



Zypcom Application Note

Product: Z34-SX, Z34-SE, Z32t-SX, Z32t-SE, Z32bSX, Z32b-SE

Application: Security Callback Setup and Operation

This document explains the 10 number callback security feature. The security password command (^W) was added under the overall operation of Zscript command language. Zscript a autologon script language is expanded for answer side password and callback security operation.

Security is available in dial mode only, the Z32/Z34 can be configured to provide security — password and callback — on incoming calls using ^W Zscript command. The ^W security command is only active on incoming calls unlike the other Zscript commands.

The modem's pass-through password and callback security features will function only in asynchronous communication modes (error control and buffered async — &Q0, &Q5, &Q6, or &Q7) as is the case with all other Zscript commands.

The security features described herein provide a deterrent to unauthorized access. No communications system can be made perfectly secure. Zypcom cannot guarantee the invulnerability of any communications system. Zypcom does not assume any liability arising out of the application or use of any security functions described herein. Neither does it convey any license under its parent rights nor rights of others.

Zscript Password and Callback Security Command (^W)

With password or callback security operation enabled, the modem will verify the authenticity of a password before allowing access to the computer. If callback security is enabled, the modem will call back the user after the password has been verified. The password and callback protection schemes used by Zypcom for incoming calls is summarized below.

- Any remote modem calls the local Zypcom modem with security enabled (^W in a stored memory location 0 to 9) at any supported asynchronous line speed. We will call the Zypcom modem with a ^W in a memory location and S34=0 the security modem.
- Zypcom security modem answers and handshakes successfully with remote modem.
- With the ^W command stored in a memory (&Zn) location, the security modem does not send the connect message or update the EIA lead (CXR) until a valid password is received.
- Remote user sends carriage return.
- The security modem sends PASSWORD? which is displayed on remote terminal.
- Remote user types in a valid password (password is not echoed to the screen) followed by a carriage return or <CRLF>.
- The security modem confirms password and in the case of a pass-through call initiates access to the computer (CXR is raised and the password is sent to the attached DTE) or in the case of a callback, the security modem hangs up the call (the remote DTE screen sees the NO CARRIER message) and the security modem dials the telephone number stored in the same memory location that contained the verified password.

NOTE 1: Once the security modem has answered a call it will wait approx. 60 seconds for the first <CR> if not received the security modem will hang-up. Once the security modem issues PASSWORD? it will wait 60 seconds for the user password followed by a <CR>. In the case of callback the Zypcom security modem hangs up after validating the password and waits 20 seconds before calling the telephone number associated with the valid password (if incoming ring occurs at this time the security modem will not answer the call). The calling modem should hang-up normally due to loss of carrier which can take up to 20 seconds. If the Zypcom security modem finds that during the callback process a busy line occurs, or no dialtone, or ring no answer, etc. the Zypcom security modem should output these call progress message to the computer unless disabled and will not attempt to make a second try.

DTE Messages

Below are the messages sent to the DTE attached to the Zypcom security enabled modem. These messages can be turned off by the ATE0Q1&W command.

Password (pass-through) Security Enabled:

Messages with a valid password:

(CXR lead goes high if &C1 is set)

Messages with an invalid password:

AUTOLOGON FAILED

Callback Security Enabled:

Messages with a valid callback password:

H0DT7832501
CONNECT 57600

Messages with an invalid callback password:

AUTOLOGON FAILED

Security Commands

The modem's security configuration is controlled from the DTE by a special security command. This command is implemented by using the Hayes AT&Z command to store it in memory. This command is not accessible in remote control mode. You can not input, change, delete or access memory locations that have a ^W security command using the side channel remote control capability.

The security modem incorporates 10 memory locations for storing telephone numbers, passwords and/or the security commands. To implement a security command, use the Hayes AT&Z command to store the ^W command in a specific memory location. The ^W security command is listed in Table 1. Additional Zscript commands are also listed in Table 1 below.

Table 1: Zscript Commands (^W is the new security command)

COMMAND	EXAMPLE	MEM. LOC.	FUNCTION
^W	(Security Pswd):	&Z0-9	Set user password for security callback operation. If a callback number is present and valid password occurs, callback is in 15-20 seconds after hang-up. If busy or no answer modem does not retry. Dial modifiers are functional with callback numbers. If no callback number is present and a valid password occurs the modem raises its EIA signal (CXR), sends out password and passes access on to the computer.
^T	(Transmit):	&Z0-9	Enter data to be transmitted
^R	(Receive):	&Z0-9	Enter data to be received
^C	(Command):	&Z0-9	Enter the command field (always last in the Zscript sequence and should never used in a memory location with ^W)
^A	(Return)	&Z0-9	Equivalent to <ENTER>
^P	(Pause)	&Z0-9	Causes the modem to pause for 2 sec. before continuing to process Zscript commands (^W, ^T, ^R, ^A, ^C) and can be repeated
^X	(Hex)	&Z0-9	Allows any Hex value to be sent like linefeed (Hex0A) Each ^X sends only two hex values.
<ENTER>		&Z0-9	Completes the Zscript sequence.

NOTE: Each command will function only in the listed memory locations. AT&V2 will display all memory locations contents.

Rules for Using Zscript Passwords and Security Commands

- ^W and register S34 are active on the answer side only.
- Memory locations 0 through 9 may be used for answer side security Zscripts or for storing originate side autologon Zscripts.
- Any memory location with a ^W while S34=0 causes all memory locations with a ^W to become active and searched for a matching password. Locations that do not have a ^W in them are not active at this time.
- The entire command string, including the AT&Z command, cannot exceed 68 characters. Modem responses (Transmit);, (Security Pswd);, etc. are not included in the 68 character count
- To clear memory location enter nothing in to it (ex. clear location 2, AT&Z2=<CR> to clear location 0, AT&Z0=<CR>). To clear all locations enter AT&ZC<CR>.
- &V2 displays all memory locations along with any Zscript commands or data. To display a single memory location type "AT&Zn?".
- ^C (<CONTROL> C) command can not be used in a memory location if ^W command is present and is always the last command in the memory location otherwise.
- Commands ^T, ^R, ^X, ^P and ^A can be used in conjunction with the ^W command but are primarily for originate side autologon Zscripts.

Passwords:

- Passwords and commands may be entered in capitals or lowercase letters. (However, they will be stored and subsequently displayed as capitals). Passwords are not case sensitive.
- Special characters (! @ ?, etc.) may be used for passwords entered via the DTE interface.
- The callback phone number is stored before the ^W command not after.

For further information on using the security commands, see the following examples.

Enabling Callback Operation

Use the command AT&Z to store the ^W security password command, the callback phone number and password to be used. All memory locations with a ^W are to be scanned for password match. Set S register S34=0 and write to memory &W.

The following example uses the ^W (Security Pswd) command to program memory location 0 for callback operation:

STEP	TYPED BY USER	ECHOED TO THE SCREEN
0.	ATS34=0&W	ATS34=0&W OK
1.	AT&Z0=T783-2501	AT&Z0=T783-2501
2.	^W	(Security Pswd):
3.	BLUE	(Security Pswd): BLUE
4.	<ENTER>	OK

A remote user can now call the Zypcom security modem to initiate a callback call. The remote user first calls the security modem, after the modems complete their handshake and connect, the remote user presses the <ENTER> key and is prompted by the message **PASSWORD?**. The remote user then types the assigned password (BLUE) and presses <ENTER>. Upon receipt of the correct password (BLUE) the security modem will hang-up this call. The remote modem will disconnect in 15 to 20 seconds automatically upon loss of carrier (NO CARRIER). The security modem that has verified the password will initiate a callback in 20 seconds after disconnecting. Once this callback connection is established (CONNECT 57600), data may pass freely. The data link will work as described for error control or non-error control operation.

Enabling Password Security with a Response

STEP	TYPED BY USER	ECHOED TO THE SCREEN
0.	ATS34=0&W	ATS34=0&W OK
1.	AT&Z0=	AT&Z0=
2.	^W	(Security Pswd):
3.	GOLD	(Security Pswd): GOLD
4.	^T	(Transmit):
5.	Welcome to the Zypcom BBS! ^{^X} 0A ^{^A}	(Transmit): Welcome to the Zypcom BBS!(Hex)0A(Return)
6.	<ENTER>	OK

In this example if GOLD is received the ^T command instructs the modem to respond with "Welcome to the Zypcom BBS!" followed by a linefeed (Hex 0A) and carriage return (^A) for formatting purposes. The user will have to enter a carriage return and receive the PASSWORD? prompt. After the password (GOLD<CR>) is sent and the modem verifies the password it will transmit the response (Welcome to the Zypcom BBS!) immediately.

**Table 2: Example of mixed password and callback commands displayed via &V2 command
(remember to enable S34 by setting it to 0)**

MEMORY LOCATION	FUNCTION
&Z0=T783-2501(Security Pswd): BLUE	Call 783 2501 if BLUE password is detected
&Z1=T7832502(Security Pswd): GOLD	Call 783 2502 if GOLD password is detected
&Z2=(Security Pswd): CRIMSON	If CRIMSON is detected pass access to computer
&Z3=(Security Pswd): PURPLE(Transmit): CONNECTED	If PURPLE is detected pass access to computer and send "CONNECTED"
&Z4=	
&Z5=	
&Z6=	
&Z7=	
&Z8=	
&Z9=	

Commands Notes

When automatically answering a call (S0=1) the Z32/Z34 will execute all security Zscript sequences with ^W stored in a memory location if register S34 is equal to "0". The S34 register can be used to enable only one Zscript sequence by setting it to that location plus 1 (enabled location 3 set S34=4). Register S34 controls the answer side Zscripts but has no effect when the modem originates a call. When S34=0, all ^W passwords are valid. S34=1 only the password or Zscript in memory location 0 is valid. S34=2 only the password or Zscript in memory location 1 is valid and so forth. S34=255 no security sequences are valid. S34 default is S34=255.

To enable a originate side autologon Zscript sequence just dial that memory location using the ATDS# command.

The Zscript commands consists of password and callback security (^W), programmed transmit (^T) and receive (^R) commands as well as one command (^C) command. The transmit fields tell the Z32/Z34 what to send to the remote end, and the receive fields tell the Z32/Z34 what to receive from the remote end. In addition, the command field always the last field specifies what the Z32/Z34 should do if the last transmit or receive command successfully executes. The command (^C) command can not operate with the security password (^W) command. If you have any problems with the above information please call Zypcom Technical Support at 510-783-2501.