

S65-66

Reserved

Link Speed Status   S67

The *S67* register indicates the true data link (DCE) speed. This register is for reference only.

Bit	Value	Command	Description
4-0	00000		N/A
	00001		300 bps
	00010		Reserved
	00011		1200 bps
	00100		2400 bps
	00101		4800 bps
	00110		7200 bps
	00111		9600 bps uncoded
	01000		9600 bps trellis
	01001		12000 bps
	01010		14400 bps
	01011		16800 bps
	01100		19200 bps
	01101		21600 bps
	01110		24000 bps
	01111		26400 bps
	10000		28800 bps
7-5	--	--	Reserved

* default

S68

Reserved

DCE Independent Speed   S69

The *S69* register selects the DCE independent rate operation. When *S69* is 0, DTE and DCE rates are equal and the maximum originate connect rate up to 14400 bps is determined by *S80*. When *S69* is non-zero, the maximum originate connect rate is determined by *S69*.

Bit	Value	Command	Description
4-0	00000	%B	Use rate indicated by S80
	00001	%B1	300 bps
	00011	%B2	1200 bps
	00100	%B3	2400 bps
	00101	%B4	4800 bps
	00111	%B5	9600 bps uncoded
	01000	%B6	9600 bps trellis
	00110	%B7	7200 bps
	01001	%B8	12000 bps
	01010	%B9	14400 bps
	00010	%B10	Reserved
	01011	%B11	16800 bps
	01100	%B12	19200 bps
	01101	%B13	21600 bps
	01110	%B14	24000 bps
	01111	%B15	26400 bps
	10000	%B16	28800 bps *
7-5	--	--	Reserved

* default

Operating Mode   S70

The *S70* register determines the protocol operating mode and action taken on an MNP link attempt failure. LAPM is assigned highest priority.

Example: With \N7 selected the modem tries a LAPM connection first; if unsuccessful the modem tries an MNP connection; if also unsuccessful the modem connects in normal mode. Modes allowing protocol fallback are referred to as auto-reliable.

Bit	Value	Command	Description
2-0	000	\N	Normal
	001	\N1	Direct
	010	\N2	MNP only (reliable)
	011	\N3	MNP or normal (auto-reliable)
	100	\N4	LAPM only (reliable)
	101	\N5	LAPM or normal (auto-reliable)
	110	\N6	LAPM or MNP only (auto-reliable)
	111	\N7	LAPM or MNP or native (auto-reliable) *
3	0	\M	Disable V.42 fast detect
	1	\M1	Enable V.42 fast detect *
7-4	--	--	Reserved

* default

Operating Mode Status   S71

The *S71* register indicates the level of error controlling protocol. This register is for reference only.

Bit	Value	Command	Description
2-0	000		Protocol not active
	001		Protocol negotiation in progress
	010		MNP level 2 active
	011		MNP level 3 active
	100		MNP level 4 active
	101		MNP level 5 active
	110		LAPM active
	111		LAPM with data compression active
7-3	--	--	Reserved

* default

Bit Mapped   S72

Bit	Value	Command	Description
0	0 1	\J \J1	Disable slaved DTE/DCE (constant speed DTE on) * Disable slaved DTE/DCE (constant speed DTE on)
1	--	--	Reserved
2	--	--	Reserved
3	0 1	 &R2	CTS does not follow DCD CTS follows DCD
6-4	--	--	Reserved
7	0 1		Disable autocallback * Enable autocallback

* default

Password Timeout   S73

The length of time the remote user has to enter a password before the secure V.3400 drops the call.

Bit	Value	Command	Description
7-0	0-255		Time in seconds (0 = disable)

* default

Callback Delay   S74

The length of time the secure modem waits to place the callback call after the remote user correctly enters a password and the call is dropped. Default is 15 seconds.

Bit	Value	Command	Description
7-0	0-255		Time in seconds (0 = disable)

Callback Retry   S75

The number of times the modem will attempt to place the callback call to a remote user if the first attempt is unsuccessful.

Bit	Value	Command	Description
7-0	0-255		Number of attempts to place the call

Callback Retry Delay   S76

The length of time that the modem waits, after an unsuccessful attempt to connect to the remote unit at the programmed callback number, before trying to place the call again. Default is 15 seconds.

Bit	Value	Command	Description
7-0	0-255		Time in seconds (0 = disable)

Lockout Threshold   S77

The number of incorrect remote user password attempts that can be made before the call is dropped.

Bit	Value	Command	Description
7-0	0-255		Number of incorrect password attempts (0 = disable)

Autocallback Timer   S78

The *S78* register specifies the time in seconds that the modem waits before initiating autocallback. The default is 30 seconds.

Bit	Value	Command	Description
7-0	0-255		Time in seconds before autocallback

Break Length   S79

The *S79* register sets the length of the break sent to the DTE when a break signal is received. Range from 1-255 in 20 ms increments. Default is 35 (700 ms).

Bit	Value	Command	Description
7-0	0-255	\B \Bn	Send break Set break length (*n*=1-255)

Serial Port Speed   S80

The S80 register indicates the serial port speed.

Bit	Value	Command	Description
4-0	00001		300 bps
	00010		600 bps
	00011		1200 bps
	00100		2400 bps
	00101		4800 bps
	00110		7200 bps *
	00111		9600 bps
	01000		12000 bps
	01001		14400 bps
	01010		16800 bps
	01011		19200 bps
	01100		21600 bps
	01101		24000 bps
	01110		26400 bps
	01111		28800 bps
	10000		38400 bps
	10001		57600 bps
	10010		115200 bps

* default

Minimum DCE Speed   S81

Bit	Value	Command	Description
4-0	00000	%L	Disabled
	00001	%L1	Disabled *
	00011	%L2	1200 bps
	00100	%L3	2400 bps
	00101	%L4	4800 bps
	00111	%L5	9600 bps uncoded
	01000	%L6	9600 bps trellis
	00110	%L7	7200 bps
	01001	%L8	12000 bps
	01010	%L9	14400 bps
	00010	%L10	Reserved
	01011	%L11	16800 bps
	01100	%L12	19200 bps
	01101	%L13	21600 bps
	01110	%L14	24000 bps
	01111	%L15	26400 bps
	10000	%L16	28800 bps
7-3	--	--	Reserved

* default*

S82-S87

Reserved

Modulation Type   S88

Bit	Value	Command	Description
3-0	0000		Auto mode
	0001		V.21
	0010		B103
	0011		Reserved
	0100		B212A
	0101		V.22 bis
	0110		V.27 (lease line only)
	0111		Reserved
	1000		V.29 (lease line only)
	1001		Reserved
	1010		V.33 (lease line only)
	1011		V.32 bis
	1100		V.34
7-4			Reserved

S89-S90
  Reserved

Current Modulation   S91

Bit	Value	Command	Description
3-0	0000		Auto mode
	0001		V.21
	0010		B103
	0011		Reserved
	0100		B212A
	0101		V.22 bis
	0110		V.27 (lease line only)
	0111		Reserved
	1000		V.29 (lease line only)
	1001		Reserved
	1010		V.33 (lease line only)
	1011		V.32 bis
	1100		V.34
7-4			Reserved

S92 - S94
  Reserved

V.34 Settings   S95

Bit	Value	Command	Description
0	0 1		Disable V.8 for non-V.34 answer Enable V.8 for non-V.34 answer *
3-1	--		Reserved
4	0 1		Disable non-linear encoding Enable non-linear encoding *
5	0 1		Disable pre-emphasis Enable pre-emphasis *
6	0 1		Disable constellationshaping Enable constellation shaping *
7	0 1		Precoding disabled Precoding enabled*

* default

V.34 Settings   S96

Bit	Value	Command	Description
4-0	--		Reserved
5	0 1		Disable asymmetric bit rates Enable asymmetric bit rates *
6	--		Reserved
7	0 1		Disable TX power control Enable TX power control *

* default

S97 - S100
Reserved