
Minature V.34 Telephone Line Interface

Description

The XE0055S and XE0055T are very slim telephone interface modules. They support V.34 communications at 28,800 bps, yet are no more than 0.290 inches thick and comply with FCC Part 68 Rules for connection to the public telephone network.

The XE0055S and XE0055T differ only in their Ring Indicate outputs. The XE0055S provides an integrated RI output. It remains low while ring is present. The XE0055T's RI output is not integrated. It provides a pulse train at twice the ring frequency.

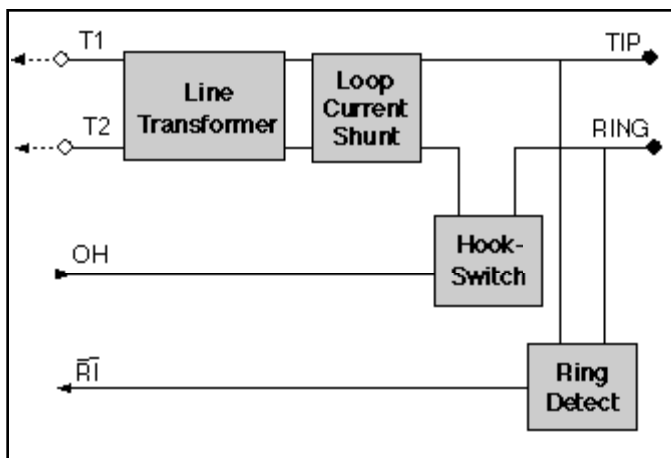
Xecom offers two mechanical variations of the XE0055S and XE0055T. The XE0055S1 and XE0055T1 mount vertically to consume minimal board space. The XE0055S2 and XE0055T2 mount horizontally for the lowest possible profile. Both versions have the same pin out and are electrically identical.

The XE0055S operates from a single power supply from +3 to +5 Volts. As with all Xecom telephone interface modules, internal ring indication and switch hook are provided.

Features

- * Small Size:
XE0055S1/T1 1.5" by 0.5" by 0.280";
XE0055S2/T2 1.5" by 0.5" by 0.230";
- * V.34 compatible for data transfer to 28,800 bps;
- * FCC Part 68 Compliant;
- * Pin compatible replacement for Xecom's XE0054SIP
- * Ring Detection;
- * Single Power Supply, 3 to 5 Volts;
- * Hookswitch Control
- * Two Mechanical Variations
XE0055S1/T1 Vertical Mount
XE0055S2/T2 - Horizontal Mount

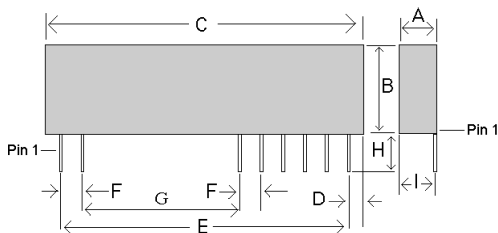
Block Diagram
XE0055S & XE0055T



Mechanical Specifications

XE0055S1 & XE0055T1

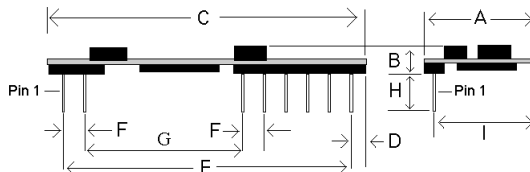
Dim	Inches		Millimeters	
	Min	Max	Min	Max
A	0.270	0.290	6.86	7.37
B	0.490	0.510	12.45	12.95
C	1.490	1.510	37.85	38.35
D	0.040	0.060	1.02	1.52
E	1.390	1.410	35.31	35.81
F	0.090	0.110	2.29	2.79
G	0.790	0.810	20.07	20.57
H	0.125	0.200	4.19	5.08
I	0.260	0.280	6.60	7.11



Pin Size: 0.025" by 0.025"
Recommended hole size: 0.056"

XE0055S2 & XE0055T2

Dim	Inches		Millimeters	
	Min	Max	Min	Max
A	0.490	0.510	12.45	12.95
B	0.225	0.235	5.72	5.97
C	1.490	1.510	37.85	38.35
D	0.040	0.060	1.02	1.52
E	1.390	1.410	35.31	35.81
F	0.090	0.110	2.29	2.79
G	0.790	0.810	20.07	20.57
H	0.125	0.200	3.18	5.08
I	0.440	0.460	11.18	11.68



Pin Size: 0.025" by 0.025"
Recommended hole size: 0.056"

Pin	Name	Description
1	Ring	Ring is one of two signals which form the telephone network connection (RJ11 Pin 4). This device is not sensitive to the polarity of the battery voltage on the telephone line. Ring has 1500 volts isolation from the rest of the circuitry. This isolation must be preserved throughout the system.
2	Tip	Tip provides the second connection to the telephone network (RJ11 Pin 3). Tip has 1500 volts isolation from the rest of the circuitry. This isolation must be preserved throughout the system.
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 XE0055S telephone line transformer.
5	GND	This signal is used as common reference for all of the control signals in the XE0055S. Signals on T1 and T2 are not referenced to ground.
6	VCC	VCC provides the power source for the hook-switch control. The XE0055S will operate with VCC equal to 3 to 5 volts
7	T2	T2 connects directly to the secondary side of the telephone line transformer of the XE0055S
8	/RI	Ring Indicate, output, active low TTL. Ri goes low on the XE0055S with each ring and remains low as long as the ring is present on the telephone line. The XE0055T RI output provides a pulse at twice the Ring Frequency.

PIN CONFIGURATION

XE0055S & XE0055T

(top view)

- 1 Ring
- 2 Tip
- 3 OH
- 4 T1
- 5 Gnd
- 6 VCC
- 7 T2
- 8 /RI

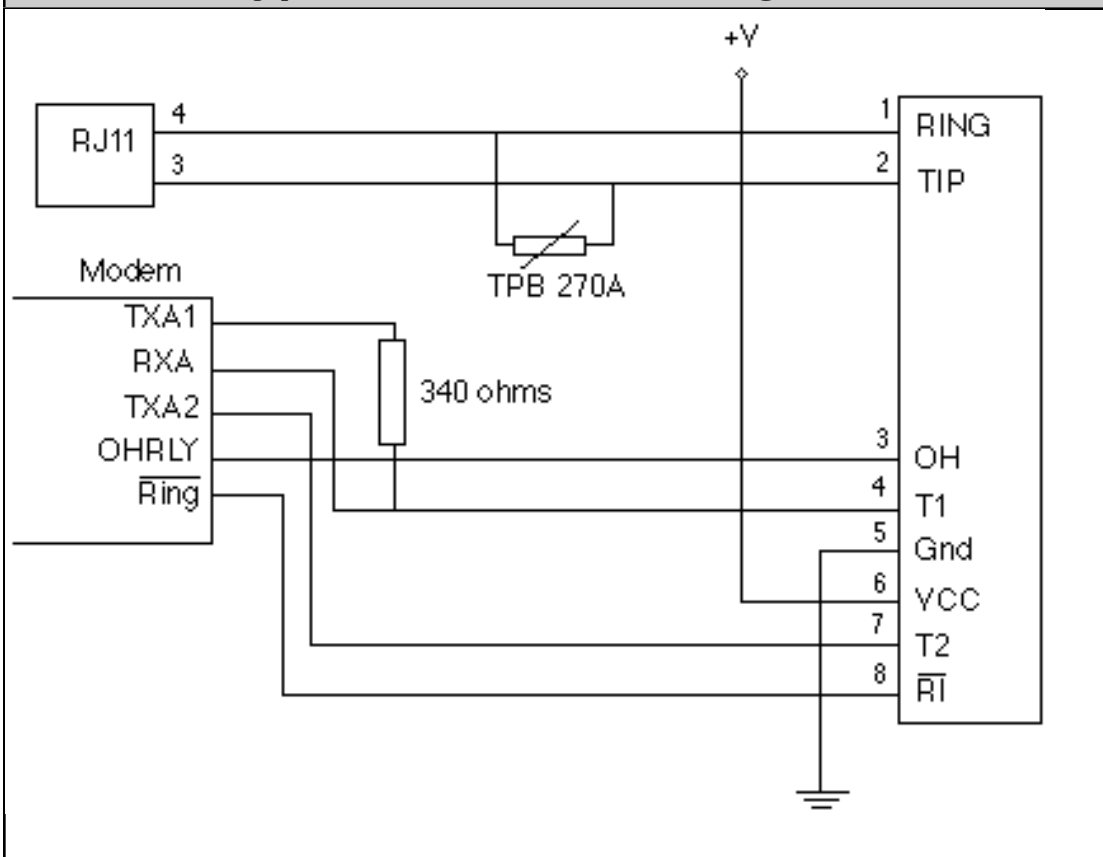
Electrical Specification (Vcc=+3v , Ta=0 to 70 deg C)

Parameter	Conditions	Min	Typ	Max	Units
Power Supply Current	Off Hook		6	10	mA
Transmit Insertion loss	600 Ohm Impedence, 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 Match input impedance	Input impedance to T1 & T2	336	340	344	Ohms
Ring Detect Sensitivity (on-hook)	Min. AC voltage between Tip & Ring Type B ringer	38		150	Vrms
Ring Detect Peak Current	Ringling voltage of 40 Vrms applied between Tip & Ring	100			uA
Ring Detect Idle Current	No Ringing Voltage present			10	uA
Ring Indicate Output Voltage	Ring Voltage present on Tip & Ring		0.2	0.5	Volts
Loop Current Switch Control Voltage	ON: (off-hook) OFF: (on-hook)	2.0	2.5 0.2	0.5	Volts Volts
Loop Current Switch Control Current			15	25	mA
Loop Current	Off-Hook current draw from Telephone Line	20		100	mA
Total Harmonic Distortion	At 1800 Hz, -9 dBm signal level	-72	-76		dBm

ABSOLUTE MAXIMUM RATINGS

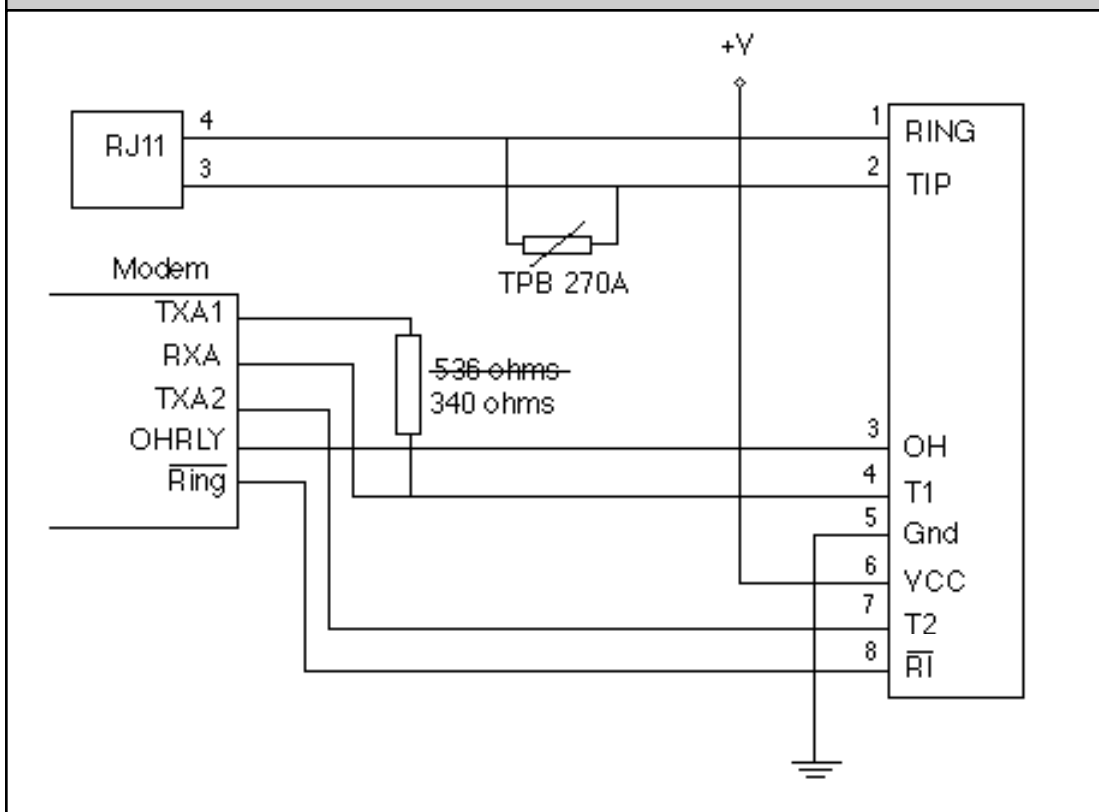
Storage Temperature	-25 [°] C to +85 [°] C
Operating Temperature Range	0 [°] C to +70 [°] C
Maximum Lead Temperature (soldering 2 seconds per wave)	260 [°] C

XE0055S Typical Connection Diagram



Application Note

Converting from XE0054SIP to XE0055S



The schematic above shows the only change required to convert from an XE0054SIP to the XE0055S. The value of R_m (impedance matching resistor) must be changed from 536 ohms to 340 ohms.

Telephone Line Connection Information

When developing a product to be connected to the telephone line, it is necessary to use a circuit described as a Data Access Arrangement (DAA) which is approved by the appropriate governmental agency. In the US, for example, this agency is the Federal Communications Commission (FCC), while in Canada it is the Department of Communications (DOC). 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 XE0055S and XE0055T were designed to meet all FCC Part 68 requirements for hazardous voltage, surge protection and leakage current. If the system developed transmits data, or DTMF tones on the telephone line, the user must certify that the signals transmit 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 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
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 delay of 2 seconds or greater is required after the time the XE0055S or XE0055T 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 XE0055S or XE0055T 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 isolation provided by the DAA module. This is generally accomplished through an independent testing lab which test the System and submits the proper paperwork to the FCC for approval. Since the XE0055S and XE0055T already comply with FCC Part 68 rules, this is a relatively simple process.

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