

**Linelink**

<b>COLLABORATORS</b>
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# Chapter 1

## Linelink

### 1.1 LineLink S-Registers

S Register List  
for LineLink 144e

S0 Auto-answer

Range            Default

0-255 rings    0            This register determines the number to rings the modem will count before automatically answering a call. A value of 0 will prevent the modem from answering. Values from 1 thru 255 are the number of rings the modem will count before answering. The default value is 0.

S1 Count Incoming Rings

Range            Default

0-255 rings    43           This register counts the number of incoming rings. When the value in this register equals the value in Register S0, the modem answers. This register resets approximately 8 seconds after the last ring.

S2 Escape Character

Range            Default

0-127 ASCII    43           Register S2 sets the ASCII value of the escape characters, used to switch the modem from Data Mode to Command Mode without losing the connection to the remote modem. Values greater than 127 disable the escape feature, preventing a return to the

Command Mode. If the modem will be used to automatically answer incoming calls, either disable the escape characters or set them to a value other than that used by the originating modem. To return to Command Mode with the escape characters disabled, the remote modem must hang up or an ON-to-OFF transition of the DTR interface signal must occur with the &D1, &D2, or &D3 command in effect.

S3 Carriage return character.

Range           Default

0-127 ASCII    13           Register S3 sets the ASCII value of the carriage return (end-of-line) character. This is the character used to end the command line (and have the modem execute the line) and also the character that appears after the modem sends a response.

S4 Line feed character.

Range           Default

0-127 ASCII    10           Register S4 sets the ASCII value of the line feed character. The modem sends the line feed character after a carriage return only when word responses are sent (v1command in effect). If a line feed character is not wanted, change the register value to a null character (the line feed character cannot be totally disabled).

S5 Backspace character.

Range           Default

0-32, 127 ASCII   8           Register S5 sets the ASCII value of the backspace character. This character is both the character created by pressing the Backspace key and the character echoed to move the cursor to the left. To

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change the register value, assign an ASCII value between 0 and 32, or greater than 127. Do not use values between 33 and 126 since they correspond to printable ASCII characters.

S6 Wait for dial tone.

Range Default

2-255 seconds 2 When the modem executes a Dial command line with the X0, X1, or X3 response set in effect, Register S6 tells the modem how long to wait after going off hook before it dials the first digit in the Dial command line. This feature is convenient when it takes longer than two seconds to obtain a dial tone. If the modem does not detect a dial tone when the time in Register S6 elapses, you will receive the NO DIALTONE (or 6) response.

S7 Wait time for carrier.

Range Default

1-60 seconds 40 Register S7 tells the modem how many seconds to wait for a remote modem's carrier signal before hanging up. The register value can be increased if the modem does not detect a carrier within the specified time. If the modem detects a remote carrier signal within the specified time, it sends a CONNECT response and enters Data Mode. If it does not detect a remote carrier signal within the specified time, it sends the NO CARRIER (or 3) response, hangs up and returns to the Command Mode.

S8 Pause time for comma.

Range Default

0-255 seconds 2 Register S8 tells the modem how many seconds to pause for each comma (,) it encounters in a Dial command line. The comma is used when dialing through a PBX or other special telephone service to wait for an outside telephone line. An alternative to changing this register value is to include more

than one comma in your command line.

S9 Carrier Detect response time.

Range Default

1-255 06 Register S9 tells the modem how long the remote modem's carrier signal must be present so the modem does not mistake the signal for a busy signal, ring, or voice. The factory setting requires the modem to listen to the carrier signal for at least 0.6 seconds before recognizing it. Increasing the time in this register reduces the chances that the modem will mistake noise such as a busy signal or voice for a carrier signal. For example, entering a value 15 means that the remote modem's carrier signal must be present for 1.5 seconds for the modem to recognize it.

S10 Carrier loss time.

Range Default

1-255 14 Register S10 sets the time between the loss of a remote modem's carrier signal and when the modem disconnects. This allows the remote modem's carrier signal to momentarily disappear from the telephone line without the modem disconnecting. the factory setting can be changed to a higher value when a noisy telephone line that might interfere with the remote modem's carrier signal. To have the modem ignore the Data Carrier Detect status and act as if the remote modem's carrier signal is always present, set the value to 255. Assigning a value smaller than the value in Register S9 causes the modem to disconnect when it detects a momentary carrier loss, because Register S10 expires before the carrier response time expires.

S-Register Description

S11 Range Default

50-255 ms 75 Register S11 controls the speed of

the Touch-Tone (DTMF) dialing. Increasing the register value to 255 slows the dialing rate to 1.9 digits per second. Do not select a value less than 50 milliseconds. (Register S11 has no effect on pulse dialing, which is fixed at 10 pulses per second.)

S12 Return to data mode timer.

Range Default

0-255 1/50 seconds 40 Register S12 controls the time delay before typing the escape characters. Register S12 controls the time before returning to data mode after receiving escape characters unless "AT" command is received.

S14 Functions

Range Default

Bit Mapped 170 Register S14 is a bit-mapped register and provides the following functions (equivalent commands are shown in parentheses):

Bit 0&2	Bit0	Bit2	AT Command
0	0	Q0	
0	1	Q1	
1	0	Q2	

Bit 1	Echo commands to DTE
0	Do not echo commands (E0)
1	Echo commands (E1)

Bit 3	Word or number responses
0	Send number responses (V0)
1	Send word responses (V1)

Bit 4	0 Accept commands
1	Ignore commands

Bit 5	Dialing method
0	Touch-Tone (T)
1	Pulse (P)

Bit 6	Reserved c
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Bit 7	Answer/originate operation
0	Answer (A and R)
1	Originate (D)

S23 Test functions

Range Default



Bit Mapped 007 Register S23 is a bit-mapped register and provides the following test functions (equivalent commands are shown in parentheses):

Bit 0 Response to remote modem request for Remote Digital Loopback Test  
 0 Ignore request (&T5)  
 1 Grant request (&T4)

Bits 1, 2, 3 DTE speed

3	2	1	
	0	0	0
0	0	1	300 bit/s
0	1	0	1200 bit/s
0	1	1	2400 bit/s
1	0	0	4800 bit/s
1	0	1	9600 bit/s
1	1	0	19,200 bit/s
1	1	1	38,400 bit/s

Bits 4,5 Parity setting

5	4	
0	0	Even parity
0	1	Space parity
1	0	Odd parity
1	1	mark parity

Bits 6,7 Guard tones

7	6	
0	0	Guard tones disabled (&G0)
0	1	550 Hz guard tone (&G1)
1	0	1800 Hz guard tone (&G2)
1	1	Reserved

S25 DTR Delay.

Range Default

0-255 seconds 5 If the &M1 command is in effect, Register S25 specifies the number of seconds that the modem waits after a connection has been made before examining the DTR lead. This delay allows a asynchronous terminal to be detached from the modem and a synchronous terminal connection while remaining in the Data Mode. After this delay S25 reverts to hundredths of seconds.

S26 RTS/CTS Delay

Range Default

0-255 hundreds of seconds 001 Sync Mode only. Register S2 specifies the time in hundreds

of second increments, of the delay between RTS and the CTS response.

S27 Test Function

Bit mapped 49H Register S27 is a bit-mapped register and provides the following test functions (equivalent commands are shown in parentheses):

		Bit 0,1,3	Communication operation
3	1	0	
0	0	0	<M>Asynchronous operation (&M0, &Q0)
0	0	1	Synchronous operation after dialing (&M1, &Q1)
0	1	0	Synchronous terminal support (&M2, &Q2)
0	1	1	Manually originate synchronous call (&M3, &Q3)
1	0	0	Not valid
1	0	1	Asynchronous error control (&Q5)
1	1	0	Aysnchronous buffered mode (&Q6)
1	1	1	not valid
		Bit 2	0 Dial up line (&L0)
			1 Leased line (&L1)
		Bit 3	Reserved
		Bit 4,5	Synchronous timing selection
5	4		
0	0		Modem provides synchronous transmit clock on EIA pin 15 (&X0)
0	1		Modem accepts external synchronous clock (&X1)
1	0		receive clock (slave timing) (&X2)
		Bit 6 & 7	Bit 6 Bit7 AT Command
		0 0	B0
		1 0	B1
		0 1	B2
		1 1	B3

S30 Automatic Timeout.

Range Default Register S30 specifies the number of seconds the modem waits without activity, before disconnecting. Timing is in 10 second increments.

S36 Negotiation Falback

Range Default

- 0-7            7        When the initial attempt to connect in error-control mode fails, S36 specifies what should occur next.
- 0    Hang up
  - 1    Attempt a direct asynchronous connection (&Q0)
  - 2
  - 3    Attempt an asynchronous connection using automatic speed buffering (&q6).
  - 4    Attempt a CCITT V.42 Alternative Protocol connection (MNP 2-4); if negotiation fails, hang up.
  - 5    Attempt a CCITT V.42 Alternative Protocol connection (MNP ); if negotiation fails, attempt a direct asynchronous connection.
  - 6
  - 7    Attempt a CCITT V.42 Alternative Protocol connection (MNP compatible); if negotiation fails, attempt an asynchronous connection using automatic speed buffering.

Note: The selected fallback option can be initiated immediately with S48. For example, a connection attempt using the MNP can be forced by setting S48=128 and S36=5 or 7.

### S37    Maximum DCE Line Speed

S37 selects the speed (for all modes except CCITT V.24bis) at which the modem attempts to connect with a remote modem; the speed selected will be the highest DCE speed supported by both modems (see S93 for CCITT V.25bis modes).

- 0    Speed of last AT command issued
  - 1    75 bps
  - 2    110 bps
  - 3    300 bps
  - 5    1200 bps
-

- 6 2400 bps
- 7 4800 bps
- 8 7200 bps
- 9 9600 bps
- 10 12000 bps
- 11 14400 bps

S38 Delay Before Forced Hangup

Range Default

0-255 20 S38 specifies the number of seconds the modem waits when in error-control mode (&Q5) before disconnecting after receiving the command to hang up or an on-to-off transition of DTR. The range for this register is 0-255 seconds; the default to 20 seconds. If the register is set to 0, the modem does not wait for data in the buffers to clear (gives NO CARRIER response). If the register is set to a value between 0 and 254, the modem will wait the number of seconds, or until all data has been transferred, before hanging up. (If data clears gives of response, if not gives NO CARRIER response). If the register is set to 255, the modem will not hang up until all data is transferred.

S39 ATN Command Bit Map

Bit 5	Bit 4	Bit 3	AT Command
0	0	0	N0
0	0	1	N1
0	1	0	N2
0	1	1	N3
1	0	0	N4
1	0	1	N5

S46 Compression Error Control protocol Selection

Range Default

136,138 138 Register S46 enables d  
13 No compression  
138 Compression

48 Feature Negotiation Action

Range Default

0, 7, 128 7 Register S48 defines whether feature negotiation is to be performed by the modem. The feature negotiation process allows the modem to ascertain the

remote system's capabilities. If these capabilities are already known and negotiation is not necessary, this feature can be bypassed.

- 0 Negotiation disabled. Modem assumes the remote modem is configured properly to make a connection, bypasses the detection and negotiation phases, and proceeds with the protocol selected by Register S46.
- 3 Reserved
- 7 Negotiation enabled.
- 128 Negotiation disabled. Forces immediate fallback as specified in Register S36. Can be used to force the V.42 alternative protocol (compatible with MNP), bypassing the detection and negotiation phases.

S49 Buffer Lower Limit  
Range Default

- 0-255 10 S49 specifies the minimum size of the buffer used in error-control or automatic speed buffering mode. The range is 1-255 bytes; the default setting is 10.

S50 Buffer Upper Limit  
Range Default

- 0-255 200 S50 specifies the maximum size of the buffer used in error-control of automatic speed buffering mode. The range is 2-255 bytes; the default setting is 200.

S63 Private Circuit Carrier Level  
Range Default

- 0-15 0 S63 specifies the carrier power level in dBm for leased line operation. This register specifies a carrier level value that is not to be exceeded. The range of this register is 0-15 (0 to -15 dBm). The default setting is 0.

S82 Beak Signaling Technique  
Range Default

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- 3, 7, 128      128      S82 selects a method of break signal handling for CCITT V.42 communications: in sequence, expedited, and destructive. Break signals provide a way to get the attention of the remote host. The break type used depends on the application.
- 3      Expedited signaling used regardless of sequence in transmitted and received data; data integrity maintained.
- 7      Destructive signaling used regardless of sequence of transmitted and received data; data in process at time is destroyed.
- 128      In sequence signaling used as data is transmitted and received; data integrity maintained ahead of and after break.

#### S86      Connection Failure Cause Code

Range      Default

- 0, 4-15      None      S86 helps determine the cause of a connection failure. When the modem issues a NO CARRIER result code, a value is written to this S-register. To read this register following the connection failure, issue AT\$86? <CR>. The modem will report one of the values below.
- 0      Normal hang up; no error occurred.
- 4      Physical carrier loss.
- 5      Feature negotiation failed to detect presence of another error-control modem at the other end.
- 6      Other error-control modem did not respond to feature negotiation message sent by this modem.
- 7      Other modem is synchronous-only; this modem is asynchronous-only.

- 8 Modems could not find a common framing technique.
- 9 Modems could not find a protocol in common.
- 10 Incorrect feature negotiation message sent by other modem.
- 11 Synchronous information (data of flags) not received from other modem. Modem waited 30 seconds before hanging up.
- 12 Normal disconnect initiated by other modem.
- 13 Other modem did not respond after many transmissions of the same message. modem made 10 attempts then hung up.
- 14 Protocol violation occurred.
- 15 Compression failure.

Note: Multiple occurrences may contribute to a NO CARRIER message; S86 records the first event that occurred.

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