V.92 V.44
56K PCI Modem

Installation Guide

ENGLISH

System Requirements

- Computer with Pentium 166 MMX or higher processor.
- Windows 98SE/2000/ME/XP and NT 4.0 Operating System.
- 20 MB Hard Disk free space or above
- Sound card for voice features
- 1 available PCI slot.
- CD-ROM drive.

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.
4. Insert the Internal 56k Modem into the PCI slot and secure with a screw in the back plane.
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) if required.
8. Turn on your computer.

Warning for Windows ME & XP User

The modem will be automatically installed modem driver under Windows ME & XP environment after you turn on the PC.

However, due to the native driver included within Windows ME & XP is not latest version, we strongly recommend you to follow up the Auto-Run procedures as below to update the modem driver.

9. As Windows 98 or 2000 starts (Windows Me, XP and NT 4 users skip this step) it will detect that new hardware has been added, and start the "Add New Hardware Wizard" Click on Cancel.

10. Insert the analog Modem communication 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".**
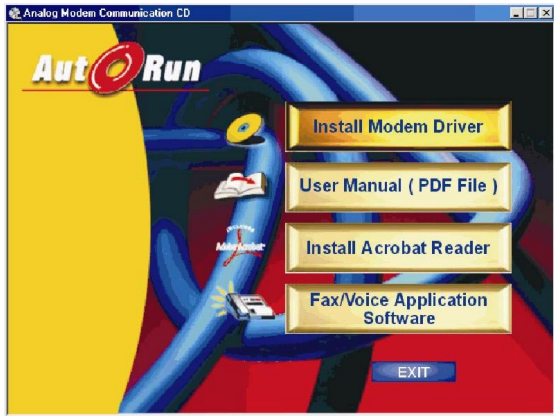
Windows 98SE and ME

The Add New Hardware wizard pop up momentarily while

the drivers are added and then the window will close automatically.

Or

Windows XP

You will be informed that **"Digital Signature Not Found".** Click on

Continued Anyway to complete the installation.

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 you computer before you can use your modem. Click OK to restart.

If you can not perform these procedures smoothly as above, please perform the file directly:
CD:\Driver\Setup.exe

Using Your Modem

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

Fax/Voice Application software that allows you to send and receive faxes directly from your PC. To install applications click on the "Fax/Voice Application Software" link on the analog Modem communication CD.

Host-Based Controller Modem
AT Command Reference Manual

Introduction

The following reference manual specifies the Agere Systems Inc. AT command set for host-based controller modem products.

Host-based controller products take advantage of the significant processing power of the host system to control modem protocol processing. Generally, host-based solutions include a PCI or a partial ISA interface to communicate directly with the host system. This powerful combination eliminates the need and cost of having a controller resident on the modem.

Agere Systems host-based controller modems support a broad base of commands for data, FAX, and voice communications. The command set includes support for the basic data commands standardized by ITU-T recommendation V.250 (05/99), class 1 FAX commands standardized by ITU-T recommendation T.31 (08/95), and voice commands standardized by ITU-T recommendation V.253 (02/98).

Additional support is included for many nonstandard commands. Most of the nonstandardized commands are designed to support modem product development and solution debugging efforts.

This document contains an overview of the supported commands, responses, and registers used by Agere Systems' host-based controller modem products. However, a particular modem may not support the entire AT command set. Some features are dependent on product application, licensing, and other contractual agreements.

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How to Use This Manual

The Agere Systems AT command set for host-based controller modems consists of commands based on data, FAX, and voice communications. The commands, presented in this manual, follow the conventions set by ITU-T recommendation V.250 (05/99) which standardized many of the common AT extensions.

This section identifies the relevant standards from V.250, and any modifications to presentation which have been made for clarity and ease of use.

The Agere Systems host-based controller command set also includes commands which have not been standardized by a specific ITU recommendation. Some of these commands support legacy systems; other commands support test and debug efforts; and still others support features which are specific to Agere Systems products.

AT Command Conventions

This document describes the AT commands and S registers associated with the Agere Systems host-based controller modem chips. Each command has a standard layout consisting of:

- A command title.
- A general command description.
- Result codes including the conditions for obtaining the result.
- A detailed command description.

The command title is formatted in large bold letters and contains the command, its parameters, and a descriptive command name. The general command description identifies in broad terms the function of the command and when to use it. The detailed command description breaks down the effect of each of the parameters values. This section may also contain supplementary information needed for proper usage of the command.

The modem or data circuit terminating equipment (DCE) returns at least one result code for each command submitted to it by the host system or data terminal equipment (DTE). The most common result codes returned by the DCE are *OK* and *ERROR*. Conditions for receiving the result code follow the listed result code.

Sample Command

E<value>—Command Echo

Use this command to instruct the modem to echo characters sent to it. When the echo feature is selected, characters sent to the modem are sent back to the host and displayed on the monitor.

Result codes:

- *OK* if <value>= 0—1.
- *ERROR* if <value>≠ 0—1.

Table 1. E<value> Commands

Command	Function
E0	Disables echo command.
E1	Enables echo command (default).

How to Use This Manual (continued)

Basic Syntax Commands

Basic syntax commands use the following format:

■ <command>[<parameter>]

where <command> is a single character or a group of characters that represent the command and <parameter> is an optional decimal number. There are some exceptions to these rules and they are noted for each command as needed. The echo command in the previous example follows the basic commands syntax structure.

Extended Syntax Commands

Extended syntax commands* have three different command formats:

■ No parameters: +<name>

■ Single parameter: +<name>[=<parameter>]

■ Multiple parameters: +<name>[=<parameter1>][,<parameterX>]

where <name> is the name of the command and begins with an alphanumeric character and <parameterX> is an optional decimal number. There are some exceptions to these rules and they are noted for each command as needed.

In addition to the standard command format, extended commands have a read and test syntax. The host system uses the read syntax to pole the modem and determine the current setting for the command parameters. Read syntax has the following format:

■ Read syntax: +<name>?

The host system uses the test syntax to pole the modem and determine the supported parameter values for the command. Test syntax has the following format:

■ Test syntax: +<name>=?

The modem responds to this command with a list of the supported parameter ranges.

* The description of extended syntax commands presented here is a simplified version of the information presented in ITU-T Recommendation V.250 (05/99). For further details, refer to section 5.4 of Recommendation V.250.

S Register Conventions

S registers contain parameters used by the modem. The presentation format for an S register is very similar to the format used for an AT command. Each S register has a standard layout consisting of:

■ S register title.

■ S register description.

■ Parameter description.

The S register title is formatted in large bold letters and begins with a capital S followed by the register number. The title also includes a descriptive name for the register. The S register description defines the parameter the S register represents.

S register parameters can have a variety of effects on the functionality of the modem. As a result the parameter description can have several forms. The most common form includes the parameter range, the parameter default, and the units used by the parameter.

How to Use This Manual (continued)

S register sample

S2—Escape Character (User-Defined)

S2 contains the decimal value of the ASCII character used as the escape character. The default value corresponds to an ASCII +. The escape sequence allows the modem to exit data mode and enter command mode when on-line. A value over 127 disables the escape process, i.e., no escape character will be recognized.

- Range: 0—255

- Default: 43 (+)

- Units: ASCII

Other Document Conventions

For the sake of clarity, the following conventions have been adopted and used throughout this document.

Item	Example	Conventions Description
AT Command	**&C\<value\>**	AT commands are all capitals followed by its parameter values in bold print.
		This document does not explicitly use the AT prefix when presenting commands. However, the AT prefix is used for all examples.
S Registers	S\<value\>	S registers have a capital S followed by the register number.
Parameters	\<value\>	Parameters or variables always use lower case lettering enclosed in brackets, \<\>.
Results Codes	*OK*	Result codes are all capitals and italics.
Examples	—	Examples use the Courier font and are shown exactly as they appear when the commands are entered into a terminal program such as *Windows** Hyperterminal.

* *Windows* is a register trademark of Microsoft Corporation.

Synchronous Mode and V.80 AT Commands

Agere Systems host-based controller modem AT command set supports synchronous command mode and most of the commands defined in ITU-T recommendation V.80, which defines in-band modem control and synchronous data modes for asynchronous host systems. Recommendation V.80 address two types of commands:

- AT commands issued in command mode.

- In-band commands transmitted in the data stream.

The in-band commands are delimited by the hexadecimal characters EM (or numerically, 19h.) Agere Systems host-based commands set support all of the AT commands identified in recommendation V.80:

- **+ES**.

- **+ESA**.

- **+IFC**.

AT Command Set

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 basic command syntax is as follows:

■ <command><parameter>.

The <command> is a combination of the attention prefix (AT) followed by the AT command. The <parameter> is a string which represents a numeric decimal value.

Any command issued is acknowledged with a response in either text or numeric values. These responses are known as result codes. The result codes are list in Table 179.

Commands may be executed while in command mode, which is entered under one of the following conditions:

■ After powerup, at the termination of a connection, or after the execution of a command other than dial or answer.

■ Upon the receipt of the escape sequence (three consecutive character matching the contents of resister S2) while in on-line mode.

■ Upon the on-to-off transition of DTR if **&D1**, **&D2**, or **&D3** has been set.

Data and General Commands

+++ Escape Sequence

An escape sequence allows the modem to exit data mode and enter on-line command mode. While in on-line command mode, AT commands are sent directly to the modem. Use the return to on-line data mode command (see O<value>—Return to On-Line Data Mode on page 17) to return to data mode.

Place a pause before and after the escape sequence to prevent the modem from interpreting the escape sequence as data. The length of the pause is set by register S12 (see S12—Escape Guard Time on page 80), the escape guard time. Register S2 (see S2—Escape Character (User-Defined) on page 78) identifies the escape sequence character.

A/—Repeat Last Command

Use this command to repeat the last AT command. The modem repeats the command currently in the command buffer. Do not use the AT prefix with this command. Do not conclude the command with a terminating character such as enter.

A—Answer

Use this command to instruct the modem to connect to the line and establish a connections with the remote modem or DCE. This command can be canceled if the modem receives a new command or character from the host system before handshaking has begun.

Result codes:

■ *CONNECT* if a connection is established and the extended result code parameter (see X<value>—Result Code Selection and Call Progress Monitoring on page 19) is equal to 0.

■ *CONNECT <text>* if a connection is established and the extended result code parameter is not equal to 0.

■ *NO CARRIER* if a connection cannot be established or the modem aborts the connection on request of the host system.

■ *OK* if the command is aborted or DTR is turned off by the host system when the data terminal ready control (see &D<value>—Data Terminal Ready (DTR) Control on page 22) is not set to 0.

■ *ERROR* if the modem is in on-line command mode when receiving the A command.

AT Commands Set (continued)

Data and General Commands (continued)

B<value>—Communication Standard Setting

Use this command to select the communication standard used by the modem.

Result codes:

■ *OK* if <value> = 0—3, 15, 16.

■ *ERROR* if <value> ≠ 0—3, 15, 16.

Table 2. B<value> Commands

Command	Function
B0	Selects 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 V.23 reverse channel (same as B3).
B3	Unselects V.23 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).

C<value>—Carrier Control

This command is supported to assure backward compatibility with communications software that issues the **C1** command. However, this modem does not support the **C0** command. The **C0** command instructs some modems not to send carrier (i.e., it puts them in receive-only mode).

Result codes:

■ *OK* if <value> = 1.

■ *ERROR* if <value> ≠ 1.

Table 3. C<value> Commands

Command	Function
C0	Transmit carrier always off (not supported).
C1	Normal transmit carrier switching (default).

D<dial string>—Dial

Use this command to instruct the modem to begin the dialing sequence. The dial string which is made up of the telephone number and dial modifiers is entered after the **D** command.

A dial string can be up to sixty characters long. Any digit or symbol may be dialed as touchtone digits. Characters such as spaces, hyphens, and parentheses are ignored by the modem and may be included in the dial string to enhance readability.

Result codes:

■ *CONNECT* if a connection is established and the extended result code parameter (see X<value>—Result Code Selection and Call Progress Monitoring on page 19) is equal to 0.

■ *CONNECT <text>* if a connection is established and the extended result code parameter is not equal to 0.

AT Command Set (continued)

Data and General Commands (continued)

D<dial string>—Dial (continued)

- *NO CARRIER* if a connection can not be established or the modem aborts the connection on request of the host system.

- *BUSY* if the W or @ modifiers are used and a busy signal is detected.

- *NO ANSWER* if the @ modifier is used and the remote ring followed by 5 seconds of silence is not detected before expiration of the connection timer (see S7—Connection Completion Time-Out on page 79).

- *NO DIALTONE* if tone detection is enabled or the W modifier is used and no dial tone is detected.

- *OK* if the command is aborted or DTR is turned off by the host system when the data terminal ready control (see &D<value>—Data Terminal Ready (DTR) Control on page 22) is not set to 0.

- *ERROR* if the modem is in on-line command mode when receiving the dial command.

Table 4. Dial Modifiers

Modifier	Function Name	Description
L	Dial the last number	Instructs the modem to dial the last number dialed. This modifier is valid only if it is the first symbol of the dial string. All consecutive characters are discarded.
P	Select pulse dialing	—
T	Select tone dialing (default)	—
W	Wait for dial tone	Instructs the modem to wait for a second dial tone before processing the dial string.
,	Dial pause	Instructs the modem to pause before processing the next character in the dial string. Register S8 (see S8—Pause Time for Comma Dial Modifier on page 80) determines the length of the pause.
!	Hook flash	Instructs the modem to go on-hook for 0.5 seconds and then return to off-hook.
@	Wait for quiet answer	Instructs the modem to 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.
;	Return to command mode	Instructs the modem to return to command mode after it has finished dialing without disconnecting the call. This modifier must be the last character in the dial string.
$	Bong tone detection	—
S=<location>	Dial from register	Instructs the modem to dial a telephone number previously stored using the &Z<location>=<dial string> command. Valid storage locations are 0—3.
^	Disable data calling tone transmission	—
V	Dial using speakerphone	Instructs the modem to switch to speakerphone mode and dial the number. Use the ATH command to disconnect the voice call.

AT Command Set (continued)

Data and General Commands (continued)

E<value>—Echo Command

Use this command to enable or disable the modem echo feature. When the echo feature is selected and the modem is in command mode, characters sent to the modem are sent back to the host and displayed on the monitor.

Result codes:

- *OK* if <value> = 0—1.
- *ERROR* if <enable> ≠ 0—1.

Table 5. E<value> Commands

Command	Function
E0	Disables echo command.
E1	Enables echo command (default).

F<value>—On-Line Data Character Echo Command

This command is supported to ensure backward compatibility with communications software that issues the **F1** command. The **F0** version of this command is not supported. This command was originally used to set echo features for the DTE.

Result codes:

- *OK* if <value> = 1.
- *ERROR* if <value> ≠ 1.

Table 6. F<value> Commands

Command	Function
F0	On-line data character echo enabled (not supported).
F1	On-line data character echo disabled.

H<value>—Hook Control

Instructs the modem to go on-hook to disconnect a call or go off-hook to make the telephone line busy.

Result codes:

- *OK* if <value> = 0—1*.
- *ERROR* if <value> ≠ 0—1.

Table 7. H<value> Commands

Command	Function
H0	Instructs the modem to go on-hook (default).
H1	Instructs the modem to go off-hook.

* ITU-T Recommendation V.250 (05/99) standardized this command. However, the standard does not include the additional functionality added with the H1 command.

AT Command Set (continued)

Data and General Commands (continued)

I<value>—Request ID Information

Use this command to display product information about the modem. In each case the information is transmitted to the host system followed by a final result code.

Result codes:

- As described in Table 8 if <value> = 0—9, 11.

- *ERROR* if <value> ≠ 0—9, 11.

Table 8. I<value> Commands

Command	Function
I0, **I3**	Returns modem identity string and driver version number.
I1	Calculates ROM checksum and displays the checksum followed by the *OK* result code on the DTE.
I2	Performs a ROM check and verifies the checksum. The modem generates an *OK* result codes unless the checksum does not verify. If there is a problem with the checksum, the modem generates an *ERROR* result code.
I4	Returns firmware version for the data pump followed by the *OK* result code.
I5	Returns the code version, board ID, subsystem vendor ID.
I6, **I7**, **I8**	Returns *OK* for compatibility.
I9	Returns country ID in English.
I11	Displays connection information as described in the following example.

The **ATI11** results are listed on two screens. To get to the second screen, the user must hit any key. The following page contains an example of the **ATI11** results.

AT Command Set (continued)

Data and General Commands (continued)

I<value>—Request ID Information (continued)

```
   Description                                  V.90 connection
   --------------                               -------------------

1  Last Connection                             V.90
2  Initial Transmit Carrier Rate               28800
3  Initial Receive Carrier Rate                49333
4  Final Transmit Carrier Rate                 28800
5  Final Receive Carrier Rate                  49333
6  Protocol Negotiation Result                 LAPM
7  Data Compression Result                     V42bis
8  Estimated Noise Level                       152
9  Receive signal Power Level (–dBm)           25
10 Transmit Signal Power Level (–dBm)          16
11 Round Trip Delay (msec)                     4
Press any key to continue; ESC to quit

12 Near Echo Level (–dBm)                      NA
13 Far Echo Level (–dBm)                       NA
14 Transmit Frame Count                        3
15 Transmit Frame Error Count                  0
16 Receive Frame Count                         0
17 Receive Frame Error Count                   0
18 Retrain by Local Modem                      0
19 Retrain by Remote Modem                     0
20 Call Termination Cause                      0
21 Robbed-Bit Signalling                       00
22 Digital Loss (dB)                           6
23 Remote Server ID                            NA

OK
```

The **ATI11** 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.

AT Command Set (continued)

Data and General Commands (continued)

I<value>—Request ID Information (continued)

The following table describes each of the results listed for the **ATI11** command.

Table 9. ATI11 Command Results

Result	Description
Last Connection	V.90, V.34, or V.32, depending on the type of connection negotiated.
Initial Transmit Carrier Rate	Initial upstream rate.
Initial Receive Carrier Rate	Initial downstream rate.
Final Transmit Carrier Rate	Current or final upstream rate.
Final Receive Carrier Rate	Current or final downstream rate.
Protocol Negotiation Result	LAPM, *MNP* *, or none, depending on V.42 negotiation.
Data Compression Result	LAPM, *MNP*, or none, depending on V.42 negotiation.
Estimated Noise Level	Mean-square error of received downstream signal. Difference between received constellation point and reference decision point. This is a dimensionless decimal number that is only valid during a call. Higher numbers are worse. There is no absolute threshold of goodness; it depends on the downstream data rate. The number varies during a call, so it is useful to sample it a few times.
Receive Signal Power Level (–dBm)	The received signal power, although labeled with units of –dBm, is only a relative measure for comparing calls to/from different locations. This value is valid only during a call.
Transmit Signal Power Level (–dBm)	Upstream transmit signal power.
Round Trip Delay (ms)	Round trip delay in milliseconds.
Near Echo Level (–dBm)	Echo levels are valid for V.34 only.
Far Echo Level (–dBm)	Echo levels are valid for V.34 only.
Transmit Frame Count	Number of LAPM frames sent upstream during this call. Count wraps around at 65535.
Transmit Frame Error Count	Number of REJ frames received at the analog client modem.
Receive Frame Count	Number of LAPM frames received by the client during this call. Count wraps around at 65535.
Receive Frame Error Count	Number of frames received in error by the client.
Retrain by Local Modem	Number of retrains or rate renegotiations requested by the modem.
Retrain by Remote Modem	Number of retrains or rate renegotiations requested by the remote modem.
Call Termination Cause	Reason for call ending. Only valid after call ends. Result codes: ■ 0 = local modem command: ATH, DTR drop. ■ 1 = remote modem: cleardown, loss of signal. ■ 2 = no answer, busy, etc. ■ 3 = training failure V.90 or V.34. ■ 4 = protocol failure if required by \N4, for example.
Robbed-Bit Signaling	For PCM connection only, a hexadecimal 6-bit pattern of T1 frames with robbed-bit signaling.
Digital Loss (dB)	For PCM connection only, the downstream digital loss.
Remote Server ID	For K56flex connection only, the V.8bis information sent by the server. Meaning is defined at the server and by convention.

* *MNP* is a registered trademark of Microcom Systems, Inc.

AT Command Set (continued)

Data and General Commands (continued)

L<value>—Speaker Volume

Use this command to set the monitor speaker volume setting when the speaker is on.

Result codes:

■ *OK* if <volume> = 0—3.

■ *ERROR* if <volume> ≠ 0—3.

Table 10. L<value> Commands

Command	Function
L0	Low volume.
L1	Low volume.
L2	Medium volume (default).
L3	High volume.

M<value>—Speaker Control

Use this command to turn the monitor speaker on or off.

Result codes:

■ *OK* if <value> = 0—3*.

■ *ERROR* if <value> ≠ 0—3.

Table 11. M<value> Commands

Command	Function
M0	Speaker is off.
M1	Speaker is on until the modem detects the carrier signal (default).
M2	Speaker is always on when the modem is off-hook.
M3	Speaker is on until the carrier is detected, except when dialing.

* ITU-T Recommendation V.250 (05/99) standardized this command. However, the standard does not include the additional functionality added with the M3 command.

N<value>—Modulation Handshake

Use this command to set the modem protocol for handling handshake negotiation at connection time if the communication speed of the remote modem is different from the speed of the local modem.

Result codes:

■ *OK* if <value> = 0—1.

■ *ERROR* if <value> ≠ 0—1.

AT Command Set (continued)

Data and General Commands (continued)

N<value>—Modulation Handshake (continued)

Table 12. N<value> Commands

Command	Function
N0	When originating or answering, set handshake to the communication standard specified by register S37 (see S37—Dial Line Rate on page 83) and the B<value> (see B<value>—Communication Standard Setting on page 10) command. Fallback is not enabled.
N1	When originating or answering, begin the handshake at the communication standard specified by S37 and the B<value> command. Fallback to a lower speed is enabled (default).

O<value>—Return to On-Line Data Mode

Use this command to exit on-line command mode and reenter on-line data mode. If the modem is not in on-line command mode when this command is received it generate an *ERROR* result code.

Result codes:

■ *CONNECT* if <value> = 0, 1, 3 and the result code and call progress monitor is set to 0 (**X0**).

■ *CONNECT <text>* if <value> = 0, 1, 3 and the result code and call progress monitor is not set to 0 (**X<value>** where n = 1—7).

■ *NO CARRIER* if the connection is not successfully resumed.

■ *ERROR* if <value> ≠ 0, 1, 3.

Table 13. O<value> Commands

Command	Function
O0	Instructs the modem to exit on-line command mode and return to data mode (see +++ Escape Sequence on page 9).
O1	Issues a retrain before returning to on-line data mode.
O3	Issues a rate renegotiation before returning to on-line data mode.

P—Select Pulse Dialing

Use this command to configure the modem for pulse dialing. All subsequent **D<dial string>** commands use pulse dialing until either the **T** command or a tone dial modifier is received by the modem. Tone dialing is the default setting. This command does not use parameters and generates an *ERROR* result code when parameters are attached to the command.

Q<value>—Result Code Control

Result codes are informational messages sent from the modem and displayed on the monitor. Basic result codes include *OK*, *CONNECT*, *RING*, *NO CARRIER*, and *ERROR*. Use the **Q<value>** command to enable or disable result code generation by the modem. If result codes are disabled and an invalid parameter value is entered, the modem does not generate an *ERROR* result code because result codes are turn off.

Result codes:

■ *OK* if <value> = 0—1.

■ *ERROR* if <value> ≠ 0—1.

AT Command Set (continued)

Data and General Commands (continued)

Q<value>—Result Code Control (continued)

Table 14. Q<value> Commands

Command	Function
Q0	Enables result codes (default).
Q1	Disables result codes.

S<register number>=<value>—S Register Control

Use this command to view or change an S-register. S-registers contain parameters used by the modem. This command has two forms, one to show the contents of the register and the other to change the contents of the register. Some registers are read only and are not affected by the **S<register number>=<value>** command. Each register has a specific function (see S-Registers on page 77).

Result codes:

- *OK* if <register number> is a valid register (see Table 163, S-Register Summary, on page 77).

- *ERROR* if <register number> is not a valid register.

Table 15. S<register number> Extended Syntax Commands

Syntax	Function
S<register number>?	Displays register contents.
S<register number>=<value>	Sets the contents of the register to <value> if the register is not read only.

T—Select Tone Dialing

Use this command to configure the modem for DTMF tone dialing. All subsequent **D<dial string>** commands use tone dialing until either the **P** command or a pulse dial modifier is received by the modem. Tone dialing is the default setting. This command does not use parameters and generates an *ERROR* result code when parameters are attached to the command.

V<value>—DCE Response Format

Host-based modems generate result codes using one of two formats. Verbose mode generates result codes in the familiar text formats using words. Numerical mode generates result codes as a number. Each result codes has a number assigned to it (see Result Codes on page 89). Use this command to switch between numerical and verbose modes. Call progress and negotiation progress messages are affected by this command.

Result codes:

- *OK* if <value> = 0—1.

- *ERROR* if <value> ≠ 0—1.

Table 16. V<value> Commands

Command	Function
V0	Displays result codes as digits. Numerical mode.
V1	Displays result codes as text (default). Verbose mode.

AT Command Set (continued)

Data and General Commands (continued)

V<value>—DCE Response Format (continued)

Table 17. V<value> Result Code Formats

Command	Result Code Format
V0	<numeric code><CR>
V1	<CR><LF><verbose code><CR><LF>

W<value>—Result Code Option

Use this command to select the modems *CONNECT* message options.

Result codes:

■ *OK* if <value> = 0—2.

■ *ERROR* if <value> ≠ 0—2.

Table 18. W<value> Commands

Command	Function
W0	*CONNECT* result code reports DTE receive speed. Disables protocol result codes.
W1	*CONNECT* result code reports DTE receive speed. Enables protocol result codes.
W2	*CONNECT* result code reports DCE receive speed. Enables protocol result codes (default).

X<value>—Result Code Selection and Call Progress Monitoring

Enables tone detection options used in the dialing process. As these functions are chosen, the modems result codes are affected. Frequently, this command is used to control the modems responses. However, the primary function of this command is to control the modems call response capabilities.

Result codes:

■ *OK* if <value> = 1—7.

■ *ERROR* if <value> ≠ 1—7.

Table 19. X<value> Commands

Command	Extended Result Codes	Dial Tone Detect	Busy Tone Detect
X0	Disabled	Disabled	Disabled
X1	Enabled	Disabled	Disabled
X2	Enabled	Enabled	Disabled
X3	Enabled	Disabled	Enabled
X4 (default)	Enabled	Enabled	Enabled
X5, X6	Enabled	Enabled	Enabled
X7	Disabled	Enabled	Enabled

AT Command Set (continued)

Data and General Commands (continued)

X<value>—Result Code and Call Progress Monitoring (continued)

Table 20. X<value> Option Description

Function	Enabled	Disabled
Ext Result Codes	Modem displays basic result codes, connect messages with data rate, and an indication of the modems error correction and data compression operations.	Modem displays the basic result codes.
Dial Tone Detect	Modem dials upon detection of a dial tone, and disconnects the call if the dial tone is not detected within 10 seconds.	Modem dials a call regardless of whether it detects a dial tone. Register S6 (see S6—Wait Time Before Dialing on page 79) contains the dial delay.
Busy Tone Detect	Modem monitors for busy tones.	Modem ignores any busy tones it receives.

Table 21. X<value> Option Result Codes

Command	Result Codes		
X0	■ *OK* ■ *CONNECT*	■ *RING* ■ *NO CARRIER*	■ *ERROR*
X1	■ *OK* ■ *CONNECT <RATE>*	■ *RING* ■ *NO CARRIER*	■ *ERROR*
X2	■ *OK* ■ *CONNECT <RATE>*	■ *RING* ■ *NO CARRIER*	■ *ERROR* ■ *NO DIALTONE*
X3	■ *OK* ■ *CONNECT <RATE>* ■ *BLACKLISTED*	■ *RING* ■ *NO CARRIER*	■ *ERROR* ■ *BUSY*
X4	■ *OK* ■ *CONNECT <RATE>* ■ *BLACKLISTED* ■ *CALL WAITING DETECTED*	■ *RING* ■ *NO CARRIER* ■ *DELAYED*	■ *ERROR* ■ *BUSY* ■ *NO DIALTONE*
X5, X6	■ *OK* ■ *CONNECT <RATE>* ■ *BLACKLISTED* ■ *CALL WAITING DETECTED*	■ *RING* ■ *NO CARRIER* ■ *DELAYED*	■ *ERROR* ■ *BUSY* ■ *NO DIALTONE*
X7	■ *OK* ■ *CONNECT*	■ *RING* ■ *NO CARRIER*	■ *ERROR*

AT Command Set (continued)

Data and General Commands (continued)

Y<value>—Long-Space Disconnect

This command is supported to ensure backward compatibility with communications software that issues the **Y0** command. The **Y1** version of this command is not supported. Long-space disconnect is always disabled.

Result codes:

- *OK* if <value> = 0.

- *ERROR* if <value> ≠ 0.

Table 22. Y<value> Commands

Command	Function
Y0	Disables long-space disconnect (default).
Y1	Enables long-space disconnect (not supported).

Z<value>—Reset and Recall Stored Profile

Use this command to make the modem go on-hook and restore the profile saved by the last **&W** command.

Note: Both **Z0** or **Z1** restore the same profile (see &W<value>—Store Current Configuration on page 28). Agere Systems host-based modems only have one stored profile.

Result codes:

- *OK* if <value> = 0, 1.

- *ERROR* if <value> ≠ 0, 1.

Table 23. Z<value> Commands

Command	Function
Z0	Reset and restore stored profile.
Z1	Reset and restore stored profile.

&B<value>—V.32 Auto Retrain

This command is supported to ensure backward compatibility with communications software that issues the **B1** command. The **B0** version of this command is not supported. Agere Systems host-based controller modems always retrain.

Result codes:

- *OK* if <value> = 1.

- *ERROR* if <value> ≠ 1.

Table 24. &B<value> Commands

Command	Function
&B0	Disable V.32 auto retrain (not supported).
&B1	Enable V.32 auto retrain (default).

AT Command Set (continued)

Data and General Commands (continued)

&C<value>—Data Carrier Detect (DCD) Control

Use this command to control the modem's response to receiving a remote modems carrier signal. Data carrier detect (DCD) is a signal from the modem to the computer indicating that the carrier signal is being received from a remote modem. The modem typically turns off DCD when it no longer detects the remote modems carrier signal.

Result codes:

■ *OK* if <value> = 0, 1.

■ *ERROR* if <value> ≠ 0, 1.

Table 25. &C<value> Commands

Command	Function
&C0	Modem ignores the state of the carrier from the remote modem. DCD remains on at all times.
&C1	Modem turns on DCD when the remote modem's carrier signal is detected and turns off DCD when the carrier signal is not detected (default).

&D<value>—Data Terminal Ready (DTR) Control

Use this command to select the modem's response to the data terminal ready (DTR) signal. The host system generates the DTR signal and supplies it to the modem.

Result codes:

■ *OK* if <value> = 0—3.

■ *ERROR* if <value> ≠ 0—3.

Table 26. &D<value> Commands

Command	Function
&D0	Modem ignores the true status of DTR and treats it as always on. This should be used only if the 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 the *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.

* ITU-T Recommendation V.250 (05/99) standardized this command. However, the standard does not include the additional functionality added with the **D3** command.

&F<value>—Restore Factory Default Configuration

Use this command to reset the modem to the configuration programmed at the factory. This operation replaces all of the command options* and S-register settings in the active configuration with factory default values.

Result codes:

■ *OK* if <value> = 0.

■ *ERROR* if <value> ≠ 0.

* There are several noted exceptions to this command and caution should be used when determining the state of the command options once this command has been executed.

AT Command Set (continued)

Data and General Commands (continued)

&F<value>—Restore Factory Default Configuration (continued)

Table 27. &F<value> Commands

Command	Function
&F0	Restores factory default configuration.

&G<guard tone>—V.22bis Guard Tone Control

Use this command to select which guard tone, if any, the modem will send while transmitting in the high band (answer mode). This command is only used in V.22 and V.22bis mode. This option is not used in North America; it is for international use only.

Result codes:

- *OK* if <guard tone> = 0—2.

- *ERROR* if <guard tone> ≠ 0—2.

Table 28. &G<guard tone> Commands

Command	Function
&G0	Disables guard tone (default).
&G1	Selects 550 Hz guard tone.
&G2	Selects 1800 Hz guard tone.

&J<value>—Auxiliary Relay Option

This command is supported to ensure backward compatibility with communications software that issues the **J0** command. The **J1** version of this command is not supported. The auxiliary relay is never closed.

Result codes:

- *OK* if <value> = 0.

- *ERROR* if <value> ≠ 0.

Table 29. &J<value> Commands

Command	Function
&J0	The auxiliary relay is never closed (default).
&J1	Not supported.

&K<value>—Local Flow Control Selection

Use this command to select a flow control method.

Result codes:

- *OK* if <value> = 0, 3, or 4.

- *ERROR* if <value> ≠ 0, 3, or 4.

AT Command Set (continued)

Data and General Commands (continued)

&K<value>—Local Flow Control Selection (continued)

Table 30. &K<value> Commands

Command	Function
&K0	Disables flow control.
&K3	Enables RTS/CTS (hardware) flow control (default).
&K4	Enables XON/XOFF flow control.

&M<value>—Asynchronous Communications Mode

This command is supported to ensure backward compatibility with communication software that issues the **&M0** command. The preferred method for changing the asynchronous communication mode is to use the **\N<error control mode>** command.

Result codes:

- *OK* if <value> = 0.

- *ERROR* if <value> ≠ 0.

Table 31. &M<value> Commands

Command	Function
&M0	Asynchronous mode (default).
&M1, &M2, &M3, &M4	Reserved.

&P<value>—Pulse Dial Make-to-Break Ratio Selection

Use this command to select the make-to-break ratio. This command is effective only for Japan.

Result codes:

- *OK* if <value>= 0—2.

- *ERROR* if <value> ≠ 0—2.

Table 32. &P<value> Commands for Domestic Versions

Command	Function
&P0	Selects 39%—61% make/break ratio at 10 pulses per second.
&P1	Selects 33%—67% make/break ratio at 10 pulses per second (default).
&P2	Selects 33%—67% make/break ratio at 20 pulses per second.

AT Command Set (continued)

Data and General Commands (continued)

&Q<value>—Asynchronous Communications Mode

This command is supported to assure backward compatibility with communication software that issues the **&Q<value>** command. The preferred method for changing the asynchronous communication mode is to use the **\N<error control mode>** command.

Result codes:

- *OK* if <value> = 0, 5, 6, 8, or 9.

- *ERROR* if <value> ≠ 0, 5, 6, 8, or 9.

Table 33. &Q<value> Commands

Command	Function
&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 fall back according to the current user setting in register S36.
&Q9	V.42 or *MNP* error control mode. If neither error control protocol is established, the modem will fall back according to the current user setting in register S36.

&S<value>—Data Set Ready (DSR) Option

Use this command to controls DSR action.

Result codes:

- *OK* if <value> = 0, 1.

- *ERROR* if <value> ≠ 0, 1.

Table 34. &S<value> Commands

Command	Function
&S0	DSR is always on (default).
&S1	DSR comes on after establishing a connection and goes off when the connection ends.

&T<value>—Self-Test Commands

Use this command to perform diagnostic tests on the modem. Each test is designed to isolate a problem location when experiencing periodic data loss or random errors.

Result codes:

- *OK* if <value> = 0.

- *CONNECT* if <value> = 1, 3, or 6.

- *ERROR* if <value> ≠ 0, 1, 3, or 6.

AT Command Set (continued)

Data and General Commands (continued)

&T<value>—Self Test Commands (continued)

Table 35. &T<value> Commands

Command	Function
&T0	Abort. Terminates the test in progress.
&T1	Initializes local analog loopback, V.56 loop 3. This test verifies modem operation, and the connection between the modem and computer. Any data entered at the local DTE is modulated, demodulated, and returned to the local DTE. Place the modem off-line before issuing this command.
&T3	Local digital loopback test, V.54 loop 2. If no connection exists, the modem returns ERROR.
&T6	Requests a remote digital loop back, V.54 loop 2 without self test. This test verifies the integrity of the local modem, the communications link, and the remote modem. Any data entered at the local DTE is sent to the remote modem. The remote modems echoes the information back to the local modem. Ensure that both modems are on-line with error control turned off before issuing this command.

&V<value>—Display Current Configuration

Use this command to display the current configuration of the modem. If nonvolatile memory is supported, the stored profiles are displayed as well.

Result codes:

- *OK* if <value> = 0.

- *ERROR* if <value> ≠ 0.

The following page contains an example of the results of the display current configuration command:

AT Command Set (continued)

Data and General Commands (continued)

&V<value>—Display Current Configuration (continued)

```
at&v0

    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
    DialTone Detect    Enabled        X
    BusyTone 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   V42bis/MNP5    %C
    AutoAnswerRing#    0              S0
    AT Escape Char     43             S2
    CarriageReturn Char 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
Press any key to continue; ESC to quit.

    Stored Phone Numbers
    --------------------
     &Z0= 6095551234
     &Z1= 6095553987
     &Z2=
     &Z3=
OK
```

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AT Command Set (continued)

Data and General Commands (continued)

&W<value>—Store Current Configuration

Use this command to store the modems command options and all S registers except S3, S4, and S5. The Z0 command or a power-up reset of the modem restores this profiles.

Result codes:

- *OK* if <value> = 0.

- *ERROR* if <value> ≠ 0.

Table 36. &W<value> Commands

Command	Function
&W0	Stores the current configuration as profile 0.

&Y<value>—Select Stored Profile for Hard Reset

This command is supported to assure backward compatibility with communications software that issues the **&Y0** command. The **&Y1** version of this command is not supported. There is only one stored profile.

Result codes:

- *OK* if <value> = 0.

- *ERROR* if <value> ≠ 0.

Table 37. &Y<value> Commands

Command	Function
&Y0	Select stored profile 0 on power-up.

&Z<storage location>=<dialing string>—Store Telephone Number

Use this command to store a dialing string. Host-based controller modems can save four dialing sting. The format for the command is **&Z<storage location> = <dialing string>**. The dial string may contain up to 34 characters. The **ATDS=<storage location>** command (see D<dial string>—Dial on page 10) dials using the stored string.

Result codes:

- *OK* if <storage location> = 0—3.

- *ERROR* if <storage location> ≠ 0—3.

\A<block size>—Select Maximum *MNP* Block Size

Use this command to instruct the modem to use an *MNP* error corrected link with a maximum block size controlled by the parameter <block size>.

Result codes:

- *OK* if <block size> = 0—3.

- *ERROR* if <block size> ≠ 0—3.

AT Command Set (continued)

Data and General Commands (continued)

\A<block size>—Select Maximum *MNP* Block Size (continued)

Table 38. \A<block size> Commands

Command	Function
\A0	64 characters.
\A1	128 characters.
\A2	192 characters.
\A3	256 characters (default).

\B<break time>—Send Break

Use this command in non-error-controlled mode. It instructs the modem to transmit a break signal to the remote modem. The minimum break length is 100 ms and the maximum break length is 900 ms. The <break time> parameter has values between one and nine with each increment representing 100 ms.

The command works in conjunction with the **\K** (see \K<value>—Set Break Control on page 30) command.

Result codes:

■ *OK* if <break time> = 1—9 and connected in data modem mode.

■ *ERROR* if <break time> ≠ 1—9.

■ *NO CARRIER* if not connected or if connected in FAX modem mode. This result is contingent upon having a valid <break time>.

\G<value>—Modem Port Flow Control

Instructs the DCE to process XON/XOFF flow control or pass XON/OFF flow control to the remote DCE.

Result codes:

■ *OK* if <value> = 0—1.

■ *ERROR* if <value> ≠ 0—1.

Table 39. \G<value> Commands

Command	Function
\G0	Modem processes XON/XOFF flow control characters locally (default).
\G1	Modem passes XON/XOFF flow control characters.

\J<value>—Adjust Bits/s Rate Control

Use this command to specify whether or not the negotiated connect speed of the modem forces the adjustment of the speed of the DTE to the modem's speed.

Result codes:

■ *OK* if <value> = 0—1.

■ *ERROR* if <value> ≠ 0—1.

AT Command Set (continued)

Data and General Commands (continued)

\J<value>—Adjust Bits/s Rate Control (continued)

Table 40. \J<value> Commands

Command	Function
\J0	Buffer mode. Error control is set or disabled with the **\N<value>** command (default).
\J1	Forces the maximum DCE rate to the DTE rate.

\K<value>—Set Break Control

Use this command to control the response of the modem to a break received from the DTE, remote modem, or the **\B<value>** command.

Result codes:

- *OK* if <value> = 0—5.

- *ERROR* if <value> ≠ 0—5.

The response is different in three separate cases. The first case is where the modem receives a break from the DTE when it is operating in data transfer mode. See Table 41.

Table 41. \K<value> Commands When Modem Is Operating in Data Transfer Mode

Command	Function
\K0, \K2, \K4	Enter on-line command mode. No break is sent to the remote modem.
\K1	Clear data buffers and send a break to the remote modem.
\K3	Send a break to the remote modem immediately.
\K5	Send a nondestructive, nonexpedited break to the remote modem (default).

The second case, shown in Table 42, occurs when the modem is in the on-line command state (waiting for AT commands) during a data connection, and the **\B<value>** command is received in order to send a break to the remote modem.

Table 42. \K<value> Commands When Modem Is On-Line Command State During Data Connection

Command	Function
\K0, \K1	Clear data buffers and send a break to the remote modem.
\K2, \K3	Send a break to the remote modem immediately.
\K4, \K5	Send a break to the remote modem in sequence with data (default).

Finally, the third case occurs when a break is received from a remote modem during a connection. These commands are shown in Table 43.

Table 43. \K<value> Commands When Break Is Received During Connection

Command	Function
\K0, \K1	Clear data buffers and send a break to the DTE.
\K2, \K3	Send a break to the DTE immediately.
\K4, \K5	Send a break to the DTE in sequence with received data (default).

AT Command Set (continued)

Data and General Commands (continued)

\N<error control mode>—Select Error Control Mode

Use this command to select the type of error control used by the modem when sending or receiving data.

Result codes:

- *OK* if <error control mode> = 0—5, or 7.

- *ERROR* if <error control mode> ≠ 0—5, or 7.

Table 44. \N<error control mode> Commands

Command	Function
\N0	Buffer mode. No error control (same as **&Q6**).
\N1	Direct mode.
\N2	*MNP* or disconnect mode. The modem attempts to connect using *MNP* 2—4 error control procedures. If this fails, the modem disconnects. This is also known as *MNP* reliable mode.
\N3	V.42, *MNP*, or buffered (default). The modem attempts to connect in V.42 error control mode. If this fails, it will attempt to connect in *MNP* mode. If this also 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 modem disconnects.
\N5	V.42, *MNP*, or buffered (same as **\N3**).
\N7	V.42, *MNP*, or buffered (same as **\N3**).

\Q<value>—Local Flow Control Selection

Use this command to set the local flow control method.

Result codes:

- *OK* if <value> = 0—1, or 3.

- *ERROR* if <value> ≠ 0—1, or 3.

Table 45. \Q<value> Commands

Command	Function
\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 (same as **&K3**) (default).

AT Command Set (continued)

Data and General Commands (continued)

\R<value>—Ring Indicator Signal Off After Answer

This command is supported to ensure backward compatibility with communications software that issues the \R0 command. The \R1 version of this command is not supported.

Result codes:

- *OK* if <value> = 0.

- *ERROR* if <value> ≠ 0.

Table 46. \R<value> Commands

Command	Function
\R0	Ring indicator signal is off after the telephone call is answered.

\T<delay time>—Inactivity Timer

Use this command to specify the delay time used by the inactivity timer. The delay time is the length of time in minutes that the modem waits during periods of inactivity before disconnecting. Periods of inactivity are defined by no data being sent or received by the DCE. To disable the inactivity timer us the **T0** command. The delay time may also be specified in register S30 (see S30—Inactivity Timer on page 82).

This function is only applicable in buffer mode.

Result codes:

- *OK* if <value> = 0—255.

- *ERROR* if <value> ≠ 0—255.

Table 47. \T<delay time> Commands

Command	Function
\T0	Inactivity timer disabled (default).
\T1—\T255	Specifies the length of time in minutes that the modem will wait before disconnecting when no data is sent or received.

\V<value>—Protocol Result Code

Use this command to enable or disable protocol result codes (see Table 179, Result Code Summary, on page 89).

Result codes:

- *OK* if <value> = 0—2.

- *ERROR* if <value> ≠ 0—2.

Table 48. \V<value> Commands

Command	Function
\V0	Disables protocol result code appended to DCE speed.
\V1	Enables protocol result code appended to DCE speed (default).
\V2	Enables protocol result code appended to DCE speed (same as **V1**).

AT Command Set (continued)

Data and General Commands (continued)

\X<value>—XON/XOFF Pass Through

Use this command to restrict the XON/XOFF flow control to the local DCE for processing or have the local DCE send the flow control characters to the remote DCE.

Result codes:

- *OK* if <value> = 0, 1.

- *ERROR* if <value> ≠ 0, 1.

Table 49. \X<value> Commands

Command	Function
\X0	Local modem process XON/XOFF flow control characters (default).
\X1	Remote modem process XON/XOFF flow control characters.

-C<value>—Data Calling Tone

Use this command to enable or disable the data calling tone. The data calling tone allows remote data, FAX, and voice discrimination as specified in V.25. The tone has a frequency of 1300 Hz and cadence of 0.5 seconds on and two seconds off.

Result codes:

- *OK* if <value> = 0, 1.

- *ERROR* if <value> ≠ 0, 1.

Table 50. -C<value> Commands

Command	Function
-C0	Disable data calling tone (default).
-C1	Enable data calling tone.

-V90=<rate>—V.90 Downstream Rate Control

Use this command to control the V.90 downstream rate. This command has three forms and is used to view the current settings, view the range of input values, enable or disable V.90, or set the downstream V.90 rate to a specific value.

Result codes:

- *OK* if <rate> = 0—21.

- *ERROR* if <rate> ≠ 0—21.

Table 51. -V90 Extended Syntax Commands

Syntax	Function
-V90=<rate>	Disables or selects the V.90 downstream rate.
-V90?	Displays the current value.
-V90=?	Displays the range of values for the variable <rate>.

AT Command Set (continued)

Data and General Commands (continued)

-V90=<rate>—V.90 Downstream Rate Control (continued)

Table 52. -V90=<value> commands

Command	Function
-V90=0	Disables V.90.
-V90=1	Selects auto rate (default).
-V90=2	Selects 28000 bits/s.
-V90=3	Selects 29333 bits/s.
-V90=4	Selects 30666 bits/s.
-V90=5	Selects 32000 bits/s.
-V90=6	Selects 33333 bits/s.
-V90=7	Selects 34666 bits/s.
-V90=8	Selects 36000 bits/s.
-V90=9	Selects 37333 bits/s.
-V90=10	Selects 38666 bits/s.
-V90=11	Selects 40000 bits/s.
-V90=12	Selects 41333 bits/s.
-V90=13	Selects 42666 bits/s.
-V90=14	Selects 44000 bits/s.
-V90=15	Selects 45333 bits/s.
-V90=16	Selects 46666 bits/s.
-V90=17	Selects 48000 bits/s.
-V90=18	Selects 49333 bits/s.
-V90=19	Selects 50666 bits/s.
-V90=20	Selects 52000 bits/s.
-V90=21	Selects 53333 bits/s.

%B—View Numbers in Blacklist

When the blacklisting option is active, this command displays the telephone numbers and status of any failed or troubled calls. The blacklisting option is associated with the country selection. Some countries have national requirements which prohibit repeat calls to the same number through automatic dialing. Blacklisting* is a method of handling failed or troubled calls encountered during automatic dialing.

Result codes:

- *<list of phone numbers and their status>* if country supports blacklisting.

- *OK* if no failed calls occur.

- *ERROR* if country selection does not support blacklisting.

* This command is only used to display the contents of the blacklist when blacklisting is active. It does not affect the functionality associated with blacklisting. For more information on how blacklisting works see the Host-Based Controller Homologation Reference Manual.

AT Command Set (continued)

Data and General Commands (continued)

%C<value>—Data Compression Control

Use this command to enable or disable V.42bis and *MNP* class 5 data compression. On-line changes do not take effect until a disconnect occurs.

Result codes:

- *OK* if <value> = 0, 1.
- *ERROR* if <value> ≠ 0, 1.

Table 53. %C<value> Commands

Command	Function
%C0	V.42bis/*MNP* 5 disabled. No data compression.
%C1	V.42bis/*MNP* 5 enabled. Data compression enabled (default).

%E<value>—Auto Fallback/Fallforward Control

This command provides the 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.

Result codes:

- *OK* if <value> = 0—2.
- *ERROR* if <value> ≠ 0—2.

Table 54. %E<value> Commands

Command	Function
%E0	Disable fallback/fallforward.
%E1	Enable fallback and disable fallforward.
%E2	Enable fallback/fallforward (default).

+A8E=<v8o>,<v8a>,<v8cf>,<v8b>—V.8 and V.8bis Operation Controls

Use this command to set the control parameters for early call negotiation through V.8 and V.8bis. **+A8E*** may also be used as an action command to reinitiate V.8 or V.8bis if an earlier attempt to use either protocol has failed.

<v8o> enables or disables DCE-controlled V.8 origination negotiation; <v8a> enables or disables DCE-controlled V.8 answer negotiation; <v8b> disables V.8 negotiation or sets it to DCE controlled or DTE controlled negotiation. The <a8cf> parameter sets the V.8 CI signal call function to the value specified. The valid range for this parameter is 0—FF, with a default of 0xC1.

Result codes:

- *OK* if <v8o> = 1, 6 and <v8a> = 1, 5 and <v8cf> = 0—FF and <v8b> = 0—2.
- *ERROR* if <v8o> ≠ 1, 6 or <v8a> ≠ 1, 5 or <v8cf> ≠ 0—FF or <v8b> ≠ 0—2.

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* ITU-T Recommendation V.251 (02/98) standardized this command. However, the host-based controller command set only includes partial support for the standard. For complete detail of the standard form of this command refer to recommendation V.251.

AT Command Set (continued)

Data and General Commands (continued)

+A8E=<v8o>,<v8a>,<v8cf>,<v8b>—V.8 and V.8bis Operation Controls (continued)

The following parameter values are supported when V.80 is enabled.

Table 55. Valid <v8o> Values

Value	Meaning
1	Enable DCE-controlled V.8 origination negotiation (default).
6	Enable DCE-controlled V.8 origination negotiation, issue +A8x indications.

Table 56. Valid <v8a> Values

Value	Meaning
1	Enable DCE-controlled V.8 answer negotiation (default).
5	Enable DCE-controlled V.8 answer negotiation, issue +A8x indications.

Table 57. Valid <v8cf> Values

Value	Meaning
1	Enable DCE-controlled V.8 origination negotiation.
6	Enable DCE-controlled V.8 origination negotiation, issue +A8x indications.

Table 58. Valid <v8b> Values

Value	Meaning
0	Disable V.8 negotiation.
1	Enable DCE-controlled V8bis negotiation (default).
2	Enable DTE-controlled V.8 negotiation.

Table 59. +A8E Extended Syntax Commands

Command	Description
+A8E=<v8o>,<v8a>,<v8cf>,<v8b>	Set the parameters used by the modem during V.8 negotiation.
+A8E?	Display the current settings for V.8 or V.8bis negotiation.
+A8E=?	Display the supported parameter values for the A8E commands.

+A8T=<signal>,<1st message>,<2nd message>,<sig en>,<msg en>,<supp delay>—Send V.8bis Signal and/ or Message

This command instructs the DCE to send a V.8bis signal or message. This command is only supported when V.80 is enabled.

Result codes:

■ *OK* if <signal> = 0—10 and <sig en> = 0, 1 and <msg en> = 0, 1 and <supp delay> = 0,1.

■ *ERROR* if <signal> ≠ 0—10 or <sig en> ≠ 0, 1 or <msg en> ≠ 0, 1 or <supp delay> ≠ 0,1.

AT Command Set (continued)

Data and General Commands (continued)

+A8T=<signal>,<1st message>,<2nd message>,<sig en>,<msg en>,<supp delay>—Send V.8bis Signal and/ or Message (continued)

Table 60. Valid <signal> Values

Value	Meaning
0	None.
1	Initiating Mre.
2	Initiating MRd.
3	Initiating CRe, low power.
4	Initiating CRe, high power.
5	Initiating CRd.
6	Initiating Esi.
7	Responding MRd, low power.
8	Responding MRd, high power.
9	Responding CRd.
10	Responding Esr.

Table 61. Valid <sig_en> Values

Value	Meaning
0	Enable detection of initiation signals (default).
1	Enable detection or responding signals.

Table 62. Valid <msg_en> Values

Value	Meaning
0	Disable detection of messages (default).
1	Enable detection of V.8bis messages.

Table 63. Valid <supp_delay> Values

Value	Meaning
0	No delay inserted (default).
1	Insert 1.5 second delay between transmitted V.8bis signal and the subsequent V.8bis message.

Table 64. +A8T Extended Syntax Commands

Command	Description
+A8T=<signal>,<1st message>,<2nd message>,<sig_en>,<msg_en>,<supp_delay>	Send a V.8bis command or message.
+A8T?	Display the current configuration for sending a V.8bis message or command.
+A8T=?	Display the supported configuration parameters.

AT Command Set (continued)

Data and General Commands (continued)

+DR<value>—Data Compression Reporting

Use this command to turn off or turn on the compression report. If the compression report is enabled, the *+DR:<type>* intermediate result code, reports the current DCE-DCE data compression type. It is issued after the error control report (+ER) and before the final result code (e.g., *CONNECT*). The format is shown in Table 66.

Result codes:

- *OK* if <value> = 0, 1.

- *ERROR* if <value> ≠ 0, 1.

Table 65. +DR Data Compression Report Value

Command	Function
+DR=0	This command turns off the compression report.
+DR=1	This command turns on the compression report.

Table 66. +DR Data Compression Reporting Intermediate Result Codes

Command	Function
+DR: NONE	Data compression not in use.
+DR: V42B	V.42 bis is in use in both directions.

Table 67. +DR Extended Syntax Commands

Command	Description
+DR=<value>	Turns the data compression report result code on or off.
+DR?	Displays the current status of the data compression report result code.
+DR=?	Displays all of the supported values for the <value> parameter.

+DS=<direction>,<compression_negotiation>—Data Compression

Use the **+DS*** command to set the data compression method used by the modem. The settings of this command overwrite the setting of a **%C<value>** command. However, it can also be overwritten by the setting of a **%C<value>** command.

The <direction> parameter sets which directions use the compression method. Agere Systems host-based controller modems either use compression in both direction or no compression at all. The <compression negotiation> parameter tells the modem to disconnect if V.42 negotiations fail. The host-based controller AT command set does not support the disconnect feature when V.42 negotiation fails.

Result codes:

- *OK* if <direction> = 0, 3 and <compression negotiation> = 0.

- *ERROR* if <direction> ≠ 0, 3 or <compression negotiation> ≠ 0.

* ITU-T Recommendation V.250 (05/98) standardized this command. The standard version includes two additional parameters that are not included in the host-based command set. For more information on the standardized version of this command, refer to ITU-T recommendation V.250.

AT Command Set (continued)

Data and General Commands (continued)

+DS<direction>,<compression negotiation>—Data Compression (continued)

Table 68. +DS Command

Command	Method
+DS=3,0	V.42bis on both directions. Do not disconnect if it fails to negotiate it (default).
+DS=0,0	No compression.

Table 69. +DS Extended Syntax Commands

Command	Description
+DS=<direction>,<compression negotiation>	Select compression direction.
+DS?	Display the current compression configuration.
+DS=?	Display the support compression setting.

+EB=<break selection>,<timed>,<default length>—Break Handling In Error Control Operation

Use this command to set the modem behavior when a BREAK is received. Table 70 lists the valid break selection values. The valid values for default length are 10—90 in steps of 10, with a default for this field of 30. Each increment of the <default length> parameter indicates 10 ms of time.

Result codes:

■ *OK* if <break selection> = 0—3 and <timed>* = 0 and <default length>[†] = 10—90 in increments of 10.

■ *ERROR* if <break selection> ≠ 0—3 or <timed> ≠ 0 or <default length> ≠ 10—90 in increments of 10.

Table 70. Valid break_selection Values

Value	Meaning
0	Ignore break (default).
1	Nonexpedited, nondestructive.
2	Expedited, nondestructive.
3	Expedited, destructive.

Table 71. +EB Extended Syntax Commands

Command	Description
+EB=<break selection>,<timed>, <default length>	Sets the modem behavior when a break is received.
+EB?	Displays the current break selection settings.
+EB=?	Displays the supported break selection settings.

---

* ITU-T Recommendation V.250 (05/98) standardized this command. The <timed> parameter in the recommendation allows for V.42 L-SIG-NALs to indicate a break length. The host-based controller AT command set does not support this option. For more information on the standardized version of this command, refer to ITU-T recommendation V.250.

† ITU-T Recommendation V.250 (05/98) standardized this command. The <default length> parameter in the recommendation allows for break length from 10 ms to 2.54 s. The host-based controller AT commands set only supports break lengths between 10 ms and 90 ms. For more information on the standardized version of this command, refer to ITU-T recommendation V.250.

AT Command Set (continued)

Data and General Commands (continued)

+ER=<value>—Error Control Reporting

Use this command to turn on or turn off the error control report. If the compression report is enabled, the *+ER:<type>* intermediate result code reports the current DCE-DCE error control type. It is issued after the determination of the error control protocol and before the final result code (e.g., *CONNECT*). Specifically, the **+ER** intermediate result code is issued after the modulation report (**+MCR** and **+MRR**) and before the data compression report (**+DR**).

The compression report format is shown in Table 73.

Result codes:

- *OK* if <value> = 0, 1.

- *ERROR* if <value> ≠ 0, 1.

Table 72. +ER Control Reporting Commands

Command	Function
+ER=0	This command turns off the error control report (default).
+ER=1	This command turns on the error control report.

Table 73. +ER Error Control Reporting Intermediate Result Codes

Command	Function
+ER: NONE	Data compression not in use.
+ER: LAPM	V.42 LAPM protocol is in use.
+ER: ALT	V.42 alternative protocol is in use.

Table 74. +ER Extended Syntax Commands

Command	Description
+ER=<value>	Turn on or turn off error control reporting.
+ER?	Display the current setting for error control reporting.
+ER=?	Display the supported error control reporting settings (0, 1).

+ES=<orig rqst>,<orig fbk>,<ans fbk>—Error Control Selection

Use this command to select the error correction mode. If the modem is operated in V.80 mode (synchronous buffered mode), and **+ES=,,8,** the **+ES?** will always return **+ES: 6,,8**. The setting of this command overwrites the **\N** command. However, the **+ES** command is overwritten by the setting on a **\N** command.

Result codes:

- *OK* if one of the combinations shown in Table 75.

- *ERROR* all other parameter combinations.

AT Command Set (continued)

Data and General Commands (continued)

+ES=<orig rqst>,<orig fbk>,<ans fbk>—Error Control Selection (continued)

Host-based controller modems support the following parameter combinations.

Table 75. +ES Combinations

Combination	Mode
+ES=1,0,1	Buffered mode.
+ES=0,1,0	Direct mode.
+ES=4,4,6	*MNP* or disconnect mode.
+ES=3,3,5	LAPM or disconnect mode.
+ES=4,0,6	*MNP* or buffered mode.
+ES=3,0,2	LAPM, *MNP,* or buffered mode (default).
+ES=2,0,2	LAPM or buffered mode.
+ES=3,2,4	LAPM, *MNP,* or disconnect mode.
+ES=,,8	V.42 sync buffer mode (V.80 enabled).
+ES=6,,8	V.42 sync buffer mode (V.80 enabled).

Table 76. +ES Extended Syntax Commands

Command	Description
+ES=<value>	Selects the modem error control method.
+ES?	Displays the current error control settings.
+ES=?	Displays the supported error control settings.

+ESA=<trans idle>,<frame idle>,<framed un ov>,<hd auto>,<crc type>,<nrzi en>,<syn1>—Set Up Error Control Parameters

Use this command to set the control parameters for the DCE in Synchronous Access Mode (see Synchronous Mode and V.80 AT Commands on page 8). Agere Systems host based modems do not use the <framed un ov>, the <hd auto> and <syn1> parameters.

Result codes:

■ *OK* if <trans idle> = 0 and <frame idle> = 0 and <crc type> = 0, 1 and <nrzi en> = 0.

■ *ERROR* if <trans idle> = 0 or <frame idle> = 0 or <crc type> = 0, 1 or <nrzi en> = 0.

Table 77. +ESA Commands

Command	Meaning
+ESA=0,,,,0,0,,	Disables CRC generation and checking.
+ESA=0,,,,1,0,,	Causes the DCE to generate a 16-bit CRC in the transmit direction in framed sub-Mode and check the CRC in the receive direction.

AT Command Set (continued)

Data and General Commands (continued)

+ESA=<trans idle>,<frame idle>,<framed un ov>,<hd auto>,<crc type>,<nrzi en>,<syn1>—Set Up Error Control Parameters (continued)

Table 78. Valid <crc type> Values

Value	Meaning
0	Disable CRC generation and checking.
1	In framed submode, the 16-bit CRC specified in V.42 is generated by the DCE in the transmit direction and checked by the DCE in the receive direction.

+ESR=<value>—Selective Repeat

Agere Systems host-based controller modems do not use the selective reject mode. This command initiates the selective reject mode and only the **+ESR=0*** form of this command is supported.

Result codes:

■ *OK* if <value> = 0.

■ *ERROR* if <value> ≠ 0.

Table 79. +ESR Extended Syntax Commands

Command	Description
+ESR=<value>	Turns on or turns off the selective reject mode.
+ESR?	Displays the current settings for the selective reject mode.
+ESR=?	Displays the supported settings for the selective reject mode.

* ITU-T Recommendation V.250 (05/98) standardized this command. For further detail on the standard version of this command, see recommendation V.250.

+ETBM=<pending_TD>,<pending_RD>,<timer>—Call Termination Buffer Management

Use this command to set the behavior of the modem upon call termination. Only **+ETBM=0,0,0**[†] is a valid combination. This means that the modem will discard all the buffered data when the call is terminated.

Result codes:

■ *OK* if <pending TD> = 0 and <pending RD> = 0 and <timer> = 0.

■ *ERROR* if <pending TD> ≠ 0 or <pending RD> ≠ 0 or <timer> ≠ 0.

Table 80. +ETBM Extended Syntax Commands

Command	Description
+ETBM=<value>	Sets the modem behavior upon call termination.
+ETBM?	Displays the current settings for call termination behavior.
+ETBM=?	Displays the supported settings for call termination behavior.

† ITU-T Recommendation V.250 (05/98) standardized this command. For further detail on the standard version of this command, see recommendation V.250.

AT Command Set (continued)

Data and General Commands (continued)

+FCLASS=<value>—Service Class Indication

Use this command to set the modem service class. The service class determines if the modem is in data, FAX, or voice mode. The **+FCLASS** command is an extended syntax command.

Result codes:

- *OK* if <value> = 0, 1, 8.

- *ERROR* <value> ≠ 0, 1, 8.

Table 81. +FCLASS Values

Commands	Description
+FCLASS=0	Selects the modems data mode.
+FCLASS=1	Selects the modems class 1 fax mode.
+FCLASS=8	Selects the modems voice mode.

Table 82. +FCLASS Extended Syntax Commands

Command	Description
+FCLASS=<value>	Selects the class or mode of the modem.
+FCLASS?	Displays the current class or mode.
+FCLASS=?	Displays the available parameter values for the +FCLASS command.

+GCI=<T.35 country code>—Country of Installation

Use this command to set the modem country code. ITU-T Recommendation T.35 defines the country codes and the country names. Table 184 on page 102 has a complete list of the T.35 country codes.

Result codes:

- *OK* if <T.35 country code> = valid country code as defined by Table 184.

- *ERROR* if <T.35 country code> ≠ valid country code as defined by Table 184.

Table 83. +GCI Extended Syntax Commands

Command	Description
+GCI=<T.35 country code>	Set the country code.
+GCI?	Display the current country code setting.
+GCI=?	Display all supported country code settings.

+GMI—Manufacturer Identification

+GMI is an extended syntax command. It returns the modem manufacturer and either the *OK* or *ERROR* result code. The **+GMI=?** syntax returns an *ERROR* result code. The other two forms return an *OK* result code.

Result codes:

- *OK* when using the **+GMI** or **+GMI?** syntax.

- *ERROR* when using the **+GMI=?** syntax.

AT Command Set (continued)

Data and General Commands (continued)

+GMI—Manufacturer Identification (continued)

Table 84. +GMI Extended Syntax Commands

Command	Description
+GMI, **+GMI?**	Display modem manufacturer and generates an *OK* result code.
+GMI=?	Display modem manufacturer and generates an *ERROR* result code.

+GMM—Modem Identification

This command is supported to assure backwards compatibility with communication software that issues the **+GMM** command. The **+GMM** command returns the string "H.324 video ready rev 1.0".

Result codes:

■ *OK* when using the **+GMM** or **+GMM?** syntax.

■ *ERROR* when using the **+GMM=?** syntax.

Table 85. +GMM Extended Syntax Commands*

Command	Description
+GMM, **+GMM?**	Displays "H.324 video ready rev 1.0".

* ITU-T recommendation V.250 standardized this command. The standard version did not include the extended syntax version included with the host-based version of the +GMM commands. For more information see recommendation V.250.

+GMR—Request Revision Information

This command returns the version of the modem code.

Result codes:

■ *OK* when using the **+GMR** or **+GMR?** syntax.

■ *ERROR* when using the **+GMR=?** syntax.

Table 86. +GMM Extended Syntax Commands

Command	Description
+GMR, **+GMR?**	Display the version and revision information followed by the *OK* result code.
+GMR=?	Display the version and revision information followed by the *ERROR* result code.

AT Command Set (continued)

Data and General Commands (continued)

+IFC=<DCE_by_DTE>, <DTE_by_DCE>—DTE-DCE Local Flow Control

Use this command to select the local flow control method. The input parameters of the +IFC command overwrite the settings of the **\Q** and **\X<value>** commands. The reverse is also true. By modifying the settings of the **\Q** and **\X<value>** commands, the **+IFC** command parameters are overwritten.

Result codes:

- *OK* if <DCE by DTE> = 0—3 and <DTE by DCE> = 0—2.

- *ERROR* if <DCE by DTE> ≠ 0—3 or <DTE by DCE> ≠ 0—2.

The following combinations are accepted by the modem.

Table 87. +IFC Commands

Command	Data Format
+IFC=0,0	No flow control.
+IFC=1,1	Software flow control.
+IFC=2,2	Hardware flow control (default).
+IFC=3,1	Software flow control with XON/OFF characters passed on to the remote DCE.

Table 88. +IFC Extended Syntax Commands

Command	Description
+IFC=<DCE by DTE>,<DTE by DCE>	Set the local flow control method.
+IFC?	Display the current local flow control settings.
+IFC=?	Display the supported local flow control parameter settings.

+ILRR=<value>—DTE-DCE Local Rate Reporting

Use this command to display or hide the local rate report result code. If the rate report is enabled, the reported <rate> is the current DTE-DCE rate. The rate report is an intermediate result code. It is transmitted after any modulation, error control, or data compression reports, and before the final result code (e.g., *CONNECT*).

Result codes:

- *OK* if <value> = 0, 1.

- *ERROR* if <value> ≠ 0, 1.

Table 89. +ILRR Commands

Command	Function
+ILRR=0	Disables the local rate report (default).
+ILRR=1	Enables the local rate report.

AT Command Set (continued)

Data and General Commands (continued)

+ILRR=<value>—DTE-DCE Local Rate Reporting (continued)

Table 90. +ILRR Extended Syntax Commands

Command	Description
+ILRR=<value>	Select or deselect transmission of the rate report result code.
+ILRR?	Display the current status of the rate report result code.
+ILRR=?	Display the supported parameter values for DTE-DCE local rate reporting.

+IPR=<DTE rate>—Fixed DTE Rate

Use this command to set the DTE to DCE transmission rate. There are twelve fixed transmission rates used by the DTE to communicate with the DCE. This commands select one of the predefined transmission rates. If a rate is entered which is not supported, the transmission rate defaults to the next lower rate.

Result codes:

- *OK* for all values of <DTE rate>.

Table 91. +IPR Commands

Command	DTE Rate
+IPR=0	Automatic rate detection (default).
+IPR=110	100 bits/s.
+IPR=300	300 bits/s.
+IPR=600	600 bits/s.
+IPR=1200	1200bits/s.
+IPR=2400	2400 bits/s.
+IPR=4800	4800 bits/s.
+IPR=9600	9600 bits/s.
+IPR=14400	14400 bits/s.
+IPR=19200	19200 bits/s
+IPR=38400	38400 bits/s.
+IPR=57600	57600 bits/s.
+IPR=115200	115200 bits/s.

Table 92. +IPR Extended Syntax Commands

Command	Description
+IPR=<DTE rate>	Set the DTE to DCE transmission rate.
+IPR?	Display the current DTE to DCE transmission rate.
+IPR=?	Display all supported transmission rates.

AT Command Set (continued)

Data and General Commands (continued)

+ITF=<off>,<on>—Transmit Flow Control Threshold

Use this command to set the flow control thresholds. The <off> parameter represent the off signal threshold in octets. When this threshold is reached the DCE generates a flow off signal. The <on> parameter represents the on signal threshold in octets. When the volume of data resident on the DCE goes below this value the DCE generates a flow on signal.

ITU-T recommendation V.80 defines an additional parameter (<report period>) for the **+ITF** command. This parameter is only used in synchronous mode and is not supported in the host-based commands set.

Result codes:

- *OK* if <off> = 0—3 and <on> = 0—2.

- *ERROR* if <off> ≠ 0—3 or <on> ≠ 0—2.

Table 93. +ITF Extended Syntax Commands

Command	Description
+ITF=<off>,<on>	Sets the flow control thresholds.
+ITF?	Display the current value of the flow control thresholds.
+ITF=?	Display the supported values of the flow control thresholds.

+MR=<value>—Modulation Reporting Control

Use this command to hide or display the modulation report. When the modulation report is enabled, the DCE transmits the *+MRR: <rate>, <rx_rate>* and the *+MCR:<carrier>* intermediate result codes to the DTE. The <carrier> reported is the current modulation, for example, V.34. The <rate> reported is the transmit rate in bits per second or is zero if negotiation fails. The <rx_rate> is the receive channel rate and is only reported when different receive and transmit rates have negotiated.

The intermediate result codes are transmitted after the modulation and the rate have been determined and before any error control or data compression reports or the final result code (e.g., *CONNECT*) is transmitted.

Result codes:

- *OK* if <value> = 0, 1.

- *ERROR* if <value> ≠ 0, 1.

Table 94. +MR Commands

Command	Function
+MR=0	This command turns off the modulation report.
+MR=1	This command turns on the modulation report.

Table 95. +MR Extended Syntax Commands

Command	Description
+MR=<value>	Select or deselect transmission of the modulation result codes.
+MR?	Display the current status of the modulation report result code.
+MR=?	Display the supported parameter values for modulation rate reporting.

AT Command Set (continued)

Data and General Commands (continued)

+MS=<carrier>,<automode>,<0>,<max rate>,<0>,<max rx rate>—Modulation Selection

Use this command to set the modems modulation and its associated parameters. Leave blank any optional parameter whose value is not going to change. The valid values for the <carrier> parameter are given in Table 96. The valid values for <max rate> are given in Table 98, and the valid values for <max rx rate> are given in Table 100.

Result codes:

- *OK* if <automode> = 0, 1 and <max rate> = 0, 300—33600 and <max rx rate> = 0, 300—56000 and carrier is equal to one of the entries in Table 96.

- *ERROR* if <automode> ≠ 0, 1 or <max rate> ≠ 0, 300—33600 or <max rx rate> ≠ 0, 300—56000 or carrier is not equal to one of the entries in Table 96.

Table 96. Valid <carrier> Values

Value	Meaning
V90	V.90
V34	V.34
V32	V.32
V32B	V.32bis
V22	V.22
V.22B	V.22bis
V23C	V.23, constant carrier, asymmetric FDM
V21	V21
Bell212A	Bell 212A*
Bell103	Bell 103*

Automatic modulation negotiation is enabled or disabled by <automode>. However, if values are specified for the <max rate> and the <max rx rate> parameters, automatic rate selection will be disabled and the modem will attempt to connect at the specified rates.

Table 97. Valid <automode> Values

Value	Meaning
0	Disables.
1	Enabled (default).

The <max rate> specifies the highest connections rate for the DCE.

Table 98. Valid <max rate> Range

Value	Meaning
0	Determined by modulation selected in <carrier> (default).
300—33600	Value limited by modulation selected in <carrier>.

* This feature is product dependant. Check the product data sheet to determine if this feature is included.

AT Command Set (continued)

Data and General Commands (continued)

+MS=<carrier>, <automode>, <0>, <max rate>, <0>, <max rx rate>—Modulation Selection (continued)

Table 99. Valid <max rate> for each <carrier>

Value	Meaning
V90,V34	2400 bits/s—33600 bits/s in steps of 2400 bits/s.
V32bis	4800 bits/s—19200 bits/s in steps of 2400 bits/s.
V32	4800 bits/s—14400 bits/s in steps of 2400 bits/s.
V22bis	2400 bits/s.
V22	2200 bits/s.
V23C, Bell212A	1200 bits/s.
V.21, Bell103	300 bits/s.

The <max rx rate> specifies the rate limit used in the receive direction.

Table 100. Valid <max rx rate> Values

Value	Meaning
0	Determined by modulation selected in <carrier> (default).
75—56000	Value limited by modulation selected in <carrier>.

Table 101. Valid <max rx rate> Range by <carrier>

Value	Meaning
V90	28000 bits/s—56000 bits/s in steps of 1333 bits/s.
K56	32000 bits/s—56000 bits/s in steps of 2000 bits/s.
V34	2400 bits/s—33600 bits/s in steps of 2400 bits/s.
V32bis	4800 bits/s—19200 bits/s in steps of 2400 bits/s.
V32	4800 bits/s—14400 bits/s.
V22bis	240 bits/s.
V22	2200 bits/s.
V23C,Bell212A	1200 bits/s.
V21,Bell103	300 bits/s.

Table 102. +MS Extended Syntax Commands

Command	Description
+MS=<carrier>,<automode>,<min rate>, <max rate>,<,min rx rate>,<max rx rate>	Select or deselect transmission of the rate report result code.
+MS?	Display the current status of the rate report result code.
+MS=?	Display the supported parameter values for DTE-DCE local rate reporting.

Once a modulation is selected by the **+MS** command, the auto rate in both directions and the auto mode will be activated unless either parameter, <max rate> or <max rx rate> is specified by the same command.

The settings of this command overwrite the settings of S28, S37, S38, S109. Likewise, changes to these registers overwrite the settings of the **+MS** command.

AT Command Set (continued)

FAX Commands

The Agere Systems host-based controller modems support FAX commands conforming to *EIA** standard 578 and ITU-T recommendation T.31 (08/95) which outlines class 1 asynchronous facsimile under DCE control.

The nature of FAX communication is for a fascimile machine to transmit a graphic image to a receiving fascimile machine. As a result most of the commands in this section are not designed for interaction with an end user.

The commands still generate a result code to acknowledge reception and the action taken on a command. However in many cases the command will generate an *ERROR* result code if it is not connected to a sending or receiving fascimile device.

+FAA=<value>—Adaptive Answer

A service class 1 FAX DCE may have the ability to answer as a data modem DCE or as a FAX DCE. It may also be able to change from class 1 FAX mode to data modem operation in response to an incoming call.

Note: This command controls automatic switching from class 1 to class 0 for call answering only. It does not affect call origination, switching to class 1 from other classes, or switching to classes other than class 0.

- *OK* if <value> = 0, 1.
- *ERROR* if <value> ≠ 0, 1.

Table 103. +FAA Commands

Command	Function
+FAA=0	The DCE will answer only as a class 1 FAX device. No automatic switching of service class will occur based on the calling device type (default).
+FAA=1	The DCE can answer and automatically determine whether to answer as a facsimile DCE or as a data modem.

Table 104. +FAA Extended Syntax Commands

Command	Description
+FAA=<value>	Enables or disables adaptive answer.
+FAA?	Display the current setting for adaptive answer.
+FAA=?	Display the available parameter values for the **+FAA** command.

+FCLASS=1—Enter Class 1 FAX Mode

The **+FCLASS=1** command (see +FCLASS=<value>—Service Class Indication on page 43) puts the modem in class 1 FAX mode.

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* *EIA* is a registered trademark of Electronics Industries Association.

AT Command Set (continued)

FAX Commands (continued)

+FLO=<value>—Flow Control Selection

Use this command to set the type of flow control used to transmit data between the host and the modem. This command can enable hardware or software flow control. It can also disable all flow control.

Result codes:

- *OK* if <value> = 0—2.

- *ERROR* if <value> ≠ 0—2.

Table 105. +FLO Commands

Command	Function
+FLO=0	Disables flow control.
+FLO=1	Enables software flow control.
+FLO=2	Enables hardware flow control.

Table 106. +FLO Extended Syntax Commands

Command	Description
+FLO=<value>	Sets the flow control mode of operation.
+FLO?	Display the current flow control mode.

+FMI?—Manufacturer Identification

This command returns one of the following results, depending on the product:

- Lucent Data/FAX.

- Lucent Data/FAX/Voice.

Result codes:

- This command always yields an *OK* result code.

Table 107. +FMI Extended Syntax

Command	Description
+FMI, **+FMI?**	Displays the modem manufacturer identification.

AT Command Set (continued)

FAX Commands (continued)

+FMM?—Product Identification

This command returns one of the following results, depending on the product:

■ Data/FAX.

■ Data/FAX/Voice.

Result codes:

■ This command always yields an *OK* result code.

Table 108. +FMM Extended Syntax

Command	Description
+FMM, **+FMM?**	Displays the modem product identification.

+FMR?—Version/Revision Information

This command returns the modem version code.

Result codes:

■ This command always yields an *OK* result code.

Table 109. +FMR Extended Syntax

Command	Description
+FMR, **+FMR?**	Displays the modem product identification.

+FPR=<value>—Select FAX Port Rate

This command sets the DTE to DCE FAX port rate. The **+FPR** command is supported to assure compatibility with communications software that issues the this command. Host-based controller modems do not maintain the traditional relationship between the DTE and DCE that this command was designed to control. In many cases the data pump interfaces with the host system via an ISA or PCI bus.

Result codes:

■ This command always yields and *OK* result code.

Table 110. +FPR Commands

DTE Command*	Description
+FPR=0	Select automatic rate detection.
+FPR=1	Set DTE-DCE to 2400 bits/s.
+FPR=2	Set DTE-DCE to 4800 bits/s.
+FPR=4	Set DTE-DCE to 9600 bits/s.
+FPR=8	Set DTE-DCE to 19200 bits/s.
+FPR=10	Set DTE-DCE to 38400 bits/s.
+FPR=18	Set DTE-DCE to 57600 bits/s.

* The listed values do not have any significance for host-based controller modems. The values listed here are only useful in controller based systems.

AT Command Set (continued)

FAX Commands (continued)

+FPR=<value>—Select FAX Port Rate (continued)

Table 111. +FPR Extended Syntax

DTE Command	Description
+FPR=<value>	Does not perform any particular action in host-based controller systems.
+FPR? *	Does not perform any particular action in host-based controller systems.

+FRH=<mod>—Receive HDLC Data with <mod> Carrier

Use the **+FRH** command to instruct the modem to receive data framed in the HDLC protocol at the modulation defined by Table 112.

Result codes:

- *CONNECT* if <mod> = 3, 24, 48, 72—74, 96—98, 121, 122, 145, 146 and the connection is established. This is an intermediate result code.

- *OK* if <mod> = 3, 24, 48, 72—74, 96—98, 121, 122, 145, 146 and the connection is established. This is a final result code.

- *ERROR* if <mod> ≠ 3, 24, 48, 72—74, 96—98, 121, 122, 145, 146 or the connection is not established. This is a final result code.

Table 112. +FRH Commands

Command	Modulation	Speed
+FRH=3	V.21 channel 2.	300 bits/s.
+FRH=24	V.27ter.	2400 bits/s.
+FRH=48	V.27ter.	4800 bits/s.
+FRH=72	V.29.	7200 bits/s.
+FRH=96	V.29.	9600 bits/s.
+FRH=73	V.17.	7200 bits/s.
+FRH=74	V.17 (short train).	7200 bits/s.
+FRH=97	V.17.	9600 bits/s.
+FRH=98	V.17 (short train).	9600 bits/s.
+FRH=121	V.17.	12000 bits/s.
+FRH=122	V.17 (short train).	12000 bits/s.
+FRH=145	V.17.	14400 bits/s.
+FRH=146	V.17 (short train).	14400 bits/s.

Table 113. +FRH Extended Syntax Commands

Command	Description
+FRH=<mod>	Sets the FAX receive rate and frames the data using HDLC protocol.
+FRH=?	Display all available parameter values for the **+FRH** command.

AT Command Set (continued)

FAX Commands (continued)

+FRM=<mod>—Receive Data

Use the **+FRM** command to instruct the modem to received data using the modulation defined by Table 114.

Result codes:

- *CONNECT* if <mod> = 3, 24, 48, 72—74, 96—98, 121, 122, 145, 146 and the connection is established. This is an intermediate result code.

- *OK* if <mod> = 3, 24, 48, 72—74, 96—98, 121, 122, 145, 146 and the connection is established. This is a final result code.

- *ERROR* if <mod> ≠ 3, 24, 48, 72—74, 96—98, 121, 122, 145, 146 or the connection is not established. This is a final result code.

Table 114. +FRM Commands

Command	Modulation	Speed
+FRM=3	V.21 channel 2.	300 bits/s.
+FRM=24	V.27ter.	2400 bits/s.
+FRM=48	V.27ter.	4800 bits/s.
+FRM=72	V.29.	7200 bits/s.
+FRM=96	V.29.	9600 bits/s.
+FRM=73	V.17.	7200 bits/s.
+FRM=74	V.17 (short train).	7200 bits/s.
+FRM=97	V.17.	9600 bits/s.
+FRM=98	V.17 (short train).	9600 bits/s.
+FRM=121	V.17.	12000 bits/s.
+FRM=122	V.17 (short train).	12000 bits/s.
+FRM=145	V.17.	14400 bits/s.
+FRM=146	V.17 (short train).	14400 bits/s.

Table 115. +FRM Extended Syntax Commands

Command	Description
+FRM=<mod>	Sets the FAX receive rate.
+FRM=?	Display all available parameter values for the **+FRM** command.

+FRS=<value>—Receive Silence

+FRS=<value> causes the modem to listen and wait for <value> ∗ 10 ms of silence to be detected on the line. For example, <value> = 5 results in a 50 ms interval. At the end of this period the modem responds with the *OK* result code. <value> has a range of 0—255.

Result codes:

- *OK* if <value> = 0—255.

- *ERROR* if <value> ≠ 0—255.

AT Command Set (continued)

FAX Commands (continued)

+FTH=<mod>—Transmit HDLC Data with <mod> Carrier

The **+FTH=<mod>** command causes the modem to transmit data framed in the HDLC protocol at the modulation defined by Table 116.

Result codes:

- *CONNECT* if <mod> = 3, 24, 48, 72—74, 96—98, 121, 122, 145, 146 and the connection is established. This is an intermediate result code.

- *OK* if <mod> = 3, 24, 48, 72—74, 96—98, 121, 122, 145, 146 and the connection is established. This is a final result code.

- *ERROR* if <mod> ≠ 3, 24, 48, 72—74, 96—98, 121, 122, 145, 146 or the connection is not established. This is a final result code.

Table 116. +FTH Commands

Command	Modulation	Speed
+FTH=3	V.21 channel 2.	300 bits/s.
+FTH=24	V.27ter.	2400 bits/s.
+FTH=48	V.27ter.	4800 bits/s.
+FTH=72	V.29.	7200 bits/s.
+FTH=96	V.29.	9600 bits/s.
+FTH=73	V.17.	7200 bits/s.
+FTH=74	V.17 (short train).	7200 bits/s.
+FTH=97	V.17.	9600 bits/s.
+FTH=98	V.17 (short train).	9600 bits/s.
+FTH=121	V.17.	12000 bits/s.
+FTH=122	V.17 (short train).	12000 bits/s.
+FTH=145	V.17.	14400 bits/s.
+FTH=146	V.17 (short train).	14400 bits/s.

Table 117. +FTH Extended Syntax Commands

Command	Description
+FTH=<mod>	Sets the FAX transmit rate and frames the data using HDLC protocol.
+FTH=?	Display all available parameter values for the **+FTH** command.

AT Command Set (continued)

FAX Commands (continued)

+FTM=<mod>—Transmit FAX Data with <mod> Carrier

+FTM=<mod> command causes the modem to transmit data using the modulation defined by Table 118.

Result codes:

- *CONNECT* if <mod> = 3, 24, 48, 72—74, 96—98, 121, 122, 145, 146 and the connection is established. This is an intermediate result code.

- *OK* if <mod> = 3, 24, 48, 72—74, 96—98, 121, 122, 145, 146 and the connection is established. This is a final result code.

- *ERROR* if <mod> ≠ 3, 24, 48, 72—74, 96—98, 121, 122, 145, 146 or the connection is not established. This is a final result code.

Table 118. +FTM Commands

Command	Modulation	Speed
+FTM=3	V.21 channel 2.	300 bits/s.
+FTM=24	V.27ter.	2400 bits/s.
+FTM=48	V.27ter.	4800 bits/s.
+FTM=72	V.29.	7200 bits/s.
+FTM=96	V.29.	9600 bits/s.
+FTM=73	V.17.	7200 bits/s.
+FTM=74	V.17 (short train).	7200 bits/s.
+FTM=97	V.17.	9600 bits/s.
+FTM=98	V.17 (short train).	9600 bits/s.
+FTM=121	V.17.	12000 bits/s.
+FTM=122	V.17 (short train).	12000 bits/s.
+FTM=145	V.17.	14400 bits/s.
+FTM=146	V.17 (short train).	14400 bits/s.

Table 119. +FTM Extended Syntax Commands

Command	Description
+FTM=<mod>	Set FAX transmit rate.
+FTM=?	Display all available parameter values for the +FTM command.

+FTS=<value>—Transmission Silence

+FTS=<value> causes the modem to terminate a transmission and wait for <value> x 10 ms before responding with the *OK* result code. For example, <value> = 5 results in a 50 ms interval. <value> has a range of 0—255.

Result codes:

- *OK* if <value> = 0—255.

- *ERROR* if <value> ≠ 0—255.

AT Command Set (continued)

Voice Commands

The AT voice command set follows ITU-T recommendation V.253. The commands are sent through the comm port, but the data path is sent either through the comm port or through a DMA channel using the wave driver. Table 183 shows a summary of the AT voice command set.

S32=<value>—Synthetic Ring Volume

See S32—Synthetic Ring Volume on page 82.

S33=<value>—Synthesized Ring Frequency

See S33—Synthetic Ring Frequency on page 83.

+FCLASS=8—Enter Voice Mode

The command +FCLASS=8 (see +FCLASS=1—Enter Class 1 FAX Mode on page 50) puts the modem in voice mode. Speakerphone and TAD modes are subsumed under the more general heading of voice mode and use a particular subset of voice mode commands to implement their respective features and functions.

The modem controller will maintain the overall state of the system so as to know when voice commands are issued in the context of using the speakerphone versus TAD or other voice contexts.

+VCID=<pmode>—Caller-ID

Use this command to enable or to disable caller-ID.

Result codes:

- *OK* if <pmode> = 0—2.
- *ERROR* if <pmode> ≠ 0—2.

Table 120. +VCID Commands

Command	Function
+VCID=0	Disable caller-ID (default).
+VCID=1	Enable formatted caller report.
+VCID=2	Enable unformatted caller report.

Table 121. +VCID Extended Syntax Commands

Command	Function
+VCID=<pmode>	Sets the status of caller-ID.
+VCID?	Returns the current caller-ID pmode.
+VCID=?	Queries the DCE for the range of supported caller-ID report formats. The DCE returns 0, 1, 2.

AT Command Set (continued)

Voice Commands (continued)

+VDR=<enable>,<report>—Distinctive Ringing and Cadence Report

Use this command to enable or disable the distinctive ringing feature. Distinctive ringing features are identified by the *DROF=<length of ring in 0.1 s increments>* and *DRON=<length of silence in 0.1 s increments>* result codes. The default value assigned to the <enable> and <report> parameters is zero.

Result codes:

- *OK* in <enable> = 0, 1 and <report> = 0—255.

- *ERROR* if <enable> ≠ 0, 1 and <report> ≠ 0—255.

Table 122. +VDR Commands

<enable>	<report>	Function
0	0—255	Disables the ring report result code.
1	0—255	Enables the ring report result code and sets the report delay to <report>/10. The result is evaluated in seconds.

Table 123. +VDR Extended Syntax Commands

Command	Function
+VDR=<enable>,<report>	Enables or disables distinctive ringing features.
+VDR?	Returns the current values of <enable> and <report>.
+VDR=?	Queries the DCE for the range of supported distinctive ring configurations. The DCE returns (0, 1), (0—255).

+VEM=<mask>—Event Reporting and Masking

The DTE can use this command to disable an event report regardless of the DCE state or of the analog signal source or destination configuration. <mask> is bits 0—33 (i.e., FFFFFFFFC). See the IS-101 specification for defined bit values.

Table 124. +VEM Extended Syntax Commands

Command	Function
+VEM=<mask>	Sets event reporting mask.
+VEM?	Returns the current values of the <mask>.
+VEM=?	Queries the DCE for the range of supported service level events.

+VGM=<gain>—Microphone Gain

Use this command to set the microphone gain of the speakerphone function. <gain> is an unsigned octet where values greater than 128 indicate a gain larger than nominal, and values smaller than 128 indicate a gain smaller than nominal. The gain control has a range between 0 and 255.

Result codes:

- Default: manufacturer-specific.

- *OK* if <gain> = 0—255.

- *ERROR* if <gain> ≠ 0—255.

AT Command Set (continued)

Voice Commands (continued)

+VGM=<gain>—Microphone Gain (continued)

Table 125. +VGM Extended Syntax Commands

Command	Function
+VGM=<gain>	Set the microphone gain level.
+VGM?	Displays the current gain level.
+VGM=?	Displays the supported speaker gain levels for the product.

+VGR=<gain>—Receive Gain Selection

Use this command to set the receive microphone gain control. The receive gain has a range of 0—255. However the values are only significant between 121 and 134. Any value set below 121 uses the same gain as 121. And any value set above 134 uses the same gain as 134.

Note: While in TAD mode, this command may be used in TAD local recording to control the recording level from the microphone. While in speakerphone mode, this command controls the gain to the remote caller.

Result codes:

- Default: manufacturer-specific.

- *OK* if <gain> = 0—255.

- *ERROR* if <gain> ≠ 0—255.

Table 126. <gain> Values

Command	Function
<gain> = 128	Nominal level for receive gain from microphone (default).
<gain> = a value greater than 128	Increase gain above nominal level.
<gain> = a value less than 128	Decrease gain below nominal level.

Table 127. +VGR Extended Syntax Commands

Command	Function
+VGR = <level>	Sets the microphone receive gain.
+VGR?	Displays the current value of receive gain.
+VGR=?	Displays the range of supported gain values.

+VGS=<gain>—Speaker Gain

Use this command to set the speaker gain of the speakerphone function. <gain> is an unsigned octet where values greater than 128 indicate a gain larger than nominal, and values smaller than 128 indicate a gain smaller than nominal. The speaker gain control has a range from 0 to 255.

Result codes:

- Default: 128.

- *OK* if <gain> = 0—255.

- *ERROR* if <gain> ≠ 0—255.

AT Command Set (continued)

Voice Commands (continued)

+VGS=<gain>—Speaker Gain (continued)

Table 128. <gain> Values

Command	Function
<gain> = 128	Nominal level for speaker gain (default).
<gain> = a value greater than 128	Increase gain above nominal level.
<gain> = a value less than 128	Decrease gain below nominal level.

Table 129. +VGS Extended Syntax Commands

Command	Function
+VGS = <level>	Sets the speaker gain.
+VGS?	Displays the current value of the speaker gain.
+VGS=?	Displays the range of supported gain values.

+VGT=<level>—Speaker Volume Control

Use this command to set the speaker volume control.

Result codes:

■ *OK* if <level> = 0—255.

■ *ERROR* if <level> ≠ 0—255.

Table 130. <level> Values

Command	Function
<level>=128	Nominal volume level for sending to speaker (default).
<level> = a value > 128	Increase volume above nominal level.
<level> = a value < 128	Decrease volume below nominal level.

Table 131. +VGT Extended Syntax Commands

Command	Function
+VGT=<level>	Sets the speaker volume level.
+VGT?	Displays the current setting for the speaker volume level.
+VGT=?	Displays the support speaker volume level values.

+VIP—Initialize Voice Parameters

Use the **+VIP** command to reset all the voice parameters to their default values. The command has no effect on the **+FCLASS** setting.

AT Command Set (continued)

Voice Commands (continued)

+VIT=<timer>—DTE/DCE Inactivity Timer

Use this command to set the DTE/DCE inactivity timer. The DTE/DCE inactivity timer is activated when the DTE or host system selects voice fixed-rate mode. If the timer lapses, the DCE drops the connection*. Inactivity in either the voice command mode or the voice data mode will start the count down. The units are in one second intervals.

Result codes:

■ *OK* if <timer> = 0—255.

■ *ERROR* if <timer> ≠ 0—255.

Table 132. +VIT Extended Syntax Commands

Command	Function
+VIT=<timer>	Sets the DTE/DCE inactivity timer.
+VIT?	Displays the current value of the timer.
+VIT=?	Displays the range of supported delay times in seconds.

* ITU-T Recommendation V.253 (02/98) standardized this command. The Agere Systems AT command implementation of this command differs from the specification supplied by recommendation V.253. Refer to ITU-T Recommendation V.253 for further details on the difference between the two implementations.

+VNH=<Hook>—Automatic Hang-Up Control

Use this command to enable or disable automatic DCE hang-ups in the data and facsimile modes. The **+VNH** command is part of a group of commands used for call discrimination. Call discrimination is a means for the modem to supply the DTE or host system with the information and means to discriminate between data, FAX, and voice calls. The automatic hang-up control is just one of the controls used to manage call discrimination. Refer to section 5.3.1 of ITU-T recommendation V.253 (02/98) for a full description of call discrimination and how the **+VNH** command is used.

Result codes:

■ *OK* if <hook> = 0, 2.

■ *ERROR* if <hook> ≠ 0, 2.

Table 133. +VNH Commands

Command	Function
+VNH = 0	The DCE retains automatic hang-ups (as in the other nonvoice modes).
+VNH = 2	The DCE disables automatic hang-ups in the other nonvoice modes. The DTE only performs a logical hang-up (returns the *OK* result code).

Table 134. +VNH Extended Syntax Commands

Command	Function
+VNH=<hook>	Enables or disables automatic DCE hang-ups.
+VNH?	Displays the current parameter value.
+VNH=?	Displays the range of supported parameter values.

AT Command Set (continued)

Voice Commands: Speakerphone Operation

+VLS=<label>—Analog Source/Destination Selection

Use this general-purpose analog source/destination command to attach various analog devices to the system in voice mode.

Table 135. +VLS Commands

Command	Function
+VLS=0	Speakerphone off.
+VLS=5	Disables/detaches microphone analog source (leaving speaker only) when speakerphone is in operation (phone mute feature).
+VLS=7	Speakerphone on. Attach internal speaker and internal microphone, DCE off-hook. Restores/ attaches microphone along with speaker (normal speakerphone operation).

Table 136. +VLS Extended Syntax Commands

Command	Function
+VLS=<value>	Attaches or detaches an analog source or destination to the system in voice mode.
+VLS?	Reports the current analog source/destination configuration, along with a listing of all event codes reported from the modem to the DTE under that configuration.
+VLS=?	Queries the DCE for the range of supported configurations and the list of unsolicited event codes that the modem will report to the DTE under each configuration. For speakerphone, the configurations supported are 0, 5, and 7 (as explained above).

Voice Commands: Telephone Answering Device (TAD)

+VLS=?—Analog Source/Destination Selection and DTMF/Tone Reporting

Requests for the modem's DTMF/tone reporting capabilities are made using this command. For each system configuration in voice mode (i.e., speakerphone and answering machine), the modem reports the capabilities that are enabled for the configuration.

For each configuration, the modem indicates tone-reporting capabilities for each of the three different voice states: voice transmit data, voice receive data, and voice command state (voice idle).

TAD supports each of the following ITU-T recommendation V.253 analog source/destination configurations.

Table 137. Analog Source/Destination Configurations

Label #	Description
0	DCE on-hook, local phone connected to the telephone company.
1	DCE off-hook, DCE connected to telephone company.
2	DCE off-hook, local phone connected to DCE.
3	DCE off-hook, local phone connected to telephone company, DCE to local phone.
4	Speaker connected to DCE, DCE on-hook (playback messages).
5	Speaker connected to DCE, DCE off-hook (call screening).
6	Microphone connected to DCE, DCE on-hook (record greeting).
7	Microphone and speaker connected, DCE off-hook (speakerphone).

AT Command Set (continued)

Voice Commands: Telephone Answering Device (TAD) (continued)

+VPR=<rate>—Select DTE/DCE Interface Rate

The **+VPR** command returns an *OK* result code for any rate but has no action. The **+VPR*** command is supported to assure compatibility with communications software that issues this command. Host-based controller modems do not maintain the traditional relationship between the DTE and DCE that this command was designed to control. In many cases the data pump interfaces with the host system via an ISA or PCI bus.

Events Reported to the DTE

The modem will return *OK* when going off-hook in voice mode (**+FCLASS=8**). After answering in voice mode, the modem may send any of the following <DLE> shielded event codes to the DTE, as appropriate.

Table 138. <DLE> Shielded Codes Sent from DCE to DTE

Code Character	Description
0—9, A—D, #, *	DTMF tones.
a	Answer tone.
b	Busy tone.
c	FAX calling tone.
d	Dial tone.
e	Data calling tone.
h	Local phone on-hook.
H	Local phone off-hook.
R	Ring.
s	Silence timer has expired.
<ETX>	End of voice data transmission.
@	CAS tone detected.

<DLE> Codes Sent to DCE

For simple actions in voice mode, the modem may send any of the following <DLE> shielded event codes (in ASCII) to the DTE, as appropriate.

Table 139. <DLE> Shielded Codes Sent from DTE to DCE

Code Character	Description
u	Raise the volume by 1 dB.
d	Lower the volume by 1 dB.
<ETX>	End of voice data transmission.
!	End receive data state.

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* The information supplied for this command does not affect host-based controller modems. The dialogue included with this command applies to controller based modems only.

AT Command Set (continued)

Voice Commands: Telephone Answering Device (TAD) (continued)

+VRA=<interval>—Ringing Tone Goes Away Timer

Use this command to set the ringing tone goes away timer before originating a call. The ringing tone goes away timer defines the amount of time the modem will wait between ringing tones before assuming that the remote station has gone off-hook. The default is 50 and each value represents a 0.1 second increment.

Result codes:

■ *OK* if <interval> = 0—255.

■ *ERROR* if <interval> ≠ 0—255.

Table 140. +VRA Extended Syntax Commands

Command	Function
+VRA=<interval>	Sets the ringing tone goes away timer.
+VRA?	Displays the current value.
+VRA=?	Displays the range of supported timer values.

+VRN=<interval>—Ringing Tone Never Appeared Timer

Use this command to set the ringing tone never appeared timer before originating a call. The ringing tone never appeared timer defines the amount of time that the modem will wait for an initial ringing tone. If a ringing tone is not detected within this interval, the modem will assume that the remote station has gone off-hook. The default is 10 and each value represent a one second increment.

Result codes:

■ *OK* if <interval> = 0—255.

■ *ERROR* if <interval> ≠ 0—255.

Table 141. +VRN Extended Syntax Commands

Command	Function
+VRN=<interval>	Sets the ringing tone never appeared timer.
+VRN?	Displays the current value.
+VRN=?	Display the range of supported timer values.

+VRX—Enter Voice Receive Data State

Use this command to initiate the voice receive state with the voice stream received through the comm port. Applications using the wave interface do not use the **+VRX** command. The modem returns the *CONNECT* result code to the DTE.

There are two ways for the DCE to leave the voice receive state:

1. Modem receives <DLE>-! from the DTE.
2. Upon expiration of the silence detection timer, the modem passes <DLE> shielded event codes indicating a presumed hang-up (<DLE>-s) or presumed end-of-message (<DLE-q>).

AT Command Set (continued)

Voice Commands: Telephone Answering Device (TAD) (continued)

+VSD=<sds>,<sdi>—Silence Detection (QUIET and SILENCE)

Use this command to set the silence detection sensitivity (<sds>) and silence detection interval (<sdi>). The <sds> parameter defines the line noise sensitivity level in decibels.

The <sdi> parameter specifies the amount of time the modem waits before reporting silence to the DTE. It is used for determining the presumed hang-up (SILENCE), after which the modem sends <DLE>-s to the DTE. The default is 50 (5 seconds).

Result codes:

- *OK* if <sds> = 0—255 and <sdi> = 0—255.

- *ERROR* if <sds> ≠ 0—255 or <sdi> ≠ 0—255.

Larger values of <sds> indicate that the modem is to treat noisier line conditions as silence (see Table 142).

Table 142. <sds> Values

Value	Function
<sds> = 128	Nominal level of sensitivity; –40 dBm (default).
<sds> > 128	More aggressive; <sds> = 129 is –39 dBm.
<sds> < 128	Less aggressive; <sds> = 127 is –41 dBm.

Table 143. +VSD Extended Syntax Commands

Value	Function
+VSD=<sds>,<sdi>	Sets the silence sensitivity level and the silence detection interval.
+VSD?	Displays the current silence detection sensitivity and silence detection interval.
+VSD=?	Displays the range of supported values for the silence detection sensitivity and silence detection interval.

+VSM=<cml>,<vsr>—Compression Method and Sampling Rate Specifications

Use the **+VSM*** command to set the voice compression method and the sampling specification. The <cml> parameter identifies the compression method and the <vsr> parameter identifies the sampling rate.

Result codes:

- *OK* if <cml> = 128—133 and <vsr> = 7200, 8000, 11025.

- *ERROR* if <cml> ≠ 128—133 or <vsr> ≠ 7200, 8000, 11025.

---

* ITU-T recommendation V.253 standardized this command. The standard version contains two additional parameters which are not supported by the Agere Systems host-based controller AT command set. For additional information on these parameters, see ITU-T recommendation V.253.

AT Command Set (continued)

Voice Commands: Telephone Answering Device (TAD) (continued)

+VSM=<cml>,<vsr>—Compression Method and Sampling Rate Specifications (continued)

Table 144. Compression Method

<cml>	Compression Method	Available Sampling Rates
128	8-bit linear.	7200, 8000, 11025
129	16 bit linear (default).	7200, 8000 (default), 11025
130	8-bit A-law.	8000
131	8-bit μ-law.	8000
132	IMA ADPCM.	8000
133	G.729.	8000

Table 145. +VSM Extended Syntax Commands

Command	Function
+VSM=<cml>,<vsr>	Sets the compression method and the sampling rate.
+VSM?	Returns the numeric and string labels of the compression method currently in use, and the sampling rate currently in use.
AT+VSM=?	Reports the voice compression methods supported by the DCE and the voice sampling rates at which they are supported. The default is 129,800 (16-bit linear, 8.0 kHz).

+VSP=<value>—Speakerphone On/Off

Use this command to turn the speakerphone function on and off.

Result codes:

- *OK* if <value> = 0, 1.

- *ERROR* if <value> ≠ 0, 1.

Table 146. +VSP Commands

Command	Function
+VSP=0	Speakerphone function off (default).
+VSP=1	Speakerphone function on.

Table 147. +VSP Extended Syntax Commands

Command	Function
+VSP=<value>	Turns the speakerphone on or off.
+VSP?	Displays the current status of the speaker phone.
+VSP=?	Displays the range of supported values.

AT Command Set (continued)

Voice Commands: Telephone Answering Device (TAD) (continued)

+VTD=<dur>—Beep Tone Duration Timer

Use this command to set the default duration for DTMF/tone generation in 0.01 s increments. For DTMF digits, beep tone duration is the interdigit time. For tone generation, this number is the actual tone duration. The default tone duration is 100 or 1 s.

Result codes:

- *OK* if <dur> = 0—400.

- *ERROR* if <dur> ≠ 0—400.

Table 148. +VTD Commands

Command	Function
+VTD=<dur>	Sets the duration for DTMF/tone generation.
+VTD?	Displays the current beep tone duration timer.
+VTD=?	Displays the range of supported values.

+VTR—Start Voice Transmission and Reception Process

Use this command to initiate full-duplex voice mode* in the DCE. In this mode, the DTE selects the analog source and sink through the **+VLS** command; the selections can be microphone and speaker or GSTN. The DCE is not required to perform any acoustic echo cancellation or line echo cancellation.

Result codes:

- *CONNECT* if full duplex voice mode is initiated.

- *ERROR* if the DCE is not connected to at least one off-hook duplex PSTN line or one duplex non-PSTN device.

* See ITU-T Recommendation V.253 section 4.1.1 for further details on the voice states.

+VTS=<string>—DTMF and Tone Generation in Voice Mode

Use this command to produce a sequence of DTMF tones (or other tones, such as dial tone, busy, silence, etc.) as specified in the string parameter. String parameters are made up of a sequence of elements separated by commas. If the string does not supply a duration for a particular tone then the DCE uses the duration designated by the **+VTD** command. The command can also generate a hook flash, **+VTS=!**.

Result codes:

- *OK* if <string> is valid (see Table 150, String Elements, on page 68).

- *ERROR* if <sting> is not valid.

Table 149. +VTS Extended Syntax Commands

Command	Function
+VTS=<string>	Generates DTMF tones according to the <string> parameter.
+VTD=?	Displays the range of supported tones and duration.

AT Command Set (continued)

Voice Commands: Telephone Answering Device (TAD) (continued)

+VTS=<string>—DTMF and Tone Generation in Voice Mode (continued)

Table 150. String Elements

String Elements[1]	Description
A single character	The valid single characters are: 0—9, #, *, !, and A—D. This element always uses the default duration specified by the +VTD command.
A bracketed group []	A bracketed group has three components. It is used to generate a dual tone. The first component is the first tone[2] in the dual tone. The second component is the second tone[2] in the dual tone. The third component is the duration of the tones. The duration is specified in 0.01 s intervals. If one of the tone parameters is missing, its value is defaulted to 0 and that tone is not generated.
A curly bracketed group {}	A curly bracketed group has two components. The first component is a DTMF tone or hookflash character(!). The second component is the tone duration. The duration of the tone is specified in 0.01 s intervals.

1. The string definition provided in this text is a excerpt from the detailed definition provided in ITU-T recommendation V.253 (02/98). Refer to Section 10.1.5.1.1 for a full description of the <string> parsing.
2. The tone specified in the bracketed group in a numerical value between 300 and 3300.

+VTX—Enter Voice Transmit Data State

Use this command to initiate the voice transmission process with the voice stream sent through the comm port. Applications using the wave interface do not use the **+VTX** command.

There are two ways for the DCE to leave the voice transmit state:

■ Modem receives <DLE>-<EXT>in voice stream.

■ DTE/DCE inactivity timer expires.

Result codes:

■ *CONNECT* if the DCE is connected to another off-hook DCE.

■ *ERROR* if the DCE is not connected to at least one other off-hook DCE.

Testing and Debugging AT Commands Set

Use the following AT commands to test and debug host-based controller modem designs. These commands are not designed for general use. Rather, they are tools to help validate and verify the functionality of modem system.

Table 151. Test and Debugging AT Command Set Summary

Command	Description	Command	Description
&&C	Write to/read from host interface register	**&&S**	Speaker codec loopback
&&L	Line-to-line loopback	**%T112**	Debug enable/disable
&&R	Write to/read from DSP RAM location	**#UD**	Unimodem diagnostics

&&C<location>,<data>—Write To/Read From DSP Register

Use this command to write data to or read data from a DSP register. DSP registers are not the same as S registers. DSP registers* are used by the DSP to process data sent to the DSP. Each register is eight bits. Data supplied for the register must be in hex format.

Result codes:

- *OK* if <location> is a valid hex register and <data> is a valid four digit hex number.

- *ERROR* if <location> is a valid hex register or <data> is a valid four digit hex number.

Table 152. &&C Command Extended Syntax

Command	Function
&&C<location>, <data>	Instructs the modem to store <data> in DSP register <location>.
&&C<location>	Instructs the modem to read from DSP register <location>.

* Refer to the programmers reference guide for your host-based controller modem to identify the valid registers for your product.

&&L—Line-to-Line Loopback

Use this command to create a loopback for a line-to-line test of a local and remote modem. This command does not take parameters. Do not supply a parameter with this command.

Result codes:

- *OK* if no parameter is provided.

- *ERROR* if a parameter is entered.

Testing and Debugging AT Commands Set (continued)

&&R—Write to/Read from DSP RAM Location

Use this command to write data to or read data from a location in the DSP RAM. DSP RAM locations consist of two eight-bit words or 16 bits. Data supplied for DSP RAM locations must be in hex format.

Result codes:

- *OK* if <location> is a valid four digit hex RAM location and <data> is a valid four digit hex number.

- *ERROR* if <location> is a valid four digit hex RAM location or <data> is a valid four digit hex number.

Table 153. &&R Command Forms

Command	Function
&&R<location>,<data>	Instructs the modem to store <data> in DSP RAM <location>.
&&R<location>	Instructs the modem to read from DSP RAM <location>.

&&S—Speaker Codec Loopback

Use this command to create a loopback from the microphone to the speaker.

Result codes:

- *OK* if voice is supported.

- *ERROR* if voice is not supported

%T112—Debug Enable/Disable

Use this command to enable or disable the debug mode.

Result codes:

- *OK* if <value> = 0, 1.

- *ERROR* if <value> ≠ 0, 1.

Table 154. %T112 Commands

Command	Function
%T112, 0	Disable debug.
%T112, 1	Enable debug.

Test and Debug AT Commands (continued)

#UD—Unimodem Diagnostics

This command is defined by *Microsoft*'s* unimodem diagnostics command specification. The Agere Systems host-based controller modem AT command set implements a subset of the parameters in that specification.

#UD is an action command. It does not take parameters. It must be the last command in the command line. The modem logs aspects of its operation for each call and saves these results in volatile memory until cleared by one of the following events. These results are not cleared by changing DTR, V.24 circuit 108.2, &D0, &D1, or &D2.

- Power off (or D1 or D3 state entered).

- Hard reset (e.g., negate DTR with &D3 set, reset button).

- Soft reset = ATZ or AT&F.

- ATD or ATA command issued.

- Automatic answer (e.g., set register S0 > 0 and ring detected).

In response to this command, the modem reports one or more lines of information text. Each line is both preceded and terminated by a carriage return/line feed pair. Note that, as per ITU-T V.253 (02/98), CR and LF characters may be changed by writing new values to the contents of registers S3 and S4, respectively. Information text format is defined in ITU-T V.253 (02/98) as follows:

DIAG <token key = value [[key = value [key = value]]... >

where

DIAG = 5 characters, hexadecimal 44, 49, 41, 47, 20.

'<' = left angle bracket, hexadecimal 3C.

'=' = equal sign, hexadecimal 3D.

'>' = right angle bracket, hexadecimal 3E.

token = unique 32-bit hexadecimal string, i.e., 2A4D3263.

key = one or two digit hexadecimal number. See Table 155.

value = any string.

Unless otherwise noted, all values are hexadecimal numbers. Any numeric values from tables in ITU V.58 are converted to hexadecimal. Multidigit values are reported MSD first. Leading zeros may be deleted.

The following table includes all items listed in Microsoft's specification for the #UD command. The items that have an X in the implemented column have been implemented in this release.

Please refer to *Microsoft*'s unimodem diagnostics command specification for more information.

- http://www.microsoft.com/hwdev/respec/commspec.htm

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* *Microsoft* is a registered trademark of Microsoft Corporation.

Test and Debug AT Commands (continued)

#UD—Unimodem Diagnostics (continued)

Table 155. #UD Last Call Status Report Format

Note: Refer to Table 1 in the *Microsoft* specification.

Key	Value(s)	Required	Definition	Implemented
0	2 digits	Yes	Diagnostic command specification revision number, digit.digit.	X
1	See Table 156	0-A	Call setup result code.	X
2	See Table 3*	0-1	Multimedia mode.	—
3	See Table 4*	0	DTE-DCE interface mode.	—
4	String	Yes	V.8 CM octet string. Same format as V.25ter Annex A, in quotes.	—
5	String	Yes	V.8 JM octet string. Same format as V.25ter Annex A in quotes.	—
6—F	—	—	Reserved for call negotiation reports.	—
10	2 digits	Note 4*	Received signal power level in –dBm (0—43).	X
11	2 digits	Note 4*	Transmit signal power level in –dBm (0—17).	X
12	2 digits	Note 4*	Estimated noise level in –dBm (10—90).	X
13	2 digits	Note 4*	Normalized mean squared error. 100 (0x64) = minimum intersymbol distance.	—
14	2 digits	Note 4*	Near echo loss in dB.	X
15	2 digits	Note 4*	Far echo loss in dB.	X
16	4 digits	Note 4*	Far echo delay in ms.	—
17	—	Note 4*	—	X
18	—	Note 4*	—	—
19—1F	—	—	Reserved for modulation setup and training reports (see note 5*).	—
20	See Table 157	Note 6*	Transmit carrier negotiation result.	X
21	See Table 157	Note 6*	Receive carrier negotiation result.	X
22	4 digits	0—1F40	Transmit carrier symbol rate (0—8000).	X
23	4 digits	0—1F40	Receive carrier symbol rate (0—8000).	X
24	4 digits	0—FA0	Transmit carrier frequency (0—4000).	—
25	4 digits	0—FA0	Receive carrier frequency (0—4000).	—
26	4 digits	0—FA00	Initial transmit carrier data rate (0—64000).	X
27	4 digits	0—FA00	Initial receive carrier data rate (0—64000).	X
28—2F	—	—	Reserved.	—
30	2 digits	0—FF	Temporary carrier loss event count.	—
31	2 digits	0—FF	Carrier rate renegotiation event count.	—
32	2 digits	0—FF	Carrier retrains requested.	X
33	2 digits	0—FF	Carrier retrain requests granted.	X
34	4 digits	0—FA00	Final transmit carrier rate.	X
35	4 digits	0—FA00	Final receive carrier rate.	X

* Refers to notes or tables in the *Microsoft* specification.

Test and Debug AT Commands (continued)

#UD—Unimodem Diagnostics (continued)

Table 155. #UD Last Call Status Report Format (continued)

Note: Refer to Table 1 in the *Microsoft* specification.

Key	Value(s)	Required	Definition	Implemented
36—3F	—	—	Reserved.	—
40	See Table 158	0—2	Protocol negotiation result (see note 7*).	X
41	3 digits	0—400	Error control frame size.	—
42	2 digits	0—FF	Error control link time-outs.	X
43	2 digits	0—FF	Error control link NAKs.	—
44	See Table 159	0—1	Compression negotiation result (see note 7*).	X
45	4 digits	0—200	Compression dictionary size (see note 7*).	—
46—4F	—	—	Reserved.	—
50	1 digit	0—2	Transmit flow control: ■ 0 = off. ■ 1 = DC1/DC3. ■ 2 = V.24 ckt 106/133.	—
51	1 digit	0—2	Receive flow control: ■ 0 = off. ■ 1 = DC1/DC3. ■ 2 = V.24 ckt 106/133.	—
52	8 digits	0—FFFFFFFF	Transmit characters sent from DTE (see note 8*).	—
53	8 digits	0—FFFFFFFF	Receive characters sent to DTE (see note 8*).	—
54	8 digits	0—FFFF	Transmit characters lost (data overrun errors from DTE) (see note 9*).	—
55	8 digits	0—FFFF	Receive characters lost (data overrun errors from DTE) (see note 9*).	—
56	8 digits	0—FFFFFFFF	Transmit frame count, if error control protocol running (see note 9*).	X
57	8 digits	0—FFFFFFFF	Receive frame count, if error control protocol running (see note 9*).	X
58	8 digits	0—FFFF	Transmit frame error count, if error control protocol running (see note 9*).	X
59	8 digits	0—FFFF	Receive frame error count, if error control protocol running (see note 9*).	X
5A—5F	—	—	Reserved.	—
60	See Table 160 and Table 161	Note 10*	Termination cause.	X
61	2 digits	0—FF	Call waiting event count.	—
62—7F	—	—	Reserved for future versions of the specification.	—
80—FF	—	—	Reserved for manufacturer proprietary keys.	—

* Refers to notes or tables in the Microsoft specification.

Test and Debug AT Commands (continued)

#UD—Unimodem Diagnostics (continued)

Table 156. Call Setup Result Codes

Note: Refer to Table 2 in the *Microsoft* specification.

Code	Definition	Implemented
0	No previous call (modem log has been cleared since any previous call).	X
1	No dial tone detected.	X
2	Reorder signal detected. Network busy.	—
3	Busy signal detected.	X
4	No recognized signal detected.	X
5	Voice detected.	—
6	Text telephone signal detected (see V.18).	—
7	Data answering signal detected (e.g., V.25 ANS, V.8ANSam).	X
8	Data calling signal detected (e.g., V.25 CT, V.8 CI).	—
9	FAX answering signal detected (e.g., T.30 CED, DIS).	—
A	FAX calling signal detected (e.g., T.30 CNG).	—
B	V.8bis signal detected.	—
C—F	Reserved.	—

Table 157. gstnModulationSchemeActive from 3.7.2/V.58

Note: Refer to Table 6 in the *Microsoft* specification.

Value (hexadecimal)	Description	Implemented
0	V.17.	—
1	V.21.	—
2	V.22.	—
3	V.22bis.	—
4	V.23 constant carrier (1200/75).	—
5	V.23 switched carrier (half duplex).	—
6	V.26bis.	—
7	V.26ter.	—
8	V.27ter.	—
9	V.29 HD.	—
A	V.32.	X
B	V.32bis.	—
C	V.34.	X
D	V.34 HD.	—
E	V.pcm (asymmetric).	—
F	V.pcm (symmetric).	—
E–7F	Reserved (V.58).	—
80	X2.	—
81	K56flex.	X
82	V.FC.	—
83	V.32terbo.	—
80–FF	Reserved for manufacturers.	—

Test and Debug AT Commands (continued)

Table 158. errorControl Active from 3.5.2/V.58

Note: Refer to Table 7 in the *Microsoft* specification.

Value	Description	Implemented
0	Disable/none.	X
1	V.42 LAPM.	X
2	V.42 alternative protocol (*MNP*).	X
3—7F	Reserved (V.58).	—
80	*MNP* Class 10.	—
81	Enhanced cellular protocol.	—
82	*ETC* *.	—
82—FF	Reserved for manufacturers.	—

* *ETC* is a registered trademark of Paradyne Corporation.

Table 159. compressionActive from 3.2.2/V.58

Note: Refer to Table 8 in the *Microsoft* specification.

Value	Description	Implemented
0	None.	X
1	V.42bis.	X
2—7F	Reserved (V.58).	—
80	*MNP* Class 5.	X
81—FF	Reserved for manufacturers.	—

Table 160. Additional callCleared Codes (3.6.4/V.58)

Note: Refer to Table 9 in the *Microsoft* specification.

Code	Definition	Implemented
1	No previous call.	X
2	Call is still in progress.	X
3	Call waiting signal detected.	—
4	Delayed (see ETS 300 001).	X

Table 161. callCleared Codes from 3.6.4/V.58-1994

Note: callCleared indicates that the DCE has gone on-hook and that the previously existing network connection has been cleared. These values are hexadecimal, converted from decimal in V.58. Refer to Table 10 in the *Microsoft* specification.

Value	Description	Notes	Implemented
0	CauseUnidentified.	Call setup issues.	X
1—3	See Table 160.	—	X
A	NMSinitiatedDialCall.	Network management system.	—
B	NMSinitiatedLeasedLineRestoral.	Network management system.	—
C	NMSinitiatedRedial.	Network management system.	—
D	NMSinitiatedDialDisconnect.	Network management system.	—
14	PowerLoss.	DCE.	—
15	EquipmentFailure.	—	—

Test and Debug AT Commands (continued)

Table 161. callCleared Codes from 3.6.4/V.58-1994 (continued)

Note: callCleared indicates that the DCE has gone on-hook and that the previously existing network connection has been cleared. These values are hexadecimal, converted from decimal in V.58. Refer to Table 10 in the *Microsoft* specification.

Value	Description	Notes	Implemented
16	FrontPanelDisconnectRequested.	—	—
17	FrontPanelLeasedLineRestoral.	—	—
18	AutomaticLeasedLineRestoral.	—	—
19	InactivityTimerExpired.	—	X
1E	cct116RestoralRequest.	DTE interface.	—
1F	cct108isOffInhibitsDial.	—	—
20	cct108turnedOff.	—	—
28	NoNumberProvided.	Line interface.	—
29	BlacklistedNumber.	—	X
2A	CallAttemptsLimitExceeded.	—	X
2B	ExtensionPhoneOffhook.	—	—
2C	CallSetupFailTimerExpired.	—	X
2D	IncomingCallDetected.	—	X
2E	LoopCurrentInterrupted.	—	—
2F	NoDialTone.	—	X
30	VoiceDetected.	—	—
31	ReorderTone.	—	—
32	SitTone.	—	—
33	EngagedTone.	—	—
34	LongSpaceDisconnect.	—	—
3C	CarrierLost.	Signal converter.	X
3D	TrainingFailed.	—	X
3E	NoModulationinCommon.	—	—
3F	RetrainFailed.	—	X
40	RetrainAttemptCountExceeded.	—	—
41	GstnCleardownReceived.	—	—
42	FAXDetected.	—	—
46	InTestMode.	Test.	—
47	IntrusiveSelfTestInitiated.	—	—
50	AnyKeyAbort.	Call control.	X
51	DteHangupCommand.	—	X
52	DteResetCommand.	—	—
5A	FrameReject.	Error control.	—
5B	NoErrorControlEstablished.	—	X
5C	ProtocolViolation.	—	—
5D	n400exceeded.	—	X
5E	NegotiationFailed.	—	—
5F	DisconnectFrameReceived.	—	—
60	SabmeFrameReceived.	—	—
64	LossOfSynchronization.	Data compression.	—

S-Registers

The current setting of each S-register may be displayed by the **S<register number>?** command. There are two forms for this command.

Table 162. S<register number> Extended Syntax

Syntax	Function
S<register number>?	Displays register contents.
S<register number>=<value>*	Sets the contents of the register to <value>.

* Some registers are read only and are not affected by the **S<register number>=<value>** command.

The following table summarizes the S-registers used by Agere Systems host-based controller modems.

Table 163. S-Register Summary

Register	Description	Range	Unit	Default
S0	Auto-answer ring number.	0—255	Rings	0
S1	Ring counter.	0—255	Rings	0
S2	AT escape character (user defined).	0—255	ASCII	43
S3	Command line termination character (user defined).	0—127	ASCII	13
S4	Response formatting character.	0—127	ASCII	10
S5	Command line editing character.	0—8	ASCII	8
S6	Wait before dialing.	2—255	s	2
S7	Connection completion time-out.	1—255	s	50
S8	Pause time for comma (,) modifier.	0—65	s	2
S10	Automatic disconnect delay.	1—255	100 ms	20
S11	DTMF tone duration.	50—150	ms	95
S12	Escape guard time.	0—255	20 ms	50
S14	General bit-mapped options status.	—	—	8
S21	V.24/general bit-mapped options status.	—	—	48
S22	Results bit-mapped options status.	—	—	112
S24	Timer to sleep control mode.	0, 5—65	s	60
S28	V.34 modulation enable/disable.	0—1	—	1
S30	Inactivity timer.	0—255	Minutes	0
S32	Synthetic ring volume.	0—255	dB	10
S33	Synthetic ring frequency.	0—5	—	0
S35	Data calling tone.	0—1	—	0
S36	Negotiation fallback.	—	—	7
S37	Dial line rate.	0, 2—19	—	0
S38	56K downstream rate.	0—23	—	1
S42	Auto rate.	0—1	—	1
S43	Auto mode.	0—1	—	1
S48	LAPM error control and feature negotiation.	7, 128	—	7
S89	Timer to control sleep mode.	0, 5—65	s	60
S90	Read-only local phone.	0—1	—	0
S91	Line transmit level.	6—25	dB	10

S-Registers (continued)

S-Register Definitions

S0—Auto-Answer Ring Number

This register sets the number of rings the modem will count before automatically answering a call. Enter zero to disable auto-answer. When auto-answer is disabled, the modem requires an **A** command to answer an incoming call.

- Range: 0—255.
- Default: 0.
- Units: rings.

S1—Ring Counter

The modem increments the S1 register each time it detects a ring signal on the telephone line. The modem clears S1 if no rings occur over a six second interval. This register is read-only.

- Range: 0—255.
- Default: 0.
- Units: rings.

S2—Escape Character (User-Defined)

S2 contains the decimal value of the ASCII character used as the escape character. The default value corresponds to an ASCII +. The escape sequence allows the modem to exit data mode and enter command mode when on-line. A value over 127 disables the escape process, i.e., no escape character will be recognized (see +++ Escape Sequence on page 9).

- Range: 0—255.
- Default: 43 (+).
- Units: ASCII.

S3—Command Line Termination Character (User-Defined)

S3 sets the character used to terminate command lines and result codes.

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

- Range: 0—127.
- Default: 13 (carriage return).
- Units: ASCII.

S-Registers (continued)

S-Register Definitions (continued)

S4—Response Formatting Character (User-Defined)

This register sets 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.

Note: This register's value is not stored with the **&W** command.

- Range: 0—127.
- Default: 10 (line feed).
- Units: ASCII.

S5—Command Line Editing Character (User-Defined)

S5 sets the character recognized as a backspace (pertains to asynchronous operation 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. Therefore, a total of three characters are transmitted each time the modem processes the backspace character.

Note: This register's value is not stored with the **&W** command.

- Range: 0—32.
- Default: 8 (backspace).
- Units: ASCII.

S6—Wait Time Before Dialing

This register sets the length of time in seconds that the modem must 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 progress feature (W dial modifier in the dial string) will override the value in register S6. This operation, however, may be affected by some **X<value>** command options according to country restrictions. This register is only active when dial tone is disabled.

Note: This register's default value is dependent on country selection.

- Range: 2—255.
- Default: 2.
- Units: seconds.

S7—Connection Completion Time-Out

S7 sets the length of time, in seconds, that the modem will wait for a carrier before hanging up. The timer starts 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 restrictions. The timer also specifies the wait for silence time for the @ dial modifier in seconds. S7 is not associated with the W dial modifier.

Note: This register's default value is dependent on country selection.

- Range: 1—255.
- Default: 50.
- Units: seconds.

S-Registers (continued)

S-Register Definitions (continued)

S8—Pause Time for Comma Dial Modifier

S8 sets the time, in seconds, that the modem will pause when the comma (,) dial modifier is encountered in a dial string.

Note: This register's default value is dependent on country selection.

■ Range: 0—65.

■ Default: 2*.

■ Units: seconds.

S10— Automatic Disconnect Delay

S10 sets the length of time the host-based controller modem waits before hanging up after loss of carrier. Register values are given in tenths of a second and range from 0.1 to 25.5 seconds. This allows for a temporary carrier loss without causing the local modem to disconnect.

Note: This register's default value is dependent on country selection.

■ Range: 1—255.

■ Default: 20*.

■ Units: 0.1 s.

S11—DTMF Dialing Speed

This register determines the dialing speed. Refer to *Agere Systems Host-Based Controller Homologation Manual* for specific country defaults.

Note: This register's default value is dependent on country selection.

■ Range: 0—255.

■ Default: 95*.

■ Units: milliseconds.

S12—Escape Guard Time

This register sets the escape guard time. An escape character is framed with silence to ensure that it is not confused as data. This register sets the duration of the silence which must come before and after an escape sequence.

■ Range: 0—255.

■ Default: 50.

■ Units: 0.02 seconds.

* The register default shown here is for North America.

S-Registers (continued)

S-Register Definitions (continued)

S14—General Bit-Mapped Options Status

S14 indicates the status of command options. Only bits 3 and 6 are used. This register is read-only.

■ Default: 8 (00001000b).

Table 164. Register S14 Bits

Bit	Description	Value
3	Result codes (**V<value>**).	0 = Numeric (**V0**). 1 = Verbose (**V1**) (default).
6	Pulse dial pulses/s selection (**&P<value>**).	0 = 10 pulses/s (**&P0** and **&P1**) (default). 1 = 20 pulses/s (**&P2**).

S21—V.24/General Bit-Mapped Options Status

S21 indicates the status of command options. Only bits 3, 4, and 5 are used. This register is read only.

■ Default: 48 (00110000b).

Table 165. Register S21 Bits

Bit	Description	Value
3—4	DTR behavior (**&D<value>**).	0 = **&D0**. 1= **&D1**. 2= **&D2** (default). 3= **&D3**.
5	DCD behavior (**&C<value>**).	0 = **&C0**. 1 = **&C1** (default).

S22—Results Bit-Mapped Options Status

S22 indicates the status of command options. Only bits 4, 5, 6, and 7 are used. This register is read only.

■ Default: 112 (01110000b).

Table 166. Register S22 Bits

Bit	Description	Value
4—6	Result codes (**X<value>**).	0 = **X0**. 4 = **X1**. 5 = **X2**. 6 = **X3**. 7 = **X4** (default).
7	Pulse dial make/break ration (**&P<value>**).	0 = 33/67 make/break ratio (**&P1** and **&P2**) (default). 1 = 39/61 make/break ratio.

S-Registers (continued)

S-Register Definitions (continued)

S24—Timer to Control Sleep Mode

This register contains the number of seconds of inactivity (no characters sent from the DTE or 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 s. This is done for compatibility with previous products which allowed time-outs down to 1 s.

- Range: 0, 5—65.
- Default: 60.
- Units: seconds.

Note: This register is not applicable to serial modems unless they have a debug board.

S28—V.34 Modulation Enable/Disable

This register enables/disables V.34 modulation.

- Range: 0—1.
- Default: 1.

Table 167. S28 Values

Value	Function
0	Disable V.34 modulation.
1	Enable V.34 modulation.

S30—Inactivity Timer

This register 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 buffer mode.

Note: This register's default value may vary based on country selection.

- Range: 0—255.
- Default: 0 (disabled)*.
- Units: minutes.

S32—Synthetic Ring Volume

S32 specifies a synthetic ring volume. It provides a synthetic ring volume in dB with an implied minus sign. The default is 10.

- Range: 0—255.
- Default: 10.
- Units: dB.

* The register default shown here is for North America.

S-Registers (continued)

S-Register Definitions (continued)

S33—Synthetic Ring Frequency

This register specifies a synthetic ring frequency. Register values from one to five select a unique ring frequency.

- Range: 0—5.
- Default: 0 (disabled).

S35—Data Calling Tone

Data calling tone is a tone of a 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 0.5 s on and 2.0 s off. The setting of the homologation parameter 1f, calling tone flag, determines if S35 is enabled. If the calling tone flag is set to 1, this register is valid. Otherwise, this register has no effect.

Note: This register's default value is dependent on country selection.

- Range: 0—1.
- Default: 0*.

S36—Negotiation Fallback

S36 specifies the action to take in the event of negotiation failure when error control is selected.

S36 is used in conjunction with S48, LAPM error control and feature negotiation, to negotiate certain connection types. Refer to Table 175, Register S36 and S48 Configuration Settings, on page 87 for the settings of each connection type.

- Range: 0—7.
- Default: 7.

Table 168. Register S36 Values

Register S36 Settings	S48 = 7	S48 = 128
S36 = 0, 2	LAPM or hang-up.	Do not use.
S36 = 1, 3	LAPM or asynchronous.	Asynchronous.
S36 = 4, 6	LAPM, *MNP*, or hang-up.	*MNP* or hang-up.
S36 = 5, 7	LAPM, *MNP*, or asynchronous.	*MNP* or asynchronous.

S37—Dial Line Rate

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

- Range: 0—19.
- Default: 0.

* The register default shown here is for North America.

S-Registers (continued)

S-Register Definitions (continued)

S37—Dial Line Rate (continued)

Table 169. Register S37 Values

Value	Rate	Value	Rate
0	Auto rate (default).	10	12000 bits/s.
1	Reserved.	11	14400 bits/s.
2	1200/75 bits/s (V.23).	12	16800 bits/s.
3	300 bits/s.	13	19200 bits/s.
4	Reserved.	14	21600 bits/s.
5	1200 bits/s.	15	24000 bits/s.
6	2400 bits/s.	16	26400 bits/s.
7	4800 bits/s.	17	28800 bits/s.
8	7200 bits/s.	18	31200 bits/s.
9	9600 bits/s.	19	33600 bits/s.

S38—56K Downstream Rate

Once a connections type (V.90) is determined, use register S38 to force a particular downstream rate. A value of zero disables both connection types and allows a more reliable V.34 connection. The default value of one 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.

- Range: 0—23.

- Default: 1.

Table 170. Register S38 Values

Value	INF File's HKR Value	V.90 Downstream Rate
0	—	V.90 disabled
1	—	Automatic rate selection (default)
2	60,6d,00,00	28 kbits/s
3	95,72,00,00	29.333 kbits/s
4	CA,77,00,00	30.666 kbits/s
5	—	32 kbits/s
6	35,82,00,00	33.333 kbits/s
7	6A,87,00,00	34.666 kbits/s
8	—	36 kbits/s
9	D5,91,00,00	37.333 kbits/s
10	0A,97,00,00	38.666 kbits/s
11	—	40 kbits/s
12	75,A1,00,00	41.333 kbits/s
13	AA,A6,00,00	42.666 kbits/s
14	—	44 kbits/s
15	15,B1,00,00	45.333 kbits/s

S-Registers (continued)

S-Register Definitions (continued)

S38—56K Downstream Rate (continued)

Table 170. Register S38 Values (continued)

Value	INF File's HKR Value	V.90 Downstream Rate
0	—	V.90 disabled
1	—	Automatic rate selection (default)
2	60,6d,00,00	28 kbits/s
3	95,72,00,00	29.333 kbits/s
4	CA,77,00,00	30.666 kbits/s
5	—	32 kbits/s
6	35,82,00,00	33.333 kbits/s
7	6A,87,00,00	34.666 kbits/s
8	—	36 kbits/s
9	D5,91,00,00	37.333 kbits/s
10	0A,97,00,00	38.666 kbits/s
11	—	40 kbits/s
12	75,A1,00,00	41.333 kbits/s
13	AA,A6,00,00	42.666 kbits/s
14	—	44 kbits/s
15	15,B1,00,00	45.333 kbits/s
16	4A,B6,00,00	46.666 kbits/s
17	—	48 kbits/s
18	B5,C0,00,00	49.333 kbits/s
19	EA,C5,00,00	50.666 kbits/s
20	—	52 kbits/s
21	55,D0,00,00	53.333 kbits/s
22	8A,D5,00,00	54.666 kbits/s
23	—	56 kbits/s

The number of robbed-bit signaling (RBS) frames detected decreases the true DCE rate as shown in Table 171.

Table 171. RBS Frames Detected

RBS Links	Rate Hit	RBS Links	Rate Hit
0	0 kbits/s	4	6 kbits/s
1	2 kbits/s	5	8 kbits/s
2	4 kbits/s	6	8 kbits/s
3	4 kbits/s		

For example, if S38 = 10 and there are three RBS links, the V.90 downstream rate will be 34.666 Kbits/s (38.666 kbits/s – 4 kbits/s). The exception to this is for 32 kbits/s and 34 kbits/s rates, which are the true rates regardless of the number of RBS frames detected.

S-Registers (continued)

S-Register Definitions (continued)

S42—Auto Rate

This command is used for testing and debugging only.

Retrain operation is disabled or enabled in data mode, and fallback is disabled in data mode.

- Range: 0—1.
- Default: 1.

Table 172. Register S42

Value	Function
S42 = 0	Auto rate disabled.
S42 = 1	Auto rate enabled (default).

S43—Auto Mode

This command is used for testing and debugging only.

V.32bis start-up auto mode operation is disabled.

- Range: 0—1.
- Default: 1.

Table 173. Register S43

Value	Function
S43 = 0	Auto mode disabled.
S43 = 1	Auto mode enabled (default).

S48—LAPM Error Control and Feature Negotiation

S48 enables or disables error control and feature negotiation. It works in conjunction with S36 to determine the type of error correction method to use. Table 175 show how the values of S48 and S36 interact to select the error control method.

- Range: 7, 128.
- Default: 7.

Table 174. Register S48

Value	Description
S48 = 7	Enable negotiation (default).
S48 = 128	Disable negotiation. Forces immediate fallback options specified in S36.

S-Registers (continued)

S-Register Definitions (continued)

S48—LAPM Error Control and Feature Negotiation (continued)

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

Table 175. Register S36 and S48 Configuration Settings

Register S36 Settings	S48 = 7	S48 = 128
S36 = 0, 2	LAPM or hang-up.	Do not use.
S36 = 1, 3	LAPM or asynchronous.	Asynchronous.
S36 = 4, 6	LAPM, *MNP*, or hang-up.	*MNP* or hang-up.
S36 = 5, 7	LAPM, *MNP*, or asynchronous.	*MNP* or asynchronous.

S89—Timer to Control Sleep Mode

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

If a number between 1 and 4 is entered for this register, the value will be set to 5, and 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: 60.

- Unit: seconds.

S90—Read-Only Local Phone

This register tells the status of the local phone. It is read-only.

- Range: 0, 1.

Table 176. S90 Values

Value	Function
0	Local phone is on-hook.
1	Local phone is off-hook.

S91—Line Transmit Level

Register S91 is effective only for Japan. It specifies the line transmit level in dBm with an implied minus sign.

- Range: 6—15 (corresponding to –6 dBm to –25 dBm transmit level).

- Default: 15 (–15 dBm transmit level).

- Units: –dBm.

S-Registers (continued)

S-Register Definitions (continued)

S109—Debug Register

To debug host-based designs, Agere Systems provides a debug driver and a debug utility. The debug utility obtains and stores operating information from the modem. S109 selects the type of information that the modem supplies to the debug utility.

The debug utility and driver are dependent on the operating system. To obtain the appropriate utility and driver combination contact your local FAE.

■ Range: 0—3

■ Default: 0

Table 177. S109 Values

Value	Function
0	Turn off debug register.
1	Log the V.90 training state variables.
2	Log the mean-square error (MSE) of received signal once per second.
3	Select options 1 and 2.

Table 178. Debug Utilities by Operating Systems

Operating System	Debug Utility
Win9x	mdmdebug.exe
Win 2000	mdm32.exe
Win NT 4.0	NT_debug.exe

Result Codes

The host-based controller AT command handler responds to commands from the caller and to activity on the line via result codes. Table 179 presents a summary of these result codes.

Two forms of each result code are available. The long-form, or verbose, response is given when V1 is selected, and the short-form, data-like numeric response is given when V0 is selected. The long-form code is preceded and terminated by the sequence <CR> <LF>. The short-form is also terminated by <CR>, but it has no preceding sequence. If result codes are suppressed, nothing is returned to the caller.

Table 179. Result Code Summary

Result Code	Numeric Code	Description
OK	0	Acknowledges the execution of a command line.
CONNECT	1	Modem connected to line.
RING	2	Incoming ring signal has been detected.
NO CARRIER	3	Modem lost carrier signal, does not detect carrier signal, or does not detect answer tone.
ERROR	4	Invalid command.
CONNECT 1200 EC*	5	Connection at 1200 bits/s.
NO DIALTONE	6	No dial tone detected.
BUSY	7	Busy signal detected.
NO ANSWER	8	Remote end never answered.
CONNECT 2400 EC*	10	Connection at 2400 bits/s.
CONNECT 4800 EC*	11	Connection at 4800 bits/s.
CONNECT 9600 EC*	12	Connection at 9600 bits/s.
CONNECT 14400 EC*	13	Connection at 14400 bits/s.
CONNECT 19200 EC*	14	Connection at 19200 bits/s.
CONNECT 7200 EC*	24	Connection at 7200 bits/s.
CONNECT 12000 EC*	25	Connection at 12000 bits/s.
CONNECT 16800 EC*	86	Connection at 16800bits/s.
CONNECT 300 EC*	40	Connection at 300 bits/s.
CONNECT 21600 EC*	55	Connection at 21600 bits/s.
CONNECT 24000 EC*	56	Connection at 24000 bits/s.
CONNECT 26400 EC*	57	Connection at 26400 bits/s.
CONNECT 28800 EC*	58	Connection at 28800 bits/s.
CONNECT 31200 EC*	59	Connection at 31200 bits/s.
CONNECT 33600 EC*	60	Connection at 33600 bits/s.
CONNECT 38400 EC*	28	Connection at 38400 bits/s (DTE rate).
CONNECT 57600 EC*	18	Connection at 57600 bits/s (DTE rate).
CONNECT 115200 EC*	87	Connection at 115200 bits/s (DTE rate).

* EC only appears when the extended result codes configuration option is enabled. EC is replaced by one of the following symbols, depending on the error control method used:
    —V42bis—V.42 error control and V.42bis data compression.
    —V42—V.42 error control only.
    —*MNP* 5—*MNP* class 4 error control and *MNP* class 5 data compression.
    —*MNP* 4—*MNP* class 4 error control only.
    —NoEC—no error control protocol.

Result Codes (continued)

Table 179. Result Code Summary (continued)

Result Code	Numeric Code	Description
DELAYED	88	Delay is in effect for the dialed number.
BLACKLISTED	89	Dialed number is blacklisted.
BLACKLIST FULL	90	Blacklist is full.
CONNECT 32000 EC*	70	Connection at 32000 bits/s (K56flex mode) or V.90.
CONNECT 34000 EC*	71	Connection at 34000 bits/s (K56flex mode).
CONNECT 36000 EC*	72	Connection at 36000 bits/s (K56flex mode) or V.90.
CONNECT 38000 EC*	73	Connection at 38000 bits/s (K56flex mode).
CONNECT 40000 EC*	74	Connection at 40000 bits/s (K56flex mode) or V.90.
CONNECT 42000 EC*	75	Connection at 42000 bits/s (K56flex mode).
CONNECT 44000 EC*	76	Connection at 44000 bits/s (K56flex mode) or V.90.
CONNECT 46000 EC*	77	Connection at 46000 bits/s (K56flex mode).
CONNECT 48000 EC*	78	Connection at 48000 bits/s (K56flex mode) or V.90.
CONNECT 50000 EC*	79	Connection at 50000 bits/s (K56flex mode).
CONNECT 52000 EC*	80	Connection at 52000 bits/s (K56flex mode) or V.90.
CONNECT 54000 EC*	81	Connection at 54000 bits/s (K56flex mode).
CONNECT 56000 EC*	82	Connection at 56000 bits/s (K56flex mode).
CONNECT 28000 EC*	100	Connection at 28000bits/s (V.90 mode).
CONNECT 29333 EC*	101	Connection at 29333 bits/s (V.90 mode).
CONNECT 30666 EC*	102	Connection at 30666 bits/s (V.90 mode).
CONNECT 33333 EC*	103	Connection at 33333bits/s (V.90 mode).
CONNECT 34666 EC*	104	Connection at 34666 bits/s (V.90 mode).
CONNECT 37333 EC*	105	Connection at 37333 bits/s (V.90 mode).
CONNECT 38666 EC*	106	Connection at 38666 bits/s (V.90 mode).
CONNECT 41333 EC*	107	Connection at 41333 bits/s (V.90 mode).
CONNECT 42666 EC*	108	Connection at 42666 bits/s (V.90 mode).
CONNECT 45333 EC*	109	Connection at 45333 bits/s (V.90 mode).
CONNECT 46666 EC*	110	Connection at 46666 bits/s (V.90 mode).
CONNECT 49333 EC*	111	Connection at 49333 bits/s (V.90 mode).
CONNECT 50666 EC*	112	Connection at 50666 bits/s (V.90 mode).
CONNECT 53333 EC*	113	Connection at 53333 bits/s (V.90 mode).
CONNECT 54666 EC*	114	Connection at 54666 bits/s (V.90 mode).

* EC only appears when the extended result codes configuration option is enabled. EC is replaced by one of the following symbols, depending on the error control method used:
    —V42bis—V.42 error control and V.42bis data compression.
    —V42—V.42 error control only.
    —*MNP* 5—*MNP* class 4 error control and *MNP* class 5 data compression.
    —*MNP* 4—*MNP* class 4 error control only.
    —NoEC—no error control protocol.

Voice Command Examples

The application issues AT commands to request actions by the modem, and the modem responds with standard V.250 result codes to tell the application that the requested action has been completed.

Notes for Speakerphone Examples

1. If the user decides to pick up his local (parallel) phone while in the middle of a speakerphone call, the DCE will sense the transition and send the application a <DLE>-H sequence. The application, which should always be screening for DLE-shielded codes in the background when the modem is in the voice mode, can then respond to the <DLE>-H (for example, by resetting speakerphone buttons or doing whatever else needs to be done with the speakerphone interface).

2. DLE-shielded codes that the modem will send to the application while in speakerphone mode are as follows.

Table 180. DLE-Shielded Codes

Command	Description
DLE - c	FAX calling tone detect.
DLE - e	Data calling tone detect.
DLE - h	Local phone went on-hook (hung up).
DLE - H	Local phone went off-hook (picked up).

3. When the user is in the middle of a speakerphone call, call waiting (hold operation) can be initiated when the user hears the call-waiting signal through the speaker. Call waiting entails the following communication between the application and the modem.

Command/Response	Description
ATD!	Put the current call on hold, and answer the new incoming call.
OK	DCE responds. Original call is on hold, and the speakerphone user is connected to the second call.

To terminate the second call and return to the first, the application should again send the modem the ATD! command.

Command/Response	Description
ATD!	Terminate the second call and return to the original call.
OK	DCE responds. Second call is terminated and the user is again connected to the original call.

Voice Command Examples (continued)

Example #1: Initiating a Speakerphone Call (with Phone Muting During Conversation)

The speakerphone application is loaded. The modem is initially idle in data mode. The user then decides to pick up the phone to place a speakerphone call. Picking up the phone should initiate the following chain of events.

Command/Response	Description
AT+FCLASS=8	The modem enters voice mode.
OK	DCE responds. Now in voice mode.
AT+VGT=128	Set speaker volume to normal level.
OK	DCE responds. Volume level is set.
AT+VLS=7	Attach internal speaker and microphone, DCE off-hook.
OK	DCE responds. Now in speakerphone mode. Phone off hook, dial tone audible, speaker and microphone ready to use.
ATD5551234	Provide dial string for DCE to place the call.
OK	DCE responds. Number is dialed.

The call is placed through the phone network. The caller can hear ringback or busy signal from the phone being called. If the person at the other end picks up the phone, the caller and the person at the other end converse. If the speakerphone user decides to mute his speakerphone, the application sends the following to mute the speaker-phone.

Command/Response	Description
AT+VLS=5	Enter mute mode. Microphone is disconnected from the line, leaving the speaker only.
OK	DCE responds. The microphone is no longer connected to the line, and the speakerphone is mute.

After a while, the speakerphone user decides to turn the microphone back on (mute off). This is done when the application issues the following command.

Command/Response	Description
AT+VLS=7	No mute. Microphone is reattached to system along with speaker.
OK	DCE responds. Speakerphone with both microphone and speaker is operational.

The conversation ends, and the user hangs up.

Command/Response	Description
ATH	Application tells the modem to terminate the call with standard AT command.
OK	DCE responds.

The speakerphone is now on-hook. The speaker and microphone have been detached from the system, and the modem is now in data mode (+FCLASS=0).

Voice Command Examples (continued)

Example #2: Initiating a Stored Number Speakerphone Call

The speakerphone application is loaded. The modem is initially idle in data mode. The user then decides to place a speakerphone call either by entering the number without going off-hook first or by selecting a number previously stored in the application. When the user tells the application to dial, the following events occur:

Command/Response	Description
ATD5551234;	Provide a dial string appended with a semicolon (;) for the DCE to place the call and go to command mode.
OK	The DCE responds, and the number is dialed.

The call is placed through the phone network in data mode. The modem stays in command mode, and the application should wait for the OK before sending next command.

Command/Response	Description
AT+FCLASS=8	Put the modem into voice mode.
OK	DCE responds: the modem is now in voice mode.
AT+VGT=128	Set the speaker volume to normal level.
OK	DCE responds: the volume level is set.
AT+VLS=7	Start the speakerphone by attaching the internal speaker and microphone to the line; DCE off-hook.
OK	DCE responds: speakerphone mode is active. The phone is off hook; dial tone is audible, and the speaker and microphone are ready to use.

The caller can hear ringback or busy signal from the phone being called. If the person at the other end picks up, the caller and the person on the other end converse. The conversation then ends, and the speakerphone user hangs up.

Command/Response	Description
ATH	The application tells the modem to terminate the call with a standard AT command.
OK	DCE responds: The speakerphone is now on-hook. The speaker and microphone have been detached from the system, and the modem is now in data mode (+FCLASS = 0).

Voice Command Examples (continued)

Example #3: Answering a Speakerphone Call

The speakerphone application is loaded. The modem is initially idle in data mode. In this mode, the modem is always screening for incoming calls.

Command/Response	Description
RING	DCE reports ringing from remote station. The user decides to pick-up the phone, which should initiate the following:
AT+FCLASS=8	Modem enters voice mode.
OK	DCE responds. Now in voice mode.
AT+VGT=128	Speaker volume set to normal.
OK	DCE responds. Volume level is set.
AT+VLS=7	Call is answered. Attach internal speaker and microphone to the line, DCE off-hook.
OK	DCE responds. Now in speakerphone mode, connected to the line (call is answered).

The speakerphone user picks up the phone and hears the caller from the other end. Conversation continues for awhile. When it ends, the speakerphone user hangs up.

Command/Response	Description
ATH	DTE issues standard command to terminate call.
OK	DCE responds. Speakerphone goes on-hook. Speaker and microphone are detached from system, and modem returns to data mode (+FCLASS=0).

Note: When the local phone goes off-hook in the middle of a speakerphone call, the speakerphone disconnects, and the DCE returns <DLE>-H to the DTE.

When the speakerphone is on, call waiting (hold operation) is initiated by the following:

Command/Response	Description
ATD!	DTE sends hold command to DCE.
OK	DCE responds.

Example #4: Receiving an Incoming FAX Call in Speakerphone or TAD Mode and Switching to FAX Mode

In this example, the sequence begins at the point of the user or telephone answering device (TAD) taking the speakerphone off-hook and detecting a FAX calling tone from the other end.

Command/Response	Description
<DLE>-c	DCE detects FAX calling tone from the remote FAX and informs the application by sending DLE-c sequence.
AT+FCLASS=1	Application switches modem out of voice mode and into FAX mode.
OK	DCE responds. Now in FAX mode, still off-hook and connected to incoming call.
ATA	Application instructs modem to answer FAX call using standard AT commands.
OK	DCE responds. The call is answered, and modem continues with procedures to establish connection and receive FAX transmission. The application software will then take care of disconnecting the call when the FAX is done, and returns to data mode (+FCLASS=0).

Voice Command Examples (continued)

Example #5: Receiving an Incoming Data Call in Speakerphone or TAD Mode and Switching to Data Mode

In this example, the sequence begins at the point of the user or telephone answering device (TAD) taking the speakerphone off-hook and detecting a data calling tone from the other end.

Command/Response	Description
`<DLE>-e`	DCE detects data calling tone from the remote modem and informs the application by sending DLE-e sequence.
`AT+FCLASS=0`	Application switches modem out of voice mode and into data mode.
`OK`	DCE responds. Now in data mode, still off-hook and connected to incoming call.
`ATA`	Application instructs modem to answer data call using standard AT commands.
`CONNECT`	DCE responds. The call is answered, and modem continues with procedures to establish connection.

Example #6: Switching from Speakerphone Mode to TAD Mode

In this example, the sequence begins at the point of the user in speakerphone mode and at some point in time wants to put the other end in hold. The application may switch to TAD mode in hold state and play some music wave file to the line.

Command/Response	Description
`AT+VLS=1`	Applications switches modem out of speakerphone mode and into TAD mode.
`OK`	DCE responds. Now in TAD mode.
`AT+VTX`	DTE selects voice transmit mode.
`CONNECT`	DCE responds.
`<Data>`	DTE plays music through modem to remote caller.
`<DLE><ETX>`	DTE indicates end of voice transmit data.
`OK`	DCE acknowledges switch back to voice command state.

The application may switch back to speakerphone mode by following the example to switch from TAD mode to speakerphone mode.

Voice Command Examples (continued)

Example #7: Call Screening and Recording a Message using TAD—IS101 <dle> Shielded Method

The TAD application is loaded. The modem is initially idle in data mode (+FCLASS=0).

Command/Response	Description
RING	DCE reports ringing from remote station.
AT+FCLASS=8	The modem enters voice mode.
OK	DCE responds.
AT+VGT=128	Set speaker volume to normal.
OK	DCE responds.
AT+VSM=132,8000	DTE selects IMA ADPCM with 8.0 kHz sampling rate.
OK	DCE responds.
AT+VSD=128,0	DTE selects normal silence detection sensitivity, and a silence detection interval of 0 seconds. Disable silence detection.
OK	DCE responds.
<DLE>-R	DCE detects another ring and notifies DTE.
AT+VLS=1	The modem answers the call.
OK	DCE is off-hook.

The TAD next plays its greeting message, issues a beep, and records the caller's message.

Command/Response	Description
AT+VTX	DTE selects voice transmit mode.
CONNECT	DCE responds.
<Data>	DTE plays greeting through modem to remote caller.
<DLE><ETX>	DTE indicates end of voice transmit data.
OK	DCE acknowledges switch back to voice command state.
AT+VTS=[933,0,120]	DTE annotates greeting message with a 1.2 second beep.
OK	DCE responds.
AT+VSD=128,50	DTE selects normal silence detection sensitivity and a silence detection interval of 5 seconds. Enable silence detection.
OK	DEC responds.
AT+VLS=5	The speaker is attached to the system, and the modem is off-hook.
OK	DCE is off-hook.
AT+VRX	DTE selects voice receive mode.
CONNECT	DCE agrees.
<Data>	DCE delivers <DLE> shielded voice message to DTE.

Voice Command Examples (continued)

Example #7: Call Screening and Recording a Message using TAD—IS101 <dle> Shielded Method (continued)

The caller leaves a message and hangs up. The modem detects silence for a specified period of time, and then notifies the DTE that the message being recorded has ended.

Command/Response	Description
`<DLE>-s`	DCE issues presumed end of message after silence detection interval has elapsed.
`<DLE>-!`	DTE signals end of voice receive state.
`<DLE><ETX>`	DCE ends voice transmission to DTR, with this code, and returns back to voice command state.
`ATH`	DTE issues standard command to terminate call. Speakerphone goes on-hook, speaker and microphone are detached from system, and modem returns to data mode (+FCLASS=0).
`OK`	DCE responds.

Example #8: Call Screening and Recording a Message with TAD Using the Wave Driver to Transmit and Receive Voice Samples

The TAD application is loaded. The modem is initially idle in data mode (+FCLASS=0).

Command/Response	Description
`RING`	DCE reports ringing from remote station.
`AT+FCLASS=8`	The modem enters voice mode.
`OK`	DCE responds.
`AT+VGT=128`	Set speaker volume to normal.
`OK`	DCE responds.
`AT+VSD=128,0`	DTE selects normal silence detection sensitivity and a silence detection interval of 0 seconds. Disable silence detection.
`OK`	DCE responds.
`AT+VSM=129,8000`	DTE selects 16-bit linear voice compression with 8.0 kHz sampling rate.
`OK`	DCE responds.
`<DLE>-R`	DCE detects another ring and notifies DTE.
`AT+VLS=1`	The modem answers call.
`OK`	DCE is off-hook.

AT Voice Commands (continued)

Example #8: Call Screening and Recording a Message with TAD Using the Wave Driver to Transmit and Receive Voice Samples (continued)

The TAD next plays its greeting message, issues a beep, and records the caller's message. The application may transmit voice samples using the wave driver. The application may issue WAVE_OUT_OPEN and WAVE_OUT_WRITE messages to the wave driver. At the end of the greeting message, the application may issue the WAVE_OUT_STOP message to the wave driver.

Command/Response	Description
AT+VTS=[933,0,120]	DTE annotates greeting message with a 1.2 second beep.
OK	DCE responds.

The application may receive voice samples using the wave driver. The application may issue WAVE_IN_OPEN and WAVE_IN_START messages to the wave driver.

Command/Response	Description
AT+VSD=128,50	DTE selects normal silence detection sensitivity and a silence detection interval of 5 seconds. Enable silence detection.
OK	DCE responds.
AT+VLS=5	Speaker is attached to system, and modem is off-hook.
OK	DCE is off-hook.

The caller leaves a message and hangs up. The modem detects silence for a specified period of time, and then notifies the DTE.

Command/Response	Description
<DLE>-s	DCE issues presumed end of message after silence detection interval has elapsed.

At the end of the message, the application may issue the WAVE_IN_STOP message to the wave driver.

Command/Response	Description
ATH	DTE issues standard command to terminate call. DCE goes on-hook, speaker and microphone are detached from system, and modem returns to data mode (+FCLASS=0).
OK	DCE response.

AT Command Cross Reference Tables

Table 181. Data and General Commands

Command	Description	Reference*
A/	Repeat last command.	—
A	Answer.	V.250 (05/99)
B	Communication standard setting.	—
C	Carrier control.	—
D	Dial.	V.250 (05/99)
E	Echo command.	V.250 (05/99)
F	On-line data character echo command.	—
H	Hook control.	V.250 (05/99)
I	Request ID information.	V.250 (05/99)
L	Speaker volume.	V.250 (05/99)
M	Speaker control.	V.250 (05/99)
N	Modulation handshake.	—
O	Return to on-line data mode.	V.250 (05/99)
P	Select pulse dialing.	V.250 (05/99)
Q	Result code control.	V.250 (05/99)
T	Select tone dialing.	V.250 (05/99)
S	S register control.	V.250 (05/99)
V	DCE response format.	V.250 (05/99)
W	Result code option.	—
X	Extended result code control.	V.250 (05/99)
Y	Long-space disconnect.	—
Z	Reset and recall stored profile.	V.250 (05/99)
&B	V.32 auto retrain.	—
&C	Data carrier detect (DCD) control.	V.250 (05/99)
&D	Data terminal ready (DTR) control.	V.250 (05/99)
&F	Restore factory default configuration.	V.250 (05/99)
&G	V.22bis guard tone control.	—
&J	Auxiliary relay options.	—
&K	Local flow control selection.	—
&M	Asynchronous communications mode.	—
&P	Pulse dial make-to-break ratio selection.	—
&Q	Asynchronous communications mode.	—
&S	Data set ready (DSR) option.	—
&T	Self-test commands.	—
&V	Display active configuration.	—
&W	Store current configuration.	—
&Y	Select stored profile for hard reset.	—
&Z	Store telephone number.	—
\A	Select maximum *MNP** block size.	—
\B	Send break.	—
\G	Modem port flow control.	—
\J	Adjust bits/s rate control.	—

* All references are ITU-T Recommendations unless otherwise noted.

AT Command Cross Reference Tables (continued)

Table 181. Data and General Commands (continued)

Command	Description	Reference*
\J	Adjust bits/s rate control.	—
\K	Set break control.	—
\N	Select error control mode.	—
\Q	Local flow control selection.	—
\R	Ring indicator off after answer.	—
\T	Inactivity timer.	—
\V	Protocol result code.	—
%B	View numbers in blacklist.	—
%C	Data compression control.	—
%E	Auto fallback/fallforward control.	—
-C	Data calling tone.	—
-V90	Enable/disable V.90 settings.	—
#UD	Unimodem diagnostics.	—
+A8E	V.8 and V.8bis operation control.	—
+A8T	Send V.8bis signal and/or message.	—
+DR	Data compression reporting.	V.250 (05/99)
+DS	Data compression.	V.250 (05/99)
+EB	Brake handling in error control operations.	V.250 (05/99)
+ER	Error control reporting.	—
+ES	Error control selection.	V.250 (05/99)
+ESA	Set up error control parameters.	—
+ESR	Selective repeat.	V.250 (05/99)
+ETBM	Call termination buffer management.	V.250 (05/99)
+FCLASS	Service class indicator.	V.253 (02/98)
+GCI	Country of installation.	V.250 (05/99)
+GMI	Manufacturer identification.	V.250 (05/99)
+GMM	Modem identification.	V.250 (05/99)
+GMR	Request revision information.	V.250 (05/99)
+IFC	DTE-DCE local flow control.	V.250 (05/99)
+ILRR	DTE-DCE local rate reporting.	V.250 (05/99)
+IPR	Fixed DTE rate.	V.250 (05/99)
+ITF	Transmit flow control threshold	—
+MR	Modulation reporting control	V.250 (05/99)
+MS	Modulation selection	V.250 (05/99)

* All references are ITU-T Recommendations unless otherwise noted.

AT Command Cross Reference Tables (continued)

Table 182. FAX Class 1 Commands Summary

Command	Function	Reference*
+FAA	Set DCE adaptive answer mode.	—
+FCLASS	Service class indicator.	T.31 (08/95)
+FLO	Set DTE-DCE flow control	T.31 (08/95)
+FMI	Manufacturer identification.	T.31 (08/95)
+FMM	Product identification.	T.31 (08/95)
+FMR	Version/revision information.	T.31 (08/95)
+FPR	Set DTE-DCE FAX port rate.	T.31 (08/95)
+FRH	Receive HDLC data with n carrier.	T.31 (08/95)
+FRM	Receive FAX data with n carrier.	T.31 (08/95)
+FRS	Receive silence.	T.31 (08/95)
+FTH	Transmit HDLC data with n carrier.	T.31 (08/95)
+FTM	Transmit FAX data with n carrier.	T.31 (08/95)
+FTS	Transmission silence.	T.31 (08/95)

Table 183. AT Voice Commands Summary

Command	Description	Reference*
+FCLASS=8	Enter voice mode.	V.253 (02/98)
+VCID	Caller-ID.	V.253 (02/98)
+VDR	Distinctive ring.	V.253 (02/98)
+VEM	Event reporting and masking.	IS-101
+VGM	Microphone gain.	—
+VGR	Receive gain selection.	V.253 (02/98)
+VGS	Speaker gain.	—
+VGT	Speaker volume control.	V.253 (02/98)
+VIP	Initialize voice parameters.	—
+VIT	DTE/DCE inactivity timer.	V.253 (02/98)
+VNH	Automatic hang-up control.	V.253 (02/98)
+VLS	Analog source/destination selection and DTMF/tone reporting.	V.253 (02/98)
+VPR	Select DTE/DCE interface rate.	—
+VRA	Set ringback goes away timer.	V.253 (02/98)
+VRN	Set ringback never came timer.	V.253 (02/98)
+VRX	Enter voice receive state.	V.253 (02/98)
+VSD	Set silence detection timer.	V.253 (02/98)
+VSM	Voice compression method.	V.253 (02/98)
+VSP	Speakerphone on/off.	—
+VTD	Set beep tone duration timer.	V.253 (02/98)
+VTR	Start full-duplex voice transmission and reception process.	—
+VTS	DTMF/tone generation.	V.253 (02/98)
+VTX	Enter voice transmit state.	V.253 (02/98)

* All references are ITU-T Recommendations unless otherwise noted.

AT Command Cross Reference Tables (continued)

Table 184. T.35 Country Code Table

TAPI Code (decimal)	Country	T.35 code used in +GCI (hex)	Modem internal CountryID
0	Europe	none	0x2A
54	Argentina	07	0x33
61	Australia	09	0x01
43	Austria	0A	0x0F
880	Bangladesh	0D	0x4C
104	Barbados	0E	0x46
375	Belarus	none	0x4E
32	Belgium	0F	0x02
591	Bolivia	14	0x34
55	Brazil	16	0x2B
359	Bulgaria	1B	0x2C
107	Canada	20	0x1C
56	Chile	25	0x35
57	Colombia	27	0x36
506	Costa Rica	2B	0x40
385	Croatia	none	0x4F
357	Cyprus	2D	0x2D
420	Czech Republic	2E	0x28
45	Denmark	31	0x03
593	Ecuador	35	0x37
20	Egypt	36	0x45
372	Estonia	none	0x51
358	Finland	3C	0x04
33	France	3D	0x05
49	Germany	42	0x06
30	Greece	46	0x21
124	Guam	48	0x47
502	Guatemala	49	0x3F
852	Hong Kong	50	0x1B
36	Hungary	51	0x22
354	Iceland	52	0x2E
91	India	53	0x1E
62	Indonesia	54	0x17
353	Ireland	57	0x1A
972	Israel	58	0x30
39	Italy	59	0x08
81	Japan	00	0x10
82	Korea	61	0x12
965	Kuwait	62	0x48
371	Latvia	none	0x52
961	Lebanon	64	0x4D
423	Liechtenstein	68	0x42

AT Command Cross Reference Tables (continued)

Table 184. T.35 Country Code Table (continued)

TAPI Code (decimal)	Country	T.35 code used in +GCI (hex)	Modem internal CountryID
352	Luxembourg	69	0x29
60	Malaysia	6C	0x13
356	Malta	70	0x53
52	Mexico	73	0x1D
212	Morocco	77	0x54
31	Netherlands	7B	0x07
64	New Zealand	7E	0x09
505	Nicaragua	7F	0x41
47	Norway	82	0x0A
968	Oman	83	0x4B
92	Pakistan	84	0x32
507	Panama	85	0x38
595	Paraguay	87	0x3B
86	People's Republic of China	26	0x11
51	Peru	88	0x39
63	Philippines	89	0x20
48	Poland	8A	0x25
351	Portugal	8B	0x18
121	Puerto Rico	8C	0x3D
40	Romania	8E	0x49
7	Russia	none	0x2F
966	Saudi Arabia	98	0x31
65	Singapore	9C	0x14
389	Slovakia	none	0x27
386	Slovenia	none	0x26
27	South Africa	9F	0x24
34	Spain	A0	0x0B
94	Sri Lanka	A1	0x4A
46	Sweden	A5	0x0C
41	Switzerland	A6	0x0D
886	Taiwan	none	0x15
66	Thailand	A9	0x16
90	Turkey	AE	0x23
921	UAE (United Arab Emirates)	B3	0x43
380	Ukraine	B2	0x44
44	United Kingdom	B4	0x0E
1	United States of America	B5	0x19
598	Uruguay	B7	0x3C
123	US Virgin Islands	none	0x3E
58	Venezuela	BB	0x3A
84	Vietnam	BC	0x1F