

## XE0002 DAA DATA ACCESS ARRANGEMENT

### FEATURES

- o Small Size - 1.25"x1.0"x0.5"
- o User Transferable FCC Part 68 Registration
- o Ring Detection
- o 2 to 4 Wire Converter
- o 1500 Volt Isolation
- o 800 Volt Surge Protection
- o Hookswitch Control

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

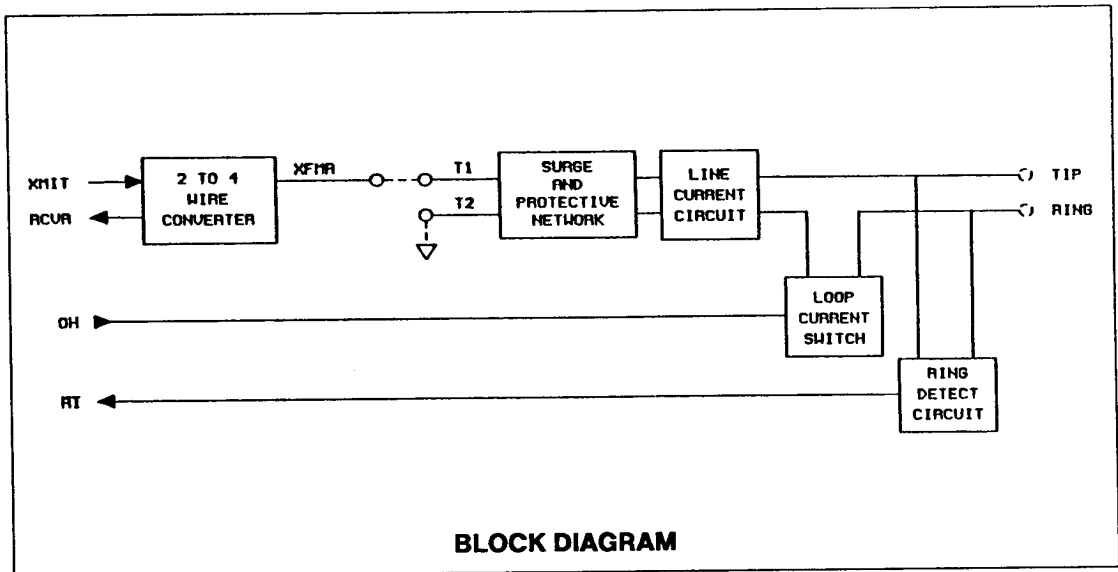
(top view)

### PIN CONFIGURATION

### DESCRIPTION

The XE0002 Data Access Arrangement provides a 'direct connect' telephone line interface. It is FCC Part 68 Type WP registered to meet 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 XE0002 provides high voltage isolation, independent on/off hook control, ring detection circuitry and 2 to 4 wire converter hybrid for use in modem applications. It operates from  $\pm 5$  volt power supplies and occupies 1.25 square inches of board space.



## RING DETECTION

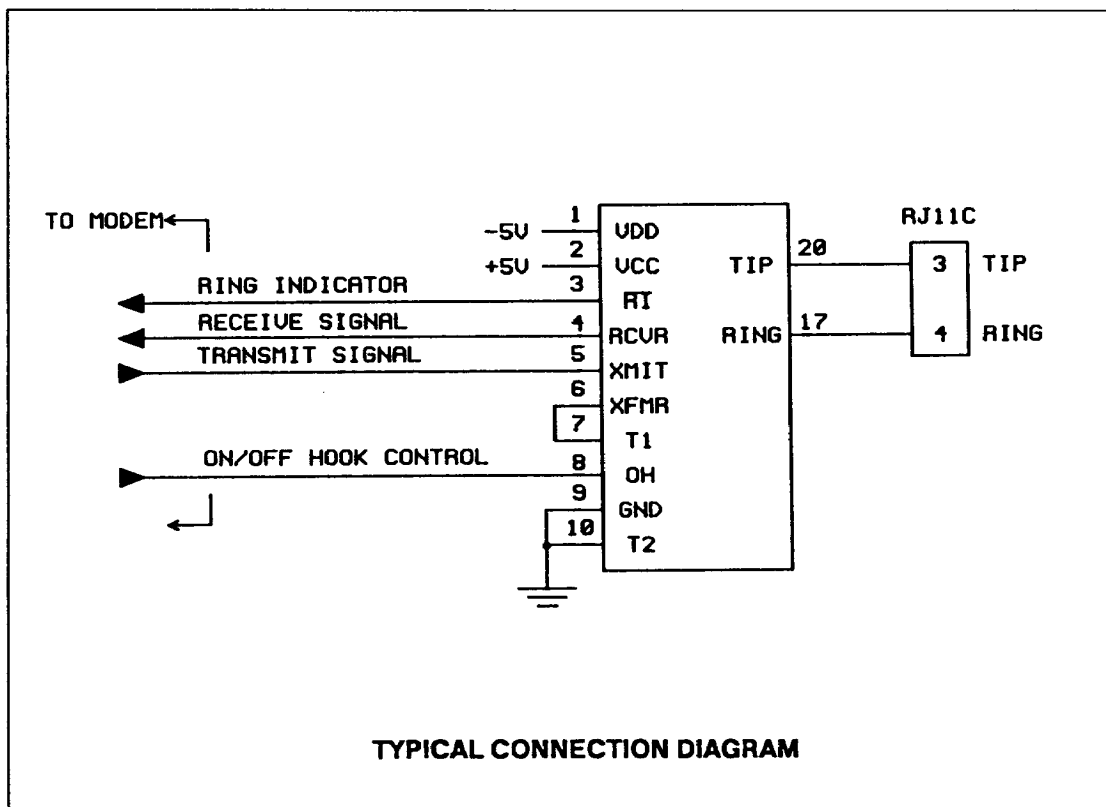
Ring detection is indicated by the signal present on  $\overline{RI}$ . This signal is normally high, but is inverted to low during the 2 second ring signal. This line reverts back to high during the 4 second interval between rings.

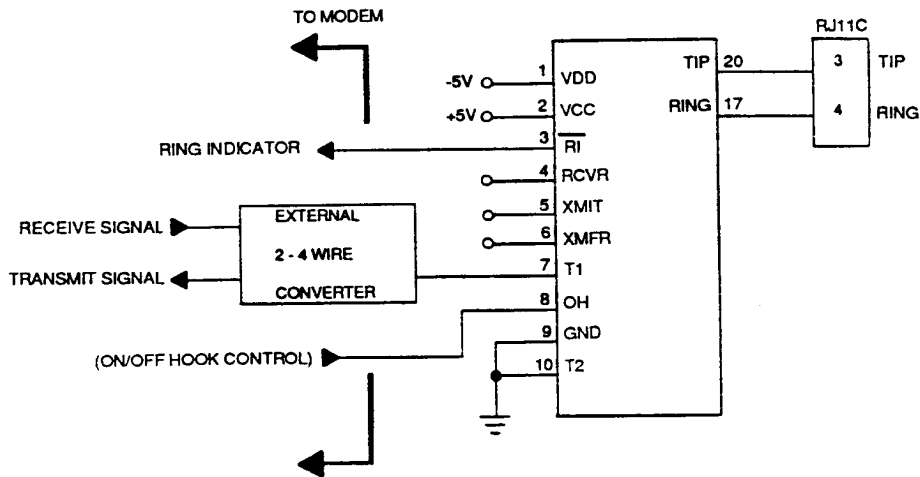
## 2 TO 4 WIRE CONVERTER

The 2 to 4 wire converter serves to provide separate transmit and receive audio paths for use in data transmission and other applications which require independent signal paths. The 2 to 4 wire converter may be bypassed, for applications which do not require it or use other circuitry, by connecting the input signal directly to the T1 input. If an external 2 to 4 wire converter is used instead of the XE0002's internal converter, it is recommended that the converter's output impedance be set to a value of  $536\Omega$  in order to create a  $600\Omega$  impedance match to the telephone line.

## ON/OFF HOOK CONTROL

The telephone line may be seized (taken 'off-hook') by application of a high signal to the OH (OFF HOOK) pin. Conversely, a low signal causes the line to be released (placed 'on-hook').



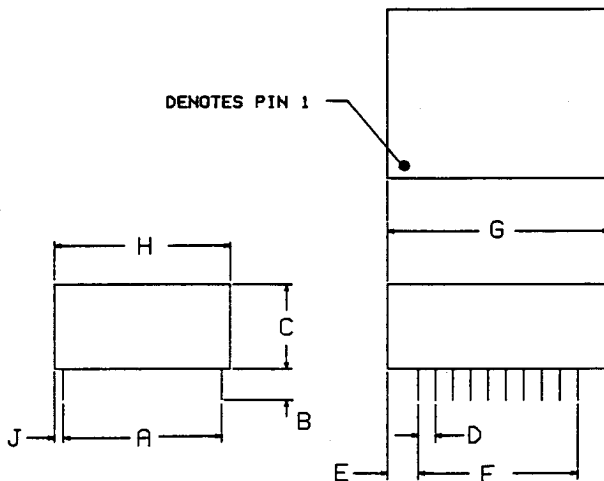


**CONNECTION DIAGRAM WITH EXTERNAL 2-4 WIRE CONVERTER**

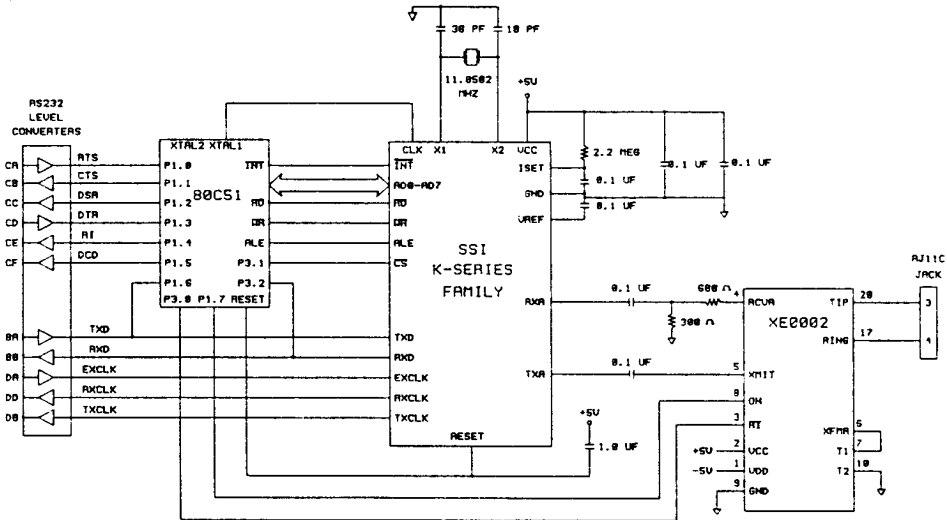
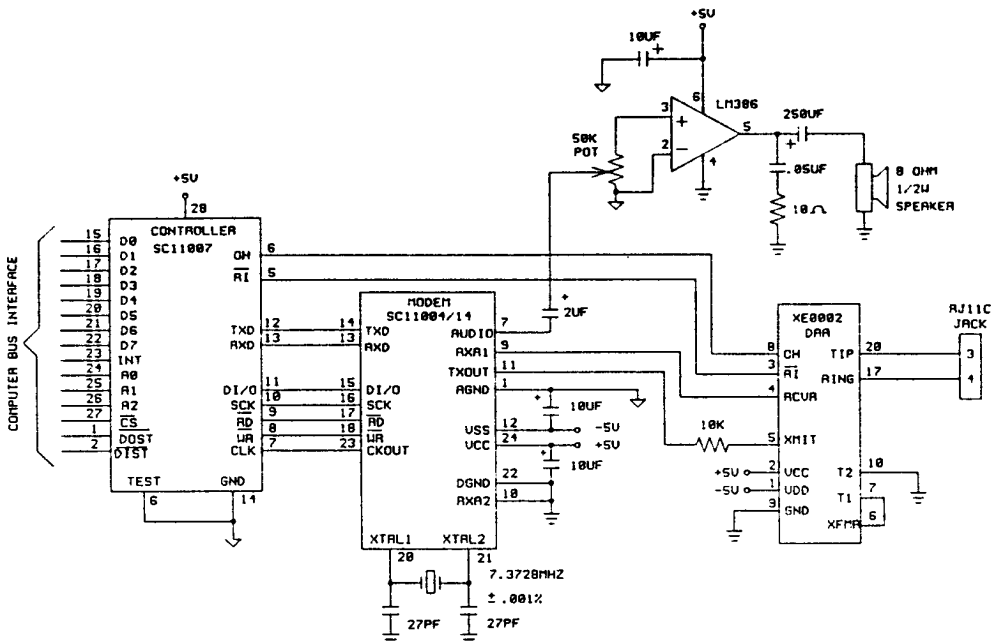
DIM	INCHES	
	MIN	MAX
A	.890	.910
B	.125	—
C	.490	.510
D	.090	.110
E	.165	.185
F	.890	.910
G	1.235	1.265
H	.985	1.015
J	.040	.060

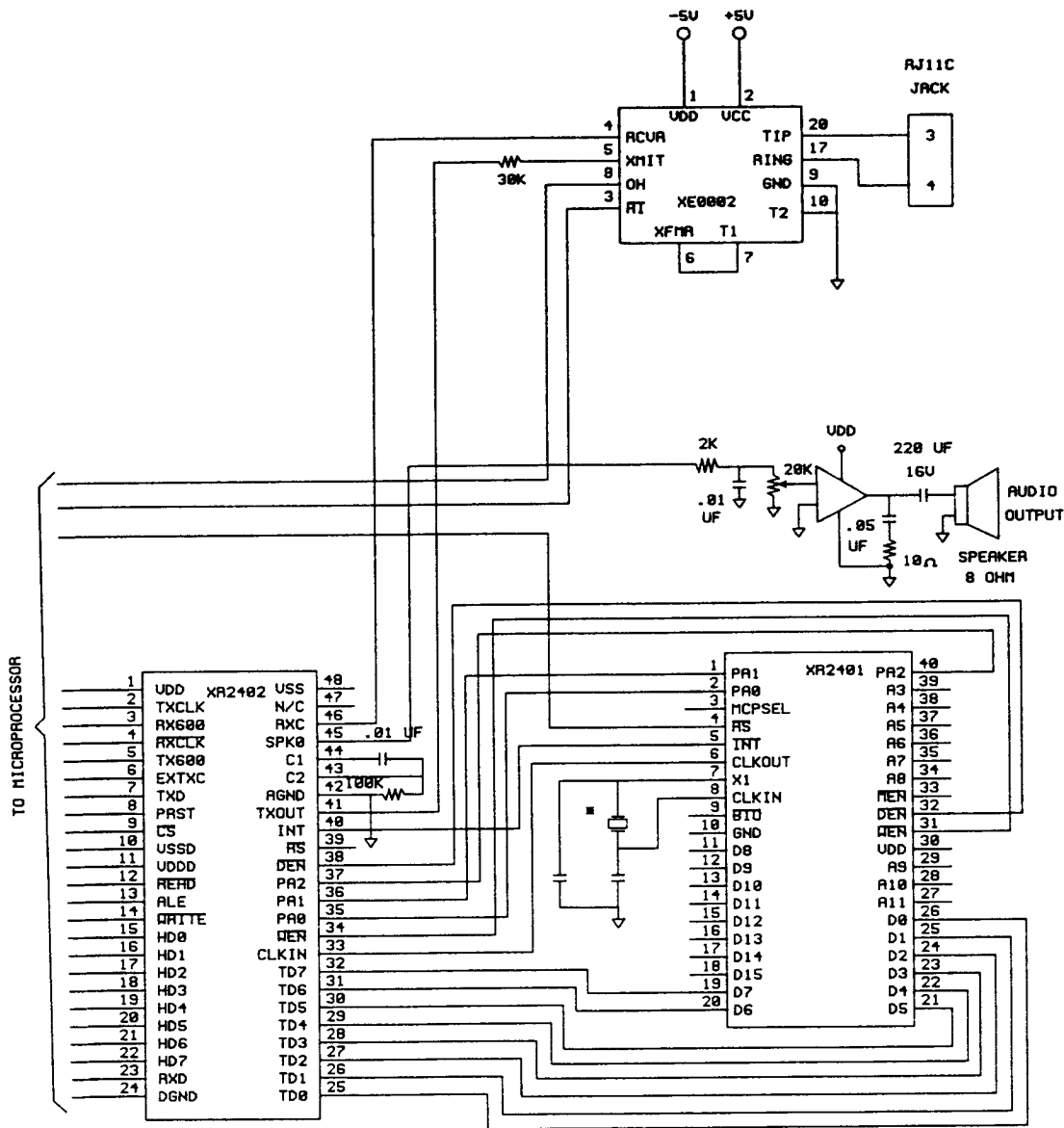
**CAUTION**

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



**MECHANICAL SPECIFICATIONS**





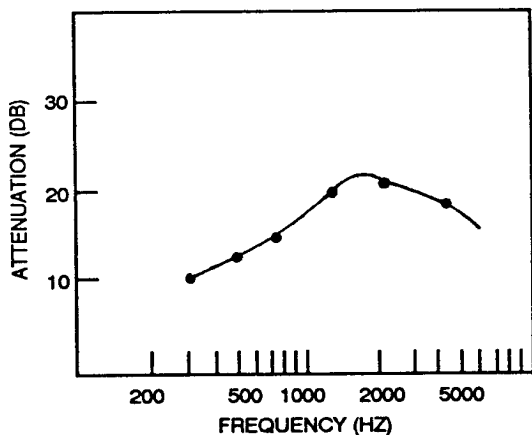
(M) CRYSTAL FREQUENCY = 19.6600 MHZ

## INTERFACE TO EXAR XR2401/XR2402

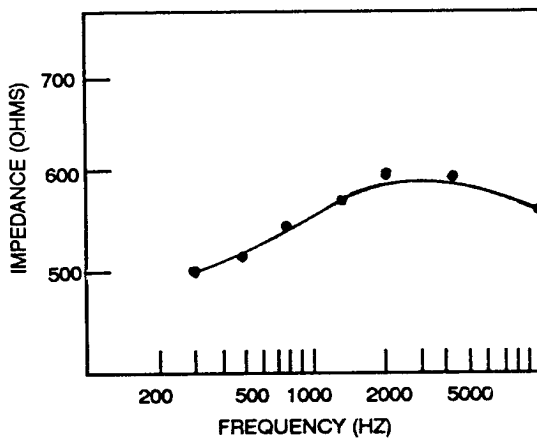
## ELECTRICAL SPECIFICATIONS

Vcc = +5v  $\pm$  10%, Vdd = -5v  $\pm$  10%, Ta = 0 to 70 deg C

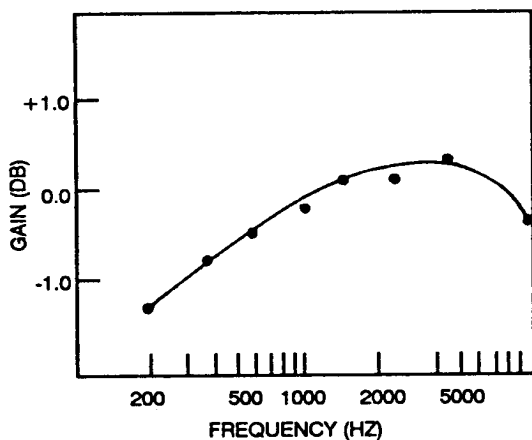
PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Supply Current			20	30	mA
Transmission Gain	Gain between transmit input and telephone line at 1800 Hz with 600 $\Omega$ termination	-0.5	0	+0.5	dB
Receive Gain	Gain between telephone line and receive output at 1800 Hz with 600 $\Omega$ termination	-0.5	0	+0.5	dB
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 $\Omega$ phone line impedance match	531	536	541	Ohms
Transhybrid Loss	Attenuation between the transmitter input and receiver output at 1kHz with 600 $\Omega$ termination	10	18		dB
Attenuation	Receive and Transmit attenuation at 300 Hz with 600 $\Omega$ termination		0.8	3	dB
Transmit Input Impedance	at 1800 Hz	8	10	12	KOhm
Receive Output Impedance	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)	3.0	2.0 0.8	0.5	Volts Volts
Loop Current Switch Control Current			1.0	2.0	mA



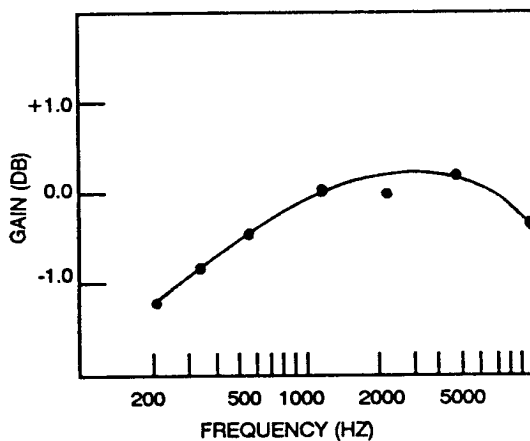
**TRANS HYBRID LOSS**



**TELEPHONE LINE MATCHING IMPEDANCE**



**TRANSMIT GAIN**



**RECEIVE GAIN**

**TYPICAL CHARACTERISTICS**

## 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 XE0002 has been designed to meet all FCC Part 68 requirements for hazardous voltage, surge protection and leakage current, and has been granted a user transferable FCC Part 68 Type WP registration. As such, a system developed which uses this product will already have FCC approval in the United States. For voice systems, no further registration is required. If the system developed transmits data or DTMF tones on the telephone line, the user must certify that the signals transmitted from the XE0002 meet basic FCC requirements for maximum transmission level, 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 Transmission 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 a 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 modem is taken "off hook" and before any data is transmitted. This is required to ensure that billing information may be exchanged between the telephone company central offices without interference.

The user of the XE0002 in a modem application 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 XE0002. This is generally accomplished through an independent testing lab, which will test the system and submit the proper paperwork to the FCC for approval. Since the XE0002 has already received Part 68 Type WP registration, this is a relatively simple process and often may be completed directly between the user and the FCC. For more information, contact XECOM's applications department.

JACK RJ11C RINGER EQUIVALENCE = 0.2B

REGISTRATION NUMBER DWE6TM - 72963 - WP - E

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XECOM INC. 374 TURQUOISE ST. MILPITAS, CALIFORNIA 95035 (408) 945-6640