

**Very-Low Profile V.34 Compatible Telephone Line Interface**

**Description**

Xecom's XE0071, Slim-Link DAA, is a miniature, high-performance telephone interface module for applications with extreme space restrictions. The XE0071 meets FCC Part 68 rules for direct connection to the public telephone network and supports V.34 data transfer.

Xecom offers the XE0071 in two pin configurations. The XE0071T pins extend perpendicularly for through-hole insertion. The XE0071L pins extended laterally so that the DAA can be surface mounted into a cutout in the host printed circuit board.

Both XE0071 models provide a complete telephone line interface including the line transformer, ring detect circuit and switch hook control. Slim-Link supplies a minimum of 1500 volts isolation from the telephone line.

The XE0071 operates from a single power supply of either +5 volts or +3.3 volts for low power applications.

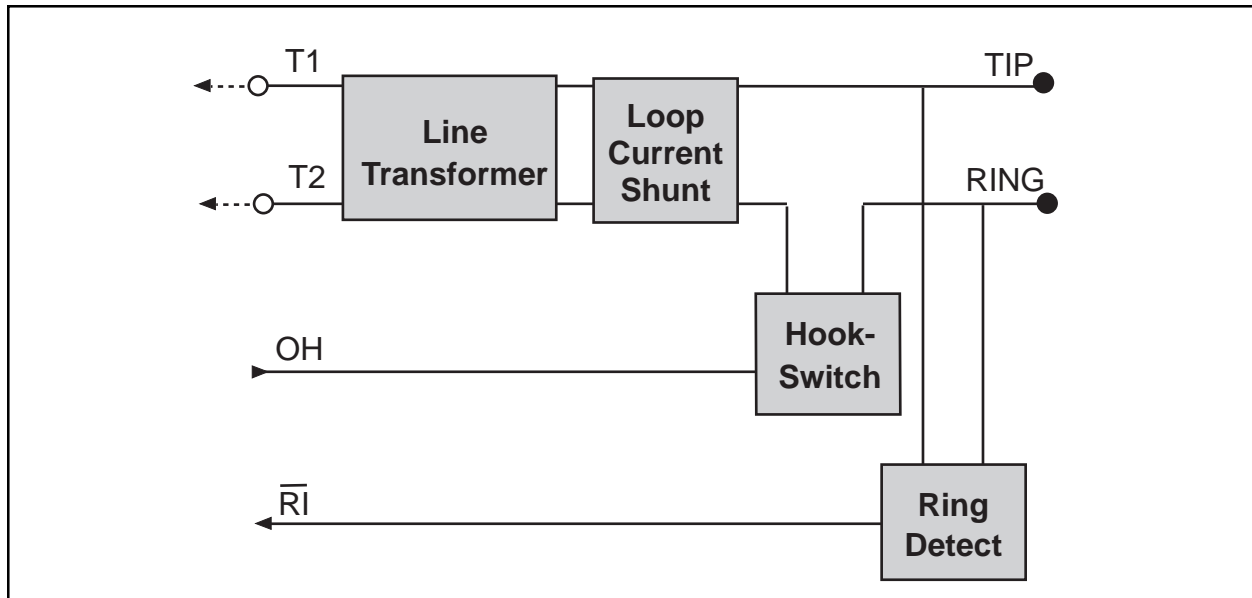
**Features**

- \* Miniature Size: 0.75" long 0.75" wide 0.159" thin (maximum);
- \* V.34 compatible for data transfer at 33,600 bps;
- \* FCC Part 68 Compliant;
- \* Low Total Harmonic Distortion;
- \* Ring Detection;
- \* 3.3 Volt or 5 Volt Operation
- \* Integral Hookswitch
- \* 2 Available Pin Styles

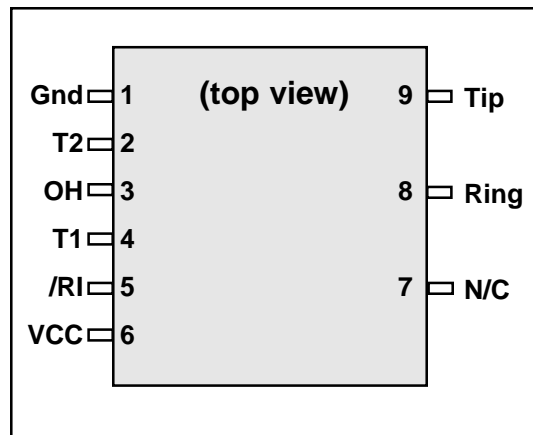
XE0071L - Pins extend laterally for mounting within PCB cutout

XE0071T - Through-Hole Pins

**XE0071 Block Diagram**



## XE0071 Pin Configuration

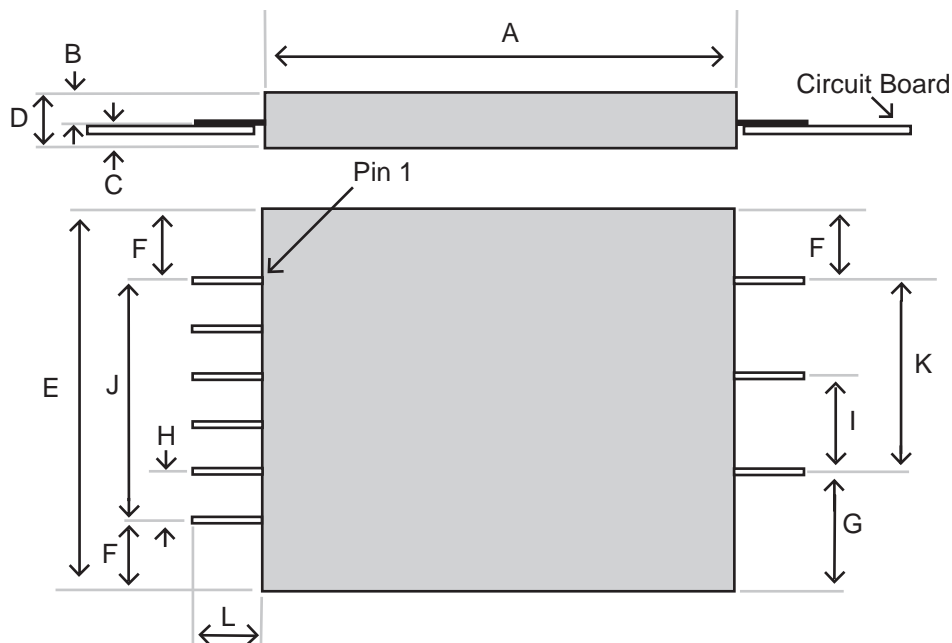


## XE0071 Pin Descriptions

Pin Name	Description
1 GND	This signal acts as common reference for all control signals. Signals on T1 and T2 are not referenced to ground.
2 T2	T2 connects directly to the secondary side of the telephone line transformer.
3 OH	Hook-switch relay control. A high on OH closes the internal relay and connects the equipment to the telephone line.
4 T1	T1 connects directly to the secondary side of the telephone line transformer.
5 /RI	Ring Indicate, output, active low, TTL, /RI provides a half-wave representation of the Ring as it appears on the telephone line.
6 VCC	VCC provides the power source for the hook-switch control. The XE0071 operates with either 3.3 volt or 5 volt power.
7 N/C	No Connect
8 Ring	Ring (RJ11 Pin 4), one of two signals which form the telephone network connection. This device is not sensitive to the polarity of the telephone line's battery voltage. Ring has 1500 volts isolation from the rest of the circuitry. This isolation must be preserved throughout the system.
9 Tip	Tip (RJ11 Pin 3) provides the second connection to the telephone network. Tip has 1500 volts isolation from the rest of the circuitry. This isolation must be preserved throughout the system.

**Note:** Xecom placed the telephone and control leads on opposite sides of the device to assist the user in maintaining the necessary isolation between the telephone network and the user equipment. FCC Part 68 rules require 1500 volts isolation between the telephone line and all other circuits.

## XE0071L Mechanical Specifications

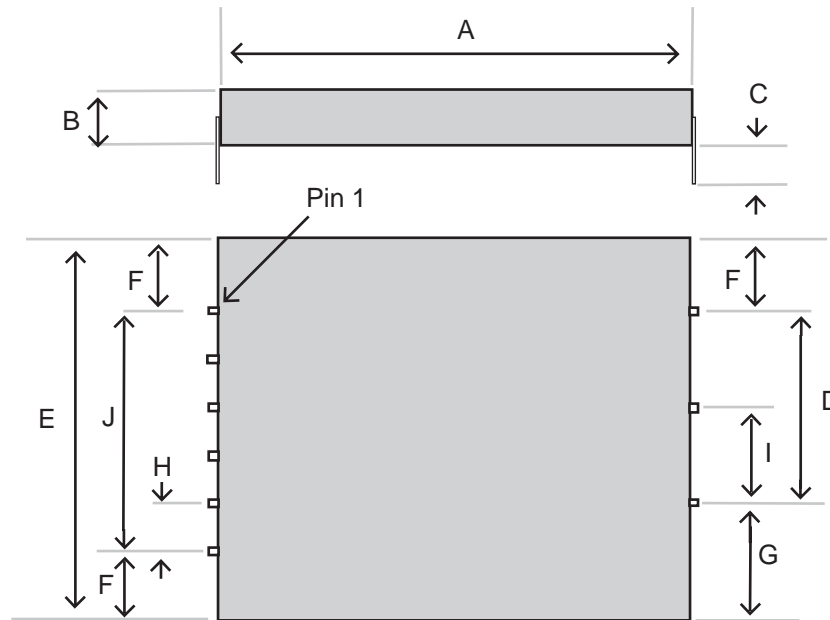


Dim	Description	Inches		Millimeters	
		Min	Max	Min	Max
A	Module Width	0.745	0.755	18.92	19.18
B	Top of module to underside of Pin	0.084	0.094	2.13	2.39
C	Underside of Pin to bottom of module	0.065	0.075	1.65	1.91
D	Module height at thickest point	0.149	0.159	3.78	4.04
E	Module Length	0.745	0.755	18.92	19.18
F	End of Pin Row to module edge	0.120	0.130	3.05	3.30
G	Pin 7 to module edge	0.220	0.230	5.59	5.84
H	Pin Spacing (control side, center to center)	0.095	0.105	2.41	2.67
I	Pin Spacing (Telco side, center to center)	0.195	0.205	4.95	5.21
J	Pin Row Length (control side)	0.495	0.505	12.57	12.83
K	Pin Row Length (Telco side)	0.395	0.405	10.03	10.29
L	Pin Length	0.045	0.055	1.14	1.40

**Notes:** Dimension D is not uniform. This drawing shows the module's maximum envelope.

Pins are 0.010 inches by 0.020 inches, tin plated.

## XE0071T Mechanical Specifications



Dim	Description	Inches		Millimeters	
		Min	Max	Min	Max
A	Module Width	0.745	0.755	18.92	19.18
B	Module height at thickest point	0.149	0.159	3.78	4.04
C	Pin Length	0.125	0.200	3.18	5.08
D	Pin Row Length (Telco side)	0.395	0.405	10.03	10.29
E	Module Length	0.745	0.755	18.92	19.18
F	End of Pin Row to module edge	0.120	0.130	3.05	3.30
G	Pin 7 to module edge	0.220	0.230	5.59	5.84
H	Pin Spacing (control side, center to center)	0.095	0.105	2.41	2.67
I	Pin Spacing (Telco side, center to center)	0.195	0.205	4.95	5.21
J	Pin Row Length (control side)	0.495	0.505	12.57	12.83

**Notes:** Dimension D is not uniform. This drawing shows the module's maximum envelope.

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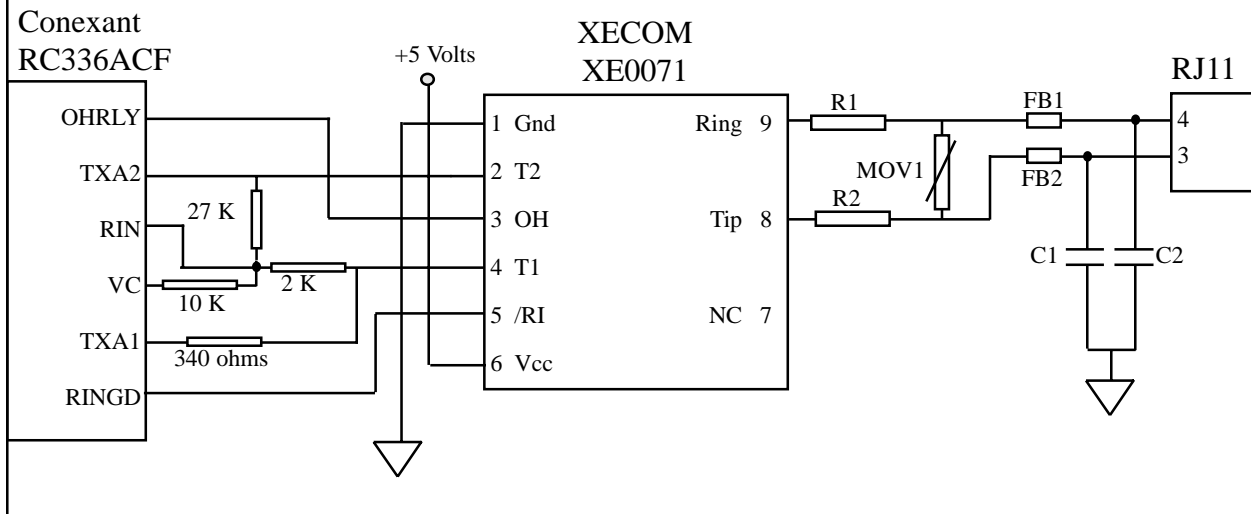
**XE0071 Electrical Specifications** ( $T_a = 0$  to  $70$  degrees C)

Parameter	Conditions	Min	Typ	Max	Units
Power Supply Current	Off Hook, 5.0 Volts		10	15	mA
	Off Hook, 3.3 Volts		6.5	10	mA
Transmit Insertion loss	600 Ohm Impedance, 1000 Hz	1.7	2.7	3.7	dB
Receive Insertion loss	600 Ohm Impedance, 1000 Hz	1.7	2.7	3.7	dB
Line Impedance	At 1000 Hz, Rm 340 ohms	540	600	660	Ohms
Coupler Matching Impedance	Input impedance to T1 & T2	320	340	360	Ohms
Ring Detect Sensitivity	Min. AC voltage between Tip & Ring Type B ringer (on-hook)	38		150	Vrms
Ring Detect Peak Current	Ring voltage of 40 Vrms	100			uA
Ring Detect Idle Current	No Ringing Voltage present			10	uA
Ring Indicate Output	Ring Voltage present		0.2	0.5	Volts
Hook Switch Control Voltage	ON: (off-hook), VCC = 5 Volts	2.0	3.0		Volts
	OFF: (on-hook)		0.2	0.5	Volts
Hook Switch Control Current	VCC = 5 Volts		15	25	mA

**Absolute Maximum Ratings**

Storage Temperature	-25 <sup>o</sup> C to +85 <sup>o</sup> C
Operating Temperature Range	0 <sup>o</sup> C to +70 <sup>o</sup> C
Maximum Lead Temperature (soldering 2 seconds per wave)	260 <sup>o</sup> C

## XE0071 Typical Connection Diagram



### Recommended Parts

<u>Designation</u>	<u>Description</u>
C1, C2	470 picofarad, 3000 Volts (Sprague Part Number 30GA-T47)
FB1, FB2	Ferrite Beads (TDK Part Number CB30-453215B)
MOV1	Typical Breakover 310 volts (Teccor Part Number P3100BA70)
R1, R2	Resistor 10 ohms, 1/2 Watt

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## FCC Part 68 Instructions

When developing a product to be connected to the telephone line, it is necessary to use a circuit known as a Data Access Arrangement (DAA) approved by the appropriate governmental agency. In the US this agency is the Federal Communications Commission (FCC), while in Canada it is Industry Canada (IC). These agencies test and approve the product to ensure that it meets their specifications, thereby protecting the telephone system from damage and protecting the user from high voltage transients (such as lightning strikes) which may come down the telephone line.

The XE0071 has been designed to meet all FCC Part 68 requirements for hazardous voltage, line impedance and leakage current. If the system transmits data, synthesized voice, or DTMF tones on the telephone line, the user must certify that the signals transmitted meet basic FCC requirements for maximum transmission levels, out of band energy and billing delay. Full details may be obtained from the FCC under Part 68 of the FCC 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
3995 Hz	to	4005 Hz	-27 dBm
4005 Hz	to	12 kHz	-20 dBm
12 kHz	to	90 kHz	-55 dBm
90 kHz	to	270 kHz	-55 dBm
270 kHz	to	6 MHz	-15 dBm

### 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 the time the XE0071 is taken “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 user of the XE0071 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 XE0071. This is generally accomplished through an independent testing lab which tests the System and submits the proper paperwork to the FCC for approval. Since the XE0071 already complies with FCC Part 68 rules, this is a relatively simple process.

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**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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