



InModem 56



User Guide

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System Requirements

- Computer with Pentium 166 MMX or higher processor.
- Windows 95/98, NT 4 or 2000 Operating System.
- Analogue Telephone line.
- 1 available PCI slot.
- CD-ROM drive.

Package inclusions

- Modem.
- Telephone lead (RJ11-RJ11).
- Telephone lead adaptor (605 – RJ11).
- Quick Start Guide.
- NetComm CD.
- Warranty card.
- ISP (Internet Service Provider) CD.

Modem Installation

1. Turn off your computer and disconnect the power cable.
2. Remove the cover from your computer. Please check your computer's manual for instructions and cautions regarding the removal of covers or installation of add-in boards.
3. Select an empty PCI slot and remove the appropriate expansion slot cover from the computer.

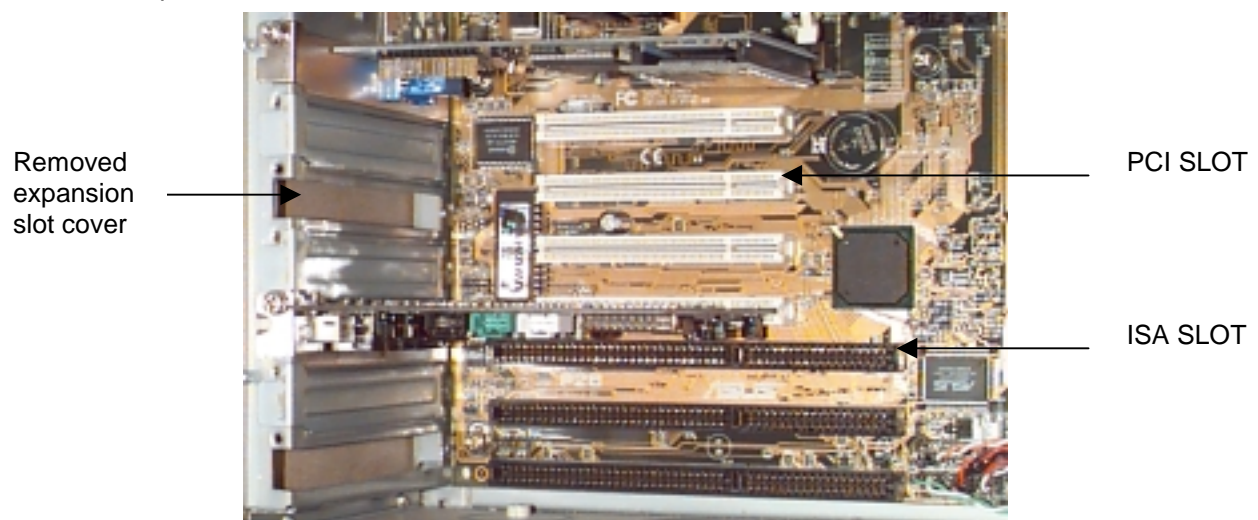


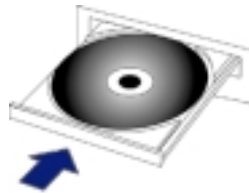
Fig: Computer Internals

4. Insert the InModem 56 into the PCI slot and secure with a screw in the backplane.



5. Replace the Computers cover.
6. Insert one end of the telephone cord into the Modem's Line (top) Socket
7. Connect the other end of the phone cord to a telephone phone point, via the supplied adaptor (RJ11-605) if required.
8. Turn on your computer.
9. As Windows 95 or 98 starts (Windows NT 4 and 2000 users skip this instruction) it will detect that new hardware has been added, and start the "Add New Hardware Wizard" (Windows 9x only). Click on **Cancel**.

10. Insert the NetComm CD into your CD-ROM drive

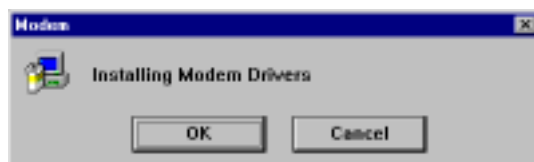


11. The CD should autostart, displaying the following window. If it does not start click on Start – Run and type in D:\autorun.exe where D is the drive letter of your CD-ROM drive.



12. Select "Install Modem Driver".

13. Click on OK to confirm the installation.



14. As the drivers are being installed this Window will be displayed.



15. Windows 95 and 98

The Add New Hardware wizard pop up momentarily while the drivers are added and then the above window will close automatically.

Or

Windows 2000 – You will be informed that “Digital Signature Not Found”. Click on Yes to complete the installation.

Or

Windows NT 4 – After the drivers are installed you will be informed that you need to Restart your computer before you can use your modem. Click OK to restart, or Cancel to restart later.

Using Your Modem

Your modem is now ready to use. Included with your modem is the following software:

- Bitware Fax software that allows you to send and receive faxes directly from your PC. To install Bitware click on the “Install Bitware Fax Software” link on the NetComm CD.
- ISP Software allows you to sign up with an ISP (Internet Service Provider) to connect to the Internet.

Most Windows communications software will either auto detect your modem, or ask you which modem you wish to use with it. Choose the NetComm InModem 56 (IN5692). If the software asks you which COM port to use you can determine this by going to the Control Panel – Modems – NetComm InModem 56 – Properties and the **Port** that the modem is configured to (often COM 3) will be displayed.

Troubleshooting

Problem:

The modem keeps disconnecting.

Resolution:

1. Turn off call waiting.
2. Disconnect all other telephone devices (telephone handsets, answering machines, faxes, cordless phones) connected to the phone line.
3. Check for updated drivers on the NetComm Web site <http://www.netcomm.com.au>

Problem:

The modem is reporting NO DIALTONE.

Resolution:

1. Check that the phone line is plugged into the modems LINE (not Phone) socket.
2. Check that no one else is using a phone that is connected to the same phone line.
3. Go to Control Panel – Modems – NetComm InModem 56 – Properties – Connection and remove the tick in the “Wait for dial tone before dialing” checkbox.

Problem:

The modem is not responding.

Resolution:

1. Make sure that there are no other packages communicating with the modem. In particular check that there are no fax packages running.
2. Check the System properties (Control Panel – System – Device Manager in Windows 95 & 98) to make sure there are no system conflicts listed.
3. Try restarting your computer.
4. Go to Control Panel – Modems – Diagnostics and highlight the Com port listed next to the NetComm InModem 56 and then click on “**More Info**”. If the modem is responding you will be presented with a window with the modems responses to a number of AT commands.
5. Try inserting the modem into a different PCI slot.

Problem:

The modem will not connect.

Resolution:

1. Try connecting to a different phone number.
2. Try connecting from a different phone line (if possible).
3. Disconnect all other telephone devices (telephone handsets, answering machines, faxes, cordless phones) connected to the phone line.

Problem:

The modem won't connect at 56k speeds.

Resolution:

1. The server you are dialing might not support 56k speeds.
2. Your phone line might not support 56k speeds.

Appendix A: AT Command Reference

AT commands are issued to the modem to control the modem's operation and software configuration. AT commands can only be entered while the modem is in command mode. The format for entering AT commands is: TYPE: ATXn where X is the AT command and n is the specific value for that command. PRESS: Enter If n is omitted from a command that takes a parameter value, the value 0 (zero) is assumed.

Any command issued is acknowledged with a response in either text or numeric values known as result codes. Table 2 lists all the valid result codes.

In the following listing, all commands and command-values accepted by the modem are shown; any entries other than those shown cause the ERROR result code.

+++ Escape sequence

The escape sequence allows the modem to exit data mode and enter on-line command mode. While in on-line command mode, you may communicate directly to your modem using AT commands. Once you are finished, you may return to data mode using the ATO command. A pause, the length which is set by the Escape Guard Time (S12), must be used before and after an escape sequence is issued. This pause prevents the modem from interpreting the escape sequence as data.

The value of the escape sequence character may be changed using Register S2.

A/ Repeat Last Command

This command repeats the last command string entered. Do not precede this command with an AT prefix or conclude it by pressing Enter.

A Answer Command

This command instructs the modem to go off-hook and answer an incoming call.

Bn Communication Standard Setting

This command determines CCITT vs. Bell standard.

B0: Selects CCITT V.22 mode when the modem is at 1200 bits/s.

B1: Selects Bell 212A when the modem is at 1200 bits/s (default).

B2: Unselects V23 reverse channel (same as B3).

B3: Unselects V23 reverse channel (same as B2).

B15: Selects V.21 when the modem is at 300 bits/s.

B16: Selects Bell 103J when the modem is at 300 bits/s (default).

Result Codes:

OK	n = 0, 1, 2, 3, 15, 16
ERROR	Otherwise

Cn Carrier Control

The modem will accept the C1 command without error in order to assure backward compatibility with communications software that issues the C1 command. However, this modem does not support the C0 command. The C0 command may instruct some other modems not to send carrier (i.e., it puts them in a receive-only mode).

C0: Transmit carrier always off.

C1: Normal transmit carrier switching.

Result Codes:

OK n = 1
ERROR Otherwise

Dn Dial

This command instructs the modem to begin the dialing sequence. The dial string (n, including modifiers and the telephone number) is entered after the ATD command. A dial string can be up to 60 characters long. Any digit or symbol (0-9, *, #, A, B, C, D) may be dialed as touch-tone digits. Characters such as spaces, hyphens, and parentheses do not count—they are ignored by the modem and may be included in the dial string to enhance readability. The following may be used as dial string modifiers:

L Redials last number. Should be the first character following ATD, ignored otherwise.

P Pulse dialing.

T Touch-tone dialing (default).
, Pause during dialing. Pause for time specified in Register S8 before processing the next character in the dial string.

W Wait for dial tone. Modem waits for a second dial tone before processing the dial string.

V The modem switches to speakerphone mode and dials the number. An ATH command may be used to disconnect the voice call.

@ Wait for quiet answer. Wait for five seconds of silence after dialing the number. If silence is not detected, the modem sends a NO ANSWER result code back to the user.

! Hook flash. Causes the modem to go on-hook for 0.5 seconds and then return to off-hook.

; Return to command mode. Causes the modem to return to command mode after dialing the number, without disconnecting the call.

^ Disable data calling tone transmission.

S=n Dial a telephone number previously stored using the &Zn=x command (see the &Zn=x command for further information). The range of n is 0—3.

En Echo Command

This command controls whether or not the characters entered from your computer keyboard are echoed back to your monitor while the modem is in command mode.

E0: Disables echo to the computer.

E1: Enables echo to the computer (default).

Result Codes:

OK n = 0, 1
ERROR Otherwise

Fn Online Data Character Echo Command

This command determines if the modem will echo data from the DTE. This modem does not support the F0 version of the command. However, the modem will accept F1, which may be

issued by older communication software, to assure backward compatibility.

F0: Online data character echo enabled (NOT SUPPORTED).

F1: Online character echo disabled.

Result Codes:

OK n = 1
ERROR Otherwise

Hn Hook Control

This command instructs the modem to go on-hook to disconnect a call, or off-hook to make the phone line busy.

H0: Modem goes on-hook (default).

H1: Modem goes off-hook.

Result Codes:

OK n = 0, 1
ERROR Otherwise

In Request ID Information

This command displays specific product information about the modem.

I0: Returns modem identity string and driver version number, same as I3.

I1: Calculates ROM checksum and displays it on the DTE.

I2: Performs a ROM check and calculates and verifies the checksum displaying OK or ERROR.

I3: Returns modem identity string and driver version number, same as I0.

I4: Returns firmware version for data pump.

I5: Returns the code ver, board ID, country ID and subsystem vendor ID in hexadecimal

I6-8: Returns OK for compatibility.

I9: Returns country ID in English.

I11: Displays connection information as described in the following example.

Result Codes:

As described n = 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 11
ERROR Otherwise

The AT111 result has two pages; the user must hit a key to get the second page. See the following example:

```
ati11
Description K56flex connection V.90 Connection
-----
1 Last Connection 56K V.90
2 Initial Transmit Carrier Rate 28800 28800
3 Initial Receive Carrier Rate 50000 49333
4 Final Transmit Carrier Rate 28800 28800
5 Final Receive Carrier Rate 50000 49333
6 Protocol Negotiation Result LAPM LAPM
7 Data Compression Result V42bis V42bis
```

```

8 Estimated Noise Level 152 152
9 Receive Signal Power Level (-dBm) 25 25
10 Transmit Signal Power Level (-dBm) 16 16
11 Round Trip Delay (msec) 4 4
Press any key to continue; ESC to quit.
12 Near Echo Level (-dBm) NA NA
13 Far Echo Level (-dBm) NA NA
14 Transmit Frame Count 3 3
15 Transmit Frame Error Count 0 0
16 Receive Frame Count 0 0
17 Receive Frame Error Count 0 0
18 Retrain by Local Modem 0 0
19 Retrain by Remote Modem 0 0
20 Call Termination Cause 0 0
21 Robbed-Bit Signaling 00 00
22 Digital Loss (dB) 6 6
23 Remote Server ID 4342C3 NA
OK

```

The AT111 command may be issued from on-line command mode or after the end of a call. After a call, some of the values are no longer valid; it's useful to know which ones. Each of the line items in the AT111 result is explained next:

1. V.90, 56K, V.34, or V.32 depending on the type of connection negotiated.
2. Initial upstream rate
3. Initial downstream rate
4. Current or final upstream rate
5. Current or final downstream rate
6. LAPM or MNP or None, depending on V.42 negotiation
7. V42bis or MNP or None, depending on V.42 negotiation
8. Mean-square error of received downstream signal. Difference between received constellation point and reference decision point. This is a dimensionless decimal number, only valid during a call. Higher numbers are worse. There's no absolute threshold of goodness; it depends on the downstream data rate. The number varies during a call, so it can be useful to sample it a few times.
9. The received signal power, although labeled -dBm, is only a relative measure for comparing calls to/from different locations. Only valid during a call.
10. Upstream transmit signal power.
11. Round-trip delay in milliseconds.
12. Echo levels are valid for V.34 only.
13. Echo levels are valid for V.34 only.
14. Number of LAPM frames sent upstream during this call. Count wraps around at 65535.
15. Number of REJ frames received at the analog client modem.
16. Number of LAPM frames received by client during this call. Count wraps around at 65535.
17. Number of frames received in error by the client.
18. Number of retrains or rate renegotiations requested by this modem.
19. Number of retrains or rate renegotiations requested by remote modem.
20. Reason for call ending, only valid after call ends:
0 = Local modem command: ATH, DTR drop
1 = Remote modem: clear-down, loss of signal
2 = No answer, busy, etc.
3 = Training failure V.90, K56flex or V.34.
4 = Protocol failure if required by V.42, for example.
21. For PCM connection only, a hexadecimal 6-bit pattern of T1 frames with robbed-bit signaling.
22. For PCM connection only, the downstream digital loss.
23. For K56flex connection only, the V.8bis info sent by the server. Meaning is defined at the server and by convention. Example above is from a recent Ascend MAX in m-Law.

Ln Monitor Speaker Volume

This command sets speaker volume to low, medium, or high.

- L0:** Selects low volume.
- L1:** Selects low volume.
- L2:** Selects medium volume (default).
- L3:** Selects high volume.

Result Codes:

OK n = 0, 1, 2, 3
 ERROR Otherwise

Mn Monitor Speaker Mode

This command turns the speaker on or off.

- M0:** The speaker is off.
- M1:** The speaker is on until the modem detects the carrier signal (default).
- M2:** The speaker is always on when modem is off-hook.

Nn Modulation Handshake

This command controls whether or not the local modem performs a negotiated handshake at connection time with the remote modem when the communication speed of the two modems is different.

- N0:** When originating or answering, this is for handshake only at the communication standard specified by S37 and the ATB command.
- N1:** When originating or answering, begin the handshake only at the communication standard specified by S37 and the ATB command. During handshake, fallback to a lower speed may occur (default).

Result Codes:

OK n = 0, 1
 ERROR Otherwise

On Return On-line to Data Mode

- O0:** Instructs the modem to exit on-line command mode and return to data mode (see AT Escape Sequence, +++).
- O1:** This command issues a retrain before returning to on-line data mode.
- O3:** This command issues a rate renegotiation before returning to on-line data mode.

Result Codes:

OK n = 0, 1, 3
 ERROR Otherwise

P Select Pulse Dialing

This command configures the modem for pulse (non touch-tone) dialing. Dialed digits are pulsed until a T command or dial modifier is received. Tone dial is the default setting.

Qn Result Code Control

Result codes are informational messages sent from the modem and displayed on your monitor. Basic result codes are OK, CONNECT, RING, NO CARRIER, and ERROR. The ATQ command allows the user to turn result codes on or off.

Q0: Enables modem to send result codes to the computer (default).

Q1: Disables modem from sending result codes to the computer.

Result Codes:

OK n = 0, 1
ERROR Otherwise

T Select Tone Dialing

This command instructs the modem to send DTMF tones while dialing. Dialed digits are tone dialed until a P command or dial modifier is received. This is the default setting.

Vn DCE Response Format

This command controls whether result codes (including call progress and negotiation progress messages) are displayed as words or their numeric equivalents. For the result code, see table 4.

V0: Displays result codes as digits.

V1: Displays result codes as text (default).

Result Codes:

OK n = 0, 1
ERROR Otherwise

Wn Result Code Option

W0: CONNECT result code reports DTE receive speed. Disable protocol result codes.

W1: CONNECT result code reports DTE receive speed. Enable protocol result codes.

W2: CONNECT result code reports DCE receive speed. Enable protocol result codes (default).

Result Codes:

OK n = 0, 1, 2
ERROR Otherwise

Xn Result Code Selection and Call Progress Monitoring

This command enables tone detection options used in the dialing process. As these functions are chosen, the modem chip set's result codes are also affected. Therefore, this command is frequently used to control the modem chip set's responses. The primary function of this control is to control the modem chip set's call response capabilities.

X0	Ext. Result Code	Dial Tone Detect	Busy Tone Detect
X1	Disable	Disable	Disable
X2	Enable	Disable	Disable
X3	Enable	Enable	Disable
X4	Enable	Disable	Enable (default)
X5	Enable	Enable	Enable
X6	Enable	Enable	Enable
X7	Enable	Enable	Enable
X8	Disable	Enable	Enable

Extended Result Codes

Disabled: Displays only the basic result codes OK, CONNECT, RING, NO CARRIER, and ERROR.

Enabled: Displays basic result codes, along with the connect message and the modem's date rate, and an indication of the modem's error correction and data compression operation.

Dial Tone Detect

Disabled: The modem dials a call regardless of whether it detects a dial tone. The period of time the modem waits before dialing is specified in register S6.

Enabled: The modem dials only upon detection of a dial tone, and disconnects the call if the dial tone is not detected within 10 seconds.

Busy Tone Detect

Disabled: The modem ignores any busy tones it receives.

Enabled: The modem monitors for busy tones.

Result Codes:

OK n = 0, 1, 2, 3, 4, 5, 6, 7
ERROR Otherwise

Yn Long Space Disconnect

Long space disconnect is always disabled.

Y0: Disable long space disconnect (default).

Y1: Enable long space disconnect (NOT SUPPORTED).

Result Codes:

OK n = 0
ERROR Otherwise

Zn Recall Stored Profile

This command instructs the modem chip set to go on-hook and restore the profile saved by the last &W command. Either Z0 or Z1 restores the same single profile.

Result Codes:

OK n = 0, 1
ERROR Otherwise

&Bn V.32 Auto Retrain

This modem always auto retrains.

&B0: Disable V.32 auto retrain (NOT SUPPORTED).

&B1: Enable V.32 auto retrain (default).

Result Codes:

OK n = 1
ERROR Otherwise

&Cn Data Carrier Detect (DCD) Control

Data Carrier Detect is a signal from the modem to your computer indicating that the carrier signal is being received from a remote modem. DCD normally turns off when the modem no longer detects the carrier signal.

&C0: The state of the carrier from the remote modem is ignored. DCD circuit is always on.

&C1: DCD turns on when the remote modem's carrier signal is detected, and off when the carrier signal is not detected (default).

Result Codes:

OK n = 0, 1
ERROR Otherwise

&Dn DTR Control

This command interprets how the modem responds to the state of the DTR signal and changes to the DTR signal.

&D0: Ignore. The modem ignores the true status of DTR and treats it as always on. This should only be used if your computer does not provide DTR to the modem.

&D1: If the DTR signal is not detected while in on-line data mode, the modem enters command mode, issues OK result code, and remains connected.

&D2: If the DTR signal is not detected while in on-line data mode, the modem disconnects (default).

&D3: Reset modem on the on-to-off DTR transition.

Result Codes:

OK n = 0, 1, 2, 3
ERROR Otherwise

&Fn Load Factory Settings

This command loads the configuration stored and programmed at the factory. This operation replaces all of the command options and the S-register settings in the active configuration with factory default values.

Note: In voice mode (AT+FCLASS=8), if the AT&F command is placed on the same line as other commands, the command line is ignored. To load factory settings in voice mode, issue AT&F by itself.

Result Codes:

OK n = 0
ERROR Otherwise

&Gn V.22bis Guard Tone Control

This command determines which guard tone, if any, to transmit while transmitting in the high band (answer mode). This command is only used in V.22 and V.22bis mode.

&G0: Guard tone disabled (default).

&G1: Sets guard tone to 550 Hz.

&G2: Sets guard tone to 1800 Hz.

Result Codes:

OK n = 0, 1, 2
ERROR Otherwise

&Jn Auxiliary Relay option

&J0: The auxiliary relay is never closed. (Default)

&J1: NOT SUPPORTED

Result Codes:

OK n = 0
ERROR Otherwise

&Kn Local Flow Control Selection

&K0: Disable flow control

&K1: Reserved

&K2: Reserved

&K3: Enable RTS/CTS (hardware) flow control (default)

&K4: Enable XON/XOFF flow control

Result Codes:

OK n = 0, 3, 4
ERROR Otherwise

&Mn Asynchronous Communications Mode

&M0: Asynchronous mode (default).

&M1: Reserved

&M2: Reserved

&M3: Reserved

&M4: Reserved

Result Codes:

OK n = 0
ERROR Otherwise

&Pn Pulse Dial Make-to-Break Ratio Selection

This Command is effective only for Japan.

&P0 39/61 make/break ratio, 10PPS

&P1 33/67 make/break ratio, 10PPS (default)

&P2 33/67 make/break ratio, 20PPS

Result Codes:

OK n = 0, 1, 2
ERROR Otherwise

&Qn Asynchronous Communications Mode

&Q0: Asynchronous Mode, buffered. Same as \N0.

&Q5: Error Control Mode, buffered (default). Same as \N3.

&Q6: Asynchronous Mode, buffered. Same as \N0.

&Q8: MNP error control mode. If an MNP error control protocol is not established, the modem will fallback according to the current user setting in S36.

&Q9: V.42 or MNP error control mode. If neither error control protocol is established, the modem will fallback according to the current user setting in S36.

Result Codes:

OK n = 0, 5, 6, 8, 9
ERROR Otherwise

&Sn Data Set Ready (DSR) Option

This command selects DSR action.

&S0: DSR always ON (default).

&S1: DSR comes on when establishing a connection and goes off when the connection ends.

Result Codes:

OK n = 0, 1
ERROR Otherwise

&Tn Self-Test Commands

This command allows the user to perform diagnostic tests on the modem. These tests can help to isolate problems when experiencing periodic data loss or random errors.

&T0 Abort. Stops any test in progress.

&T1 Local analog loop. This test verifies modem operation, as well as the connection between the modem and computer. Any data entered at the local DTE is modulated, then demodulated, and returned to the local DTE. To work properly, the modem must be off-line.

&T3 Local digital loopback test.

&T6 Remote digital loopback test. This test can verify the integrity of the local modem, the communications link, and the remote modem. Any data entered at the local DTE is sent to, and returned from, the remote modem. To work properly, the modems must be on-line with **error control disabled**.

Result Codes:

OK n = 0
CONNECT n = 1, 3, 6
ERROR Otherwise

&V View Active Configuration and Stored Profile

This command is used to display the active profiles.

For example:

```
Option Selection AT Cmd
Comm Standard Bell B
CommandCharEcho Enabled E
Speaker Volume Medium L
Speaker Control OnUntilCarrier M
Result Codes Enabled Q
Dialer Type Tone T/P
ResultCode Form Text V
ExtendResultCode Enabled X
Dial Tone Detect Enabled X
Busy Tone Detect Enabled X
LSD Action Standard RS232 &C
DTR Action Standard RS232 &D
Press any key to continue; ESC to quit.
Option Selection AT Cmd
V22b Guard Tone Disabled &G
Flow Control Hardware &K
Error Control Mode V42, MNP, Buffer \N
Data Compression Enabled %C
AutoAnswerRing# 0 S0
AT Escape Char 43 S2
CarriageReturnChar 13 S3
Linefeed Char 10 S4
```


Backspace Char 8 S5
Blind Dial Pause 2 sec S6
NoAnswer Timeout 50 sec S7
“ , “ Pause Time 2 sec S8
Press any key to continue; ESC to quit.
Option Selection AT Cmd
No Carrier Disc 2000 msec S10
DTMF Dial Speed 95 msec S11
Escape GuardTime 1000 msec S12
Data Calling Tone Disabled S35
Line Rate 33600 S37
DSVD mode Disabled -SSE
Stored Phone Numbers
&Z0=
&Z1=
&Z2=
&Z3=
OK

&Wn Store Current Configuration

This command stores certain command options and S-register values except S3, S4, and S5. The ATZ command or a power-up reset of the modem restores this profile.

Result Codes:

OK n = 0
ERROR Otherwise

&Yn Select Stored Profile for Hard Reset

This command does not change the behavior of the modem but is included for compatibility with applications that issue the &Y0 command

&Y0: Select stored profile 0 on power-up

&Y1: ERROR

Result Codes:

OK n = 0
ERROR Otherwise

&Zn=x Store Telephone Number

This command is used to store up to four dialing strings for later dialing. The format for the command is &Zn = "stored number" where n is the location 0—3 to which the number should be written. The dial string may contain up to 40 characters. The ATDS = n command dials using the string stored in location n.

Result Codes:

OK n = 0, 1, 2, 3
ERROR Otherwise

\An Select Maximum MNP Block Size

The modem will operate an MNP error corrected link using a maximum block size controlled by the parameter supplied.

\A0: 64 characters.

\A1: 128 characters.

\A2: 192 characters.

\A3: 256 characters (default).

Result Codes:

OK n = 0, 1, 2, 3
ERROR Otherwise

\Bn Transmit Break to Remote

In non-error-control mode, the modem will transmit a break signal to the remote modem with a length in multiples of 100ms according to parameter specified. The command works in conjunction with the \K command.

\B1 - \B9: Break length in 100ms units. (Default = 3.) (Non-error-control mode only.)

Result Codes:

OK If connected in data modem mode.
NO CARRIER If not connected or connected in fax modem mode.

\G Modem Port Flow Control

\G0: Modem process XON/XOFF flow control characters locally (default).

\G1: Modem passes XON/XOFF flow control characters.

Result Codes:

OK n = 0, 1
ERROR Otherwise

\J Bits/s Rate Adjusted

This command determines whether or not the negotiated connect speed of the modem forces the adjustment of the speed of the DTE to the modem's speed.

\J0: Buffer mode. Error control selected (or not) by \Nn command (default).

\J1: Force the max DCE rate to the DTE rate.

Result Codes:

OK n = 0 or 1
ERROR Otherwise

\Kn Break Control

Controls the response of the modem to a break received from the DTE or the remote modem or the \B command. The response is different in three separate cases.

The **first** case is where the modem receives a break from the DTE when the modem is operating in data transfer mode:

- \K0:** Enter on-line command mode, no break sent to the 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 break to remote modem in sequence with transmitted data. (Default.)

The **second** case is where the modem is in the on-line command state (waiting for AT commands) during a data connection, and the \B is received in order to send a break to the remote modem:

- \K0:** Clear data buffers and send break to remote modem.
- \K1:** Clear data buffers and send break to remote modem. (Same as 0.)
- \K2:** Send break to remote modem immediately.

- \K3:** Send break to remote modem immediately. (Same as 2.)
- \K4:** Send break to remote modem in sequence with data.
- \K5:** Send break to remote modem in sequence with data. (Same as 4.) (Default.)

The **third** case is where there a break is received from a remote modem during a connection:

- \K0:** Clear data buffers and send break to the DTE.
- \K1:** Clear data buffers and send break to the DTE. (Same as 0.)
- \K2:** Send a break immediately to DTE.
- \K3:** Send a break immediately to DTE. (Same as 2.)
- \K4:** Send a break in sequence with received data to DTE.
- \K5:** Send a break in sequence with received data to DTE. (Same as 4.) (Default.)

Result Codes:

OK n = 0,1, 2, 3, 4, 5
 ERROR Otherwise

\Nn Error Control Mode Selection

This command determines the type of error control used by the modem when sending or receiving data.

- \N0:** Buffer mode. No error control (same as &Q6).
- \N1:** Direct mode.
- \N2:** *MNP** or disconnect mode. The modem attempts to connect using MNP 2³/₄ error control procedures. If this fails, the modem disconnects. This is also known as MNP reliable mode.
- \N3:** V.42, *MNP*, or buffer (default).The modem attempts to connect in V.42 error control mode. If this fails, the modem attempts to connect in *MNP* mode. If this fails, the modem connects in buffer mode and continues operation. This is also known as V.42/*MNP* auto reliable mode (same as &Q5).
- \N4:** V.42 or disconnect. The modem attempts to connect in V.42 error control mode. If this fails, the call will be disconnected.
- \N5:** V.42. *MNP* or buffer (same as \N3).
- \N7:** V.42. *MNP* or buffer (same as \N3).

Result Codes:

OK n = 0, 1, 2, 3, 4,5,7
 ERROR Otherwise

\Q Local Flow Control Selection

- \Q0:** Disable flow control. Same as &K0.
- \Q1:** XON/XOFF software flow control. Same as &K4.
- \Q2:** CTS-only flow control. This is not supported and the response is ERROR.
- \Q3:** RTS/CTS to DTE (default). Same as &K3.

Result Codes:

OK n = 0, 1, 3
 ERROR Otherwise

\Rn Ring indicator signal off after the telephone call is answered (Compatibility command)

\R0: ring indicator signal is off after the telephone call is answered

Result Codes:

OK n = 0
ERROR Otherwise

\Tn Inactivity Timer

This command specifies the length of time (in minutes) that the modem will wait before disconnecting when no data is sent or received. A setting of zero disables the timer. Alternatively, this timer may be specified in register S30. This function is only applicable to buffer mode.

\T0: Inactivity timer disabled (default).

Result Codes:

OK n = 0 – 255
ERROR Otherwise

\Wn Protocol Result Code

\W0: Disable protocol result code appended to DCE speed.

\W1: Enable protocol result code appended to DCE speed (default).

\W2: Same as \W1.

Result Codes:

OK n = 0, 1
ERROR Otherwise

\Xn XON/XOFF Pass Through

\X0: Modem process XON/XOFF flow control characters locally (default).

\X1: Modem passes XON/XOFF flow control characters.

Result Codes:

OK n = 0, 1
ERROR Otherwise

-Cn Data Calling Tone

Data Calling Tone is a tone of certain frequency and cadence as specified in V.25 which allows remote Data/FAX/Voice discrimination. The frequency is 1300 Hz with a cadence of .5 s on and 2 s off.

-C0: Disabled (default).

-C1: Enabled.

Result Codes:

OK n = 0, 1
ERROR Otherwise

-V90 = <n>

Command to enable/disable V.90 and change downstream rate

-V90=0 will disable V.90

-V90=1 will enable V.90 Auto Rate (default value)

-V90=X - controls the downstream rate

-V90? - Shows the current value

-V90=? - Shows the range [0-21]

The table below shows the possible values:

"AT-V90=X"	Downstream Rate
0	V.90 disabled
1	Auto Rate (default)
2	28000 kbit/s
3	29333 kbit/s
4	30666 kbit/s
5	32000 kbit/s
6	33333 kbit/s
7	34666 kbit/s
8	36000 kbit/s
9	37333 kbit/s
10	38666 kbit/s
11	40000 kbit/s
12	41333 kbit/s
13	42666 kbit/s
14	44000 kbit/s
15	45333 kbit/s
16	46666 kbit/s
17	48000 kbit/s
18	49333 kbit/s
19	50666 kbit/s
20	52000 kbit/s
21	53333 kbit/s

%Cn Data Compression Control

This command determines the operation of V.42bis and *MNP* class 5 data compression. Online changes do not take effect until a disconnect occurs first.

%C0: V.42bis/*MNP* 5 disabled. No data compression.

%C1: V.42bis/*MNP* 5 enabled. Data compression enabled (default).

Result Codes:

OK n = 0, 1
ERROR Otherwise

%En Enable/Disable Auto-Retrain and Fallback/Fall Forward

Provides option for the modem to automatically monitor line quality to fall back when line quality is insufficient and to fall forward when line quality is sufficient.

%E0: Disable fallback/fall forward

%E1: Enable fallback, Disable fall forward

%E2: Enable fallback/fall forward (Default)

Result Codes:

OK n = 0,1, 2
ERROR Otherwise

Appendix B: S-Registers

S-registers generally affect how the AT commands perform. Contents of the registers can be displayed or modified when the modem is in command mode.

To display the value of an S-register:

TYPE: ATSn? where n is the register number.
PRESS: Enter

To modify the value of an S-register:

TYPE: ATSn = r where n is the register number, and r is the new register value.
PRESS: Enter

S0 Auto Answer Ring Number

This register determines the number of rings the modem will count before automatically answering a call. Enter 0 (zero) if you do not want the modem to automatically answer at all. When disabled, the modem can only answer with an ATA command.

Range: 0—255
Default: 0
Units: rings

S1 Ring Counter

This register, Ring Counter, is read only. The value of S1 is incremented with each ring. If no rings occur over a six second interval, this register is cleared.

Range: 0—255
Default: 0
Units: rings

S2 AT Escape Character (user defined)

This register determines the ASCII valued used for an escape sequence. The default is the + character. The escape sequence allows the modem to exit data mode and enter command mode when on-line. Values greater than 127 disable the escape sequence.

Range: 0—255
Default: 43
Units: ASCII

S3 Command Line Termination Character (user defined)

This register determines the ASCII values as the carriage return character. This character is used to end command lines and result codes.

Range: 0—127, ASCII decimal
Default: 13 (carriage return)
Units: ASCII
Note: This register value is not stored with &W command.

S4 Response Formatting Character (user defined)

This register determines the ASCII value used as the line feed character. The modem uses a line feed character in command mode when it responds to the computer.

Range: 0—127, ASCII decimal
Default: 10 (line feed)
Units: ASCII
Note: This register value is not stored with &W command.

S5 Command Line Editing Character (user defined)

This register sets the character recognized as a backspace and pertains to asynchronous only. The modem will not recognize the backspace character if it is set to a value that is greater than 32 ASCII. This character can be used to edit a command line. When the echo command is enabled, the modem echoes back to the local DTE the backspace character, an ASCII space character, and a second backspace character. This means a total of three characters are transmitted each time the modem processes the backspace character.

Range: 0—127, ASCII decimal

Default: 8 (backspace)

Units: ASCII

Note: This register value is not stored with &W command.

S6 Wait Before Dialing

This register sets the length of time, in seconds, that the modem must wait (pause) after going off-hook before dialing the first digit of the telephone number. The modem always pauses for a minimum of two seconds, even if the value of S6 is less than two seconds. The wait for dial tone call progress feature (W dial modifier in the dial string) will override the value in register S6. This operation, however, may be affected by some ATX options according to country restrictions.

Range: 2—65

Default: 2

Units: seconds

S7 Connection Completion Time-Out

This register sets the time, in seconds, that the modem must wait before hanging up because carrier is not detected. The timer is started when the modem finishes dialing (originate), or goes off-hook (answer). In originate mode, the timer is reset upon detection of an answer tone if allowed by country restriction. The timer also specifies the wait for silence time for the @ dial modifier in seconds. S7 is not associated with the W dial modifier.

Range: 1—255

Default: 50

Units: seconds

S8 Comma Dial Modifier Time

This register sets the time, in seconds, that the modem must pause when it encounters a comma (,) in the dial command string.

Range: 0—65

Default: 2

Units: seconds

S10 Automatic Disconnect Delay

This register sets the length of time, in tenths of a second, that the modem waits before hanging up after a loss of carrier. This allows for a temporary carrier loss without causing the local modem to disconnect. The actual interval the modem waits before disconnecting is the value in register S10.

Range: 1—254

Default: 20

Units: .1 seconds

S11 DTMF Dialing Speed

This register determines the dialing speed which is prefixed for each country.

Range: 50—150
Default: 95
Units: .001 seconds

S12 Escape Guard Time

This register sets the value (in 20 ms increments) for the required pause after the escape sequence (default 1 s).

Range: 0—255
Default: 50
Units: .02 seconds

S14 General Bit Mapped Options Status

Indicates the status of command options. Only bit 3 and bit 6 are used, read-only.

Bit 3		Result codes (Vn)
0	=	Numeric (V0)
1	=	Verbose (V1) (Default)
Bit 6		Pulse dial PPS selection (&Pn)
0	=	10 PPS (&p0, &p1) (Default)
1	=	20 PPS (&p2)

Default: 8 (00001000b)

S21 V.24/General Bit Mapped Options Status

Indicates the status of command options. Only bits 3, 4 and 5 are used, read-only.

Bits 3-4		DTR behavior (&Dn)
0	=	&D0 selected
1	=	&D1 selected
2	=	&D2 selected (Default)
3	=	&D3 selected
Bit 5		DCD behavior (&Cn)
0	=	&C0 selected
1	=	&C1 selected (Default)

Default: 48 (00110000b)

S22 Results Bit Mapped Options Status

Indicates the status of command options. Only bits 4, 5 and 6 are used, read only.

Bits 4-6		result codes (Xn)
0	=	X0 selected
4	=	X1 selected
5	=	X2 selected
6	=	X3 selected
7	=	X4 selected (Default)
Bit 7		Pulse dial make/break ratio (&Pn)
0	=	33/67 make/break ratio (&P1, &P2) (Default)
1	=	39/61 make/break ratio (&P0)

Default: 112 (01110000b)

S24 Timer to Control Sleep Mode

This command displays the number of seconds of inactivity (no characters sent from the DTE, no RING) in the off-line command state before the modem places itself into standby mode. A value of zero prevents standby mode. S24 is an alias for S89.

Note: If a number between 1 and 4 is entered for this register, it will set the value to 5, and the inactivity before standby will be 5 seconds. This is done for compatibility with previous products which allowed time-outs down to 1 s.

Range: 0, 5—65
Default: 10

S28 V.34 Modulation Enable/Disable

This register enables/disables V.34 modulation. 0 = disabled, 1 = enabled

Range: 0 —1
Default: 1

S30 Inactivity Timer

S30 specifies the length of time (in minutes) that the modem will wait before disconnecting when no data is sent or received. This function is only applicable to buffered mode.

Range: 0—255
Default: 0

S32 Synthetic Ring Volume

This register specifies a synthetic ring volume.

Range: 0—255 (allowed, but not meaningful)
Default: 10

S33 Synthetic Ring Frequency

This register specifies a synthetic ring frequency. There are five choices, with 0 meaning disabled.

Range: 0—5
Default: 0

S35 Data Calling Tone

Data Calling Tone is a tone of certain frequency and cadence as specified in V.25 which allows remote Data/FAX/Voice discrimination. The frequency is 1300 Hz with a cadence of .5 s on and 2 s off. 0 = disabled, 1 = enabled

Range: 0—1
Default: 0

S37 Dial Line Rate (default 0)

This register sets the maximum line data rate. In K56flex and V.90 mode, S37 controls the upstream V.34 rate.

S37 = 0 auto rate
S37 = 1 reserved
S37 = 2 1200/75 bit/s (V.23)
S37 = 3 300 bit/s
S37 = 4 reserved
S37 = 5 1200 bit/s
S37 = 6 2400 bit/s
S37 = 7 4800 bit/s
S37 = 8 7200 bit/s
S37 = 9 9600 bit/s
S37 = 10 12000 bit/s
S37 = 11 14400 bit/s
S37 = 12 16800 bit/s
S37 = 13 19200 bit/s

S37 = 14 21600 bit/s
 S37 = 15 24000 bit/s
 S37 = 16 26400 bit/s
 S37 = 17 28800 bit/s
 S37 = 18 31200 bit/s
 S37 = 19 33600 bit/s

S38 K56flex Downstream Rate

To force a particular K56flex downstream rate, use S-register S38. S38=0 disables K56flex, and may allow a more reliable V.34 connection. S38=1 default allows the modem to select the downstream rate automatically. Other values of S38 force the downstream rate, with fallback to V.34 if unsuccessful at the configured rate:

S38=0 Disable K56flex
 S38=1 Automatic rate selection (default)
 S38=2 32 kbit/s
 S38=3 34 kbit/s
 S38=4 36 kbit/s
 S38=5 38 kbit/s
 S38=6 40 kbit/s
 S38=7 42 kbit/s
 S38=8 44 kbit/s
 S38=9 46 kbit/s
 S38=10 48 kbit/s
 S38=11 50 kbit/s
 S38=12 52 kbit/s
 S38=13 54 kbit/s
 S38=14 56 kbit/s

S48 LAPM Error Control and Feature Negotiation (default 7)

S48 = 7 Negotiation enabled
 S48 = 128 Negotiation disabled; forces immediate fallback options specified in S36

The following chart lists the S36 and S48 configuration settings necessary to negotiate certain types of connections:

	S48 = 7	S48 = 128
S36 = 0, 2	LAPM or hangup	do not use
S36 = 1, 3	LAPM or async	async
S36 = 4, 6	LAPM, MNP, or hangup	MNP or hangup
S36 = 5, 7	LAPM, MNP, or async	MNP or async

S89 Timer to Control Sleep Mode

This command displays the number of seconds of inactivity (no characters sent from the DTE, no RING) in the off-line command state before the modem places itself into standby mode. A value of zero prevents standby mode.

Note: If a number between 1 and 4 is entered for this register, it will set the value to 5, and the inactivity before standby will be 5 seconds. This is done for compatibility with previous products which allowed time-outs down to 1 s.

Range: 0, 5—65
 Default: 10

S108 Network Codec Type

S108=22 m-Law
 S108=33 A-law
 S108=7 default, or any other value: Coding as specified by digital modem in V.8bis information. If an old server

does not tell its code type in V.8bis, then the client modem chooses based on its country ID. m-law regions are Japan, Taiwan, Korea, Hong Kong, North America, and Latin America. Everywhere else is A-law.

Appendix C: Modem Specifications

The NetComm InModem 56 is a "Win" modem. This means that the signal processing is done by the modem, but software on the computer controls the signal processing.

Data Protocol Standards

Protocol	Speed range (BPS)
V.90	56000-28000
K56flex	56000-28000
V.34	33600-2400
V.32bis	14400-4800
V.32	9600-4800
V22bis	2400
V.22	1200
V.21	300
Bell 212A	1200
Bell 103	300

Error Correction

- V.42 LAPM
- MNP 2-4

Data Compression

- V.42bis
- MNP Class 5

Group 3 FAX Protocol Standards

EIA Class 1 interface

Protocol	Speed Range (BPS)
V.17	14400-7200
V.29	9600-7200
V.27ter	4800-2400
V.21 Channel 2	300