

# Chapter 11

## V.25 bis Autodialer

### GENERAL

V.25 bis is an option that allows dialing functions to be controlled using synchronous data.

Select V.25 bis through the appropriate *&M* command in the AT command set (Chapter 5).

If using the LCD:

- Scroll through the menu to Main Menu 5, MODIFY CONFIGURATION.
- Advance to and enter the DTE PARAMETERS submenu.
- Select SYNC DATA.
- Advance to DIAL METHOD.
- Select either V.25 BISYNC DIALER or V.25 SDLC DIALER or V.25 ASYNC DIALER and then select either ASCII or EBCDIC character format.



#### Note

*The modem must be configured as V.25 SDLC ASCII NRZ for use with an AS400 IBM computer.*

### Autodialer Command Strings and Parameters

Most command strings for the autodialer include two parts: the command itself and the parameter(s) that follow. For the purposes of this chapter, parameters can be telephone numbers or anything appropriate to V.25 bis as described in the following text. Parameters are separated by semicolons.

For example:

PRN a; nnn . . . n    where a = the phone number address in memory and nnn . . . n = the phone number

The a and the nnn . . . n are both parameters.

Not all commands have parameters. For example the CIC command has no parameter.

## GUIDELINES

Use the following guidelines when working with V.25 bis software:

- An indicator enclosed in less than/greater than signs represents a specific character in the appropriate character set, ASCII or EBCDIC.

<sp> - space

- Each response below is considered an individual message per V.25 bis conventions. A dial command with intermediate call progress enabled (BISYNC mode ASCII/EBCDIC character set) is illustrated:

From DTE

To DTE

<sy><sy><stx>CRN<sp>(205)555-0124<etx>

<sy><sy><stx>VAL<etb>

<sy><sy><stx>CNX<sp>@9600BPS<etx>

- Spaces in a command from the DTE are optional and ignored.
- Command strings can be upper or lower case. Responses are always upper case.
- V.25 bis commands are implemented in the following data formats:  
ASYNC  
BISYNC  
SDLC        NRZ  
SDLC        NRZI  
in ASCII or EBCDIC

- The separator fields are data format dependent.

for ASYNC {sep} = command <CR>  
 BISYNC {sep} = <sy><sy><stx>command <etx>  
 SDLC {sep} = <Flags><Addr><ctl>command <FCS>

Where: <sy> = 16 hexadecimal  
 <stx> = 02 hex  
 <etx> = 03 hex  
 <etb> = 17 hex  
 <Flag> = 7E hex  
 <Addr> = FF hex  
 <ctl> = 13 hex (last frame), 03 hex (not last frame)  
 <FCS> = Frame Check Sequence  
 <CR> = Carriage Return

### Invalid Responses Explanations

Except when stated otherwise, the following explanations for invalid *INV* responses apply:

- INVCU* Any transmission error (parity, framing, etc.).
- INVMS* Receiving too many characters for any command.
- INVMS* Any command followed by a semicolon ;
- INVPS* This message has one of three possible meanings:
- Any parameter set ending with a semicolon ;
  - Any parameter set containing too many or not enough parameters; this includes
    - any command entered without parameters that requires parameters
    - any command entered with parameters that does not require parameters.
  - Any parameter containing too many characters.

*INVPV* This message has one of three possible meanings:

- Any parameter set containing invalid characters
- Any parameter or parameter set containing no valid (only ignored) characters
- Any parameter set containing an out-of-range parameter

## DIAL PARAMETERS

Table 11-1 lists and describes the parameters used in autodialing. The memory available for dialing can hold up to 40 characters. Parameters inserted for readability are not counted.

*Table 11-1. V.25 bis Dial Parameters*

Character	Function
0 thru 9	DTMF and pulse digit
* and #	DTMF digit
:	Wait for dial tone
W	Wait for 2nd type of dial tone
>	Pause for 1 second
=	Pause for 3 seconds
<	Pause for programmed delay time
P	Pulse dialing
T	Tone dialing
&	Flash (go on hook) for ½ second
;	PARM separator
Space, dash, parenthesis, period	Parameters inserted for readability

## V.25 BIS COMMAND AND RESPONSE DEFINITIONS

The following sections describe the commands used with the V.25 bis autodialer and explain the responses received when each command is executed.

**Dial Command CRN *nn...n***

The dial command is a *CRN* followed by the number to be dialed *nn...n*. The modem accepts up to 40 dial parameters, excluding the *CRN* command and any leading spaces.

Responses:

*VAL* Valid command received. Transmitted on receiving an error-free command with no transmission error such as a parity error. This confirmation is sent before the command is executed.

*INVCU* Invalid command - command unknown.  
Example: TRN (205)-555-0124

*INVMS* Invalid command - message syntax error.  
Examples: CRN;(205)-555-0124  
CRN; (semicolon invalid)

*INVPS* Invalid command - parameter syntax error.  
Examples: CRN (205)-555-0124  
CRN (205)-555;0124  
CRN

*INVVPV* Invalid command - parameter value error.  
Examples: CRN (205)-555-012Q  
CRN

*CFIET* Call failure - reorder or busy.

*CFIRT* Call failure - timeout occurred.

*CFINT* Call failure - no answer back tone.

*CFIDT* Call failure - no dial tone.

*CFIAB* Call failure - ABT detected but no carrier.

*INC* Incoming ring detected.

### **Program Number Command PRN *a;nn...n***

The program number command is *PRN* followed by the one digit decimal address *a* and the number to be stored *nn . . . n*. Each address can store up to 31 dial parameters. Ignored characters in the dial number are not stored. Nine stored numbers are available at addresses 1-9.

Responses:

Same as for the *CRN* command except for call progress responses.

### **Intermediate Call Progress Response**

The following response is given only if enabled. See Option Definition 002 below.

*CNX@nnnnnBPS* - where *nnnnn* is the line speed. This connect response appears after handshake completed, but before DSR is activated. This response is required if the intermediate call progress option is enabled.

### **Dial Stored Number CRS *a***

The command for dialing a stored number is *CRS* followed by the one digit address *a* for the stored number to be dialed.

Responses:

Same as for the *CRN* command plus

*CFINS*      Call failure - number not stored.

If the number is linked with other numbers, via a *PRL* command, failure responses are returned as

*{sep}a;{call progress messages} . . .*

where *a* is the address dialed, followed by the separator field and call progress messages (*CFI*, etc.).

If the call fails to connect and the number is linked with other numbers, the autodialer tries to call the next number in the list of linked numbers.

**Request List of Stored Numbers RLN**

The request list of stored numbers command is an *RLN*.

Responses:

*INVCU* Invalid command - command unknown.

Example: TLN

*INVMS* Invalid command - message syntax error.

Example: RLN;

If no number is stored at the specified address nothing is returned for that address. The separator {sep} is a

<etb><sy><sy><stx>LSN<sp>

sequence for BISYNC format (the last LSN string terminates with per V.25 bis). For synchronous bit-oriented operation, each LSN string is treated as an individual message per V.25 bis.

All stored numbers are sent to the DTE as

LSNa;nn...n{sep}a;nn...n...

where *a* is the stored number address and *nn...n* is the number stored.

**Disregard Incoming Call DIC**

The command for disregarding an incoming call does not require parameters. If no call is incoming, the command is ignored.

Responses:

*VAL* Valid command received. Transmitted on receiving an error-free command with no transmission error such as a parity error. This confirmation is sent before the command is executed.

*INVCU* Invalid command - command unknown.

Example: TIC

*INVMS* Invalid command - message syntax error.

Example: SIC;

### **Connect Incoming Call CIC**

No parameters are required. If there is an incoming call, the modem immediately answers the call. If no call is incoming, the command is ignored.

Responses:

*VAL* Valid command received. Transmitted on receiving an error-free command with no transmission error such as a parity error. This confirmation is sent before the command is executed.

*INVCU* Invalid command - command unknown.

Example: TIC

*INVMS* Invalid command - message syntax error.

Example: SIC;

### **Redial Last Number CRR *n***

The *CRR n* command redials the last number a maximum of *n* times. If no parameters are present, the modem redials once. Also, the maximum number of redials, the amount of time between redials, and other parameters may vary depending on application and national requirements if outside the U. S.

Responses:

Same as for the CRS command.

Failure response is

{sep}*r* ; {call progress messages}...

where *r* is the recall count ( $1 \leq r \leq n$ ; 1,2...,etc.), followed by a separator field and call progress messages (*CFI XX, etc.*). If the call fails to connect, this is repeated for the specified number of times.



**Link Number by Address PRL a;b**

This command links the number at address *a* with the number at address *b*. The addresses are one digit decimal values. Linking numbers enables different numbers to be dialed if a call failure occurs.

Only forward linking to one other number is allowed, so address 1 can be linked to 4 to 8 to 9 etc.; however (using this example), if address 4 is dialed by a *CRS* command without connection it links forward to 8 then to 9.

If all these fail to connect, the autodialer will not back-link to address 1 unless circular linking is used. Numbers may be linked as 4 to 5 to 3; however, if address 3 is dialed, back-linking to 5 is not allowed.

If circular linking (1 to 8 to 7 to 1) is used, dialing is discontinued after the addressed number in the dial command has been dialed twice. If only one parameter follows the *PRL* command, the number at address *a* is unlinked from its forward link.

For example, if the link list 4 to 8 to 3 to 7 to 9 to 1 exists and *PRL 7* is received, 7 would be unlinked from 9, but not from 3. This would result in two link lists: 4 to 8 to 3 to 7 and 9 to 1.

Responses:

*VAL* Valid command received. Transmitted on receiving an error-free command with no transmission error such as a parity error. This confirmation is sent before the command is executed.

*INVCU* Invalid command - command unknown.

Example: TRL 1;5

*INVMS* Invalid command - message syntax error.

Examples: PRL;1;5  
PRL;

*INVPS* Invalid command - parameter syntax error.

Examples: PRL 1;5;  
PRL 1;0;0

PRL 1;  
PRL  
PRL 001;5

*INVPV* Invalid command - parameter value error.

Examples: PRL 1;Q  
PRL Q;1  
PRL 1;45 where only addresses  
01 - 09 are defined

*CFILD* Call failure - no connection from link list.

### **Request List of Linked Numbers RLL**

The request list of linked numbers command is an *RLL* with no parameters.

Responses:

*INVCU* Invalid command - command unknown.

Example: TLL

*INVMS* Invalid command - message syntax error.

Example: RLL;

*LSL* List linked numbers.

In all *LSL* examples, if no number is stored at the specified address no response is sent. The separator field for BISYNC is an

$\langle etb \rangle \langle sp \rangle \langle sp \rangle \langle stx \rangle LSL \langle sp \rangle$

The last *LSL* string ends with per V.25 bis. For synchronous bit oriented operation, each *LSL* string is treated as an individual message per V.25 bis. All linked numbers are sent to the DTE as

$LSLa;l\{sep\}a;l$

where *a* = stored address and *l* = link address.

### **Request List of Version RLV**

The request list of version information command is an *RLV* with no parameters.

Responses:

*INVCU* Invalid command - command unknown.

Example: TLV

*INVMS* Invalid command - message syntax error.

Example: RLV;

*LSV* List version

The version information is sent to the DTE as

*LSV*<sp>*Sbbbbbb00sccppddr / comment field*

where *bbbbbb* is the board number, *s* is the series number, *cc* is the controller code revision, *pp* is the data pump code revision, *dd* is the board dash number, and *r* is the printed circuit board revision followed by a comment field.

### **MODEM OPTIONS COMMAND PRO xxx;yy;0;0..**

The program options command is *PRO* followed by the starting register address (1 to 3 decimal digits), option count (1 or 2 decimal digits) and the data for each option (1 to 3 decimal digits per option). The Options section lists all available options with definitions, possible settings, and default values.

The modem must be able to accept 40 non-ignored characters besides the *PRO* command (leading zeros and semicolons are not considered ignored characters).

Responses:

*VAL* Valid command received. Transmitted on receiving an error-free command with no transmission error such as a parity error. This confirmation is sent before the command is executed.

*INVCU* Invalid command - command unknown.

Example: TRO 0;1;1

*INVMS* Invalid command - message syntax error.

Examples: PRO;0;1;1

PRO;

*INVPS* Invalid command - parameter syntax error.

Examples: PRO 0;1;0;

PRO 0;1;1;1

PRO

PRO 0;001;1

*INVPV* Invalid command - parameter value error.

Examples: PRO 0;1;Q

PRO Q;1;1

PRO 0;0;0

PRO 68;1;0

when option 68 is undefined for the modem.

*INVPV*<sp>*xxx* Invalid command - parameter value error.

Examples: PRO 10;5;0;0;0;2;1

This invalid message can be returned when a block of options is being changed. The conditions for this invalid response are as follows:

- An undefined option number is specified. In the above example, if option 12 is undefined for a certain modem (and no other error conditions apply) options 10 and 11 would be changed as specified in the command message. The next option to be changed would be option 12. The modem would detect that this is an undefined option, stop execution of the command, and return an *INVPV012* message. Options 10 and 11 would still be changed as commanded, options 13 and 14 would be unchanged.

- An out-of-range value for a particular option is specified In the above example, if the fourth value in the option string is undefined or out-of-range for option 13 in a certain modem (and no other error conditions apply) options 10 through 12 would be changed as specified in the command message. The next option to be changed would be option 13. The modem would then detect that the value is undefined or out-of-range for that option, stop execution of the command, and return an INVPV013 message Options 10 through 12 would still be changed as commanded; options 13 and 14 would be unchanged.

### **Save Current Settings PRK**

*PRK* saves option settings current.

Responses:

*VAL* Valid command received. Transmitted on receiving an error-free command with no transmission error such as a parity error. This confirmation is sent before the command is executed.

*INVCU* Invalid command - command unknown.

Example: TRK

*INVMS* Invalid command - message syntax error.

Examples: PRK;0 PRK Q

### **Restore Factory Settings PRP *n***

*PRP n* restores current option settings to factory option set *n* where *n* is a 1 digit decimal number.



#### **Note**

*Restoring a factory option set other than factory option 9 disables the V.25 synchronous dialer.*

If no parameter follows the command, the modem automatically selects factory option set 1.

Responses:

*VAL* Valid command received. Transmitted on receiving an error-free command with no transmission error such as a parity error. This confirmation is sent before the command is executed.

*INVCU* Invalid command - command unknown.  
Example: TRP

*INVMS* Invalid command - message syntax error.  
Examples: PRP;1 PRP Q

*INVPS* Invalid command - parameter syntax error.  
Examples: PRP 1; PRP 1;1 PRP 001

*INVPV* Invalid command - parameter value error.  
Example: PRP 5

where factory default 5 is not defined for the modem.  
Current modem factory options are 1 - 9.

### **Request List of Stored Options RLO xxx; yy**

The request list of stored options command is *RLO* followed by an optional 1 to 3 digit decimal address and a 1 or 2 digit decimal count. The Options section below lists all available options with definitions, possible settings, and default values.

Responses:

*INVCU* Invalid command - command unknown.  
Example: TLO 0;1

*INVMS* Invalid command - message syntax error.  
Examples: RLO;0;1  
RLO Q;1

*INVPS* Invalid command - parameter syntax error.  
Examples: RLO 0;1;  
RLO 0;1;4  
RLO 0;001

*INVVPV* Invalid command - parameter value error.  
Examples: RLO 0;Q RLO 0;0 RLO999;45

*LSO* List stored options.

The separator {sep} for BISYNC is an

<etb><sp><sp><stx>LSO<sp>

sequence for the sync format (the last *LSO* string terminates with per V.25 bis). For synchronous bit oriented operation, each *LSO* string is treated as an individual message per V.25 bis.

If no parameters follow, all stored options are sent to the DTE as

LSOxxx;ooo{sep}xxx;ooo...

Each value must be padded with leading zeros so that each field has three characters. Option zero would be sent as

LSO000;000

If only an address follows the command, the single requested option is sent to the DTE as

LSOxxx;ooo

If address and count follow the command, the requested count of options starting with the specified address are sent to the DTE as

LSOxxx;ooo{sep}xxx;ooo...

## OPTIONS

This section lists the options for the V.25 bis autodialer. These options can be changed using the *PRO* command or listed using the *RLO* command.

- 000-001: Not applicable
- 002: Intermediate call progress messages
  - 0 - Disable
  - 1 - Enable
  - Default value = 0
- 003: Blind dial
  - 0 - Disable
  - 1 - Enable
  - Default value = 0
- 004-006: Not applicable
- 007: Long space disconnect
  - 0 - Disable
  - 1 - Enable
  - Default value = 1
- 008-019: Not applicable
- 020: Programmable / permissive operation
  - 0 - Permissive
  - 1 - Programmable
  - Default value = 0
- 021-022: Not applicable
- 023-049: Reserved for future use
- 050: Mode
  - 0 - 2-wire dial-up operation (PSTN)
  - 1 - 4-wire leased line operation
  - 2 - 2-wire leased line operation
  - Default value = 0



- 051: Primary transmit / receive rate  
(See Rate Select section below.)  
Default value = 54 (28800 bps)  
000-006: Not applicable  
007: 1200 bps  
008: 2400 bps  
009-033: Not applicable  
034: 4800 bps  
035: 9600 bps uncoded  
036: 9600 bps  
037-045: Not applicable  
046: 7200 bps  
047: 12,000 bps  
048: 14,400 bps  
049: 16,800 bps  
050: 19,200 bps  
051: 21,600 bps  
052: 24,000 bps  
053: 26,400 bps  
054: 28,800 bps  
055-999: Reserved for future use
- 052-054: Not applicable
- 055: Transmit clock  
0 - Internal  
1 - External  
2 - Receive (slave)  
Default value = 0
- 056: Leased line transmit level -  
Transmit level (0 through -30 dBm)  
(- {decimal} dBm)  
Default value = 0
- 057-062: Not applicable
- 063: Autoanswer  
0 - Disable  
1 - Enable (answer after 1 to 255 rings)  
Default value = 1

- 064: Line current disconnect  
0 - Off  
1 - Short (8 ms)  
2 - Long (90 ms)  
Default value = 2
- 065-075: Not applicable
- 076: Speaker control  
0 - Off  
1 - On  
2 - N/A  
3 - N/A  
4 - On until CD  
5 - N/A  
6 - Off while dialing  
Default value = 4
- 077: Speaker volume  
0 - Low  
1 - Medium  
2 - High  
Default value = 1
- 078-084: Not applicable
- 085: Constant carrier RTS/CTS delay  
0 to 250 ms  
Must be set in increments of 10 ms:  
10, 20, 30 . . . 250  
Default value = 0
- 086: Not applicable
- 087: DTR dropout timer  
0 to 255 in 10 ms increments  
DTR must turn off for this length of  
time to be recognized.  
Default value = 5 (50 ms)
- 088: Not applicable

- 089: Pause in dial string  
0 - Invalid  
1 to 255 seconds  
Default value = 2
- 090: Carriage return character  
(13 decimal is ASCII and EBCDIC default)
- 091: Line feed character  
(10 decimal is ASCII default;  
37 decimal is EBCDIC default)
- 092: Guard tone  
0 = None  
1 = 550 Hz  
2 = 1800 Hz  
Default value = 0
- 093: Carrier detect delay  
0 - Off 1 to 255 in increments of 10 ms  
Default value = 6 (60 ms)
- 094: Loss of carrier disconnect  
0 - Off 1 to 255 in 100 ms increments  
Default value = 14 (1.4 sec)
- 095: DTR dial address  
Stored telephone number address to dial  
on DTR off-to-on transition  
Default value = 1
- 096: DTR dial  
0 - Disable  
1 - Enable  
2 - N/A  
Default value = 0
- 097: Not applicable

- 098: Call timeout
  - 0 - Off
  - 1-255 sec
  - Default value = 30 sec
  
- 099-102: Not applicable
  
- 103: Signal quality retrain
  - 0 - Disable
  - 1 - Send training sequence on poor quality
  - Default value = 1
  
- 104-106: Not applicable
  
- 107-110: Reserved for future use
  
- 111: Modulation mode
  - 000: Automode
  - 001: V.21
  - 002: B103
  - 003: Reserved
  - 004: Reserved
  - 005: V.22
  - 006: V.22 bis
  - 007: V.27 ter
  - 008: Reserved
  - 009: V.29
  - 010: Reserved
  - 011: V.33
  - 012: V.32 bis
  - 013: V.34 (V.Fast)
  
- 112 V.34 Select Threshold
  - 000: Low
  - 001: Medium
  - 002: High
  
- 113 V.34 Asymmetric bit rates
  - 000: Disabled
  - 001: Enabled

114 - 899: Reserved for future use

900-902: Not applicable

903: Bilateral loop  
 0 - Disable  
 1 - Enable  
 Default value = 0

If enabled and a test is commanded, bilateral loop is defined as follows:

**Test Commanded      Bilateral Loop**

Loop 1	Loop 2
Loop 2	Loop 1
Loop 3	Loop 4
Loop 4	Loop 3

Loop definitions are per CCITT V.54.

904: DTE commanded remote digital loopback  
 0 - Disable  
 1 - Enable  
 Default value = 0

905: DTE commanded local analog loopback  
 0 - Disable  
 1 - Enable  
 Default value = 0

906: Remote commanded test  
 0 - Disable  
 1 - Enable  
 Default value = 1

907: Test timer  
 0 - Until DTR drops  
 TTT - 1 to 255 sec  
 Default value = 0

908: Not applicable

909-999: Reserved for future use