High-Performance Quad DAA Module

Description

Xecom created the XE0046 for high-performance, multi-line applications. The XE0046 integrates four high performance DAA's into a single compact module. Each DAA circuit operates independently of all the others.

Like all of Xecom's DAA modules, the XE00046 integrates a Ring Detect Circuit, Loop Current Holding Circuit, Solid-State Hookswitch, and Telephone Line Transformer for each line. The XE0046 also provides each line with a path for the Caller ID signal from the telephone network and a two-to-four wire convertor. The two-to-four wire convertor separates the receive signal from the transmit signal.

Below is a list of the special features incorporated into the XE0046 for high-performance, multi-line applications.

XE0046 Features

*   Four Individual DAA's in a Single Package;

*   Each DAA supports 33,600 bps data transfer;

*   Each DAA provides a path for the Caller ID signal from the phone company central office;

*   Each DAA includes a 2/4 four wire convertor;

*   Each DAA passes network signaling up to 0 dBm without distortion.

*   Small Size: 2.5 inches long, 1.5 inches wide, and 0.6 inches high;

*   FCC Part 68 Compliant;

*   Individual Ring Detection for each line;

*   Each DAA integrates a Low-Distortion Telephone Line Transformer;

*   Each DAA provides a1500 volts isolation between the phone line and all other circuits;

*   Solid-State Hookswitch Control for each line;

XE0046 Block Diagram   (This Block Diagram represents each DAA within the XE0046)

XECOM   XE0046
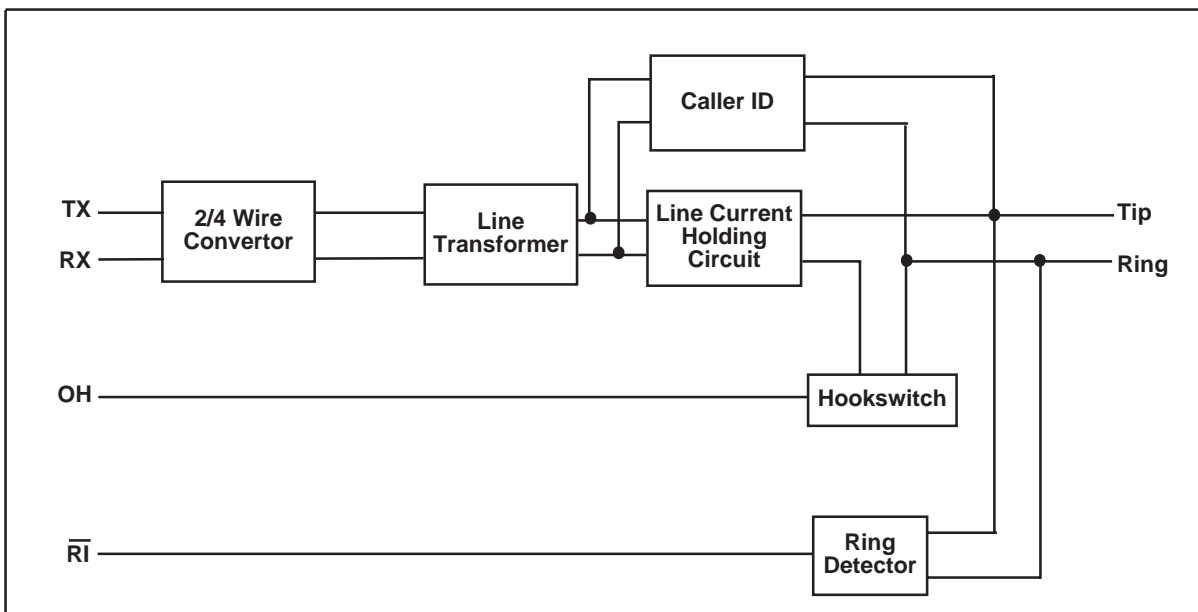
XE0046 Mechanical Specifications
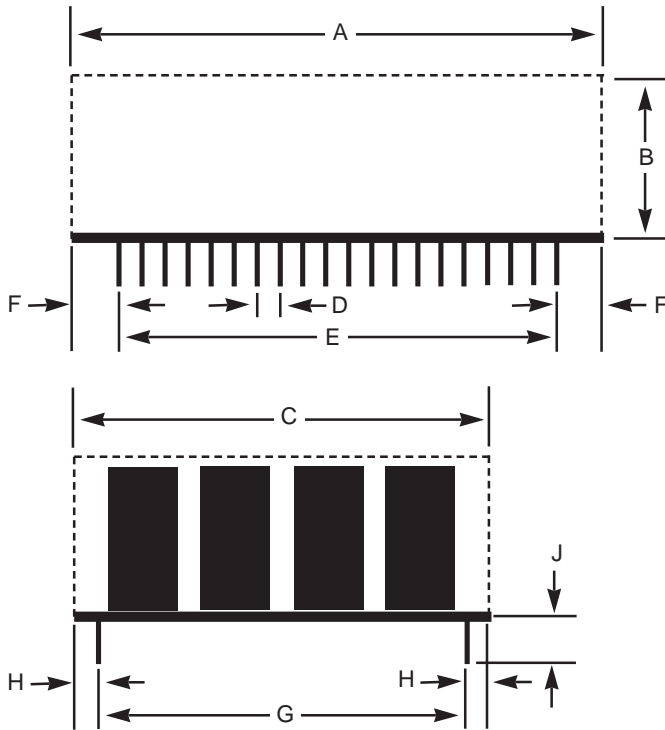
Dim	Inches Min	Inches Max	Millimeters Min	Millimeters Max
A	2.480	2.520	62.99	64.01
B	0.580	0.620	14.73	15.75
C	1.480	1.520	37.59	38.61
D	0.090	0.110	2.29	2.79
E	1.890	1.910	48.01	48.51
F	0.280	0.320	7.11	8.13
G	1.390	1.410	35.31	35.81
H	0.040	0.060	1.02	1.52
J	0.125	-	3.18	-

Notes:

These dimensions reflect the module's maximum envelope.

I/O pins are .025 inch square, tin-plated.

Warning:

There are un-insulated electrical conductors on the underside of the XE0046. No exposed electrical conductors should be routed under the module

XE0046 Pin Configuration

Vcc	■ 1	40 ■	TX1
Vdd	■ 2	39 ■	RX1
		38 ■	OH1
Tip1	■ 4	37 ■	/RI1
		36 ■	N/C
Ring1	■ 6	35 ■	TX2
		34 ■	RX2
Tip2	■ 8	33 ■	OH2
		32 ■	/RI2
Ring2	■ 10	31 ■	N/C
		30 ■	TX3
Tip3	■ 12	29 ■	RX3
		28 ■	OH3
Ring3	■ 14	27 ■	/RI3
		26 ■	N/C
Tip4	■ 16	25 ■	TX4
		24 ■	RX4
Ring4	■ 18	23 ■	OH4
		22 ■	/RI4
Gnd	■ 20	21 ■	N/C

XE0046 Signal Descriptions

Pin	Name	Description
1	VCC	VCC provides the + 5 volt power source for the XE0046.
2	Vdd	Vdd provides the -5 volt power source to the XE0046
4, 8, 10, 16	Tip(n)	Tip provides the second connection to the telephone network (RJ11 Pin 3) on each of the four internal DAAs. Tip has 1500 volts isolation from the rest of the circuitry. This isolation must be preserved throughout the system.
6, 10, 14, 18	Ring(n)	Ring is one of two signals which form the telephone network connection (RJ11 Pin 4) on each of the four internal DAAs. The XE1046 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 which must be preserved throughout the system.
20	GND	This signal is used as common reference for all of the control signals in the XE0046. Signals on Tip and Ring are not referenced to ground.
21, 26, 31, 36	N/C	No Connect
22, 27, 32, 37	/RI(n)	Ring Indicate, output, active low, TTL, RI provides a half-wave representation of the Ring appearing on each telephone line.
23, 28, 33, 38	OH(n)	Hook-switch relay control an active high input. A high on OH closes the internal relay within each DAA and connects the equipment to that telephone line.
24, 29, 34, 39	RX(n)	RX is the analog output from each DAA. RX is referenced to ground. The level of RX will be within 1 dB of the received signal on the telephone line.
25, 30, 35, 40	TX(n)	TX is the analog input to each DAA. The signal level at TX will be within 1 dB of the level of the transmitted signal on Tip and Ring. TX is referenced to ground.

Note: The "n" designates the DAA with which the signal connects. Only power and ground signals are common to all DAA's.

Electrical Specification *(Vcc = +5 Volts ±10%, Vdd = -5 Volts ±10%,Ta=0 to 70 deg C)*

Parameter	Conditions	Min	Typ	Max	Units
Icc	Off Hook, Vcc = 5.0 Volts		10	15	mA
Idd	Vdd = -5.0 volts		3	5	mA
Transmit Insertion loss	600 Ohm Impedance, 1000 Hz	-1.0	0	1.0	dB
Receive Insertion loss	600 Ohm Impedance, 1000 Hz	-1.0	0	1.0	dB
Line Impedance	At 1000 Hz,	540	600	660	Ohms
Ring Detect Sensitivity (on-hook)	Min. AC voltage between Tip & Ring Type B ringer	38		150	Vrms
Ring Detect Peak Current	Ringing 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	3.0 0.2	0.5	Volts Volts
Loop Current Switch Control Current			15	25	mA
Loop Current	Off-Hook current draw from Telephone Line	0		100	mA
Total Harmonic Distortion	1800 Hz, -9 dBm signal level		-85		dBm
Caller ID Insertion Loss	Hookswitch open	-8.0	-6.0	-4.0	dBm

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 Industry Canada. 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 XE0046 has been designed to meet FCC Part 68 requirements for hazardous voltage, surge protection and leakage current. If the system transmits data, or DTMF tones on the telephone line, the user must certify that these transmitted signals meet 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 XE0046 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 XE0046 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 XE0046. 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 XE0046 already complies with FCC Part 68 rules, this is a relatively simple process.

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