

### Features

- Low distortion transformer signal coupling (0.01% max)
- Complete ring detector circuit
- Low power hookswitch
- Electronic inductor/gyrator circuit
- Solid state surge protection
- Transient protection zeners
- Complete hybrid circuit (2-4 wire converter) included
- Compatible with all modem chip sets
- V.32 bis/V.34 compatible

### Applications

- Modems
- Fax machines
- Remote data acquisition
- Security systems
- Voice mail systems
- PC motherboard
- Computer telephony
- Process control
- Medical
- PBX
- Direct broadcast satellite

### Description

Clare's Cybergate™ CYG2217 DAA module provides a complete telephone line interface circuit, including a 2-4 wire converter for transmit and receive signal separation in a small 1.07" x 1.07" x 0.4" package. The module provides a fast and cost effective solution for designs that require an interface to the telephone line. The module is designed to meet FCC part 68 requirements thus providing a low risk design solution.

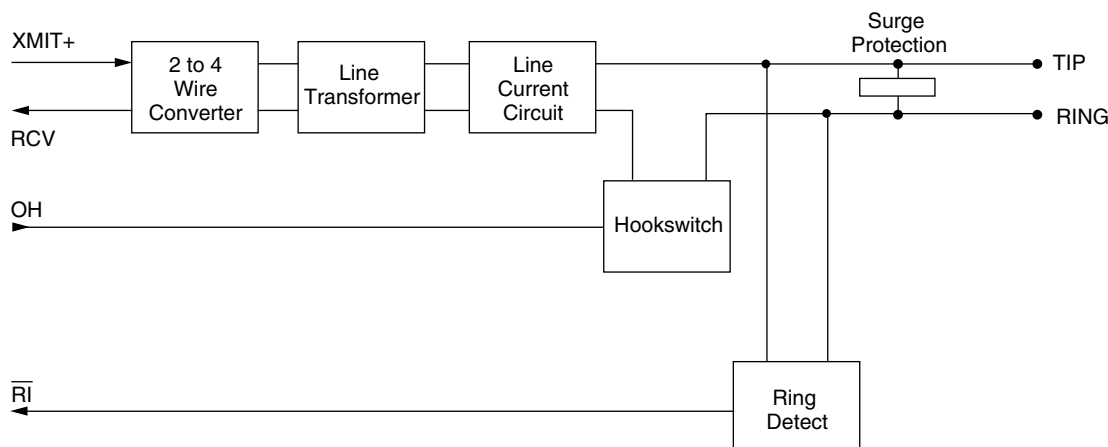
### Approvals

- UL recognized file #: E174201

### Ordering Information

Part #	Description
CYG2217	DAA Module (18/Tube)

### Block Diagram



### Handling and Assembly Recommendations

The CYG2217 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 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

<sup>1</sup> Derate Linearly 1.33 mw / oC

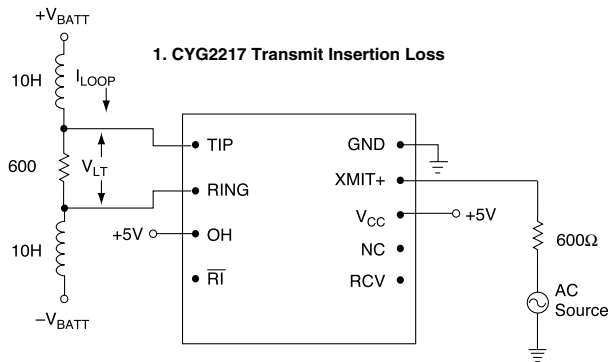
<sup>2</sup> Derate Linearly 3.67 mw / oC

*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.*

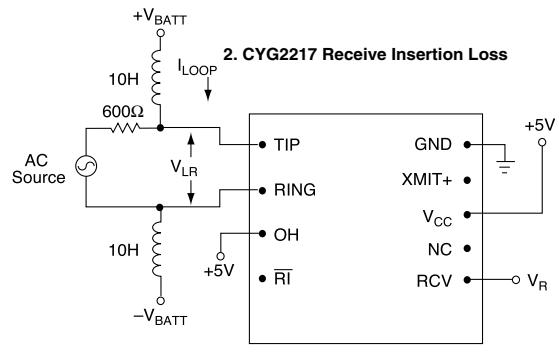
### Electrical Characteristics

Parameter	Conditions	Min	Typ	Max	Units
<b>DC Electrical Characteristics</b>					
On-Hook Impedance 2,1 (R,T) per FCC 68.312	@100V V <sub>DC</sub> across pins 1,2	10	-	-	MΩ
Off-Hook Line Leakage Current 2,1 (R,T) per FCC 68.312	@100V V <sub>DC</sub> across pins 1,2	-	-	10	μA
Power Supply Current @ VCC	V <sub>CC</sub> =5V	4	5	6	mA
Hookswitch Control Current @ (OH)	@V <sub>OH</sub> =2.4V	3.5	4.1	5.0	mA
	@V <sub>OH</sub> =5.0V	11.8	12.4	13	mA
Hookswitch Control Voltage	-	2.0	3.0	20	V
Off-Hook	-	-	0.2	0.5	V
On-Hook	-	-	-	-	V
<b>AC Signal Path Electrical Characteristics</b>					
Return Loss	600Ω, 1800Hz	39	40	-	dB
Insertion Loss	600Ω, 1800Hz	-	-	-	dB
Transmit	Test Circuit 1	6.0	6.5	7	dB
Receive	Test Circuit 2	-1.0	0	+1.0	dB
Frequency Response	300-3500Hz	-0.25	-	+0.25	dB
<b>Longitudinal Balance</b>					
On-Hook	Per FCC 68.310	60	-	-	dB
Off-Hook	Per FCC 68.310	40	-	-	dB
Transhybrid Loss	600Ω, 1800Hz	-	-32	-10	dB
Total Harmonic Distortion	600Ω, 1800Hz	-	-80	-	dB
DC Loop Current	-	20	-	120	mA
<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 5) Output Voltage (Pulsed)	V <sub>CC</sub> =+5V	-	-	0.8	V
Logic '0', Ring present	-	-	-	V <sub>CC</sub>	V
Logic '1', Ring not present	-	-	-	V <sub>CC</sub>	V
<b>Surge and Isolation Characteristics</b>					
Surge Protection Voltage Tip and Ring (Pins 1,2)	-	-	-	300	V
Isolation Voltage (Pins 18,17,16,15,14,5,4,to1,2)	Per FCC 68.302	1000	-	-	V <sub>RMS</sub>

### Test Circuits



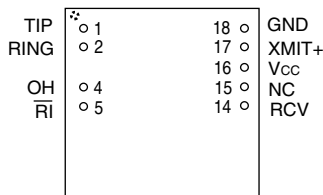
$$\text{Transmit Insertion Loss} = G_{TR} = 20 \text{Log} \frac{V_{LT}}{V_T}$$



$$\text{Receive Insertion Loss} = G_{RC} = 20 \text{Log} \frac{V_R}{V_{LR}}$$

### Package Pinout

**CYG2217  
CYG22XX**



**CYG2217 Pinouts & Definitions**

PIN#	Name	Function
1	TIP	Connection to telephone line Tip connected through an external fuse.
2	RING	Connection to telephone line Ring conductor.
4	OH	Driving this pin high asserts the off-hook condition. The hookswitch LED is current limited by an internal 300Ω resistor.
5	RI	Active LOW indicates an incoming ring signal. This is pulsed LOW by the AC ring signal and is not a steady state LOW during ringing.
14	RCV	Provides the analog output signal from the 2-4 wire converter of the CYG2217. RCV uses a 2.5 volt reference signal and therefore must be capacitively coupled to host equipment which uses a ground reference.
15	NC	No connection.
16	V <sub>CC</sub>	Provides power to the CYG2217. Typically +5V, V <sub>CC</sub> should not exceed 20V.
17	XMIT+	Provides the analog input signal from the 2-4 wire converter of the CYG2217. XMIT+ uses a 2.5 volt reference signal and therefore must be capacitively coupled to host equipment which uses a ground reference.
18	GND	Connection to host system ground.



**CLARE**

MICRO CHIPS.  
MACRO SOLUTIONS.

## Worldwide Sales Offices

### CLARE LOCATIONS

Clare Headquarters  
78 Cherry Hill Drive  
Beverly, MA 01915  
Tel: 1-978-524-6700  
Fax: 1-978-524-4900  
Toll Free: 1-800-27-CLARE

Clare Micronix Division  
145 Columbia  
Aliso Viejo, CA 92656-1490  
Tel: 1-949-831-4622  
Fax: 1-949-831-4628

### SALES OFFICES

#### AMERICAS

##### Americas Headquarters

Clare  
78 Cherry Hill Drive  
Beverly, MA 01915  
Tel: 1-978-524-6700  
Fax: 1-978-524-4900  
Toll Free: 1-800-27-CLARE

##### Eastern Region

Clare  
P.O. Box 856  
Mahwah, NJ 07430  
Tel: 1-201-236-0101  
Fax: 1-201-236-8685  
Toll Free: 1-800-27-CLARE

##### Central Region

Clare Canada Ltd.  
3425 Harvester Road, Suite 202  
Burlington, Ontario L7N 3N1  
Tel: 1-905-333-9066  
Fax: 1-905-333-1824

##### Western Region

Clare  
1852 West 11th Street, #348  
Tracy, CA 95376  
Tel: 1-209-832-4367  
Fax: 1-209-832-4732  
Toll Free: 1-800-27-CLARE

##### Canada

Clare Canada Ltd.  
3425 Harvester Road, Suite 202  
Burlington, Ontario L7N 3N1  
Tel: 1-905-333-9066  
Fax: 1-905-333-1824

### EUROPE

#### European Headquarters

CP Clare nv  
Bampslaan 17  
B-3500 Hasselt (Belgium)  
Tel: 32-11-300868  
Fax: 32-11-300890

#### France

Clare France Sales  
Lead Rep  
99 route de Versailles  
91160 Champlan  
France  
Tel: 33 1 69 79 93 50  
Fax: 33 1 69 79 93 59

#### Germany

Clare Germany Sales  
ActiveComp Electronic GmbH  
Mitterstrasse 12  
85077 Manching  
Germany  
Tel: 49 8459 3214 10  
Fax: 49 8459 3214 29

#### Italy

C.L.A.R.E.s.a.s.  
Via C. Colombo 10/A  
I-20066 Melzo (Milano)  
Tel: 39-02-95737160  
Fax: 39-02-95738829

#### Sweden

Clare Sales  
Comptronic AB  
Box 167  
S-16329 Spånga  
Tel: 46-862-10370  
Fax: 46-862-10371

#### United Kingdom

Clare UK Sales  
Marco Polo House  
Cook Way  
Bindon Road  
Taunton  
UK-Somerset TA2 6BG  
Tel: 44-1-823 352541  
Fax: 44-1-823 352797

### ASIA PACIFIC

#### Asian Headquarters

Clare  
Room N1016, Chia-Hsin, Bldg II,  
10F, No. 96, Sec. 2  
Chung Shan North Road  
Taipei, Taiwan R.O.C.  
Tel: 886-2-2523-6368  
Fax: 886-2-2523-6369

<http://www.clare.com>

---

*Clare cannot assume responsibility for use of any circuitry other than circuitry entirely embodied in this Clare product. No circuit patent licenses nor indemnity are expressed or implied. Clare reserves the right to change the specification and circuitry, without notice at any time. The products described in this document are not intended for use in medical implantation or other direct life support applications where malfunction may result in direct physical harm, injury or death to a person.*

---

Specification: DS-CYG2217-R1  
©Copyright 2001, Clare, Inc.  
All rights reserved. Printed in USA.  
1/12/01