

World's Smallest Global Fax and Data Modem for Embedded Systems

Description

The Xecom XE5617G is the world's smallest complete, global modem for data and fax. The XE5617G fits in a 68-pin PLCC socket. Xecom calls this the Hybrid PLCC or HyPLCC™ package. Only Xecom offers a complete modem in a PLCC style package

Every XE5617G module includes user transferable FCC Part 68 registration and Global Telecom compatibility. This eases the compliance burden on the system designer adding a modem to a process control, medical monitoring, point-of-sale, or remote diagnostic system.

The XE5617G is pin compatible with other Xecom Hybrid PLCC models including the XE2420G, XE5690G and XE5692G.

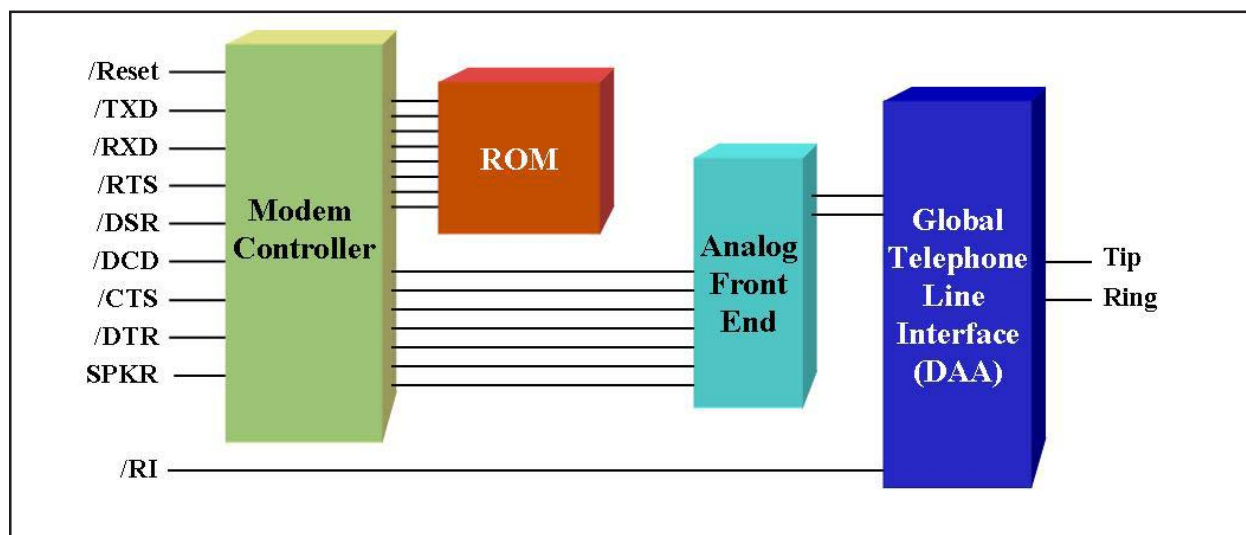
Models

XE5617G - V.92 data, V.34 fax; Hybrid PLCC Module

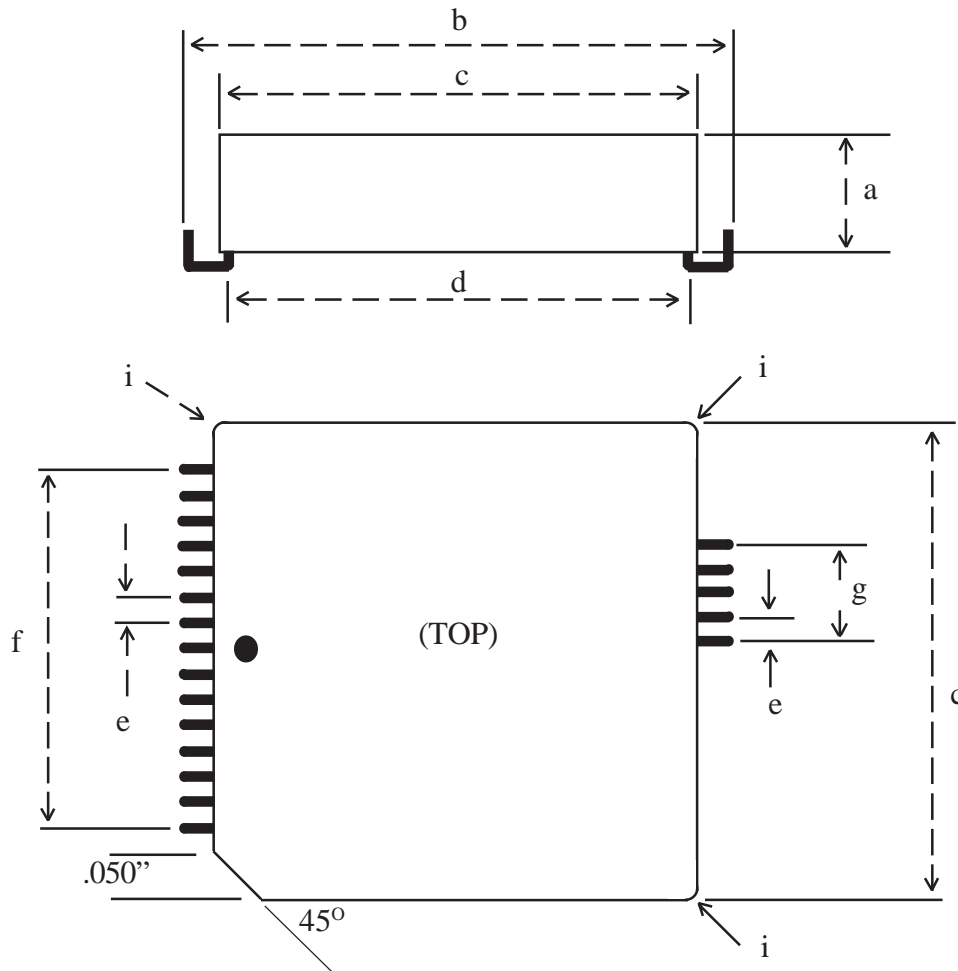
Features

- Small Size: less than 1 inch by 1 inch and just 0.29 inches thick
- Data transfer rates, 300 bps to 56 Kbps
- Fax transfer from 4800 bps to 14.4 Kbps
- Control & configuration via AT commands.
- 3.3 and 5 volt compatible serial interface
- V.42 error control; V.42bis data compression.
- Shared line features prevent modem operation from interfering with voice communications.
- Complete integrated DAA.
- Nonvolatile configuration storage
- User transferrable FCC Part 68 registration
- World-wide telephone network compliance.
- UL60950 compliant
- 3.3 Volt operation;
- RoHS compliant
- Versions operating at Temperatures of -40° C to +85° C operation are available

XE5617G BLOCK DIAGRAM

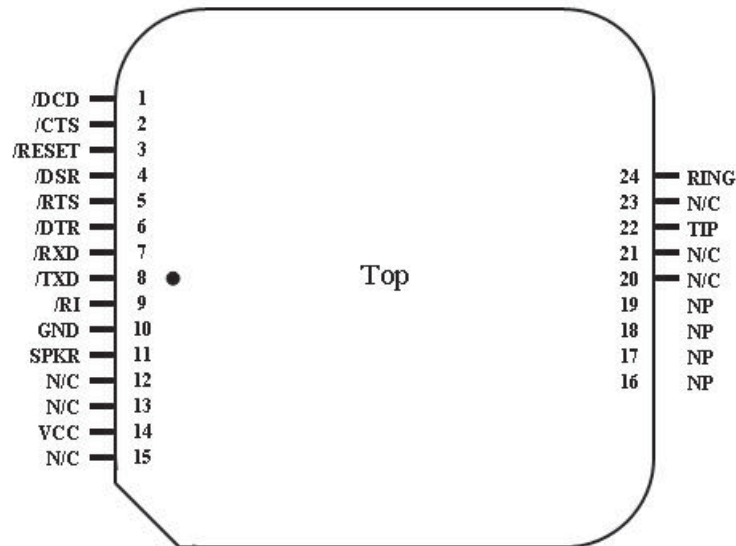


XE5617G Mechanical Specifications



Dimension	Inches			Millimeters		
	Min	Typ	Max	Min	Typ	Max
a	0.280	0.285	0.290	8.76	8.89	9.02
b	0.985	0.990	0.995	25.02	25.15	25.27
c	0.950	0.955	0.960	24.13	24.26	24.38
d	0.910	0.920	0.930	23.11	23.37	23.62
e	0.045	0.050	0.055	1.15	1.27	1.40
f	0.695	0.700	0.705	17.65	17.78	17.91
g	0.195	0.200	0.205	10.03	10.16	10.29
i(radius)	0.015	0.020	0.025	0.13	0.25	0.38

XE5617G Pin Configuration



Pin Descriptions

PIN	NAME	DESCRIPTION
1	/DCD	/DCD is an active low output from the modem. This output is controlled by the AT&C command. In the default condition, AT&C1, /DCD indicates the presence of a valid carrier signal.
2	/CTS	/CTS is an active low output from the modem. When hardware flow control is active, the modem asserts /CTS to indicate that it can accept data from the terminal equipment on /TXD.
3	/RESET	/RESET is an active low input which initiates a modem hardware reset. /RESET must be active for a minimum of 100 milliseconds for a proper modem reset sequence. No external reset is required; if none is used, the /RESET signal should be left open.
4	/DSR	/DSR is an active low output from the modem. The /DSR signal typically indicates that the modem has established a communications link. The AT&S command determines the operation of the /DSR signal.
5	/RTS	/RTS is an active low input to the modem. When hardware flow control is active, /RTS indicates to the modem that the host has data to send.
6	/DTR	/DTR is an active low input to the modem. The operation of /DTR is controlled by the AT&D command. As the default, AT&D2, the modem interprets /DTR as an indication that the Host is ready to communicate, and if /DTR is removed while the modem is on-line, the modem drops the connection and enters command mode.

XE5617G Pin Descriptions (continued)

PIN	NAME	DESCRIPTION
7	/RXD	/RXD provides the path for received data and modem responses to be sent from the modem to the host terminal equipment.
8	/TXD	/TXD provides the path for transmitted data and modem commands to be passed from the host terminal equipment to the modem.
9	/RI	The /RI signal reports on the presence of an incoming ring signal. When a ring occurs at Tip and Ring, the /RI output goes low and toggles with the cadence of the ring signal.
10	Ground	Ground provides the reference voltage for all host interface signals.
11	SPKR	SPKR provides a Pulse Width Modulated version of the signal on Tip and Ring allowing connection of a speaker to the modem to monitor modem operations. The signal on SPKR is controlled by the ATL and ATM commands.
12, 13	N/C	No internal connection
14	VCC	VCC provides 3.3 volt power to the modem.
15	N/C	No internal connection
16-19	NP	No Pin
20-21	N/C	No internal connection
22	Tip	<p>The Ring and Tip signals provide modem the connection to the telephone line. FCC Part 68 Rules require a 1500 volt isolation barrier between the telephone line and all other circuits. This isolation must be preserved throughout the system.</p> <p>The telephone company places a DC “Battery” voltage across Tip and Ring on public switched telephone lines. The XE5617G will operate regardless of the polarity of this “Battery” voltage. The “Battery” voltage drives up to 100 milliamps of DC loop current. UL60950 requires minimum creepage and clearances distances be maintained between the Tip and Ring traces and all other circuits. Clearance is the shortest distance between conductive circuits; creepage is the distance between conductive surfaces along the surface</p>
23	N/C	No internal connection, To prevent damage in case of voltage surges on the telephone line, we recommend that nothing be connected to this pin.
24	Ring	<p>The Ring and Tip signals provide modem the connection to the telephone line. FCC Part 68 Rules require a 1500 volt isolation barrier between the telephone line and all other circuits. This isolation must be preserved throughout the system.</p> <p>UL60950 requires minimum creepage and clearances distances be maintained between the Tip and Ring traces and all other circuits. Clearance is the shortest distance between conductive points along the surface.</p>

XE5617G Electrical Specifications

Parameter	Min	Typ	Max	Units	Comments
VCC	3.13	3.3	3.47	Volts	
ICC		80	85	mA	On Line
Ring Voltage Detected	26		150	VRMS	Type B Ringer
Ring Frequency Detected	15.3		68	Hz	Type B Ringer
Telephone Loop Current	16	40	100	ma	
Line Impedance		600		Ohms	
Data Transmit level		-12.0	-9.0	dBm	
DTMF Transmit Level		-2.5	0	dBm	Avg over 3 second interval
Voh	2.4		5.0	Volts	
Vol			0.4	Volts	
Vih	2.0		5.0	Volts	
Vil	-0.3		0.8	Volts	

XE5617G ABSOLUTE MAXIMUM RATINGS

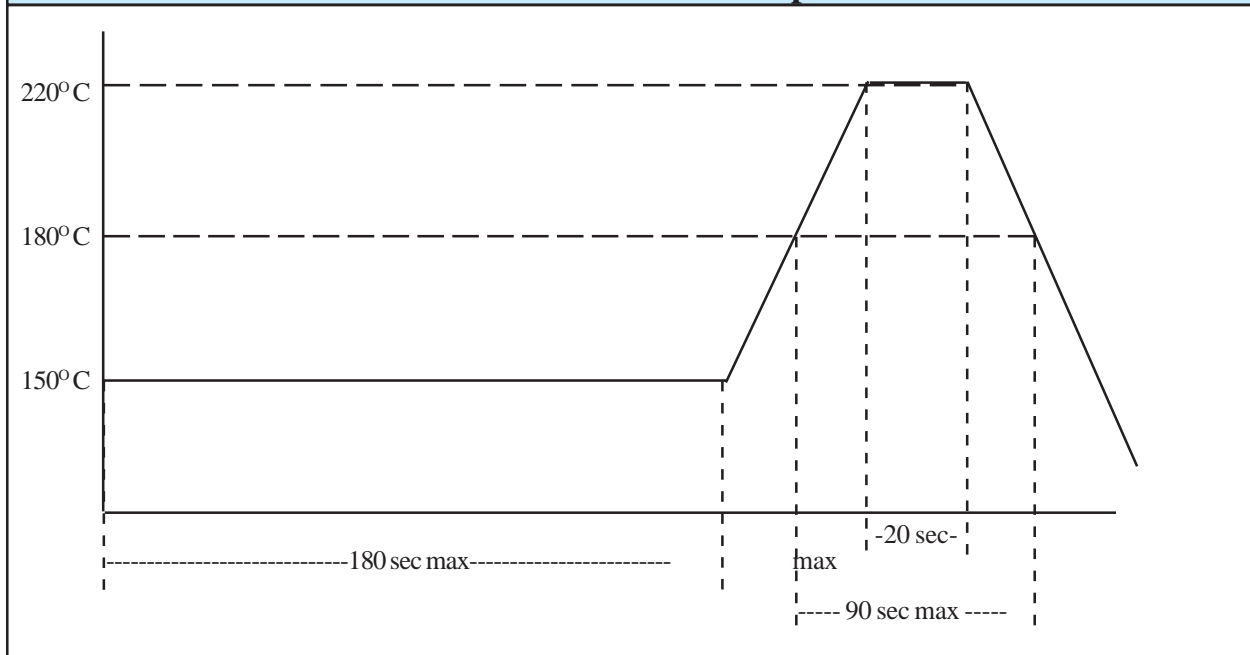
Storage Temperature	-25° C to +85° C
¹ Maximum Operating Temperature Range	0° C to +70° C
VCC	3.6 Volts
<p>¹ The XE5617G can be ordered as an Industrial Temperature Range part. These parts are screened for operation from -40° C to +85° C. There is additional cost for this screening. Add the -ITR to the original model number to specify the Industrial Temperature Range (ITR) screening.</p>	

XE5617G Surface-Mount Soldering Instructions

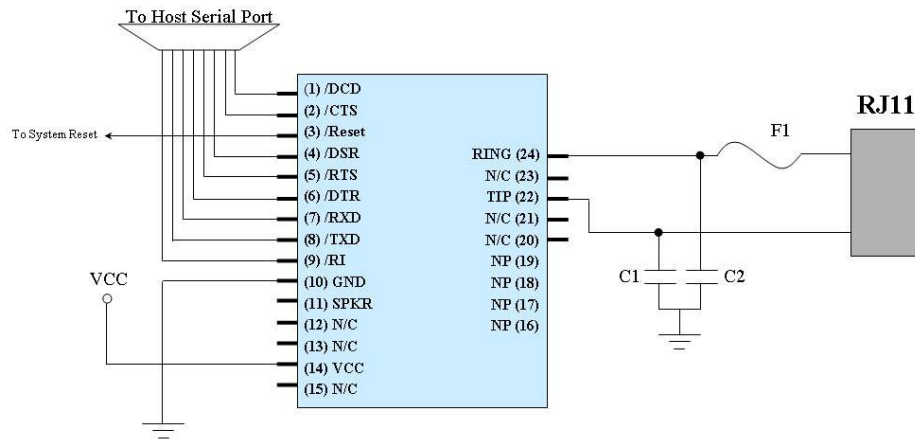
The XE5617G is subject to damage if overexposed to heat during solder reflow operations. Following the soldering instructions below will ensure that the process of soldering the module to the board does not damage the modem.

Maximum Temperature	220° C
Maximum Time at 220° C	20 Seconds
Maximum Time above Eutectic (180° C)	90 Seconds
Maximum Preheat Dwell Time	180 Seconds

Maximum Recommended Solder Temperature Profile



XE5617G Typical Connection Diagram



Parts List for XE5617G Typical Connection Diagram

Reference Designation	Qty	Description
C1, C2	2	Cap. 680 pfd, Y2
F1	1	PTC, TRF600-150

Notes:

- 1 Capacitors, C1 and C2, may be required for EMI filtering in your system. Without these components you may experience unintended radiation when the telephone cable is attached. C1 and C2 are high-voltage capacitors. We recommend the Novocap ES2211N681K502NXTM. This 680 pfd, 5000 volt capacitor will direct the high frequency harmonics to the system ground.
2. F1 is a positive thermal coefficient (PTC) device which protects the modem from excessive current flow. These devices are required for your system to pass UL60950. Fuses may be used in place of the PTC's

XE5617G Connection Data

The XE5617G reports data on the current connection in response to the AT+I1 command. Because many of the reported parameters require an active connection, this command is best utilized from the on-line command mode accessed with the escape sequence. The items shown in italics are only valid during an active call.

The Connection Report is presented in two pages. The first page will be displayed on receipt of the AT+I1 command. To move to the second page of the report hit any key. The table below describes the information provided in the Connection Report.

REPORTED ITEM	DESCRIPTION
1 Last Connection	Reports the modulation used on the last completed connection; values include: V.92PCM, V.92, V.90, V.34 and V.32
2 Initial Transmit Carrier Rate	Upstream data rate first negotiated on last connection
3 Initial Receive Carrier Rate	Downstream data rate first negotiated on last connection
4 Final Transmit Carrier Rate	Upstream data rate at the end of the last connection
5 Final Receive Carrier Rate	Downstream data rate at the end of the last connection
6 Protocol Negotiation Result	Reports the error correction protocol negotiated on last connection; values include LAPM/SREC, LAPM, MNP, and none.
7 Data Compression Result	Reports Link data compression protocol negotiated on last connection; values include LAPM, MNP, V.42bis, V.44 and none.
8 <i>Noise Level</i>	Reports the estimated noise level in the modem signal.
9 <i>Receive Signal Power Level</i>	Reports the approximate level of the incoming modem signal.
10 <i>Transmit Signal Power Level</i>	Reports the level of the outgoing modem signal.
11 <i>Round Trip Delay</i>	Reports how many milliseconds for the signal to be transmitted and returned.
12 <i>Near Echo level</i>	Reports level of echoed signal in V.34 mode.
13 <i>Far Echo Level</i>	Reports level of echoed signal in V.34 mode.
14 <i>Transmit Frame Count</i>	Reports the total number of LAPM frames transmitted thus far during the call.
15 <i>Transmit Frame Error Count</i>	Reports the number of transmitted frames rejected during the current call.
16 <i>Receive Frame Count</i>	Reports the total number of LAPM frames received thus far during the call.
17 <i>Transmit Frame Error Count</i>	Reports the number of received frames rejected during the current call.
18 <i>Retrain by Local Modem</i>	Reports the number of retrain and rate renegotiations requested by the local modem.
19 <i>Retrain by Remote Modem</i>	Reports the number of retrain and rate renegotiations requested by the remote modem.
20 <i>Local Rate Renegotiation</i>	Reports the number of rate renegotiations requested by the local modem.
21 <i>Remote Rate Renegotiation</i>	Reports the number of rate renegotiations requested by the remote modem.
22 Call Termination Cause	Reports the reason for termination of the last call; 0, disconnect by local modem command, 1, loss of received modem carrier, 2, failed call attempt, 3, V.92, V.90 or V.34 training failure, and 4, protocol failure.
23 Robbed-Bit Signalling	On PCM connections only reports the presence of robbed-bit signalling
24 Digital Loss (dB)	On PCM connections only shows the digital signal loss
25 Remote Server ID	On PCM lines indicates the ID of the remote server
26 Last PCM S Pointer	Displays the last S pointer when the modem expected to enter PCM mode

XE5617G AT Commands

The XE5617G uses "AT" commands for configuration and control. This section describes the AT command format and lists the commands, registers and result codes.

Command Mode: The XE5617G enters command mode on power-up, reset, a lost connection, or receipt of the escape code. In command mode the modem accepts commands from the host on transmit data. Appropriate result codes are returned on received data.

Note: For backward compatibility some functions are controlled by more than one command. In these instances the last command issued determines the function setting.

Command Line Format

AT commands follow a strict format. Each command line, except A/, begins with the prefix AT. The "A" and "T" may be both upper case or both lower case but cannot be of different cases. The modem determines data rate of the host equipment by measuring the width of the incoming bits of the "A" and "T."

Multiple commands may be combined into a single command line of up to 40 characters. Commands are executed in the sequence they appear upon receipt of a carriage return. Spaces inserted into the command line are not placed in the buffer.

The command line can be edited with a backspace before it is executed. The backspace erases the previous character in the command line. Register S5 allows the user to select a character other than backspace to edit the command line.

If the command buffer overflows, the modem issues an "ERROR" result code, and the command line is not executed. Register S3 allows the user to select a character other than a carriage return to terminate the command line.

Re-Execute Last Command - The A/ command causes the modem to re-execute the last command line. This is the only command which does not require the "AT" prefix.

Omitted Parameters - Most commands include a parameter which determines how the functions will be set. When the command parameter is omitted from the command string, it is assumed to be a 0.

Escape Characters - A 3 character escape sequence may be entered to switch the modem into command mode while on line. The escape character, set by Register S2, must be entered 3 times in succession to execute the escape. An AT command must then be entered within the period defined by S12 to enter command mode. The default escape sequence is "+++."

Result Codes - The modem issues a result code after each action. Result codes may be sent as full words, one or two digit numeric codes, or may be disabled all together. Each result code ends with a carriage return when numeric result codes are chosen. When full word result codes are chosen, a Line Feed and Carriage Return precede and follow each result code.

XE5617G AT Commands

An asterisk indicates the factory default

A - Answer Command - Causes the modem to immediately go off-hook and attempt to negotiate a connection

D - Dial Command - Causes the modem to go off-hook and dial a remote modem. Below is a list of characters accepted in the dialing string.

- 0-9, A-D, #, * = Dialing Digits
- L = Redial Last Number Dialed
- P = Pulse dial
- S=n = Dial number stored in location n
- T = Tone dial
- W = Wait for dial tone
- , = Pause for the duration of S8
- ! = Switch hook flash
- ; = Return to the command state

En - Command Echo - Determines if the modem returns the commands received from the host.

- n=0 Do not echo commands
- n=1 Enable command echo *

Hn - Switch Hook Control - Controls the connection to the telephone line.

- n=0 Switch hook relay opens
- n=1 Switch hook relay closes

In - Modem Identification - Provides product data..

- n=0 Modem identity
- n=1 ROM Checksum
- n=2 Verify Checksum,
- n=3 Driver Version Number
- n=4 Data Pump Firmware Version
- n=5 Code Version
- n=9 Country ID
- n=11 Connection Data

Ln - Speaker Volume - Selects level of speaker output.

- n=0 Low Volume
- n=1 Low Volume
- n=2 Moderate Volume *
- n=3 High Volume

Mn - Speaker Activity - Determines when the speaker will be active.

- n=0 Speaker off
- n=1 Speaker on until carrier received *
- n=2 Speaker remains on
- n=3 Speaker on until DCD active

Nn - Link Negotiations - Selects how Register S37 will be used to set the link negotiations

- n=0 Connect only using the speed selected by S37
- n=1 Begin negotiations at the selected speed but allow fallback *

On - On Line - Puts the modem back into data mode from the on-line command mode with or without a retrain.

- n=0 Return On Line with no retrain *
- n=1 Initiate retrain while returning On line.
- n=3 Initiate rate renegotiation on return On line.

Qn - Responses - Determines if the modem will send responses to the host.

- n=0 Send responses *
- n=1 No Responses

Sr? - Interrogate Register - Read value of selected register.

Sr=n - Set Register Value - Set value of selected register.

Vn - Result Codes - Determines what the type of result codes to be issued.

- n=0 Numeric Result Codes
- n=1 English Word Result Codes*

Wn - Expanded Result Codes - Allows protocol messages to be appended to the modem Connect responses.

- n=0 Report DTE Receive Speed
- n=1 Report DTE Receive Speed and protocol type
- n=2 Report DCE Receive Speed and protocol type *

XE5617G AT Commands

Xn - Result Code Set - Sets the modem responses

- n=0 Responses 0-4
- n=1 Responses 0-5 & 10
- n=2 Responses 0-6 & 10
- n=3 Responses 0-5, 7 & 10
- n=4 Responses 0-8 & 10*
- n=5 All Responses
- n=6 All Responses
- n=7 All Responses except extended result codes

Z - Reset - Causes an immediate modem soft reset and reconfigures the modem to the stored values

&Cn - Data Carrier Detect Operation - Determines how the modem will present /DCD to the host.

- n=0 /DCD forced active at all times
- n=1 /DCD indicates modem carrier signal state *

&Dn - Data Terminal Ready Determines how the modem will react to the removal of /DTR from the host.

- n=0 Modem ignores status of /DTR
- n=1 If /DTR is deactivated while the modem is on line, the modem enters on-line command mode
- n=2 /DTR must be active to maintain connection *
- n=3 Modem is reset when /DTR deactivated

&F - Restore Factory Configuration - Returns configuration to its factory settings.

&Kn - Local Flow Control - Determines the operation of flow control between the modem and local host.

- n=0 No Flow Control
- n=3 RTS/CTS (hardware) Flow Control *
- n=4 XON/XOFF (software) Flow Control

&Sn - Data Set Ready - Determines how the modem will present /DSR to the host.

- n=0 Force DSR active *
- n=1 /DSR Indicates the modem's readiness to communicate

&Tn - Modem Test Modes - Modem diagnostics.

- n=0 Terminate Test in Progress
- n=1 Local Analog Loopback test
- n=3 Local Digital Loopback test

&V - View Active Configuration - Presents current modem configuration information

&W - Store Active Configuration - Places the current configuration into the selected memory location where it can be recalled on a soft reset.

&Zx=n - Store Number n in Location "x" - Permits placement of a telephone number in the selected memory location. Dialing the stored number is accomplished with the s=n dial modifier where n is the memory location of the stored number.

- x=0 Location 0
- n=1 Location 1
- n=2 Location 2

\Gn - In Band Flow Control - Determines how the modem handles received XON and XOFF flow control characters.

- n=0 Act on received XON and XOFF characters
- n=1 Pass XON/XOFF characters in data stream

\Kn - Response to receipt of Break Signal (Data Mode) Determines how the modem will handle an received break signal.

- n=0 Enter on-line command mode, do not transmit break
- n=1 Clear data buffers, transmit break
- n=2 same as n=0
- n=3 Immediately transmit break
- n=4 same as n=0
- n=5 Transmit nondestructive break in sequence with data

XE5617G AT Commands

\N - Error Control Mode - Selects which protocols will be used during data connections.

- n=0 Buffer Data, No Error Control
- n=1 Direct mode, No Error Control, No buffered data
- n=2 MNP Error Correction required
- n=3 Auto Error Correction *
- n=4 V.42 Required
- n=5 same as n=3
- n=7 same as n=3

\Qn - Local Flow Control - Determines the type of flow control used to regulate data flow between the modem and local host.

- n=0 Disabled
- n=1 XON/XOFF (Software)
- n=3 RTS/CTS (Hardware) *

\Tn - Inactivity Timer - Sets the time the modem waits before disconnecting due to inactivity

- n=0 Timer disabled *
- n=1-255 Inactivity Timer in minutes the modem

\Xn - Software Flow Control Pass Through - Determines how the modem will process received XON and XOFF characters.

- n=0 Process XON and XOFF characters locally *
- n=1 Pass XON and XOFF characters to the remote modem

%Cn - Data Compression Control - Determines if Data Compression can be negotiated.

- n=0 Data Compression Disabled
- n=1 Data Compression Permitted *

+DCS=a,b - Select Data Compression Type - Selects the data compression to be used on subsequent calls

- a - V.42bis
 - 0 = Disabled
 - 1 = Enabled *
- b - V.44
 - 0 - Disabled
 - 1 - Enabled *

+DR=a - Select Data Compression Report - Determines if the modem issues a Data Compression message.

- a - Data Compression Report
 - 0 = Disabled
 - 1 = Enabled *

+ER=a - Select Error Correction Report Type - Determines if the Error Control status of the connection will be reported.

- a - Error Correction Report
 - 0 = Disabled *
 - 1 = Enabled

-V90=r - Select V.90 downstream data rate - selects the downstream data rate during a V.90 connection.

- r=0 V.90 disabled
- r=1 Auto negotiate data rate
- r=2 28,000 bps
- r=3 29,333 bps
- r=4 30,666 bps
- r=5 32,000 bps
- r=6 33,333 bps
- r=7 34,666 bps
- r=8 36,000 bps
- r=9 37,333 bps
- r=10 38,666 bps
- r=11 40,000 bps
- r=12 41,333 bps
- r=13 42,666 bps
- r=14 44,000 bps
- r=15 45,333 bps
- r=16 45,666 bps
- r=17 48,000 bps
- r=18 49,333 bps
- r=19 50,666 bps
- r=20 52,000 bps
- r=21 53,333 bps

+FCLASS = a Select Service Class - Selects modem operating mode.

- a - Service Class
 - 0 = Data Mode
 - 1 = Class 1 Fax Mode
 - 8 = Select Voice Mode

XE5617G AT Commands

+GCI = a Country Selection (Hex Format code) -
Chooses the modem's country configuration. The country configuration is always stored in nonvolatile memory.

a - Country Code

00	=	Japan
04	=	Germany
09	=	Australia
0A	=	Austria
0F	=	Belgium
20	=	Canada
26	=	People's Republic of China
31	=	Denmark
3C	=	Finland
3D	=	France
42	=	Germany
46	=	Greece
50	=	Hong Kong
51	=	Hungary
53	=	India
54	=	Indonesia
57	=	Ireland
59	=	Italy
61	=	Korea
6C	=	Malaysia
72	=	Europe
73	=	Mexico
7B	=	Netherlands
7E	=	New Zealand
82	=	Norway
89	=	Philippines
8B	=	Portugal
9C	=	Singapore
9F	=	South Africa
A0	=	Spain
A5	=	Sweden
A6	=	Switzerland
A9	=	Thailand
AE	=	Turkey
B4	=	United Kingdom
B5	=	United States
BC	=	Vietnam

+IFC = a,b Local Flow Control - Selects the flow control settings for the modem.

a - DTE control of data from DCE

- 0 = No Flow Control
- 1 = XON/XOFF (Software Flow Control)
- 2 = RTS/CTS (Hardware Flow Control) *

b - DCE control of data from DTE

- 0 = No Flow Control
- 1 = XON/XOFF (Software Flow Control)
- 2 = RTS/CTS (Hardware Flow Control) *

+ILR=a - Report Serial Data Rate - Determines if the local serial data rate will be reported as part of the Connect message.

- 0 = Do not transmit local serial data rate with the Connect response
- 1 = Transmit the local serial data rate as part of the Connect message.

+IPR=a - Fix Serial Data Rate - Sets the speed of the serial interface to a predetermined rate.

a - Data Rate Setting

0	=	Automatic rate detection
110	=	100 bps
300	=	300 bps
600	=	600 bps
1200	=	1200 bps
2400	=	2400 bps
4800	=	4800 bps
9600	=	9600 bps
14400	=	14,400 bps
19200	=	19,200 bps
38400	=	38,400 bps
57600	=	57,600 bps
115200	=	115,200 bps

XE5617G AT Commands

+MS=a,b,c,d,e,f - Select Modulation - Selects the starting modulation for link negotiations/

a - Carrier

V92 = V.92 connection *

V90 = V.90 connection

V34 = V.34 connection

V32B = V.32bis connection

V32 = V.32 connection

V22B = V.22bis connection

V22 = V.22 connection

Bell212A = Bell 212A connection

V23C = V.23 connection

V21 = V.21 connection

Bell103 = Bell 103 connection

b - Automatic Modulation negotiations

0 - Disabled

1 - Enabled *

c - Minimum receive data rate (300 to 33,600 bps)

d - Maximum receive data rate (300 to 33,600 bps)

e - Minimum transmit data rate (300 to 33,600 bps)

f - Maximum transmit data rate (300 to 33,600 bps)

XE5617G Voice Commands

+FClass=8 - Enter Voice Mode

+VCID=n Caller ID Options

n=1 Disable Caller ID

n=2 Enable formatted Caller ID

n=3 Enable unformatted Caller ID

+VDR=a,b Distinctive Ring

a=0 Disable Distinctive Ring

a=1 Enable Distinctive Ring

b=0-255 delay in Ring Result code (b x 0.1 seconds)

+VEM=n Event Reporting and masking

n=0-255 Event Code

+VGM=n Microphone Gain

n=0-255 Microphone Gain (128 nominal value)

+VGR=n Receive Gain

n=0-255 Receive Gain (128 nominal value)

+VGS=n Speaker Gain

n=0-255 Speaker Gain (128 nominal value)

+VGT=n Speaker Volume Control

n=0-255 Speaker Volume (128 nominal value)

+VIP Initialize Voice Parameters

+VIT=t DTE/DCE Inactivity Timer

t=0-255 seconds

+VNH=n Automatic DCE Disconnect

n=0 DCE Disconnect enabled

n=2 DCE Disconnect disabled

+VLS=n Speakerphone Selection

n=0 Speakerphone off

n=5 Speakerphone Mute Operation

n=7 Normal Speakerphone Operation

+VRA=n Wait After Ringback Tone

n=0-255 Required wait after Ringing (0.1 seconds)

+VRN=n No Ringback Tone Delay

n=0-255 Required delay before off-hook (seconds)

+VRX Enter Voice Receive State

+VSD=s,i Silence Detection

s=0-255 sensitivity in -dBm

i=0-255 duration of silence (0.1 seconds)

+VSM=c,s Voice Compression

c=128 8-bit Linear Compression

c=129 16-bit linear Compression *

c=130 8-bit A-law Compression

c=131 8-bit μ -law Compression

c=132 IMA ADPCM Compression

c=133 G.729 Compression

s=129800 8.0 KHz sampling rate

+VSP=n Speaker Phone

n=0 Speakerphone Off

n=1 Speakerphone On

+VTD=t Beep tone Duration

t=0-400 Beep duration in .01 seconds

+VTR Start Full-Duplex Voice Communications

+VTS=(string) DTMF string

string = 0-9, #, *, ! (hook flash), A, B, C, D

+VTX Enter Voice Transmit State

XE5617G Fax Commands

+FCLASS = a Select Service Class

a - Service Class

- 0 = Data Mode *
- 1 = Class 1 Fax Mode
- 8 = Voice Mode

+FLO = a Flow Control

a - Flow Control Type

- 0 = Flow Control Disabled
- 1 = XON/XOFF (software flow control)
- 2 = RTS/CTS (hardware flow control) *

+FPR = a Serial Data Rate

a - Select Serial Data Rate

- 0 = Automatic Rate Detection
- 1 = 2400 bps
- 2 = 4800 bps
- 4 = 9600 bps
- 8 = 19,200 bps
- 10 = 38,400 bps
- 18 = 57,600 bps *

+FRH = a Receive HDLC Data

a - Select Modulation

- 3 = V.21 Channel 2; 300 bps
- 24 = V.27ter; 2400 bps
- 48 = V.27ter; 4800 bps
- 72 = V.29; 7200 bps
- 73 = V.17; 7200 bps
- 74 = V.17 short train; 7200 bps
- 96 = V.29; 9600 bps
- 97 = V.17; 9600 bps
- 98 = V.17 short train; 9600 bps
- 121 = V.17; 12,000 bps
- 122 = V.17 short train; 12,000 bps
- 145 = V.17; 14,400 bps
- 146 = V.17 short train; 14,400 bps

+FRM = a Receive Data

a - Select Modulation

- 3 = V.21 Channel 2; 300 bps
- 24 = V.27ter; 2400 bps
- 48 = V.27ter; 4800 bps
- 72 = V.29; 7200 bps
- 73 = V.17; 7200 bps
- 74 = V.17 short train; 7200 bps
- 96 = V.29; 9600 bps
- 97 = V.17; 9600 bps
- 98 = V.17 short train; 9600 bps
- 121 = V.17; 12,000 bps
- 122 = V.17 short train; 12,000 bps
- 145 = V.17; 14,400 bps
- 146 = V.17 short train; 14,400 bps

+FRS = a Receive Silence

a - Required Silence in 10 msec increments values 0 to 255

+FTH = a Transmit HDLC Data

a - Select Modulation see +FRH for selections

+FTM = a Transmit Data

a - Select Modulation see +FRM for selections

+FTS = a Transmit Silence

a - Requires the modem to end transmission and wait before issuing OK response. The wait set by "a" is in 10 millisecond increments. Values of "a" range from 0 to 255.

XE5617G REGISTER SETTINGS

- S0 Answer on nth Ring:** S0 sets the modem to automatically answer on the nth ring. Setting S0 to 0 disables automatic answer.
Range: 0 to 255
Units Rings
Default 0
- S1 Ring Count:** S1 is a read-only register showing the number of rings detected. If no ring is detected within 8 seconds, S1 is reset.
Range: 0 to 255
Units Rings
Default 0
- S2 Escape Character:** S2 sets the ASCII escape character. Values of 0-127 select valid characters; values from 128 to 255 disable the escape sequence.
Range: 0 to 255
Units ASCII Character
Default 43 (+)
- S3 Line Termination Character:** S3 determines the ASCII character which will terminate commands and modem responses.
Range: 0 to 127
Units ASCII Character
Default 13 (Carriage Return)
- S4 Line Feed Character:** S4 sets the ASCII character to act as a line feed character in modem responses.
Range: 0 to 127
Units ASCII Character
Default 10 (Line Feed)
- S5 Backspace Character:** S5 defines the ASCII character used as a backspace to edit the command line.
Range: 0 to 127
Units ASCII Character
Default 8 (Back Space)
- S6 Dial Tone Wait Time:** S6 determines how long the modem waits for dial tone before dialing. The Dial Tone Wait Time cannot be set to less than two seconds.
Range: 0 to 255
Units Seconds
Default 3
- S7 Wait for Carrier after Dialing:** S7 determines how long the modem waits for a valid carrier signal after dialing.
Range: 0 to 255
Units Seconds
Default 60
- S8 Comma Pause Time:** S8 defines the duration of the pause initiated by a comma in the dialing string when waiting for a second dial tone.
Range: 0 to 255
Units Seconds
Default 2
- S10 Carrier Off Disconnect Delay:** S10 selects how long carrier must be lost to initiate a modem disconnect.
Range: 1 to 255
Units 0.1 Seconds
Default 20
- S11 DTMF Dialing Speed:** S11 determines the DTMF tone duration and spacing.
Range: 50 to 150
Units milliseconds
Default 95
- S12 Escape Code Guard Timer:** S12 sets the modem guard timer. Anything received before or after the escape sequence, within the guard timer, causes the modem to abort the escape.
Range: 10 to 255
Units 0.02 Seconds
Default 50
- S28 V.34 Modulation:** S28 determines if V.34 modulation can be used.
S28=0 Disabled
S28=1 Enabled
Default: 1
- S30 Disconnect Inactivity Timer:** S30 sets how long the modem remains on line with no data flowing. A zero prevents the modem from disconnecting due to inactivity.
Range: 0-255
Units Minutes
Default: 0

XE5617G REGISTER SETTINGS

- S35 Calling Tone:** S35 determines if Calling Tone will be present on a data call.
S35 = 0 Disabled
S35 = 1 Enabled
Default: 1
- S36 Response to LAPM Negotiation failure:** S36 determines the action taken by the modem if the selected error correction negotiations are unsuccessful.
S36 = 0 Disconnect
S36 = 1 Maintain link with no error correction
S36 = 2 Disconnect
S36 = 3 Maintain link with no error correction
S36 = 4 Attempt MNP; disconnect on MNP failure
S36 = 5 Attempt MNP; maintain link with no error correction on MNP failure
S36 = 6 Attempt MNP; disconnect on MNP failure
S36 = 7 Attempt MNP; maintain link with no error correction on MNP failure
Default: 7
- S37 Line Data Rate:** S37 sets the maximum line data rate that can be negotiated. In V.90 mode this register controls the upstream data rate.
0 = Automatic Negotiation
2 = V.23, 1200/75 bps
3 = 300 bps
5 = 1200 bps
6 = 2400 bps
7 = 4800 bps
8 = 7200 bps
9 = 9600 bps
10 = 12,000 bps
11 = 14,400 bps
12 = 16,800 bps
13 = 19,200 bps
14 = 21,600 bps
15 = 24,000 bps
16 = 26,400 bps
17 = 28,800 bps
18 = 31,200 bps
19 = 33,600 bps *
- S38 Downstream Data Rate:** S38 forces a maximum line data rate in V.90 mode
0 = V.90 disabled
1 = Automatic rate selection *
2 = 28,000 bps
3 = 29,333 bps
4 = 30,666 bps
5 = 32,000 bps
6 = 33,333 bps
7 = 34,666 bps
8 = 36,000 bps
9 = 37,333 bps
10 = 38,666 bps
11 = 40,000 bps
12 = 41,333 bps
13 = 42,666 bps
14 = 44,000 bps
15 = 45,333 bps
16 = 46,666 bps
17 = 48,000 bps
18 = 49,333 bps
19 = 50,666 bps
20 = 52,000 bps
21 = 53,333 bps
22 = 54,666 bps
23 = 56,000 bps
- S48 LAPM Error Control -** S48 allows LAPM Error Control to be enabled or disabled.
S48 = 128 LAPM Disabled
S48 = 7 LAPM Enabled
Default: 7

XE5617G RESPONSES

<u>Digits</u>	<u>Verbose</u>	<u>Description</u>
0	OK	Command Successful
1	CONNECT	300 bps or higher connection
2	RING	Ring signal detected
3	NO CARRIER	Carrier not detected
4	ERROR	Error in command line
5	CONNECT 1200	1200 bps Connection
6	NO DIAL TONE	No dial tone detected
7	BUSY	Busy signal detected
8	NO ANSWER	Remote does not answer
10	CONNECT 2400	2400 bps Connection
11	CONNECT 4800	4800 bps Connection
12	CONNECT 9600	9600 bps Connection
13	CONNECT 14400	14,400 bps Connection
14	CONNECT 19200	19,200 bps Connection
18	CONNECT 57600	57,600 bps Connection
24	CONNECT 7200	7200 bps Connection
25	CONNECT 12000	12,000 bps Connection
40	CONNECT 300	300 bps Connection
55	CONNECT 21600	21,600 bps Connection
56	CONNECT 24000	24,000 bps Connection
57	CONNECT 26400	26,400 bps Connection
58	CONNECT 28800	28,800 bps Connection
59	CONNECT 31200	31200 bps Connection
60	CONNECT 33600	33,600 bps Connection
70	CONNECT 32000	32,000 bps Connection
71	CONNECT 34000	34,000 bps Connection
72	CONNECT 36000	36,000 bps Connection
73	CONNECT 38000	38,000 bps Connection
74	CONNECT 40000	40,000 bps Connection
75	CONNECT 42000	42,000 bps Connection
76	CONNECT 44000	44,000 bps Connection
77	CONNECT 46000	46,000 bps Connection
78	CONNECT 48000	48,000 bps Connection
79	CONNECT 50000	50,000 bps Connection
80	CONNECT 52000	52,000 bps Connection
81	CONNECT 54000	54,000 bps Connection
82	CONNECT 56000	56,000 bps Connection
86	CONNECT 16800	16,800 bps Connection
87	CONNECT 115200	115,200 bps Connection
88	DELAYED	Dialing of this number is delayed due to success failed attempts

XE5617G RESPONSES

<u>Digits</u>	<u>Verbose</u>	<u>Description</u>
89	BLACKLISTED	Attempted Number is Blacklisted
90	BLACKLIST FULL	The buffer for storing blacklisted numbers is full
100	CONNECT 28000	28,000 bps Connection
101	CONNECT 29333	29,333 bps Connection
102	CONNECT 30666	30,666 bps Connection
103	CONNECT 33333	33,333 bps Connection
104	CONNECT 34666	34,666 bps Connection
105	CONNECT 37333	37,333 bps Connection
106	CONNECT 38666	38,666 bps Connection
107	CONNECT 41333	41,333 bps Connection
108	CONNECT 42666	42,666 bps Connection
109	CONNECT 45333	45,333 bps Connection
110	CONNECT 46666	46,666 bps Connection
111	CONNECT 49333	49,333 bps Connection
112	CONNECT 50666	50,666 bps Connection
113	CONNECT 53333	53,333 bps Connection
114	CONNECT 54666	54,666 bps Connection

The following responses will be appended to Connect responses when extended result codes are selected, see ATW command.

<u>Verbose</u>	<u>Description</u>
V.44	V.44 Data Compression
V.42	V.42 error correction protocol negotiated
V.42bis	V.42bis data compression protocol negotiated
MNP4	MNP4 error correction negotiated
MNP5	MNP5 error correction negotiated
NoEC	No Error Control active on this link

FCC Instructions

The XE5617G complies with Part 68 of the FCC Rules and Regulations. With each device shipped, there is a label which contains the FCC Registration Number. The FCC Registration number incorporates the Model Number, Manufacturer Identifier, Product Type identifier and Ringer Equivalence Number (REN) for this product. You must, upon request, provide this information to your telephone company. The format of the FCC Registration Number

US: DWEMM01BX5617G (*pending*)

The mounting of this device in the final assembly must be made in such a manner as to preserve the high voltage protection between the TIP/RING Connection and the rest of the system. Typically, this may be accomplished by maintaining a minimum spacing 100 mils between the TIP/RING Traces to the RJ-11C Jack and low voltage portion of the system. No additional circuitry may be attached between TIP/RING and the telephone line connection, unless specifically allowed in the rules.

The REN is useful to determine the quantity of devices you may connect to a telephone line and still have all of these devices ring when the number is called. In most, but not all areas, the sum of the RENs of all devices connected to one line should not exceed five (5.0). To be certain of the number of devices you may connect to the line, as determined by the REN, you should contact the local telephone company to determine the maximum REN for you calling area.

If your system causes harm to the telephone network, the telephone company may discontinue service temporarily. If possible, they will notify you in advance. If advance notification is not practical, you will be notified as soon as possible.

Your telephone company may make changes in its facilities, equipment, operations or procedures that could affect proper functioning of your equipment. If they do, you will be notified in advance to give you an opportunity to maintain uninterrupted telephone service.

If you experience trouble with this device, please contact XECOM at (408) 942-2200 for information on obtaining service or repairs. The telephone company may ask you to disconnect this device from the network until the problem has been corrected or until you are sure that the device is not malfunctioning.

Terms of Sale

Devices sold by XECOM are covered by the warranty provisions appearing in its Terms of Sale only. XECOM makes no warranty, express, statutory, implied, or by description regarding the information set forth herein, or regarding the freedom of the described devices from patent infringement. XECOM makes no warranty of merchantability or fitness for any purposes. XECOM reserves the right to discontinue production and change specifications and prices at any time and without notice. This product is intended for use in normal commercial applications. Applications requiring extended temperature range, unusual environmental requirements, or high reliability applications, such as military, medical life-support or life-sustaining equipment, are specifically not recommended without additional processing and authorization by XECOM for such application.

Xecom assumes no responsibility for the use of any circuitry other than circuitry embodied in a Xecom product. No other circuits, patents, or licenses are implied.

Life Support Policy

Xecom's products are not authorized for use as Critical Components in Life Support Devices or Systems.

Life Support Devices or Systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and whose failure to perform, when properly used in accordance with instructions provided in the labeling, can be reasonably expected to result in significant injury to the user.

A Critical Component is any component of a life support device or system whose failure to perform can be reasonably expected to cause failure of the life support device or system, or to affect its safety or effectiveness.

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The logo for Xecom, featuring the word "xecom" in a bold, lowercase, sans-serif font with a registered trademark symbol (®) to the upper right. The text is white and set against a black rectangular background.

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