



CH1804/A, CH1809/A LINE DETECTOR MONITOR

INTRODUCTION

The CH1804/A and CH1809/A are line status detectors that are used to detect/monitor a device off-hook condition or severed or cut telephone lines on a telephone line shared by multiple devices. The CH1804/A is a single line monitor, while the CH1809/A is a dual line device and can monitor two telephone lines. The CH1804/A is a low cost subset of the CH1809/A in the same package. The devices are used for Alarm Systems to detect a severed telephone line. In this mode, voltage of less than 8VDC is detected. Or used for collision avoidance, in Systems, where multiple telephone line access can occur. In this mode the detector will detect any time the telephone line voltage drops below 25VDC.

Since the detector accesses the public switched telephone lines it must be FCC Part 68 approved. This approval is provided with conveyed registration. A sticker is supplied for placement on the user equipment in compliance with FCC Part 68 requirements. The device operates on a single 5 volt supply and provides a separate active high indication when either of the two attached lines is cut. Single in-line package is 1.0" long and 0.5" high, requiring minimal PCB area.

OPERATION

Each device contains one or two separate independent line detector circuits with separate Tip and Ring inputs and active high outputs for each circuit. A common 5 volt supply provides power to both. The output of each detector circuit has 45K ohm pull up resistance to 5 volts and 2.2 μ F capacitance to ground. This is provided to filter out zero crossing pulses which can occur during ringing. This resident source of output drive current might not be sufficient for some applications. It is permissible to add a lower value resistor in parallel between the output and 5 volts, if the zero crossing pulses are not objectionable (this resistor should not be less than 1K ohms). If more drive current is needed while retaining zero crossing filtering, an external capacitor must be added to keep the RC time constant, the same, or higher.

When using each detector circuit, external leakage and capacitance on each Tip and Ring input must be minimized. Differential leakage to Tip and Ring in excess of 0.1 microamperes can appear like a central office battery voltage to the detector circuit.

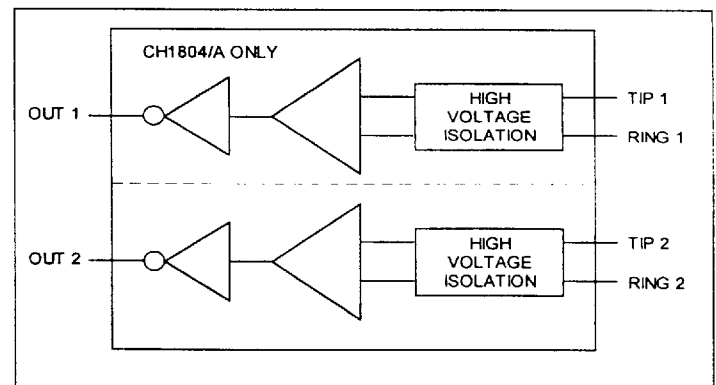
Common mode leakage to Tip and Ring in excess of 1 microampere is also undesirable. Thus the circuit board layout and external wiring for Tip and Ring must be well insulated.

Capacitance on Tip and Ring should also be minimized as it could retain charge after a transition and appear like a central office battery voltage for many tens of seconds or more. The input impedance of the detector circuit is approximately 10M ohms to ground and the capacitance may have to be discharged for 3 or 4 time constants to indicate a detection depending on initial conditions. Thus it would be desirable to keep capacitance well below 1 μ F to keep the delay from exceeding tens of seconds.

FEATURES

- FCC Part 68 approved with conveyed registration.
- Usable on public switched telephone lines and wet leased lines.
- Detects a severed telephone cable. Does not require polling.
- The "A" version detects an off-hook condition of one or more devices.
- Single in line package (SIP) requires minimum PCB area.
- Low power operation. Single 5V operation.

	CH1804/1809	CH1804A/1809A
1804/A, 1809/A		
Detects a Cut Line on the Local Loop	X	
Detects Devices Off-hook		X



Feature 1. CH1804/A, CH1809/A Functional Block Diagram

If the detector is the only device on the telephone line, leakage and differential capacitance will tend not to affect normal operation, since the line capacitance in the central office or the local loop are the only consideration. The more devices that share a given local loop, such as modems and extension telephones, the greater the capacitance and leakage possibilities. Sources of capacitance, when on hook, include ring detection circuits in modems.

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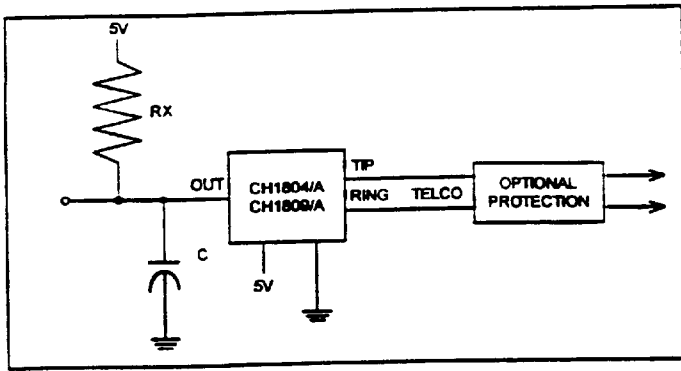


Figure 2. Application Diagram CH1804/A, or half of a CH1809/A Dual Cut Line Detector

FOR OFF-HOOK DETECT OF ONE OR MORE DEVICES:

The CH1804/A, CH1809/A resides on the telephone lines and as such is subject to transients produced by electrical discharge and ring voltage transition, which could cause momentary false cut line indications, additional external capacitance on the output may be desirable. The capacitance value to add to each output should be determined by appropriate analysis and testing for particular application. It is suggested that the outputs be level detected as opposed to edge detected to indicate a cut line. This will minimize the possibility of false indications on excessively noisy lines. Type reel values or .1µf or 30K ohms.

FOR CUT LINE DETECT:

The CH1804/CH1809 detects a total drop of line voltage. Line voltage is always present when connected, whether the telephone line is off-hook or on-hook. The line voltage must be at least 8V to indicate the presence of the line. All North American public switched telephone lines and most "wet" active leased lines are suitable. "Dry" leased lines may not be used with the CH1804/A, CH1809/A since there is no voltage on the lines

Table 1. CH1804/A, CH1809/A Pin Descriptions

PIN	DESCRIPTION for: CH1809/A	CH1804/A
1	Tip 1 - Telco 1	Tip 1 - Telco 1
2	Ring 1 - Telco 1	Ring 1
3	N.C.	N.C.
4	Out1 - Active High Output 1	Out1
5	Vcc - 5 Volts ± 10%	Vcc
6	Gnd - Ground	Gnd
7	Out2 - Active High Output 2	N.C.
8	N.C.	N.C.
9	Tip 2 - Telco 2	N.C.
10	Ring 2 - Telco 2	N.C.

DESIGN CONSIDERATION FOR FCC CONFORMANCE

The CH1804/A, CH1809/A includes circuits that couple it to the phone line and provide FCC required isolation and protection. The following guidelines should be followed to maintain registration.

- 1) CH1804/A, CH1809/A must be mounted away from hazardous voltages.

- 2) Connecting the CH1804/A, CH1809/A to phone lines should be made through a standard RJ11 jack or other approved connector device.
- 3) Circuit board traces to the CH1804/A, CH1809/A Tip and Ring pins must exceed 0.10 inch spacing to one another and at least 0.2 inches spacing from all other traces. Tip and Ring traces should have normal width of 0.020 inches.
- 4) Tip and Ring traces should be as short as possible to prevent coupling from other signals. Mount CH1809/CH1809A close to telephone line connection.
- 5) The registration label included must be affixed to the outside of the host product.
- 6) For your user manual, the following information should be provided.

SUPPLEMENTAL PROTECTOR

If the CH1804/A, CH1809/A is being used on telephone lines that are prone to high voltage transient or FCC Part 15 A/B suppressor may be required. This consists of 1.25 A fuses in both lines and a 300V stransorb for transient protector and Canadian approvals and ferrite bead inductor and 0.1µF capacitor (15000) to ground for EMI/RFI suppressor. See Cermetek Application Note # 127. If the CH1804/A, CH1809/A is being used with another Cermetek device where the supplemental protection is already planned for, the CH1804/A, CH1809/A can share that protection with parallel connector by the Tips and Rings in front of the protective network.

"Type of Service: The (insert your product name) is designed to be used on standard device telephone lines. It connects to the telephone line by means of a standard jack called the USOC RJ-11C (or USOC RJ45S). Connection to telephone company provided coin service (central office implemented systems) is prohibited. Connection to party lines service is subject to state tariffs.

Telephone Company Procedures: The goal of the telephone company is to provide you with the best service it can. In order to do this, it may occasionally be necessary for them to make changes in their equipment, operations or procedures. If these changes might affect your service or the operation of your equipment, the telephone company will give you notice, in writing, to allow you to make any changes necessary to maintain uninterrupted services.

If you have any questions about your telephone line, such as how many pieces of equipment you can connect to it, the telephone company will provide this information upon request.

In certain circumstances, it may be necessary for the telephone company to request information from you concerning the equipment which you have connected to your telephone.

Upon request of the telephone company, provide the FCC registration number and the ringer equivalence number (REN) of the equipment which is connected to your line; both of these items are listed on the equipment label. The sum of all of the REN's on your telephone lines should be less than five in order to assure proper service from the telephone company. In some cases, a sum of five may not be usable on a given line.

If Problems Arise: If any of your telephone equipment is not operating properly, you should immediately remove it from your telephone line, as it may cause harm to the telephone network. If the telephone company notes a problem, they may temporarily discontinue service. When practical, they will notify you in advance of this disconnection.

Table 2
CH1804/A, CH1809/A Electrical Specifications

$V_{CC}=5V \pm 10\%$
 $T_A=0\text{- to }+55\text{-C}$

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
LOGIC Output high Output low	V_{CC} V_{CC}	$I_{OH}=40 \mu A$ $I_{OH}=1.6 \text{ mA}$	2.4		0.4	V V
TELEPHONE LINE INTERFACE Input Resistance	R	Tip or Ring to any other pin	8			M ohms
Surge Protection		Conforms to all FCC Part 68 surge, hazardous voltage, and leakage requirements			1500	V
V Input Uncut (CH1804/1809 only)	V Uncut	Voltage between Tip and Ring, $V_{CM}=\pm 20V$	8			V
Off-hook Voltage (CH1804A/1809A)	V Off-hook	Voltage between Tip and Ring		25	32	V
Leakage Current	I_{LK}	Leakage to TIP or RING			± 0.1	μA
Detection Time	T_D	$CX=0.001 \mu F$ (Tip or Ring to GND) $V_{CX}=50V$ (Tip to Ring)			1	sec
FCC REGISTRATION# Ringer Equivalence Power	I_{CC}	Supplied with label +5V Supply Voltage (CH1804/A, 1809/A)		0.3	0.0A 1	REN mA

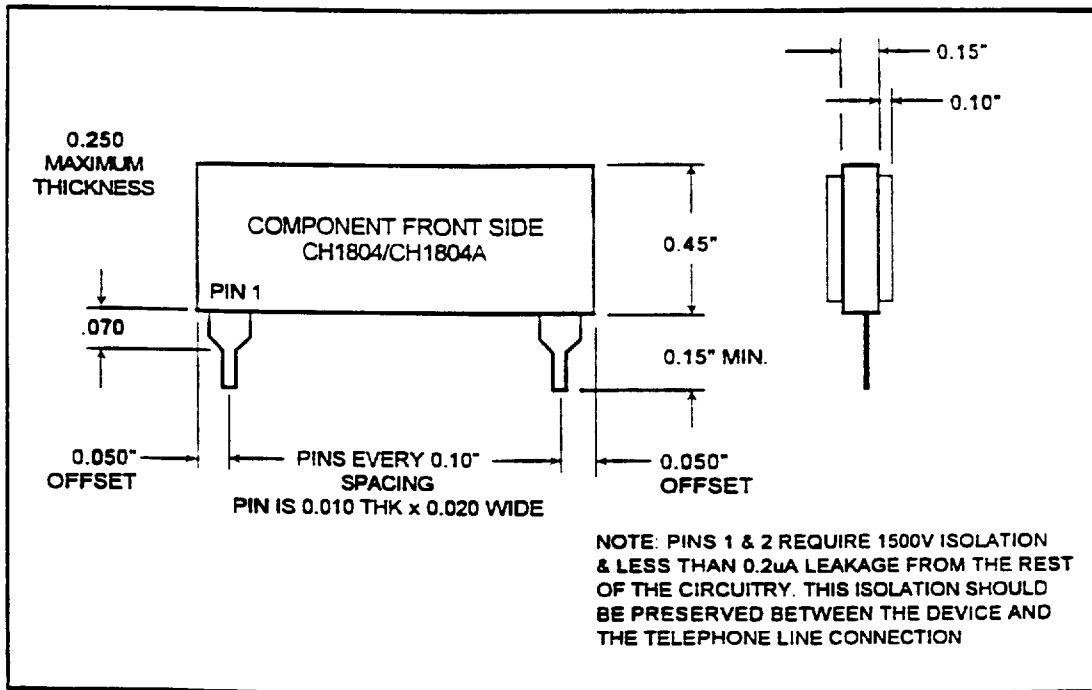


Figure 3. CH1804/A, CH1809/A Physical Dimensions

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