1200bps Multichip Modem Module

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Description

The XE1212BL5 is a complete 1200/300 bps modem in one compact, component. It includes an FCC Part 68 Registered telephone interface for direct connection to the telephone network and a parallel 8250B UART for conection with an IBM-PC, XT or AT system bus. Industry standard "AT" commands control modem configuration . The XE1212BL5 contains all signal processing functions, including analog filters, modulators and demodulators for both PSK and FSK operation.

The XE1212BL5 was designed specifically for systems needed compact, embedded communciations facilities.

Features

- Small Size 2.28" x 1.0" x 0.5"
- FCC Part 68 Registered
- Supports 212A/103 and CCITTV.22/V.21
- Industry Standard "AT" Command Set
- Parallel Interface
- Emulates 8250B UART
- Call Progress Monitoring
- DTMF and Pulse Dialing
- Software Controlled Audio Output
- UL Recognized Component
- CSA Registered Component
- +5 Volt Power Only

BLOCK DIAGRAM
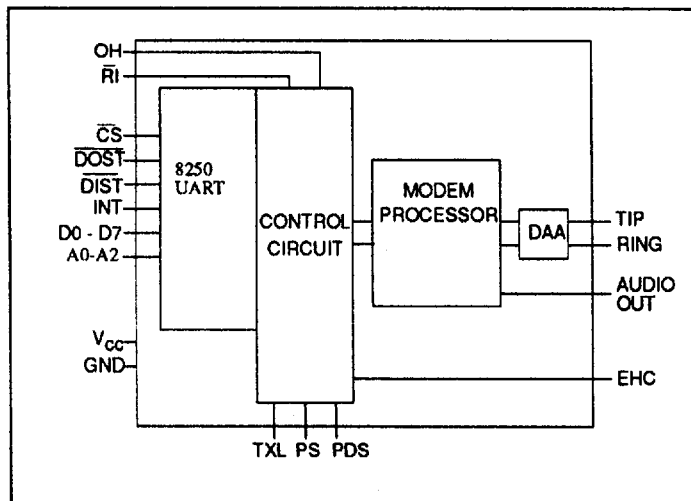
PIN CONFIGURATION

Pin		Pin	
N/C	1•	40	TIP
GND	2		
Vcc	3		
RI\	4	37	RING
PDS	5		
N/C	6		
N/C	7		
PS	8		
OH	9		
N/C	10		
N/C	11		
AUDIO	12		
INT	13	28	D0
A0	14	27	D1
A1	15	26	D2
A2	16	25	D3
CS\	17	24	D4
DOST\	18	23	D5
DIST\	19	22	D6
EHC	20	21	D7

XE1212BL5 Mechanical Specifications

DIM	INCHES		METRIC(MM)	
---	MIN	MAX	MIN	MAX
A	2.255	2.305	57.2	58.6
B	0.985	1.015	25.0	25.8
C	0.490	0.510	12.4	13.0
D	0.890	0.910	22.6	23.1
E	1.890	1.910	48.0	48.5
F	0.125	0.200	3.1	5.1
G	0.040	0.060	1.0	1.5
H	0.180	0.200	4.5	5.1
J	0.090	0.110	2.3	2.8
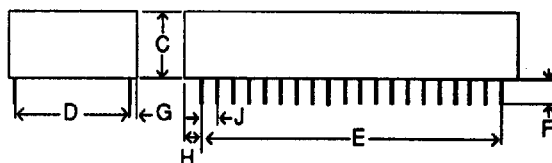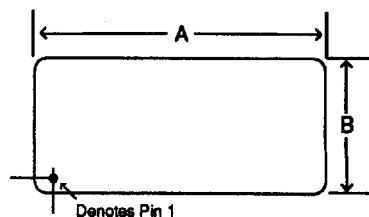
Pins = 0.020" X 0.014"
All pins tin-plated
Recommended PCB lead hole size = 0.045"

Pin Descriptions

PIN	NAME	I/O	DESCRIPTION
1	N/C	--	No Connect.
2	GND	--	Ground Reference (0 volts).
3	VCC	--	Positive Supply Voltage (+5 volts).
4	\RI	O	Ring Indication. A low level on this status line indicates the presence of the ring cycle. This line is normally used for test/status only.
5	PDS	I	On power up, the XE1212BL5 reads PDS to select the pulse dialing standard used. With PDS open or high, the Bell Standard, 39% Make, 61% Break, is selected; PDS tied to ground through an 18K resistor, selects the CCITT standard, 33% Make, 67% Break.
6,7	N/C	--	No Connect. These pins should not be connected.
8	PS	I	XE1212BL5 reads PS status on power-up to determine whether to use the Bell or CCITT protocol. If the PS is tied to ground through an 18K resistor, CCITT V.22 protocol is selected. If PS is open, the XE1212BL5 defaults to the Bell 212A Mode.
9	OH	O	This signal allows the user to monitor the status of the hookswitch relay in the DAA. When the signal on OH is high, the relay is closed, and the XE1212BL5 is connected to the telephone line. During rotary dialing, this line is pulsed at a rate of 10pps.

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PIN	NAME	I/O	DESCRIPTION
10,11	N/C	--	No Connect. These pins should not be connected.
12	AUDIO	O	The output of the 2-4 wire converter (input to the DAA) is brought out on this pin through an internally programmable attenuator to allow an audio monitor of the modem functions.
13	INT	O	The Interrupt Line goes high whenever any of the enabled interrupts in the Interrupt Enable Register (IER) are active. The interrupts are Received Data Available, Transmitter Holding Register Empty, Receiver Line Status and Modem Status. The Interrupt Line is reset upon the appropriate interrupt servicing. This pin is forced to a Hi-Z state when bit 3 bit of the modem control register (MCR) is low (power on state).
14-16	A0..A2	I	These 3 address inputs select a UART register during read or write operations as shown in Table 1. The Divisor Latch Access Bit (DLAB) of the LCR register must be set high by the system software to access the bit rate Divisor Latch (DLM) as shown in Table 2.
17	\CS	I	The XE1212BL5 is selected when Chip Select is driven low. When high, the data bus lines (D0..D7) will be in the high impedance state.
18	\DOST	I	The CPU can write data or control words into a selected register of the XE1212BL5 when DOST and CS are low. Data is latched on the rising edge of the signal.
19	\DIST	I	The CPU can read data or status from a selected register of the when DIST and CS are low.
20	EHC	O	External Handset Control. This pin is used to control a relay which connnects a telephone handset to the telephone line. During data transfer, when the internal relay in the DAA is closed (off hook), this pin is high. When the internal relay is open (on-hook), this pin is low and may be used to close the external relay.
21-28	D7-D0	I/O	This eight bit data bus provides bidirectional communications between the modem and CPU. Data, Control words and Status information are transferred on these bus lines. These are tri-state lines and have internal drive buffers eliminating the need for external buffering between the CPU bus and the XE1212BL5.
37,40	RING/TIP	I/O	These are the TIP and RING connections to the telephone line from the DAA.

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XE1212BL5 AT Commands

Command	Description	Command	Description
AT	Command line prefix	En	Command echo
A	Answer incoming call now	Fn	Full/Half Duplex
A/	Re-execute last command line	Hn	Hookswitch control
Bn	Select CCITT or Bell format for 1200 bps connection	I0	Modem identificaton
		Ln	Speaker volume
Dn	Dial telephone number n; you can also include the following commands, or modifiers	Mn	Speaker On
		On	Return on-line
	P Pulse dialing	Q0	Result codes
	R Originate call in answer mode	Sr?	Read and display value of register r
	T Touch-Tone dial	Sr=n	Set register r value to n
	; Return to Command Mode after dialing	Vn	Numeric or Full Word result codes
	, Pause	Xn	Response set
	! 0.5-second hookflash	Yn	Long space disconnect
	/ Wait for 1/8 second	Z	Modem Reset
	@ Wait for silence		
	W Wait for dial tone		

Result Code Summary

Digit	Code	Meaning
0	OK	Successfully executed command line
1	CONNECT	300 bps connection established
2	RING	Ring signal detected
3	NO CARRIER	Carrier not detected within Register S7 detect time
4	ERROR	Error found in command line; returns to command line
5	CONNECT 1200	1200 bps connection established
6	NO DIAL TONE	No dial tone detected within 5 Sec. after going off-hook
7	BUSY	Busy signal detected after automatically dialing a call
8	NO ANSWER	Five seconds of silence was not detected when using the @ command in the Dial command line

Note: When the XE1212BL5 detects ringing on the telephone line, it sends a Ring result code. However, the XE1212BL5 will answer a call only if it is in auto-answer mode (ATS0>0) or is given an ATA.

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XE1212BL5 S-Registers

Register	Description	Register	Description
S0	Number of rings before the modem answers the call	S9	Carrier on Time
S1	Number of rings detected	S10	Carrier Off Time
S2	ASCII value for the escape code	S11	Duration and spacing of touch-tones
S3	ASCII value for the carriage return	S12	Escape Code Guard Timer
S4	ASCII value for the line feed	S13	UART status register (bit mapped)
S5	ASCII value for backspace	S14	General bit mapped register
S6	Wait before dialing	S15	General bit mapped register
S7	Waits for Carrier Detect	S16	Test Status register
S8	Pause time for each comma		

XE1212BL5 UART Register Function Summary

Bit No.	0 (DLAB=0) Receiver Buffer Register (RBR)	0 (DLAB=0) Transmitter Holding Register (THR)	1 (DLAB=0) Interrupt Enable Register (IER)	2 Interrupt Ident. Register (IIR)	3 Line Control Register (LCR)	4 Modem Control Register (MCR)	5 Line Status Register (LSR)	6 Modem Status Register (MSR)	0 (DLAB=1) Divisor Latch (DLL)	1 (DLAB=1) Divisor Latch (DLM)
0	Data Bit 0*	Data Bit 0*	Enable RXD Available Interrupt	"0" If Interrupt Pending	Word Length 0=7 Bit 1=8 Bit	Data Terminal Ready (DTR)	Data Ready	0	Bit 0	Bit 8
1	Data Bit 1	Data Bit 1	Enable Transmitter Holding Reg. Empty Interrupt	Interrupt Ident. Bit 0	1	Request to Send (RTS)	Overrun Error (OE)	0	Bit 1	Bit 9
2	Data Bit 2	Data Bit 2	Enable Receiver Line Status Interrupt	Interrupt Ident. Bit 1	Stop Bits 0–1 SB 1–2 SB	N/A	Parity Error (PE)	Trailing Edge Ring Indicator	Bit 2	Bit 10
3	Data Bit 3	Data Bit 3	Enable MODEM Status Interrupt	0	Parity Enable 1=PEN	0=INT (pin 13)	Framing Error (FE)	Delta Receive Line Signal Detect	Bit 3	Bit 11
4	Data Bit 4	Data Bit 4	0	0	Even Parity Select 1=EPS	N/A	Break Interrupt	1	Bit 4	Bit 12
5	Data Bit 5	Data Bit 5	0	0	Stick Parity 1=SP	0	Transmit Holding Reg Empty (THRE)	1	Bit 5	Bit 13
6	Data Bit 6	Data Bit 6	0	0	Set Break 1=SB	0	Transmit Shift Register Empty (TSRE)	Ring Indicator (RI)	Bit 6	Bit 14
7	Data Bit 7	Data Bit 7	0	0	Divisor Latch Access Bit (DLAB)	0	0	Received Line Signal detect	Bit 7	Bit 15

*Bit 0 is the least significant bit. It is the first bit serially transmitted or received.

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XE1212BL5 UART Register

DLAB	A2	A1	A0	REGISTER
0	0	0	0	Receiver Buffer (read only) (RBR)
0	0	0	0	Transmitter Holding (write only) (THR)
0	0	0	1	Interrupt Enable (IER)
X	0	1	0	Interrupt Identification (read only) (IIR)
X	0	1	1	Line Control (LCR)
X	1	0	0	Modem Control (MCR)
X	1	0	1	Line Status (LSR)
X	1	1	0	Modem Status (read only) (MSR)
1	0	0	0	Divisor Latch (DLL)
1	0	0	1	Divisor Latch (DLM)

XE1212BL5 D.C. Electrical Specifications

(TA = 0 - 70°C, Vcc = 5v ±10%)

Description	Parameter	Min	Typ	Max	Units
Power Supply Voltage	Vcc	4.5	5.0	5.5	Volts
Power Supply Current	Icc (on-hook)		28.0	50.0	mA
	Icc (off-hook)		68.0	100.0	mA
High Level Input Voltage	Vih	2.0			Volts
Low Level Input Voltage	Vil			0.8	Volts
High Level Output Voltage	Voh	3.5			Volts
Low Level Output Voltage	Vol			0.4	Volts
Leakage Current				± 1.0	uA

Telephone Line Interface Specification

Description	Min	Typ	Max	Units
Telephone Line Impedance Match		600		Ohms
Ring Detect Sensitivity (Type B Ringer)	38			Vrms
DC Line Current	0	20	100	mA

XECOM, Inc.