CYG23XX
CYBERGATE™

Features
- Low distortion transformer signal coupling
- Complete ring detector circuit
- Low power hookswitch
- Electronic inductor/gyrator circuit
- Surge protection
- V.32 bis /V.34 compatible
- PC board mountable
- 16kHz metering filter

Description
Clare's Cybergate™ 23XX DAA modules provide a complete telephone line interface circuit in a small 1.07" x 1.07" x 0.4" package. This module provides a fast and cost effective solution for designs that require an interface to the telephone line. The CYG23XX0 is designed to meet PTT and safety regulations in Germany.

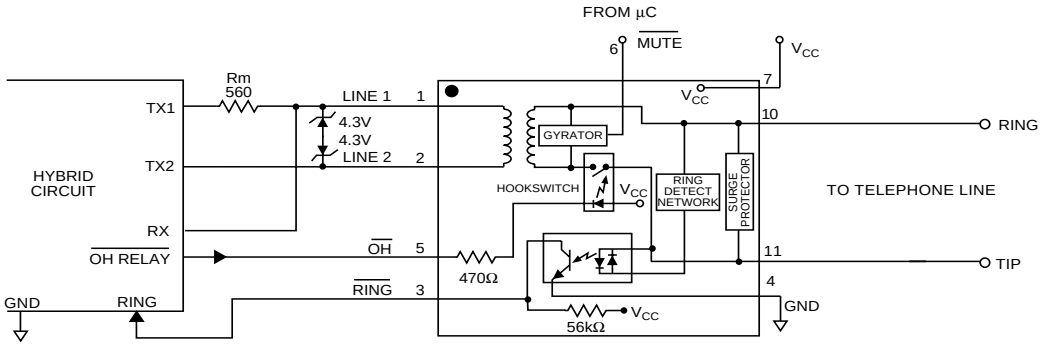
Applications
- Home medical devices
- Plant monitoring equipment
- Security/alarm systems
- Utility meters
- Modems
- Voicemail systems
- Vending machines
- Elevator control boxes
- Network routers
- PBX Systems
- PC mother boards
- Telephony applications
- Digital telephone answering machines

Approvals
- BSI Approved to EN60950
  Certification #: 8123

Ordering Information

Part #	Description
CYG2300	DAA Module Germany
CYG2320	DAA Module Australia

Block Diagram



Handling and Assembly Recommendations
The CYG23XX 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	-	-	1500	V_{RMS}
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_{CC}	-	-	20	V

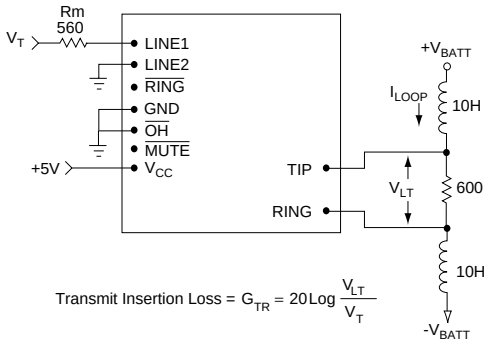
Absolute Maximum Ratings are stress ratings. Stresses in excess of these ratings can cause permanent damage to the device. Functional operation of the device at these or any other conditions beyond those indicated in the operational sections of this data sheet is not implied. Exposure of the device to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

Electrical Characteristics

Parameter	Conditions	Min	Typ	Max	Unit
DC Electrical Characteristics					
On-Hook Impedance	V_{Tip}-Ring=100VDC	10	-	-	MΩ
On-Hook Line Leakage Current	V_{Tip}-Ring=100VDC	-	-	10	µA
Off-Hook Relay Supply Current	V_{CC}=5V	7	8	9	mA
Hookswitch Power Source	-	4.75	5.0	20	V
DC Loop Current	-	5	-	120	mA
Mute Relay Supply Current	V_{CC}=5V	7	8	9	mA
AC Signal Path Electrical Characteristics					
Return Loss	f=300-3500Hz	14	25	-	dB
Insertion Loss					
Transmit	Test Circuit 1	-	-	7	dB
Receive	Test Circuit 2	-	-	7	dB
Frequency Response	f=300-3500Hz	-0.25	-	+0.25	dB
Longitudinal Balance					
On-Hook	-	60	-	-	dB
Off-Hook	-	40	-	-	dB
Total Harmonic Distortion	f=350Hz, P=-10dBm	-	-80	-	dB
Secondary Load Impedance	Line 1 and Line 2	-	100	-	Ω
Primary Source Impedance	Tip and Ring	-	600	-	Ω
Ring Detection Circuit Characteristics					
Ringing Voltage Detection Range	-	29	-	-	V_{RMS}
Ringing Frequency Detection Range	50-70Hz	15	-	70	Hz
Ringer Impedance	f=25Hz	-	18	-	KΩ
RING Output Voltage (Pulsed)	V_{CC} =+5V				
Logic '0', Ring present		-	-	0.8	V
Logic '1', Ring not present		-	-	Vcc	V
Surge, Transient, and Isolation Characteristics					
Surge Protection Voltage Tip and Ring	-	-	-	300	V
Isolation Voltage (Pins 1-7 to 10-11)	60 Seconds	-	-	1500	V_{RMS}

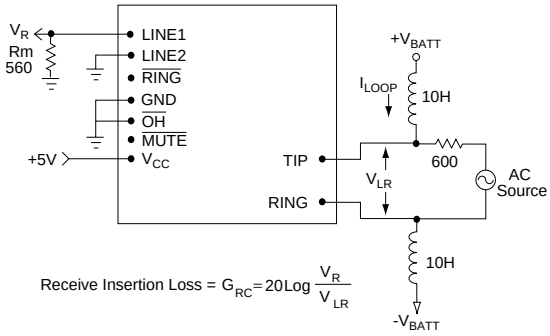
Test Circuits

1. CYG23XX Transmit Insertion Loss



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

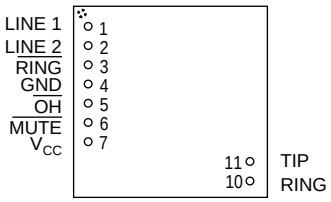
2. CYG23XX Receive Insertion Loss



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

Package Pinouts

CYG23XX



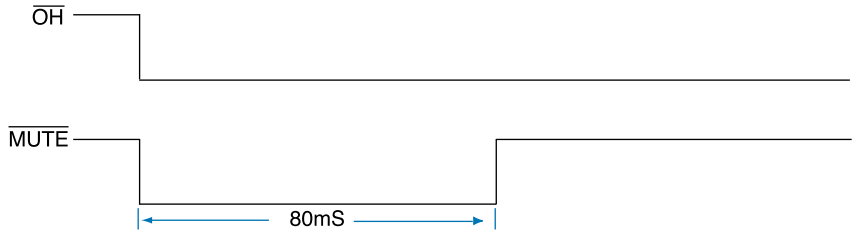
Top View

CYG23XX Pinouts & 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.
3	O	$\overline{\text{RING}}$	Active LOW indicates an incoming ring signal. This is pulsed LOW by the AC ring signal at the ring frequency.
4	I	GND	Connected to host system ground.
5	I	$\overline{\text{OH}}$	Driving this pin LOW asserts the off-hook condition. The hookswitch LED is current limited by an internal 470W resistor.
6	I	$\overline{\text{MUTE}}$	Driving this pin LOW activates the mute relay for pulse dialing. See Figure 1. The mute relay LED is current limited by an internal 470W resistor or
7	I	V_{CC}	Provides power to the hookswitch LED. Typically +5V for 8mA LED current. LED is current limited by an internal 470W resistor. V_{CC} should not exceed 20V.
11	I/O	RING	Connection to telephone line Ring conductor.
10	I/O	TIP	Connection to telephone line Tip conductor.

Off-Hook Transient Requirement

In order to meet Section 4.6.1 of the CTR-21 requirement, it is necessary to assert the MUTE pin of the CYG23XX) for a duration of 80mS after the OH pin is driven low as shown in Figure 1. This can be accomplished via the host firmware or external hardware as shown in Figures 2 and 3 respectively.



MUTE and OH Timing
Figure 1

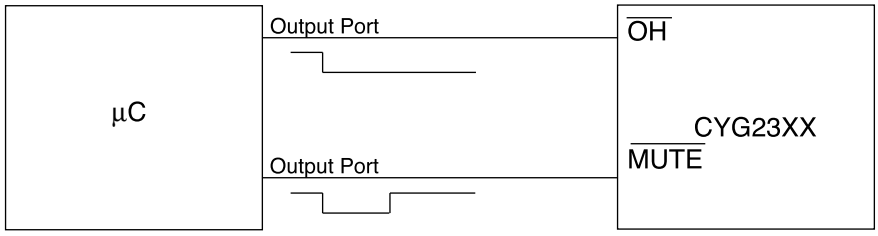
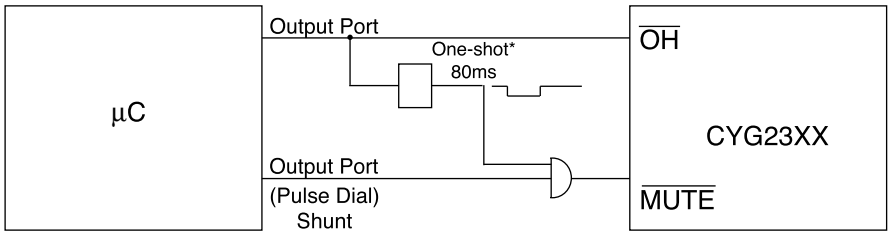


Figure 2



* Micrel MIC1555 or Equivalent

Figure 3

Asserting the MUTE pin causes the internal gyrator circuit in the CYG23XX to be bypassed, allowing low impedance pulse dialing to be performed by pulsing the OH pin. In Figure 2, the microcontroller output port going to the MUTE pin is used as a shunt for low impedance dialing and is asserted for 80mS when the OH signal is asserted. This method is preferred when the user has control of the host firmware and can easily write a subroutine to accomplish this function.

For users that do not have easy access to the modem firmware, some external hardware can be added to accomplish the same function. Figure 3 shows a monostable (one-shot) such as a 555 timer which is designed to generate an 80mS low going pulse upon the assertion of the OH signal. This 80mS pulse is ANDed with the low impedance pulse dial shunt signal which overrides the 80mS signal when pulse dialing is enabled. The pulse dial shunt signal is included as a standard output pin in most modem chipsets. This pin is activated when an ATDP command is issued to the modem.

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

Specification: DS-CYG23XX-R1

1/12/01