

# Configuring Modem Support and Chat Scripts

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This chapter contains information to help you to configure most popular modems to work with Cisco access servers or with the console and/or auxiliary port of Cisco access servers and routers.

## Configuring the Access Server

The following line configuration is recommended in most situations:

<code>line x</code>	The tty line number. The AUX port is 1 on routers, last_tty+1 on access servers.
<code>speed 38400</code>	The speed to use on this line. Set to highest speed in common between modem + port.
<code>flow hard</code>	RTS/CTS flowcontrol. Set only the CTS on ASMs.
<code>modem inout</code>	Drop connection on loss of CD, Cycle DTR for connection close

The above configuration assumes the following:

- That the modem will always communicate to the access server or router at "speed" (which is why you must LOCK SPEED on the modem).
- That the "CD" lead of the modem reflects the real state of the carrier, and that the modem will hang up when a Cisco device drops DTR.

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**Note** If possible, try to avoid using autobaud. You may experience problems with the router or access server if you use it.

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## Bitrate Maximums for Cisco Devices

Bitrate information for Cisco devices is as follows:

- 57600 is the maximum speed for ASM, STS-10, and AUX ports
- 115200 is the maximum speed for the 25xx access servers

If flowcontrol is not available on your modem, use 9600 baud as the maximum speed.

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**Note** If you are routing over the AUX port, each character generates a processor interrupt. Abnormally high CPU can be resolved by using a lower AUX port speed.

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## Configuring the Modem

You must issue commands to the modem starting with "AT" and issue them at the speed at which you wish the modem to communicate to the access server or router. This insures that the modem will always communicate to the access server or router at that speed regardless of the speed of any incoming modem connection. This also assumes that you set the modem to lock on the DTE speed, which is required.

## Configuring Reverse Connection

If possible, configure modems using reverse connection. To make a reverse connection, issue this Telnet command from anywhere on the network that can ping *x.x.x.x*:

```
telnet x.x.x.x 20yy
```

where *x.x.x.x* is any active, connected, and up interface on the Cisco device and *yy* is the line number to which you want to connect.

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**Note** The router AUX port is 01. The AUX port on an access server is the last\_tty+1, e.g. on a 16-port access server, the AUX port is port 17.

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If you get a connection refused message, refer to the section "Troubleshooting Tips" for a likely cause and resolution.

## Attaching to the Modem

Take the following steps to attach to the modem:

- Step 1** Attach to the modem using the same speed at which the Cisco access server or router port will be set, as described in "Configuring Reverse Connection." This ensures that you are at the same line speed as the Cisco access server or router.
- Step 2** Issue an AT command built by using information appropriate for your modem as listed in Table B-1.  
  
Start with commands listed as required for all modems and then add the EC/Compression pair (either "BEST," or "NO") that best suits your need. This is the minimum that you need to start. For applications that are primarily file transfer, the "BEST" pair is advised. For connections that are primarily ARA, Xremote, or interactive packet-protocol (SLIP/PPP) traffic, the "NO" pair is advised.
- Step 3** If you have an AUX port (or no modem control), add commands listed under Settings for Use with AUX Port in Table B-2. Remember to limit to 9600 bps if you have no flow control.
- Step 4** Add commands listed under the heading Platform Specific Settings in Table B-2 for ASM platforms.
- Step 5** End the string with a &W.

## Example String

A Microcom with best error correction/compression with an ASM would be:

```
AT&FS0=1&C1&D3\Q3\J0\N6%C1\Q2&W
```

## Modem Settings for Use in Strings

Table B-1 contains required settings and EC/compression settings for specific modem types. Use this information to create your modem scripts. Table B-2 contains information for setting AUX ports, for configuring ASMs, and general comments. Refer to Table B-3 for a legend of symbols used in these two tables.

**Table B-1 Required Settings and EC/Compression Settings**

Modem	Settings Required for All Modems				Settings for EC/Compression					
	FD	AA	CD	DTR	RTS/CT S Flow	LOCK DTE Speed	Best Error	Best Comp	No Error	No Comp
Codex 3260	&F	S0=1	&C1	&D3	*FL3	*SC1	*SM3	*DC1	*SM1	*DC0
USR Courier USR Sportster	&F	S0=1	&C1	&D3	&H1&R2	&B1	&M4	&K1	&M0	&K0
Global Village Teleport Gold	&F	S0=1	&C1	&D3	\Q3	\J0	\N7	%C1	\N0	%C0
Telebit T1600/T3000/ WB	&F1	S0=1	&C1	&D3	S58=2 S68=2	S51=6	S180=2 S181=1	S190=1	S180=0 S181=1	S190=0
Telebit T2500 (ECM)	&F	S0=1	&C1	&D3	S58=2 S68=2	S51=6	S95=2	S98=1 S96=1	S95=0	S98=0 S96=0
Telebit Trailblazer	&F	S0=1	&C1							
AT&T Paradyne Dataport	&F	S0=1	&C1	&D3	\Q3	--->	\N7	%C1	\N0	%C0
Hayes modems Accura/ Optima	&F	S0=1	&C1	&D3	&K3	&Q6	&Q5	&Q9	&Q6	<---
Microcom QX4232 series	&F	S0=1	&C1	&D3	\Q3	\J0	\N6	%C1	\N0	%C0
Motorola UDS FastTalk II	&F	S0=1	&C1	&D3	\Q3	\J0	\N6	%C1	\N0	%C0
Multitech MT1432 MT932	&F	S0=1	&C1	&D3	&E4	\$BA0	&E1	&E15	&E0	&E14
Digicom Scout Plus	&F	S0=1	&C1	&D3	*F3	*S1	*E9	<---	*E0	<---
Digicom SoftModem	&F	S0=1	&C1	&D3	&K3	--->	\N5	%C1	\N0	%C0
Viva 14.4/9642c	&F	S0=1	&C1	&D3	&K3	--->	\N3	%M3	\N0	%M0

## Configuring the Modem

Settings Required for All Modems					Settings for EC/Compression					
Modem	FD	AA	CD	DTR	RTS/CT S Flow	LOCK DTE Speed	Best Error	Best Comp	No Error	No Comp
ZyXel U-1496E	&F	S0=1	&C1	&D3	&H3	&B1	&K4	<---	&K0	<---
Supra V.32bis/28.8	&F	S0=1	&C1	&D3	&K3	--->	\N3	%C1	\N0	%C0
ZOOM 14.4	&F	S0=1	&C1	&D3	&K3	--->	\N3	%C2	\N0	%C0
Intel External	&F	S0=1	&C1	&D3	\Q3	\J0	\N3	%C1"H3	\N0	%C0
Practical Peripherals	&F	S0=1	&C1	&D3	&K3	--->	&Q5	&Q9	&Q6	<---

**Table B-2 AUX and Platform Specific Settings**

Modem	Settings for Use with AUX Port		ASM Platform Specific Settings			Comments
	No Echo	No Res	ASM only	CAB-MDCE	Write Memory	
Codex 3260	E0	Q1	*NA*	&S1	&W	
USR Courieræ USR Sportster	E0	Q1	&R1	*NA*	&W	
Global Village Teleport Gold	E0	Q1	\Q2	*NA*	&W	
Telebit T1600/T3000/ WB	E0	Q1	S58=0	&S4	&W	All Telebit modems need to have the speed set explicitly. These examples use 38400 bps. Using what Telebit calls "UNATTENDED ANSWER MODE" is the best place to start a dial in only modem.
Telebit T2500 (ECM)	E0	Q1	&R1	&S1	&W	
Telebit Trailblazer	E0	Q1	s58=0	*NA*	&W	Use "ENHANCED COMMAND MODE" on the T2500.
AT&T Paradyne Dataport	E0	Q1	\Q2	*NA*	&W	Almost all Microcom modems have similar configuration parameters.
Hayes modems Accura/ Optima	E0	Q1	*NA*	*NA*	&W	
Microcom QX4232 series	E0	Q1	\Q2	*NA*	&W	
Motorola UDS FastTalk II	E0	Q1	\Q2	*NA*	&W	
Multitech MT1432 MT932	E0	Q1	&E12	&S1	&W	
Digicom Scout Plus	E0	Q2	*NA*	&B2	&W	

Modem	Settings for Use with AUX Port		ASM Platform Specific Settings			Comments
	No Echo	No Res	ASM only	CAB-MDCE	Write Memory	
Digicom SoftModem	E0	Q1	*NA*	&S1	&W	
Viva 14.4/9642c	E0	Q1	*NA*	&S1	&W	
ZyXel U-1496E	E0	Q1	*NA*	&S1	&W	Additional information on ftp.zyxel.com
Supra V.32bis/28.8	E0	Q1	*NA*	&S1	&W	
ZOOM 14.4	E0	Q1	*NA*	&S1	&W	
Intel External	E0	Q1	\Q2	*NA*	&W	
Practical Peripherals	E0	Q1	*NA*	*NA*	&W	Based on PC288LCD. May vary.

Table B-3 contains a legend of symbols used in Table B-1 and Table B-2.

**Table B-3 Legend to Symbols Used in Modem Chart**

Symbol	Meaning
*NA*	This option is not available on the noted modem.
-->	The command noted on the right will handle that function.
<--	The command on the left will handle that function.
AUX port	These parameters are only required for pre-9.21 aux ports or any other port without modem control set.

## Troubleshooting Tips

Table B-4 contains troubleshooting tips on modem access and control.

**Table B-4 Modem Troubleshooting Tips**

<b>Problem</b>	<b>Likely Cause</b>
Connection refused.	<p>Someone already has a connection to that port</p> <p>-or-</p> <p>an EXEC is running on that port</p> <p>-or-</p> <p>the modem failed to lower CD after a call disconnected, resulting in an EXEC that remained active after disconnect.</p> <p>In order to force the line back into an idle state, clear the line from the console and try again. If it still fails, ensure that you have set modem inout for that line. If you don't have modem control, either turn off EXEC on the line (by using the <b>exec-timeout</b> line configuration command) before making a reverse connection or configure the modem using an external terminal. As a last resort, disconnect the modem, clear the line, make the Telnet connection and then attach the modem. This prevents a misconfigured modem from denying you line access.</p>
Connection appears to hang.	Try entering "^U" (clear line), "^Q" (XON), and press Return a few times to try to establish terminal control.
EXEC does not come up, autoselect is on.	Press Return to enter EXEC.
Modem does not hang up after entering <b>quit</b> .	The modem is either not receiving DTR information or you have not set up modem control on the Cisco access server or router.
Interrupt another user's session when you dial in.	The modem is either not dropping CD on disconnect or you have not set up modem control on the Cisco access server or router.
Connection hangs after entering "+++" on the dialing modem, followed by an ATO.	<p>The answering modem saw and interpreted the "+++" when it was echoed to you.</p> <p>This is a bug in the answering modem, common to many modems. There may be a switch to work around this problem; check the modem's documentation.</p>
Losing data.	You may have Hardware Flow Control only on for either the router or access server's line (DTE) or the modem (DCE). Hardware Flow Control should be on for both or neither.
Using MDCE.	Turn MDCE into an MMOD by moving pin 6 to pin 8 as most modems use CD and not DSR to indicate the presence of carrier. You can also program some modems to provide carrier info via DSR.