



## Features

- Transformer signal coupling
- Complete ring detector circuit
- Low power hookswitch
- Electronic inductor/gyrator circuit
- Surge protection
- Caller ID pinout to external relay (optional)
- Transient protection zeners
- V.32 compatible
- FCC Compatible
- PC board mountable
- Parallel telephone off-hook detection

## Description

The CYG2911 is a Data Access Arrangement (DAA) module providing a complete telephone line interface circuit in a small 1.07" x 1.07" x 0.4" plastic package. This module incorporates a circuit which signals HIGH when another phone in parallel has been taken off-hook when the CYG2911 is off-hook. This feature is important for cable TV set-top boxes and direct broadcast satellite units which must hang-up (go on-hook) when a consumer needs the phone line to place a 911 or emergency call. The module is designed to meet FCC Part 68 requirements thus providing a low-risk design solution.

## Applications

- Home medical devices
- Plant monitoring equipment
- Security/alarm systems
- Utility meters
- Network routers
- PBX systems
- Telephony applications
- Set top boxes

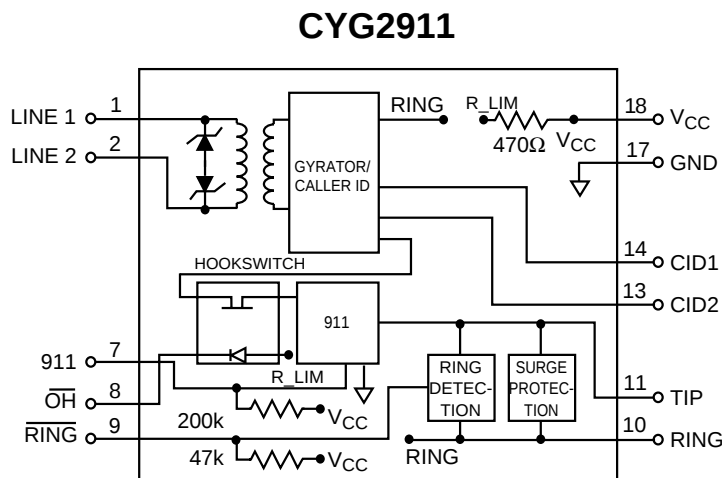
## Approvals

- UL 1950/UL1459
- Compatible with U.S. and Canadian phone lines

## Ordering Information

| Part #  | Description |
|---------|-------------|
| CYG2911 | DAA Module  |

## Block Diagram



## Handling and Assembly Recommendations

The CYG2911 products are not hermetically sealed and should not be exposed to any liquid-based rinsing processes. Clare recommends two (2) approaches. The modem should either use a no clean soldering flux that would mostly evaporate during the normal wave soldering processes, or be soldered in by hand after the rest of the card is wave soldered.

**Absolute Maximum Ratings (@ 25° C)**

| Parameter                                           | Min | Typ | Max  | Units            |
|-----------------------------------------------------|-----|-----|------|------------------|
| Isolation Voltage                                   | -   |     | 1000 | V <sub>RMS</sub> |
| Operational Temperature                             | 0   |     | +70  | °C               |
| Storage Temperature                                 | 0   | -   | +100 | °C               |
| Relative Humidity (Non-Condensing)                  | 10  | -   | 85   | %                |
| Soldering Temperature                               | -   | -   | +260 | °C               |
| Tip/Ring (5, 6) Load Current (continuous)           | -   | -   | 120  | mA               |
| Hookswitch LED Drive Current                        | -   | -   | 50   | mA               |
| Hookswitch LED Reverse Voltage                      | -   | -   | 5    | V                |
| Ring Detect Phototransistor Voltage V <sub>CC</sub> | -   | -   | 20   | V                |

*Absolute Maximum Ratings are stress ratings. Stresses in excess of these ratings can cause permanent damage to the device. Functional operation of the device at these or any other conditions beyond those indicated in the operational sections of this data sheet is not implied. Exposure of the device to the absolute maximum ratings for an extended period may degrade the device and effect its reliability.*

**Electrical Characteristics**

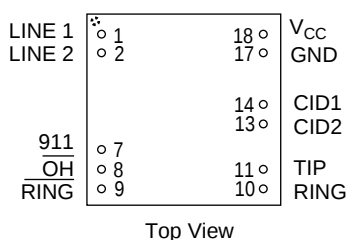
| Parameter                                                    | Conditions                                      | Min   | Typ  | Max             | Unit             |
|--------------------------------------------------------------|-------------------------------------------------|-------|------|-----------------|------------------|
| <b>DC Electrical Characteristics</b>                         |                                                 |       |      |                 |                  |
| On-Hook Impedance                                            | @100VDC across pins 10,11 (R,T), per FCC 68.312 | 10    | -    | -               | MΩ               |
| Off-Hook Line Leakage Current                                | @100VDC across pins 10,11 (R,T), per FCC 68.312 | -     | -    | 10              | μA               |
| Hookswitch Resistance                                        | -                                               | -     | -    | 15              | Ω                |
| Off-Hook Supply Current                                      | @+5V, V <sub>CC</sub>                           | 7     | 8    | 9               | mA               |
| Hookswitch Power Source, Pin 8                               | -                                               | 4.75  | 5.0  | 20              | V                |
| DC Loop Current                                              | -                                               | 20    | -    | 120             | mA               |
| <b>AC Signal Path Electrical Characteristics</b>             |                                                 |       |      |                 |                  |
| Return Loss                                                  | 300-3500Hz                                      | 18    | 25   | -               | dB               |
| Insertion Loss                                               |                                                 |       |      |                 |                  |
| Transmit                                                     | Test Circuit 1                                  | -     | -    | 9               | dB               |
| Receive                                                      | Test Circuit 2                                  | -     | -    | 9               | dB               |
| Frequency Response                                           | 300-3500Hz                                      | -0.25 | -    | +0.25           | dB               |
| Longitudinal Balance                                         |                                                 |       |      |                 |                  |
| On-Hook                                                      | Per FCC 68.310                                  | 60    | -    | -               | dB               |
| Off-Hook                                                     | Per FCC 68.310                                  | 40    | -    | -               | dB               |
| DC Loop Current                                              | -                                               | 20    | -    | 120             | mA               |
| Total Harmonic Distortion + N                                | @600Hz and -10dBm                               | -     | -45  | -               | dBm              |
| Secondary Load Impedance                                     | Line 1 and Line 2                               | -     | 294  | -               | Ω                |
| Primary Source Impedance                                     | Tip and Ring                                    | -     | 600  | -               | Ω                |
| <b>Ring Detection Circuit Characteristics</b>                |                                                 |       |      |                 |                  |
| Ringing Voltage Detection Range                              | -                                               | 20    | -    | 150             | V <sub>RMS</sub> |
| Ringing Frequency Detection Range                            | -                                               | 15    | -    | 70              | Hz               |
| Ringer Equivalence Number                                    | -                                               | -     | 0.8B | -               |                  |
| RING (Pin 9) Output Voltage (Pulsed)                         | V <sub>CC</sub> @+5V                            |       |      |                 |                  |
| Logic '0', Ring present                                      |                                                 | -     | -    | 0.8             | V                |
| Logic '1', Ring not present                                  |                                                 | -     | -    | V <sub>CC</sub> | V                |
| <b>Surge, Transient, and Isolation Characteristics</b>       |                                                 |       |      |                 |                  |
| Surge Protection Voltage Tip and Ring (Pins 11,10)           | -                                               | -     | -    | 300             |                  |
| Transient Voltage Protection on Line 1 and Line 2 (Pins 1,2) | -                                               | -5    | -    | +5              | V                |
| Isolation Voltage (Pins 1,2,7,8,9,17,18 to 10,11,13,14)      | Per FCC 68.302                                  | -     | -    | 1000            | V <sub>RMS</sub> |

## Electrical Characteristics (Continued)

| Parameter                                    | Conditions                 | Min | Typ  | Max      | Unit     |
|----------------------------------------------|----------------------------|-----|------|----------|----------|
| <b>911 Detection Characteristics (Pin 7)</b> |                            |     |      |          |          |
| Pulse Voltage                                |                            |     |      |          |          |
| External phone off-hook                      | -                          | 2.4 | -    | $V_{CC}$ | V        |
| External phone on-hook                       | -                          | -   | -    | 0.8      | V        |
| Pulse Width                                  | Telephone DCR 200 $\Omega$ | 20  | 40   | 60       | mS       |
| Internal pull-up resistor                    | -                          | -   | 200K | -        | $\Omega$ |

## Package Pinout

CYG2911



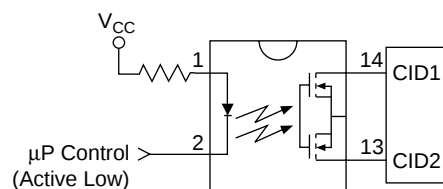
CYG2911 Pinouts &amp; Definitions

| PIN# | I/O | Name     | Function                                                                                                                                                                                                                                    |
|------|-----|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | I/O | LINE1    | Transformer isolated audio signal coupling path for the telephone line.                                                                                                                                                                     |
| 2    | I/O | LINE2    | Transformer isolated audio signal coupling path for the telephone line.                                                                                                                                                                     |
| 7    | O   | 911      | Signals HIGH for 20-60ms when the CYG2911 is off-hook and another phone goes off-hook. Glitches may appear on this pin when the CYG2911 first goes off-hook, and should be ignored for a minimum of 200ms.                                  |
| 8    | I   | OH       | Driving this pin LOW asserts the off-hook condition. The hookswitch LED is current limited by an internal 470 $\Omega$ resistor.                                                                                                            |
| 9    | O   | RING     | Active LOW indicates an incoming ring signal. This is pulsed LOW by the AC ring signal at the ring frequency from 15-40Hz.                                                                                                                  |
| 10   | I/O | RING     | Connection to telephone line Ring conductor.                                                                                                                                                                                                |
| 11   | I/O | TIP      | Connection to telephone line Tip conductor.                                                                                                                                                                                                 |
| 13   | O   | CID2     | Caller ID connection. CID1/CID2 connect to an external 1-Form-A solid state relay (Clare LCA110). When the SSR is closed (connecting CID1 to CID2), Caller ID information is presented to LINE1/LINE2 after the first telephone ring burst. |
| 14   | O   | CID1     | Caller ID connection. See CID2 above.                                                                                                                                                                                                       |
| 17   | I   | GND      | Connected to host system ground.                                                                                                                                                                                                            |
| 18   | I   | $V_{CC}$ | Provides power to the hookswitch LED. Typically +5V for $\approx$ 8mA LED current. LED is current limited by an internal 470 $\Omega$ resistor. $V_{CC}$ should not exceed 20V.                                                             |

### CYG2911

#### Caller ID Connections

Pins 13 & 14 should be connected to a 1-Form-A relay (Clare LCA110), as follows:





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