Ultra-Slim Modem Supports 14,400 bps Data, Fax, Voice

Description

Xecom now offers an ultra-slim 14,400 bps modem, the XE1414VTS. The XE1414VTS combines data, fax, and voice in a single in-line package just 1.5 inches square and .25 inches thick. XE1414VTS is available in both vertical (XE1414VTS1) and horizontal (XE1414VTS2) mounting styles.

The XE1414VTS is not just a modem chip either. It is complete modem including the telephone interface. The XE1414VTS provides user transferrable FCC Part 68 registration permitting a direct connection to the telephone line through an RJ11 jack without further expensive testing.

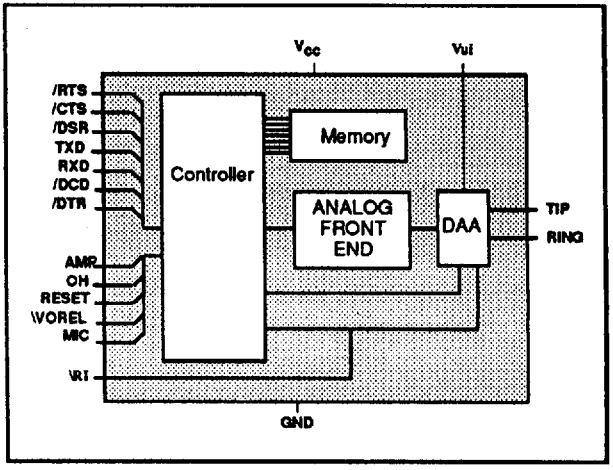
XE1414VTS has two low power modes. It automatically enter Sleep mode and reduces power during periods of inactivity. The XE1414VTS can detect a ring with VCC removed from the modem. This Shut-Down mode reduces current draw to nearly zero while the modem is not in use.

Xecom designed the XE1414VS specifically for industrial and telecommunications systems applications where communications is essential and space and power are at a premium.

Features

- Small Size; 1.5 " x 1.5" x 0.25"
- Modem control with "AT" commands
- Class 1 commands for facsimile control
- MNP and V.42 Error Control
- MNP5 Data Compression to 28,800 bps
- V.42bis Data Compression to 57,600 bps
- Plays and Records audio as ADPCM data
- Low Power Operation (+5 Volts only)
  Operating Power - 550 milliWatts
  Sleep Mode - 50 milliWatts
  Shut-Down - <5 microWatts
- Modem Protocols:
  CCITT V.32bis, V.32, V.29, V.27 ter, V.22bis, V.22, V.21; Bell 212/103

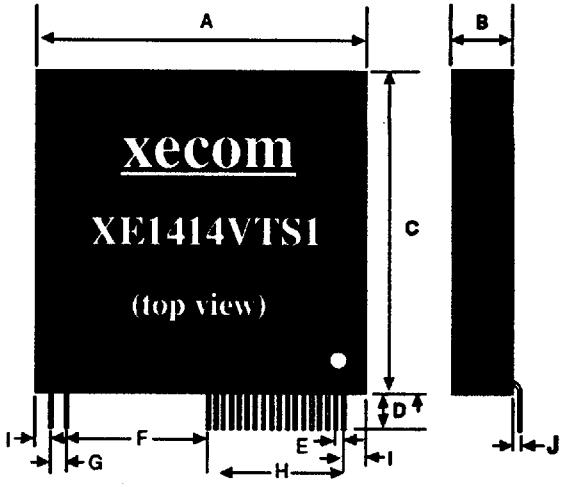
Block Diagram



XE1414VTS1 Mechanical Specifications

DIM	INCHES MIN	INCHES MAX	METRIC(MM) MIN	METRIC(MM) MAX
A	1.500	1.540	38.10	39.12
B	0.240	0.250	6.10	6.35
C	1.500	1.540	38.10	39.12
D	0.120	0.200	3.05	5.08
E	0.045	0.055	1.14	1.40
F	0.145	0.155	3.68	3.94
G	0.095	0.105	2.41	2.67
H	0.845	0.855	21.46	21.72
I	0.200	0.220	5.08	5.56
J	0.030	0.050	0.76	1.27

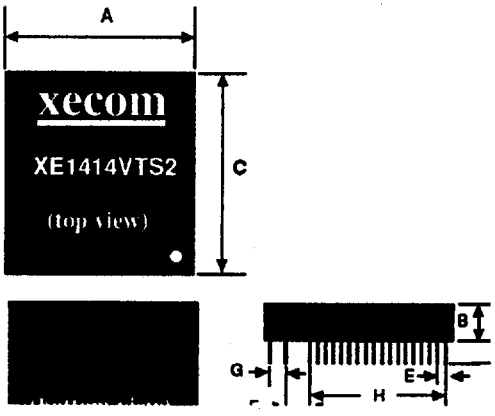
All Pins 0.018 inch square; tin-plated



XE1414VTS2 Mechanical Specifications

DIM	INCHES MIN	INCHES MAX	METRIC(MM) MIN	METRIC(MM) MAX
A	1.500	1.540	38.10	39.12
B	0.240	0.250	6.10	6.35
C	1.500	1.540	38.10	39.12
D	0.120	0.200	3.05	5.08
E	0.045	0.055	1.14	1.40
F	0.145	0.155	3.68	3.94
G	0.095	0.105	2.41	2.67
H	0.845	0.855	21.46	21.72
I	0.200	0.220	5.08	5.56

All Pins 0.018 inch square; tin-plated



XE1414VTS Pin Configuration and Definitions

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
VCC	TXD	\AA	\DTR	\HS	\CTS	OH	AMP	MIC										Tip	Ring
	Reset	RXD	\RTS	\RI	\DCD	\DSR	AR	Gnd	Vui										

Pin	Name	Description
1	Vcc	+5 Volt power
2	RESET	Hardware reset pin, active high input, TTL. Minimum reset signal 100 milliseconds.
3	TXD	Serial data input from the DTE.
4	RXD	Serial data output to the DTE.
5	\AA	Auto Answer, output active low. Indicates the modem is set to auto-answer.
6	\RTS	Request to Send, input, active low, TTL. RTS regulates data flow from the modem with hardware flow control active.
7	\DTR	Data Terminal Ready, input, active Low, TTL. AT&D sets this pin function.
8	\RI	Ring Indicate, output, active low,TTL. Indicates a ring is present. Vui powers \RI.
9	\HS	High Speed indicator, output, active Low, TTL/CMOS. Low when operating at 14,400 bps rate, high otherwise.
10	\DCD	Data Carrier Detect, output, active Low, TTL/CMOS. Function controlled by the &C command.
11	\CTS	Clear to Send, output, active Low, TTL/CMOS. \CTS regulates data flow from the host with hardware flow control active.
12	\DSR	Data Set Ready, output, active Low, TTL/CMOS. AT&S controls this function.
13	OH	Off-Hook, active high, TTL, indicates the hookswitch relay is in the "off-hook" position and the modem is connected to the telephone line.
14	\AR	Auxiliary Data/Voice Relay active Low output, TTL/CMOS. AR can drive an external relay to allow the telephone line to be used with other equipment.
15	AMP	Audio output to speaker. AMP cannot directly drive a low impedance speaker.
16	GND	Ground (0 volts)
17	MIC	Microphone input.
18	Vui	Vui provides uninterrupted power for the Ring Indicate output.
19	TIP	Tip connection to the phone line (RJ11 pin3) from the internal DAA.
20	RING	Ring connection to the phone line (RJ11 pin4) from the internal DAA. **Caution: Observe design rules for Tip and Ring trace layout**

XE1414 VTS Power Supply Characteristics (T_A = 0 - 70°C, Vcc = 5v±5%)

Symbol	Parameter	Typ	Max	Units	Comments
Vcc	Supply Voltage	5.0	5.25	V	
Icc	Vcc Supply Current	110	150	mA	XE1414VS, On Line
ccs	Sleep Current	10		mA	XE1414VS
Iui	Power for \RI	7 <1	10 5	mA uA	Ring Signal Present No Ring Signal

Power Management: The XE1414VTS includes intelligent power management capabilities. The capabilities include both an automatic sleep mode and total power shutdown.

Sleep Mode: When there is no activity on TXD, RXD or RI the modem will, within 5 seconds, automatically enter sleep mode. In this mode power consumption is typically less than 50 milliwatts. The modem resumes full operation as soon as there is activity on TXD or RI.

Power Shut-down: Where power consumption is extremely critical, primary power can be removed from the modem. The ring detector will continue to operate even without VCC. Power for RI comes from Vui. Vui typically requires less than 1 microamp until a ring is detected. VCC can be restored when a ring is detected or any time the host wishes to initiate communications.

Telephone Line Interface Specifications

PARAMETER	MIN	TYP	MAX	UNIT
Telephone Line Impedance Match		600		ohms
Ring Detect Sensitivity (Type B ringer)	38			Vrms
Telephone Line Holding Current	20		100	mA

XE1414VTS AT Command List

Command	Description	Command	Description
A	Answer Command -	&Un	Trellis Coding
Bn	Select Communications Std	&Vn	View Configuration Profiles
D	Dial Command -	&Wn	Store Active Profile
	P Pulse dial	&Zn=x	Store telephone number "x" in memory location "n"
	T Tone dial		
	R Connect as an answering modem	-Cn	Calling Tone
		-Jn	V.42 Detect
	S=n Dial stored number	"Hn	V.42bis Compression
	W Wait for dial tone	"On	V.42bis String Length
	, Pause	%A	Set Auto-reliable Fallback Character
	@ Wait for silence		
	! Switch hook flash	%Cn	MNP5 Data Compression
	; Return to command mode	%Q	Read Line Signal Quality
En	Command Echo	\An	MNP Block Size
Hn	Switch Hook Control	\Bn	Transmit Break
In	Modem Identification	\Gn	Set Modem Port Flow Control
Ln	Speaker Volume	\Jn	DTE Rate Adjust
Mn	Speaker Activity	\Kn	Break control
Nn	Data Rate	\Nn	Error Control Selection
On	On Line	\On	Originate Reliable Link
Qn	Responses	\Qn	Flow Control Selection
Sr?	Interrogate Register	\Tn	Inactivity Timer (default 0)
Sr=n	Set Register Value	\U	Select Auto-reliable Link
Vn	Result Codes	\Vn	Extended Result Codes
Xn	Result Code Set	\Xn	Passthrough Flow Control
Yn	Long Space Disconnect	\Y	Switch to Reliable Link
Zn	Reset	\Z	Switch to Normal Mode
&Cn	DCD Operation		
&Dn	DTR		
&F	Return to Factory Defaults		
&Gn	Guard Tone		
&Pn	Pulse Make/Break Ratio		
&Sn	DSR Operation		
&Tn	Test Modes		

Class 1 Fax Command List

Command	Description	Command	Description
AT+FCLASS?	Service Class Indication	AT+FRS<time>	Receive Silence
AT+FCLASS=?	Service Class Capability	AT+FRTn	Receive Test Data
AT+FCLASS=n	Set Service Class	AT+FTH<mod>	Transmit HDLC Data
AT+FAE=n	Data/Fax Auto Answer	AT+FTM<mod>	Transmit Fax
AT+FF	Enhanced Flow Control	AT+FTS<time>	Transmit Silence
AT+FRH<mod>	Receive HDLC Data	AT+FTTn	Transmit Test Data
AT+FRM<mod>	Receive Fax		

Voice Command List

Command	Description	Command	Description
#VB P	Generate Beep	#VPB	Record Voice
#VCL=n	Voice Mode Selection	#VRL=n	Playback Level
#VCSD	Voice Command Silence Detect	#VSL=n	Record Silence Detect Threshold
#VIP=n	Initialize Voice	#VSM=n	Sample Mode
#VLN=n	Playback Control (bit-mapped)	#VSQT=n	Record Silence Detect Time
#VPH	Telephone Emulation Mode	#VSR=n	Sampling Rate
#VPL=n	Playback Level	#VSST=n	Record Silence Detect Time
#VPB	Playback Voice		

XE1414VTS Register Summary

REG.	RANGE/UNITS	DESCRIPTION	DEFAULT
S0	0-255/rings	Number of rings to answer on	000
S1	0-255/rings	Count number of incoming rings	000
S2	0-127/ASCII	Escape character	043
S3	0-127/ASCII	Carriage return character	013
S4	0-127/ASCII	Line feed character	010
S5	0-32,127/ASCII	Backspace character	008
S6	2-255/sec	Dial tone wait time	002
S7	1-60/sec	Wait time for remote carrier	060
S8	0-255/sec	Comma pause time	002
S9	1-255/0.1 sec	Carrier detect response time	006
S10	1-255/0.1 sec	Delay from loss of carrier to hang up	014
S11	50-255/msec	DTMF dialing speed	095
S12	0-255/0.02 sec	TIES Escape Code Time Limit	050
S18	0-255/sec	Modem test timer	000
S25	Bit Mapped	DTR Transitions	005
S30	Bit Mapped	Sleep Mode timer	010
S37	Bit Mapped	Maximum Link Speed	000
S90	Bit Mapped	Disconnect Inactivity Timer	000
S108	Bit mapped	Retrain Signal Quality Selector	001
S109	Bit mapped	Line Speeds Permitted	062

XE1414VTS Result Codes

DIGIT	FULL	DEFINITIONS
0	OK	Successfully executed command line
1	CONNECT	300 bps connection established
2	RING	Ring signal detected
3	NO CARRIER	Carrier not detected or Carrier lost
4	ERROR	Error found in command line
5	CONNECT 1200	1200 bps connection established
6	NO DIAL TONE	No dial tone detected within 5 seconds
7	BUSY	Busy signal detected after automatically dialing a call
8	NO ANSWER	5 seconds of silence not detected
10	CONNECT 2400	2400 bps connection established
11	CONNECT 4800	4800 bps connection established
12	CONNECT 7200	7200 bps connection established
13	DATA	Connected in data mode after automatic answer
14	CONNECT 9600	9600 bps connection established
15	FAX	Connected in fax mode after automatic answer .
16	CONNECT 12000	12,000 bps connection established
17	CONNECT 14400	14,400 bps connection established
22	CONNECT 300/REL	300 bps MNP Connection established
24	CONNECT 1200/REL	1200 bps MNP Connection established
25	CONNECT 2400/REL	2400 bps MNP Connection established
26	CONNECT 4800/REL	4800 bps MNP Connection established
27	CONNECT 7200/REL	7200 bps MNP Connection established
28	CONNECT 9600/REL	9600 bps MNP Connection established
29	CONNECT 12000/REL	12,000 bps MNP Connection established
30	CONNECT 14400/REL	14,400 bps MNP Connection established
+F4	+FCERROR	Fax carrier error detected.
32	CONNECT 300/REL-MNP	300 bps MNP Connection established
34	CONNECT 1200/REL-MNP	1200 bps MNP Connection established
35	CONNECT 2400/REL-MNP	2400 bps MNP Connection established

XE1414VTS Result Codes (continued)

DIGIT	FULL	DEFINITIONS
36	CONNECT 4800/REL-MNP	4800 bps MNP Connection established
37	CONNECT 7200/REL-MNP	7200 bps MNP Connection established
38	CONNECT 9600/REL-MNP	9600 bps MNP Connection established
39	CONNECT 12000/REL-MNP	12,000 bps MNP Connection established
40	CONNECT 14400/REL-MNP	14,400 bps MNP Connection established
42	CONNECT 300/REL-MNP	300 bps MNP Connection established
44	CONNECT 1200/REL-MNP5	1200 bps MNP5 Connection established
45	CONNECT 2400/REL-MNP5	2400 bps MNP5 Connection established
46	CONNECT 4800/REL-MNP5	4800 bps MNP5 Connection established
47	CONNECT 7200/REL-MNP5	7200 bps MNP5 Connection established
48	CONNECT 9600/REL-MNP5	9600 bps MNP5 Connection established
49	CONNECT 12000/REL-MNP5	12,000 bps MNP5 Connection established
50	CONNECT 14400/REL-MNP5	14,400 bps MNP5 Connection established
54	CONNECT 1200/REL-LAPM	1200 bps LAPM Connection established
55	CONNECT 2400/REL-LAPM	2400 bps LAPM Connection established
56	CONNECT 4800/REL-LAPM	4800 bps LAPM Connection established
57	CONNECT 7200/REL-LAPM	7200 bps LAPM Connection established
58	CONNECT 9600/REL-LAPM	9600 bps LAPM Connection established
59	CONNECT 12000/REL-LAPM	12,000 bps LAPM Connection established
60	CONNECT 14400/REL-LAPM	14,400 bps LAPM Connection established
64	CONNECT 1200/REL-LAPM V.42bis	1200 bps LAPM V.42bis Connection
65	CONNECT 2400/REL-LAPM V.42bis	2400 bps LAPM V.42bis Connection
66	CONNECT 4800/REL-LAPM V.42bis	4800 bps LAPM V.42bis Connection
67	CONNECT 7200/REL-LAPM V.42bis	7200 bps LAPM V.42bis Connection
68	CONNECT 9600/REL-LAPM V.42bis	9600 bps LAPM V.42bis Connection
69	CONNECT 12000/REL-LAPM V.42bis	12,000 bps LAPM V.42bis Connection
70	CONNECT 14400/REL-LAPM V.42bis	14,400 bps LAPM V.42bis Connection

Other XE1414VTS Performance Specifications

PARAMETER		MIN	TYP	MAX	UNIT	COMMENTS
DTMF Level			-2.2	0	dBm	
DTMF Twist (Balance)				3	dB	
DTMF Tone Duration			70		ms	
Pulse Dialing Rate			10		pps	
Pulse Dialing Make/Break		39/61		%	USA	
			33/67		%	CCITT
Pulse Interdigit Interval			785		ms	
Billing Delay Interval		2.0			sec.	
Tone Detection Bandpass Frequency		290		665	Hz	3 dB point
Tone Detection OFF to ON Threshold		-33			dBm	into 600 ohms
Tone Detection ON to OFF Threshold		-35			dBm	into 600 ohms
Dial Tone Detect Duration		3.0			sec.	
Ringback Tone Detect	Duration	0.75			sec.	
	Cadence	1.5			sec.	OFF/ON Ratio
Busy Tone Detect	Duration	0.2			sec.	
	Cadence	0.67		1.5	sec.	OFF/ON Ratio