

## DAA with 2/4 Wire Hybrid

### Description

The XE0002B Data Access Arrangement provides a 'direct connect' telephone line interface. It complies with FCC Part 68 hazardous voltage, surge and leakage current specifications. This component may be used as the direct connect telephone line interface for virtually any application in which voice or data is to be transmitted over the public switched telephone network.

The XE0002B provides high voltage isolation, independent on/off hook control, ring detection circuitry and a 2 to 4 wire converter hybrid for use in modem applications. It operated from  $\pm 5$  volt power supplies and occupies 1.25 square inches of board space.

### Features

- Small Size - 1.25" x 1.0" x 0.5"
- FCC Part 68 Compliant
- Ring Detection
- 2 to 4 Wire Converter
- 1500 Volt Isolation
- 800 Volt Surge Protection
- Hookswitch Control

### PIN CONFIGURATION

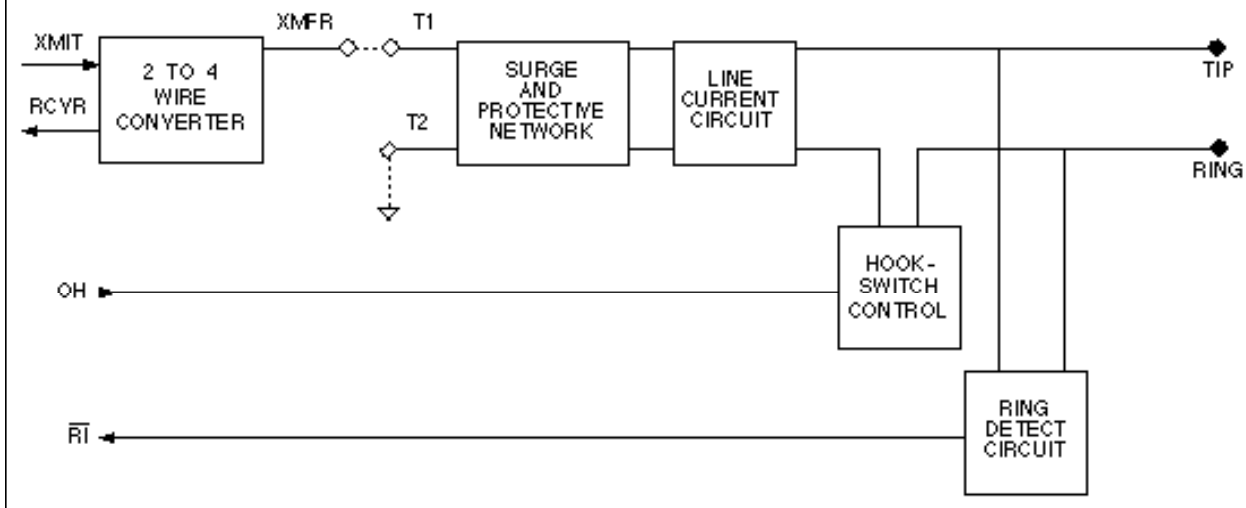
VDD	1	20	TIP
VCC	2		
RI	3		
RCVR	4	17	RING
XMIT	5		
XMFR	6		
T1	7	14	N/C
OH	8	13	N/C
GND	9	12	N/C
T2	10	11	N/C

(Top View)

### CAUTION

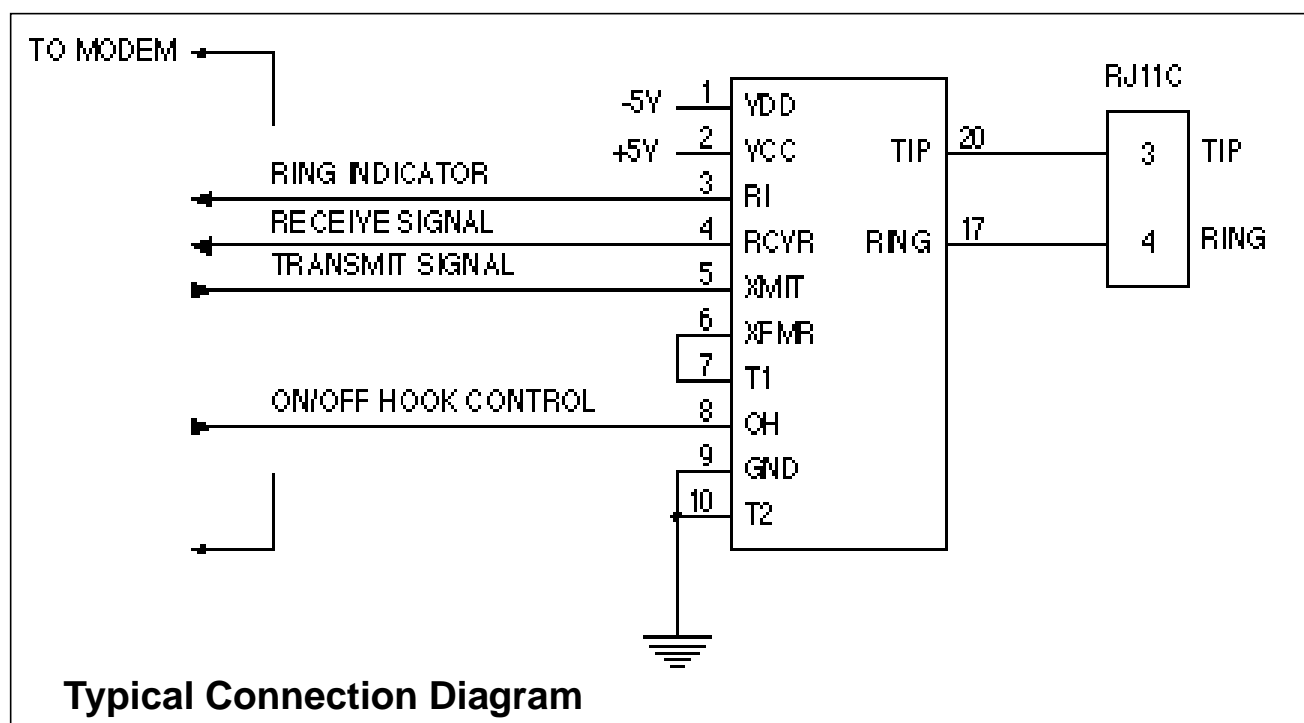
PINS 17 & 20 HAVE 1500V ISOLATION FROM THE REST OF THE CIRCUITRY. THIS ISOLATION SHOULD BE PRESERVED THROUGHOUT THE SYSTEM

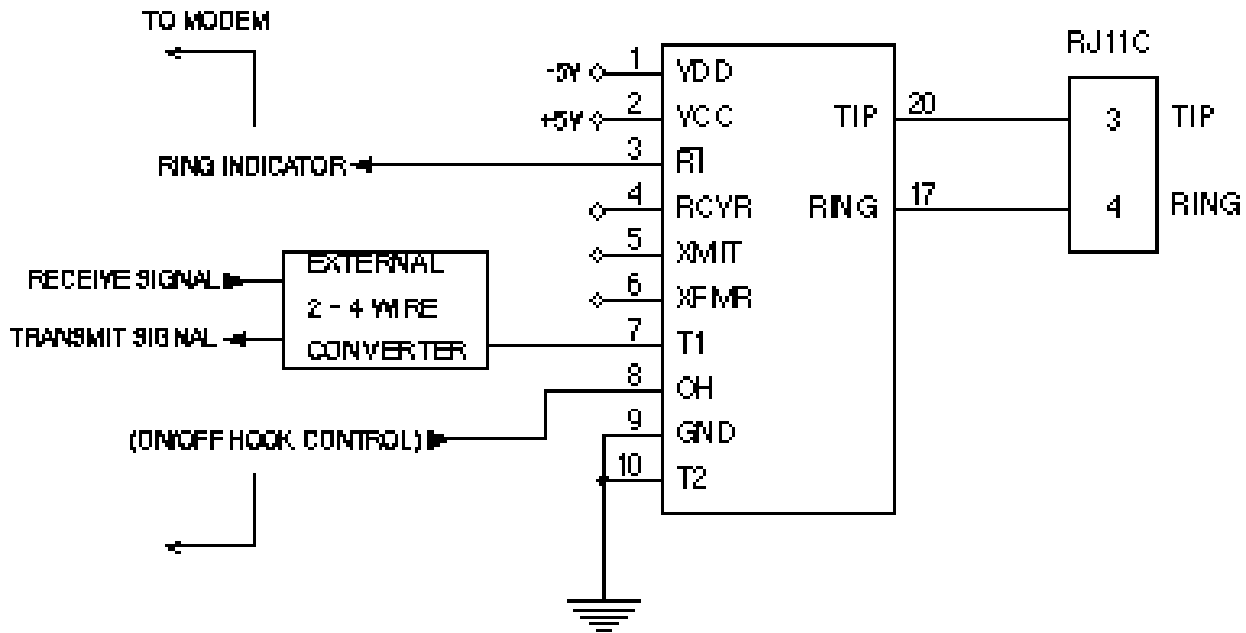
### Block Diagram



# Pin Descriptions

PIN	NAME	I/O	DESCRIPTION
1	VDD	---	-5 Volts.
2	VCC	---	+5 Volts
3	\RI	O	Ring Indicator, output, active LO, TTL. When low indicates the modem is receiving a ring signal.
4	RCVR	O	Analog signal output from the 2-4 wire convertor.
5	XMIT	I	Analog signal input to the 2-4 wire convertor.
6	XMFR	I	Analog input/output from the Surge and Protective Network to the internal 2-4 wire convertor. Must be tied to pin 7, T1, to use the internal 2-4 wire convertor.
7	T1	I	Analog Signal input/output to the Surge and Protective network.
8	OH	I	Off-Hook controls the hookswitch relay within the XE0002B. A high on OH closes the internal relay and connects the equipment to the telephone line.
9	GND	---	Ground.
10	T2	I	Analog Signal input/output to the Surge and Protective network.
17	RING	---	Ring connection to the phone line (RJ11 pin4) from the internal DAA.
20	TIP	---	Tip connection to the phone line (RJ11 pin3) from the internal DAA.

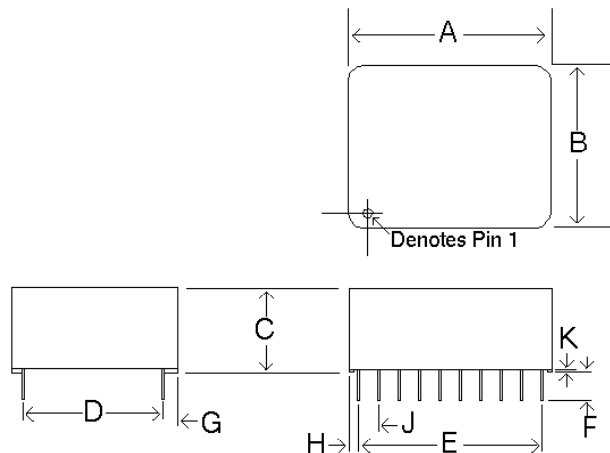


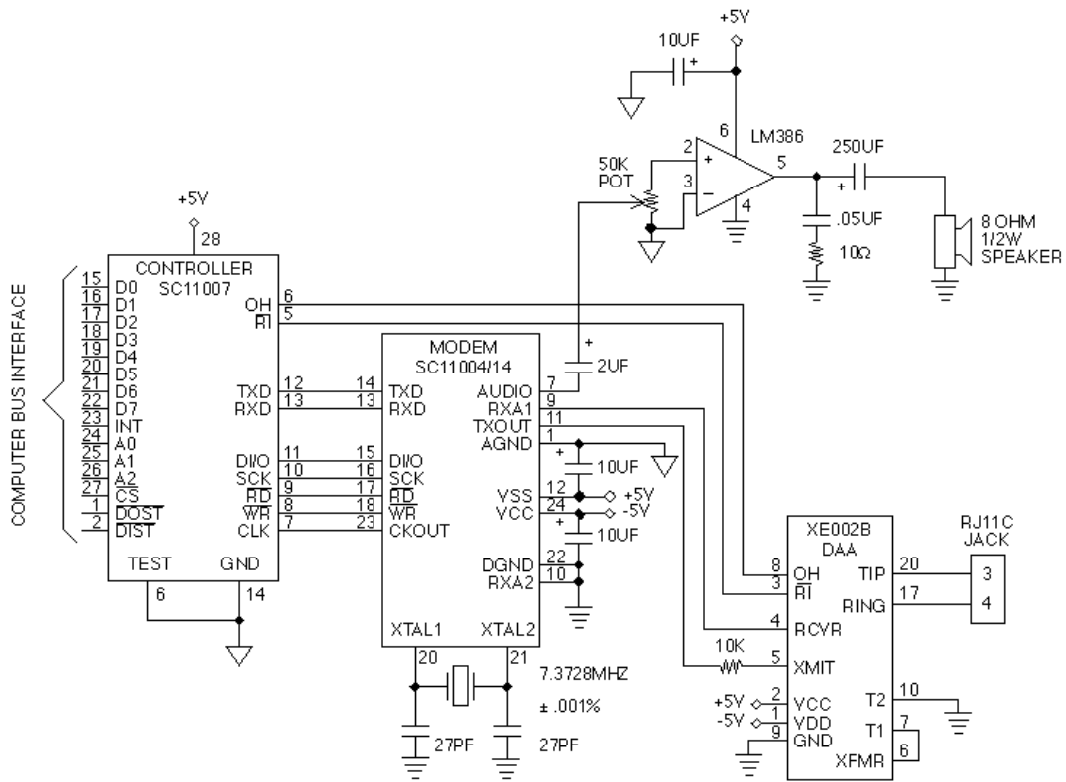


Connection Diagram With External 2-4 Wire Converter

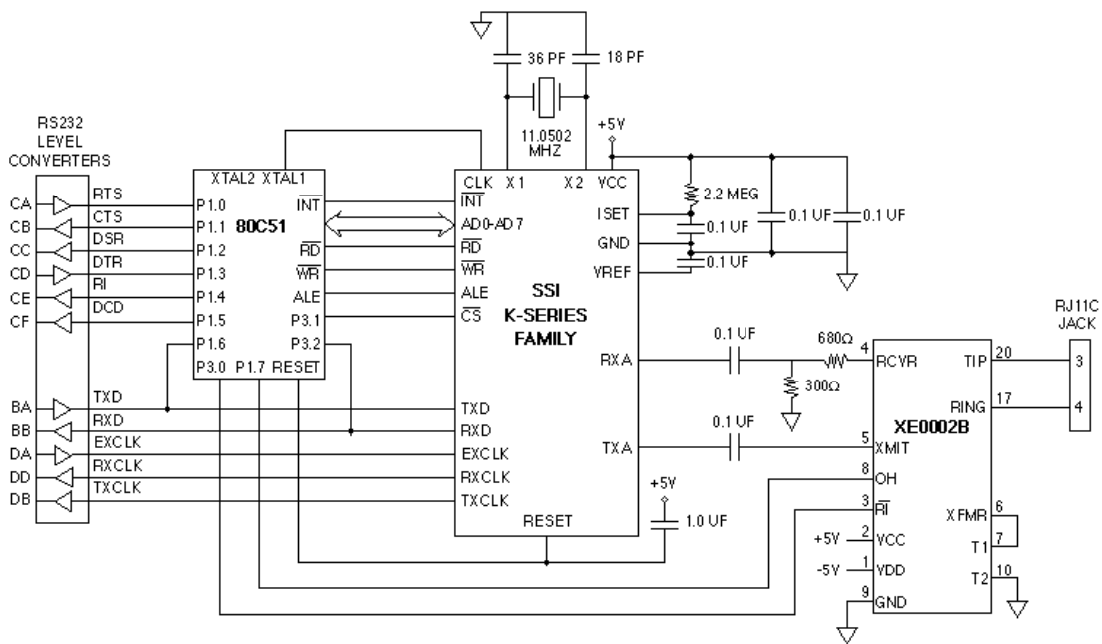
## Mechanical Specifications

PIN	INCHES		METRIC(MM)	
	MIN	MAX	MIN	MAX
A	1.235	1.265	31.37	32.13
B	0.985	1.015	25.02	25.78
C	0.490	0.510	12.45	12.95
D	0.890	0.910	22.61	23.11
E	0.890	0.910	22.61	23.11
F	0.125	---	3.18	---
G	0.040	0.060	1.02	1.52
H	0.165	0.185	4.19	4.70
J	0.090	0.110	2.29	2.79
K	0.020	0.025	0.51	0.64





**1200bps Modem Using Sierra Semiconductor SC11007/SC11014**



**Typical Connection Diagram with Silicon Systems K-Series Family**

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**INTERFACE TO EXAR XR2401/XR2402**

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XE0002B

XECOM\5

# D.C. Electrical Specification

( $V_{cc}=+5v \pm 10\%$ ,  $V_{dd}=-5v \pm 10\%$ ,  $T_a=0$  to  $70$  deg C)

Parameter	Conditions	Min	Typ	Max	Units
Power Supply Current	$V_{cc}$ $V_{DD}$		6 4	10 6	mA mA
Transmission Gain	Gain between transmit input and telephone line at 1800 Hz with 600 ohm termination	-0.5	0	+0.5	dB
Telephone Line Impedance	at 1800 Hz	540	600	660	Ohms
Coupler Match Input Impedance	Output impedance of external circuitry when T1 driven directly to provide 600 ohm phone line impedance match	531	536	541	Ohms
Transhybrid Loss	Attenuation between the transmitter input and receiver output at 1kHz with 600 ohm termination	10	18		dB
Attenuation	Receive and Transmit attenuation at 300 Hz with 600 ohm termination		0.8	3	dB
Transmit Input Impedance	at 1800 Hz	8	10	12	KOhm
Receive Output	at 1800 Hz		10	100	Ohm
Ring Detect Sensitivity (on hook)	Min. AC voltage between Tip & Ring Type B ringer	38			Vrms
Loop Current Switch Control Voltage	ON: (off hook) OFF: (on hook)	2.0	3.0 0.5	0.8	Volts Volts
Loop Current Switch Control Current			1.0	2.0	mA

## FCC User Instructions

RINGER EQUIVALENCE	0.9B
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# Typical Characteristics

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# Telephone Line Connection Information

When developing a product that is 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 XE0002B has been 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 transmitted from the XE0002B 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

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 the time the XE0002B is taken "off hook" and before any data is transmitted. This is required to ensure that billing information may be exchanged between telephone company central offices without interference.

The user of the XE0002B 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 that is provided by the XE0002B. This is generally accomplished through an independent testing lab which will test the System and submits the proper paperwork to the FCC for approval. Since the XE0002B already complies with FCC Part 68 rules, this is a relatively simple process.

**JACK RJ11C RINGER EQUIVALENCE = 0.9B**

**REGISTRATION NUMBER DWE6TM - 72963 - WP - E**

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