

## Surface Mount V.34 Telephone Line Interface

### Description

Xecom's XE0080 is a miniature, surface-mount telephone interface module for high-volume applications. The XE0080 meets FCC Part 68 rules for direct connection to the public telephone network, supports V.34 data transfer, and adapts to automated pick and place equipment.

The XE0080 is a complete telephone line interface. It includes the line transformer, ring detection, switch hook control and loop current holding circuit. The XE0080 supplies a 1500 volt isolation barrier between the telephone line and the host circuitry.

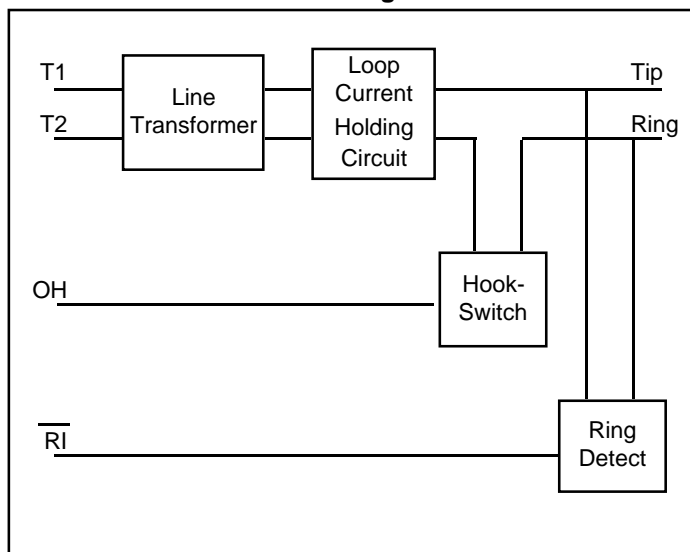
The XE0080 fits all this circuitry into a package just 0.80 inches square and 0.200 inches thick. The 0080 attaches to the board through nine surface-mount pins.

The XE0080 operates from a single power supply of either +5 volts or +3.3 volts for low power applications. It is intended for high volume applications including set top box and credit verification systems

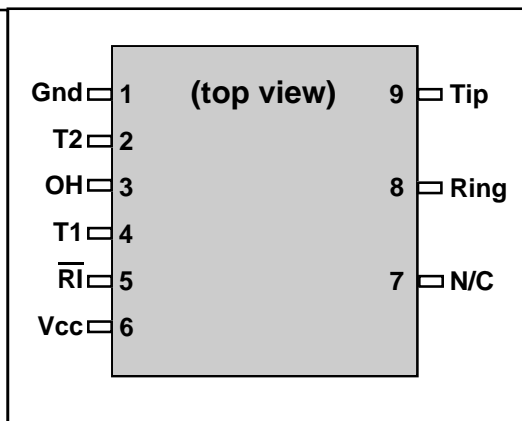
### Features

- \* Miniature Size: 0.8" long, 0.8" wide, and 0.2" thin (maximum);
- \* 9-pin Surface mountable package;
- \* Supports V.34 data transfer to 28,800 bps;
- \* FCC Part 68 Compliant;
- \* Low Total Harmonic Distortion -80 dB max.;
- \* Ring Detection;
- \* 3.3 Volt or 5 Volt Operation
- \* Hookswitch Control

### Block Diagram

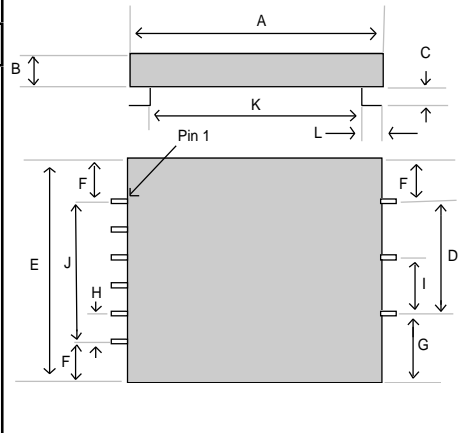


### PIN CONFIGURATION



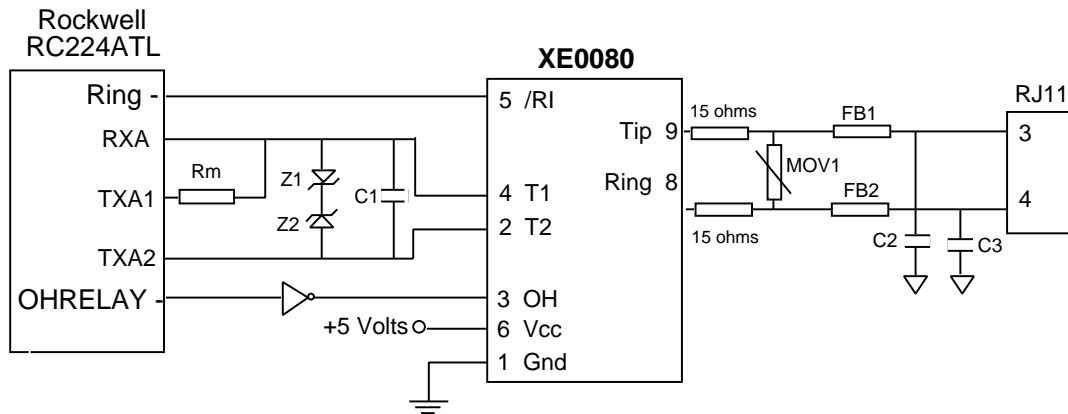
## XE0080 Mechanical Specifications

Dim	Description	Inches		Millimeters	
		Min	Max	Min	Max
A	Module Width	0.770	0.780	19.56	19.81
B	Module Height	0.195	0.205	4.95	5.21
C	Pin Length	0.035	0.045	0.89	1.14
D	Pin Row Length (6 to 9)	0.395	0.405	10.03	10.29
E	Module Length	0.750	0.760	19.05	19.30
F	End of Row to edge	0.130	0.140	3.30	3.56
G	Pin 7 to module edge	0.220	0.230	5.59	5.84
H	Pin Spacing (control side)	0.095	0.105	2.41	2.67
I	Pin Spacing (Telco side)	0.195	0.205	4.95	5.21
J	Pin Row Length (1 to 5)	0.495	0.505	12.57	12.83
K	Row to Row Spacing	0.620	0.630	15.75	16.00
L	Horizontal Pin Length	0.075	0.085	1.90	2.16



**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.

## XE0080 Typical Connection Diagram For Rockwell RC224ATL



## Recommended Parts

Designation	Description
Rm	Line Impedance Matching Resistor, 300 ohms, 5%
C1	.01 microfarad
C2, C3	47 picofarad, 3000 Volts (Sprague Part Number 30GA-T47)
Z1, Z2	Zener Diode 4.3 Volts
FB1, FB2	Ferrite Beads (TDK Part Number CB30-453215B)
MOV1	Minimum Breakover 220 volts (Teccor Part Number P2600BA70)

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## PIN DESCRIPTIONS

PIN	NAME	DESCRIPTION
1	GND	Ground connection to the XE0080. This signal provides the reference for the OH output and RI input. This pin should be connected to the system's digital ground.
2	T2	T2 in conjunction with T1 provides the differential input/output for the analog signal. T2 connects directly to the secondary of the embedded line transformer. To match the impedance of the 600 ohm telephone line, a 340 ohm resistor is required on T1 or T2.
3	OH	<p>OH is an active high input controlling the modem hook switch. Activating OH closes the hook-switch causing the XE01080 to seize the local telephone line. The telephone line connection is dropped when OH is deactivated.</p> <p>You may use OH to simulate rotary dialing. Closure of the hook-switch generates dialing pulses, one pulse for the digit one to ten pulses for the digit zero. The correct pulse rate is ten pulses per second. The pulses must be asymmetrical with the hook-switch closed for thirty-one milliseconds and open for sixty-nine milliseconds. A pause of at least one hundred milliseconds must be observed between digits.</p>
4	T1	T1 in conjunction with T2 provides the differential input/output for the analog signal. T1 connects directly to the secondary side of the line transformer embedded into the XE0080. To match the impedance of the DAA to the 600 ohm telephone line, a 340 ohm resistor is required on T1 or T2.
5	\RI	Ring Indicate is an active low output. RI active indicates the presence of an incoming call. RI provides a square wave representation of the Ring signal present across Tip and Ring. This permits intelligent monitoring of the ring signal. The XE0080 recognizes ring voltages of thirty-eight to one hundred fifty volts RMS in the frequency range of sixteen to sixty-eight Hertz.
6	VCC	+5 Volt power source for the XE01080. VCC powers the RI and OH control lines.
7	N/C	No Connect
8	Ring	Ring is one wire of the two-wire telephone line connection (RJ11 Pin 4). 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. Xecom recommends 0.100 inch spacing between traces connected to Ring and all other conductors to preserve this isolation.
9	Tip	<p>Tip is one wire of the two-wire telephone line connection (RJ11 Pin 3). 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. Xecom recommends 0.100 inch spacing between traces connected to Tip and all other conductors to preserve this isolation.</p> <p>The telephone company places a DC "Battery" voltage across Tip and Ring on all public switched telephone lines. The XE0080 accept this line battery voltage without regard to its polarity.</p>

## Electrical Specification ( $T_a=0$ to $70$ deg 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 590 ohms	540	600	660	Ohms
Coupler Matching Impedance	Input impedance to T1 & T2	320	340	360	Ohms
Ring Detect Sensitivity	AC voltage between Tip & Ring	38		150	Vrms
	Type B ringer				
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
Loop Current	Off-Hook current draw from Line	20		100	mA
Total Harmonic Distortion	At 1800 Hz, -9 dBm signal level		-80		dBm

### ABSOLUTE MAXIMUM RATINGS

Storage Temperature	-25°C to +85°C
Operating Temperature Range	0°C to +70°C
Maximum Lead Temperature (soldering 2 seconds per wave)	260°C

## Telephone Line Connection Information

A product to be connected to the telephone line must be approved by the appropriate governmental agency. In the US this agency is the Federal Communications Commission (FCC); Industry Canada (IC) performs this function in Canada. These agencies verify the product meets their country's specifications, thereby protecting the telephone system from damage and protecting the user from high voltage transients (such as lightning strikes) which may pass along the telephone line.

The XE0080 meets FCC Part 68 requirements for hazardous voltage, surge protection and leakage current. If the system is to transmit data, fax, synthesized voice or DTMF tones, the user must certify that the signals meet FCC requirements for maximum signal 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

“Permissive” 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 6MHz	-6 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 minimum delay of 2 seconds is required after the XE0080 is taken “off hook” and before any information is transmitted. This delay ensures billing information may be exchanged without interference.

For use in the United States the user of the XE0080 must register the final system under FCC Part 68. This is generally accomplished through an independent testing lab which tests the System and submits the proper paperwork to the FCC for Registration.

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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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