

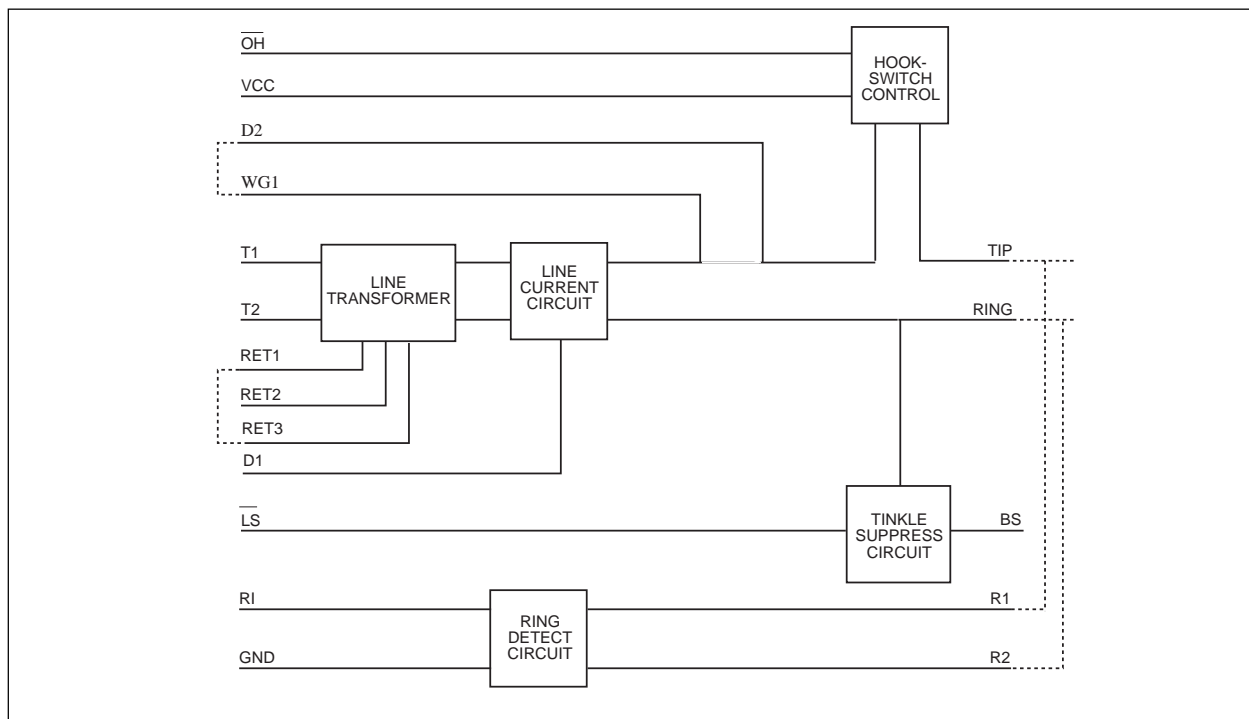
International Telephone Interfaces**Description**

Xecom's XE1000 provides a single hardware platform for telecom products world-wide. You no longer need a unique design to comply with the PTT requirements of each country. The XE1000 provides 4000 volts isolation and, in conjunction with some external straps or components, meets the requirements of PTT's throughout the world.

Small size and low power drain make the XE1000 ideal for compact, power-limited applications. The XE1000 covers just 1.3 square inches of board space and consume just 2 milliamps from the single +5 volt supply. The XE1000 includes ring detect circuitry, off hook control and bell tinkle suppression for use in the UK.

Features

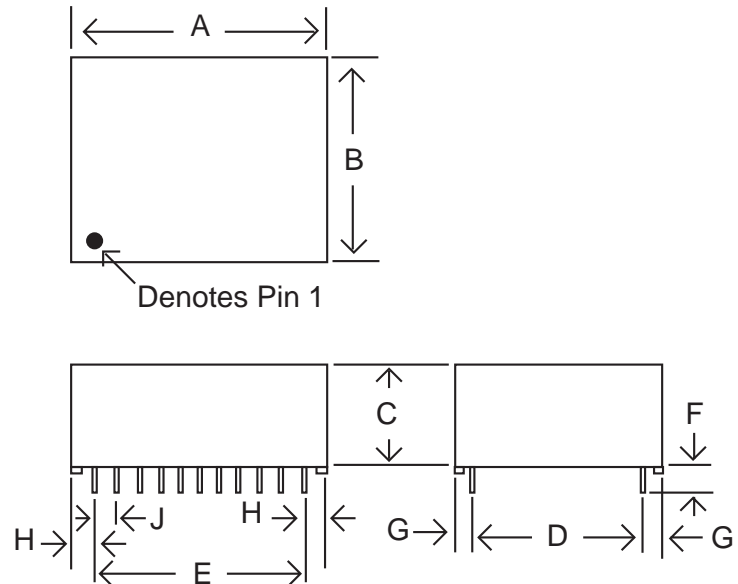
- Meet World-Wide PTT requirements (external components may be required)
- 4000 Volts RMS isolation
- BABT Certified
- Small Size (1.05" x 1.25" x 0.40")
- Low Power (typical on-line; 10 milliWatts)
- PSTN and PBX Compatible
- Ring Detection
- Hookswitch Control
- Bell Tinkle Suppression Control (XE1000)
- FCC Part 68 Compliant

BLOCK DIAGRAM

XE1000 Mechanical Specifications

DIM	INCHES		METRIC(MM)	
	MIN	MAX	MIN	MAX
A	1.250	1.270	31.75	32.26
B	1.053	1.073	26.75	27.25
C	0.384	0.404	09.75	10.25
D	0.896	0.916	22.75	23.25
E	0.990	0.010	25.15	25.65
F	0.100	0.200	03.18	05.08
G	0.074	0.084	01.88	02.13
H	0.115	0.135	02.92	03.43
J	0.090	0.110	02.29	02.79

Pin dimensions .025 inches (.635 mm) square
 Recommended hole size .056 inches (1.42 mm)



ABSOLUTE MAXIMUM RATINGS*

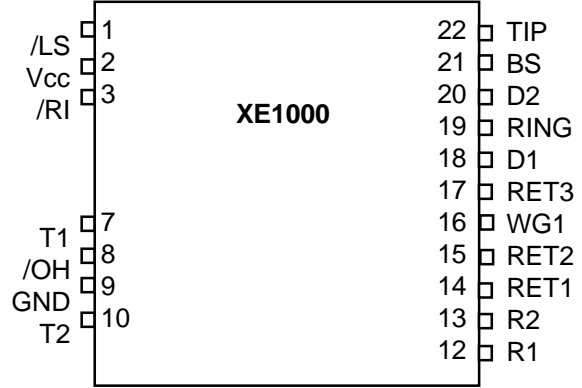
SUPPLY VOLTAGE - V_{cc}	+7.0 Volts
DC INPUT VOLTAGE	-0.6 Volts to +6.5 Volts
STORAGE TEMPERATURE RANGE	-25° C TO +100° C
LEAD TEMPERATURE(Soldering, 10sec)	300° C
OPERATING TEMPERATURE RANGE	0 TO 70° C
*Exceeding these values may result in permanent damage to the device.	

Power Supply Characteristics ($T_A = 0 - 70^\circ\text{C}$, $V_{cc} = 5v \pm 10\%$)

Symbol	Parameter	Min	Typ	Max	Units	Comments
V_{cc}	Supply Voltage	4.5	5.0	5.5	Volts	
I_{cc}	Supply Current		2.0	6.0	mA	On-Line

XE1000 Pin Configuration & Descriptions

PIN	NAME	DESCRIPTION
1	/LS	Active low, "Line Short" is used during pulse dialing to short the line for Tinkle Suppression in the UK. This line must be held to at least 4.0 volts to disable the Line Short.
2	Vcc	Vcc is the +5 volt supply voltage input.
3	/RI	This active low, open collector output provides a pulse train at twice the ring frequency present on tip and ring.
4-6	—	No Pin
7	T1	The positive input/output for differential analog signals.
8	OH	Active low, the on-hook signal places the XE1000 in the on line state. It is pulsed in combination with LS to provide pulse dialing.
9	GND	Ground reference voltage for all control signals.
10	T2	The negative differential input/output for analog signals.
11	—	No Pin
12	R1	R1 provides the Tip connection to the ring detect circuitry.
13	R2	R1 provides the Ring connection to the ring detect circuitry.
14	RET1	RET1 provides a 600 ohm line match when tied to Pin 17, RET3.
15	RET2	RET2 provides a custom line impedance match when connected to Pin 17, RET3, via an external RC network.
16	WG1	Normally this pin is tied to Pin 20 but provides a connection for the billing tone filter when required for homologation.
17	RET3	This pin is used in conjunction with pin 14 or 15 to provide matching line impedance.
18	D1	Normally this pin is tied to Pin 19, Ring, but provides a connection for the billing tone filter when required for homologation.
19	Ring	This Ring signal provides one of the two wires for connection to the telephone network.
20	D2	Normally this pin is tied to Pin 16 but provides a connection for the billing tone filter when required for homologation.
21	BS	This wire provides the bell shunt connection for the UK, blue wire.
22	Tip	The Tip signal provides half of the two-wire connection to the telephone network.



XE1000 Electrical Specifications

Parameter	Min	Typ	Max	Unit	Description
Transmit Insertion Loss	1.0	2.0	4.0	dB	Loss between transmit signal input and telephone line signal at 1000 hz with 600 ohm line termination.
Receive Insertion Loss	1.0	2.0	4.0	dB	Loss between telephone line input and receive signal at 1000 hz with 600 ohm line termination.
Line Matching Impedance		420		ohms	Input impedance on T1/T2 required to match a 600 ohm telephone line. See Application note beginning on page 5 to match a Complex impedance such as UKA.
Total Harmonic Distortion	72	76		dB	Level of signal distortion caused by the XE1000 across the voice bandwidth.
Ring Detect Sensitivity	20		150	VRMS	Ring signal levels detected as a valid ring. Limits may be altered by modem configuration.
Ring Indicate Output Voltage		4.2		Volts	Signal level on RI when a valid ring signal is detected.
Line Holding Current	10	20	120	Mamps	DC current supplied by the telephone line.
Hook-Switch Control Voltage On-Hook Off-Hook	2.0	3.0 0.2		Volts Volts	Voltage required to set hook-switch.
Hook-Switch Control Current On-Hook Off-Hook		0 5		Mamps Mamps	Current required to drive hook-switch.
Line Short Control Voltage Active Inactive	4.0	0.2 4.5	0.8	Volts Volts	Voltage Required to set Line Short relay

Country Configurations Application Note

This application note shows how the XE1000 can be used to connect with telephone networks in Europe, North America and Japan. It includes the schematic, parts list, and configuration table.

Only the XE1000 is this flexible. The addition of a few external components permits this product to meet a variety of telephone network regulations. The adaptability of the XE1000 eliminates the need for unique DAA's for each country.

The XE1000 includes ring detection and switch hook control while maintaining the necessary isolation from the telephone network. The XE1000 also includes the tinkle suppression relay used in the United Kingdom. The XE1000 is BAPT approved.

The following pages illustrate how the XE1000 can be configured for many countries.

Figure 1: An application schematic which includes all the circuitry required to meet the requirements of the listed countries. Component usage and values vary with the country of installation as shown in Figure 3.

Figure 2: Country configurations for most of the major market countries. Each column shows the external components required to meet the individual country's telecom requirements.

Figure 1: XE1000 Application Schematic

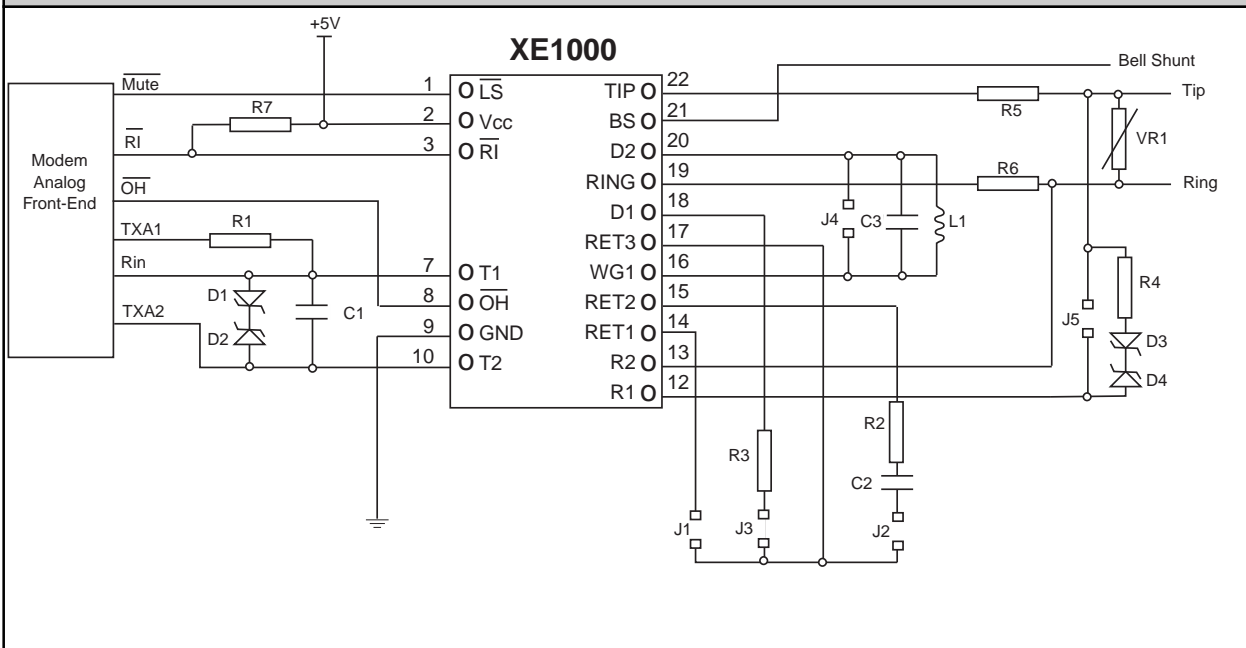


Figure 2: Country Configurations

	UK(A)	UK(B)*	USA	Italy	Japan	Germany
R1	680 OHMS	420 OHMS	420 OHMS	420 OHMS	420 OHMS	820 OHMS
R2	560 OHMS	OUT	OUT	OUT	OUT	OUT
R3	OUT	OUT	OUT	OUT	OUT	10 KOHMS
R4	OUT	OUT	OUT	0 OHMS	OUT	OUT
R5, R6	OUT	OUT	OUT	OUT	OUT	10 OHMS
R7	56 KOHMS	56 KOHMS	56 KOHMS	56 KOHMS	56 KOHMS	56 KOHMS
C1	OUT	6.8 nFd	6.8 nFd	6.8 nFd	6.8 nFd	33 nFd
C2	100 nFd	OUT	OUT	OUT	OUT	OUT
C3	OUT	OUT	OUT	OUT	OUT	0.022 uFd
L1	OUT	OUT	OUT	OUT	OUT	5 mH
VR1	OUT	OUT	TPB270B	OUT	TPB270B	OUT
D1, D2	4.7 Volts	4.7 Volts	4.7 Volts	4.7 Volts	4.7 Volts	4.7 Volts
D3, D4	OUT	OUT	OUT	10 Volts	OUT	OUT
J1	IN	OUT	OUT	OUT	OUT	IN
J2	IN	OUT	OUT	OUT	OUT	OUT
J3	OUT	OUT	OUT	OUT	OUT	IN
J4	IN	IN	IN	IN	IN	OUT
J5	IN	IN	IN	OUT	IN	IN

Notes on XE1000 Configuration:

UK(B) provides a 600 line termination; UK(A) terminates the line with a complex impedance and is the preferred termination.

"OUT" indicates the component should not be installed for that application

"IN" indicates the component is required for the application

The part number shown for VR1 is manufactured by SGS Thompson

US Telephone Line Connection Information

The following information describes the requirements for connecting equipment to the telephone network in the United States. For similar information for other countries contact the regulatory agency in that country.

When developing a product to be connected to the telephone line, it is necessary for the equipment to be approved by the appropriate governmental agency. In the US this agency is the Federal Communications Commission (FCC). The FCC evaluates the product to ensure it meets all specifications, thereby protecting the telephone system from damage and the user from high voltage transients (such as lightning strikes) on the telephone line. The DAA performs an essential function in meeting these requirements.

The XE1000 meets or exceeds all FCC Part 68 requirements for hazardous voltage, surge protection and leakage current. If the system transmits data, or DTMF tones on the telephone line, the user must meet basic FCC requirements for maximum transmission levels of out of band energy and billing delay. Full details may be obtained from the FCC under FCC Part 68 Rules and Regulations, or in Title 47 of the Code of Federal Regulations, however the basic requirements are as follows:

1. Maximum Transmit Level

For the normal "permissive" (standard) telephone line, equipment which transmits data (such as a modem) must not exceed a transmission level of -9 dBm.

2. Out of Band Energy

Data equipment must not transmit "out of band" energy on the telephone line which exceeds the following limits:

Frequency Range		Max. Power
200Hz	to 3990Hz	-9 dBm
3990Hz	to 4005Hz	-27 dBm
4005Hz	to 16kHz	-16 dBm
8kHz	to 94kHz	-47 dBm
86kHz	to 270kHz	-46 dBm
270kHz	to 6MH	-6 dBm

For modem applications, the out of band energy limit is normally ensured by the transmit filter in the modem circuitry.

3. DTMF Transmission Level

If the system is capable of DTMF dialing, the maximum DTMF transmission level must be less than 0 dBm averaged over a 3 second interval.

4. Billing Delay

A delay of 2 seconds or greater is required after "off hook" and before any information is transmitted. This is required to ensure that billing information may be exchanged between telephone company central offices without interference.

The XE1000 user must certify to the FCC that the final system meets the requirements of Part 68 which include the criteria above as well as the high voltage protection provided by the DAA. This is generally accomplished through an independent testing lab which tests the System and submits the proper paperwork to the FCC for approval.

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