



Obsolescence Notice

This product is obsolete.

This information is available for your convenience only.

For more information on Zarlink's obsolete products and replacement product lists, please visit http://products.zarlink.com/obsolete_products/

Features

- Differential to single ended conversion
- No transformers required
- Minimum installation space
- Off-Hook detection and LED indicator drive
- Relay drive output
- Battery and ringing feed to line
- Logic interface: $\overline{\text{MUTE}}$, $\overline{\text{OFHK}}$, RC
- Mute of incoming audio
- Dial pulse detection
- Voltage surge protection

Applications

Line Interface for:

- PABX
- Intercoms
- Key Systems

Ordering Information

MH88500 20 Pin SIL Package

0°C to 70°C

Description

The Zarlink MH88500 Subscriber Line Interface Circuit provides a complete interface between the telephone line and a speech switch requiring only single bidirectional switch per crosspoint. The functions provided by the MH88500 include bidirectional differential to single ended conversion in the speech path, line battery feed, ringing feed and loop and dial pulse detection. The device is fabricated as a thick film hybrid in a 20-pin 'single-in-line' package allowing optimum circuit board packing density.

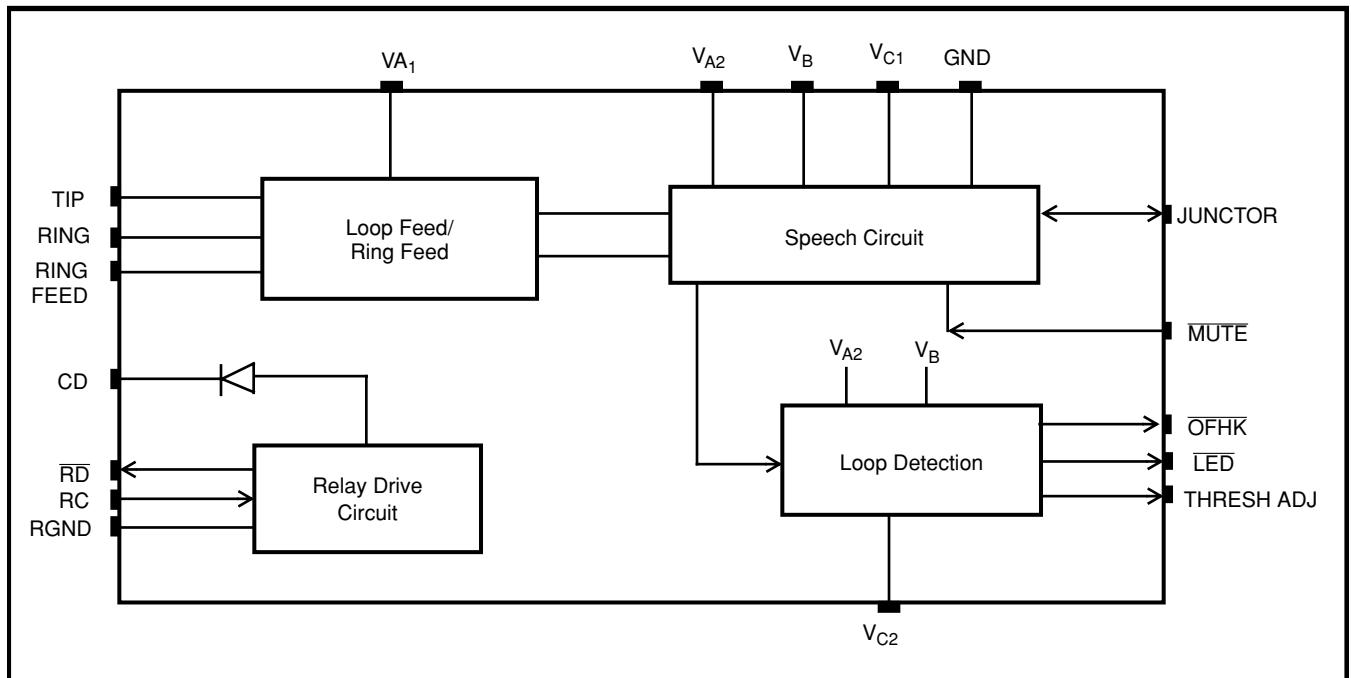


Figure 1 - Functional Block Diagram

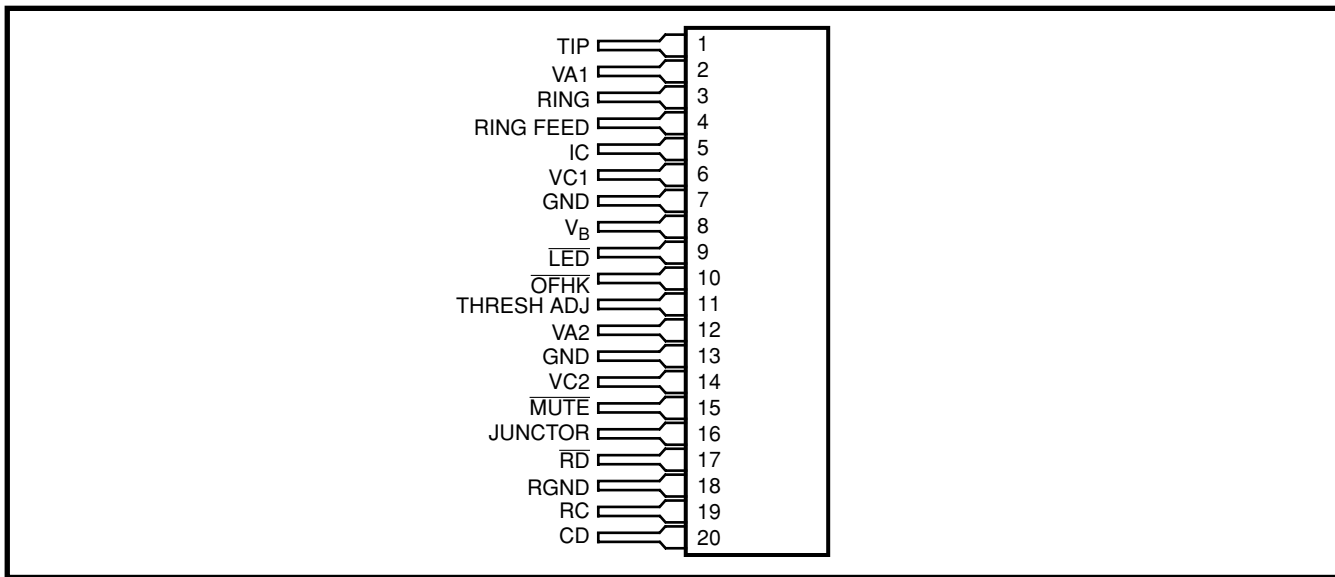


Figure 2 - Pin Connections

Pin Description

Pin #	Name	Description
1	TIP	Tip Lead. Connects to the “Tip” lead (A-wire) of the telephone line.
2	V _{A1}	Positive Line Feed Supply Voltage. Normally connected to V _{A2} .
3	RING	Ring Lead. Connects to the “Ring” lead (B-wire) of the telephone line.
4	RING FEED	Negative Line Feed Voltage and Ringing Input. Normally connected to Ring Relay.
5	IC	Internal Connection. Leave open circuit. Use for testing only.
6	V _{C1}	Sense Input. Normally connected to negative line feed voltage supply.
7	GND	Analog ground (0V). Internally connected to pin 13.
8	V _B	Negative Analog Supply Voltage.
9	LED	LED Drive Output. Drives an LED directly. Off-Hook condition, logic low.
10	OFHK	Logic Low Output. Indicates closed loop condition (Off-Hook and dial pulsing).
11	THRESH ADJ	Allows adjustment of OFHK detection threshold.
12	V _{A2}	Positive Power Supply Voltage. Normally connected to V _{A1} .
13	GND	Analog Ground (0V). Internally connected to pin 7.
14	V _{C2}	Loop Detector Voltage Supply. Connected to negative line feed voltages supply.
15	MUTE	Input mutes the incoming audio. Active low.
16	JUNCTOR	Receive/transmit audio speech path. (referenced to 0V GND)
17	RD	Relay Drive Output. Open collector sinks current when RC high. Diode clamp protected.
18	RGND	Ground for Relay Drive Circuit.
19	RC	Ring Control Input. Active high.
20	CD	Clamping Diode. Normally connected to relay positive voltage.

Functional Description

Speech Circuit

The speech circuit converts the bidirectional TIP and RING line pair to a bidirectional single ended junctor line. Figure 3 illustrates a typical connection between two SLIC's through two crosspoint switches. This configuration gives optimum transhybrid loss as seen from Figure 4 given that the output impedance of the Junctor line is 604Ω.

The $\overline{\text{MUTE}}$ input mutes signals coming from TIP and RING to the junctor line while allowing the signal from the junctor to the tip-ring pair to be transmitted.

Loop Detection

The loop detection circuit determines whether a low enough impedances is across TIP and RING to be recognized as an off-hook condition.

(Threshold impedance = 5.4kΩ with no adjustment)
 This threshold level can be adjusted by the use of external resistors as shown in Figure 6. $\overline{\text{OFHK}}$ has low output drive capability so it may drive CMOS operating with different power supplies.

Line Feed/Ring Feed Circuit

The line feed circuit provides loop current and the ability to apply ringing onto TIP and RING. The impedance from Ring Feed to GND is 600Ω which gives the loop current as:

$$I_L = \frac{\text{Voltage at RING FEED pin}}{\text{Telephone Impedance} + 600} \quad \text{Amps}$$

The positive supply for the line feed circuit is V_{A1} through the loop current is determined from RING FEED and GND.

Relay Drive Circuit

The relay drive circuit switches ringing onto RING FEED (Fig.7). The diode is present to suppress voltage transients during relay switches caused by the inductive coils of the relay. Ringing voltage includes AC ringing (90V typically) an dDC line feed voltage (-24V typically).

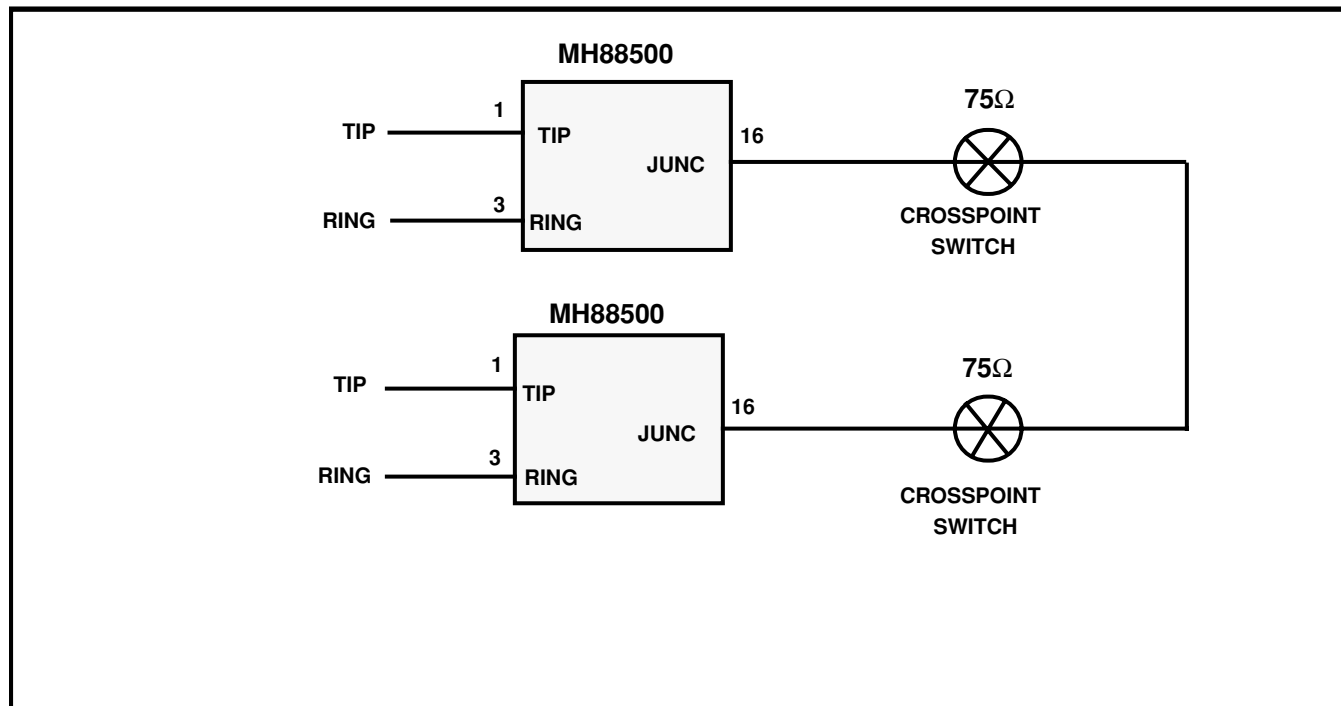


Figure 3 - SLIC Crosspoint Switch Connection

Absolute Maximum Ratings†

	Parameter	Symbol	Min	Max	Units
1	Voltage Supplies - V_{Ref} to GND	V_{A1}, V_{A2}			V
		V_B	-18	+18	V
		V_{C1}, V_{C2}	-35		V
2	Clamp Diode Breakdown Voltage- V_{Ref} to RGND	V_{CD}		+15	V
3	Operating Temperature	T_{AMB}	0	+70	°C
4	Storage Temperature	T_{STG}	-40	+100	°C
5	Power Dissipation	P_D		1.2	Watt

† Exceeding these values may cause permanent damage. Functional operation under these conditions is not implied.

AC Electrical Characteristics†

Voltages are with respect to ground (V_{SS}), $T_A = 25^\circ\text{C}$, unless otherwise stated.
Test conditions unless noted, $V_{A1}=V_{A2}=+7\text{V}$, $V_B=8\text{V}$, $V_{C2}=-24\text{V}(\pm 5\%)$.

	Characteristics	Sym	Min	Typ‡	Max	Units	Test Conditions	
1	Junctor to differential output (tip-ring) gain.	A_{JL}	2.18	2.25 7	2.32	V/V dB	1kHz, 400mV _{RMS} source on pin 16. Note 2	
2	Differential Input (tip-ring) to junctor gain	A_{LJ}	0.303	0.321	0.321	V/V dB	1kHz, 1V _{RMS} Source on pins 1&3. Note 1,2	
3	On/Off Hook Detection Threshold	Loop Resist	R_{Thresh}	4.0	5.4	6.0	kΩ	Note 1. Note 1
		Loop Current	I_{Thresh}	3.6	4.0	5.3	mA	
4	Trans Hybrid Loss			55		dB	Notes 1,2. See Figure 2	
5	Passband Linearity			±1		dB	Notes 1,2	
6	Power Supply Rejection Ratio (VC to Junctor)	PSRR		40		dB	Notes 1,2	
7	Common Mode Rejection Ratio (Tip and Ring to Junctor)	CMRR		40		dB	Notes 1,2	
8	Low Frequency Cutoff (3dB)	Junctor to Line	F_{LLJ}	53		Hz	Notes 1,2	
		Line to Junctor	F_{LJL}	20		Hz	Notes 1,2	
9	High Frequency Cutoff (3dB)	Line to Junctor	F_{HLJ}	800		kHz	Notes 1,2	
		Junctor to Line	F_{HJL}	500		kHz	Notes 1,2	
10	Longitudinal Balance			65		dB	Note 1	
11	Tip (or Ring) to ground AC input impedance	Z_I		300		Ω		
12	Junctor output impedance	Z_{OJ}		604		Ω		

† Exceeding these values may cause permanent damage. Functional operation under these conditions is not implied.

‡ Typical figures are at 25°C with nominal ± 5V supplies and are for design aid only: not guaranteed and not subject to production testing.

Note 1: 754Ω connected between JUNCTOR (pin 16) and OV.

Note 2: 604Ω connected between TIP (pin 1) and RING (pin 3).

DC Electrical Characteristics

		Characteristics	Sym	Min	Typ [‡]	Max	Units	Test Conditions
1	SUPPLY	Operating Supply Voltages	V_{A1}, V_{A2} V_B V_{C1}, V_{A2}	-13 -30	-24	+13 -20	V V V	
2		Operating Supply Currents	I_{A1} I_{A2} I_B I_{C1} I_{C2}		7 8 6 .2 .1		mA mA mA mA mA	
3	INPUTS	High Level Input Voltage \overline{MUTE} RC	V_{IH} V_{IH}	4.2 3			V V	
4		Low Level Input Voltage \overline{MUTE} RC	V_{IL} V_{IL}	.8 1			V	
5		High Level Input Current \overline{MUTE} RC	I_{IH} I_{IH}	-28 700			μA μA	
6		Low Level input Current \overline{MUTE} RC	I_{IL} I_{IL}	100 1			μA μA	
7	OUTPUTS	Sink Current \overline{LED} RD	I_{LED} I_{RD}	2 65	6 100		mA mA	$V_{OFHK}, -6V$ $CD=RC=5V, RG=0V$ $V_{RRD} < 1.5V$
8		Diode Clamp Current	I_{RLY}	65	100		mA	$RC=RGND=0V,$ $CD=5V V_{RRD} < 1.5V$
9		High Level Output Voltage	V_{OH}	6			V	\overline{LED} Unconnected
10		Low Level Output Voltage OFHK	V_{OL}	-6.5			V	\overline{LED} Unconnected
11		High Level Output Current	I_{OH}	10			μA	
12		Low Level Output Current	I_{OL}	10			μA	

‡ Typical figures are at 25°C with nominal ± 5V supplies and are for design aid only: not guaranteed and not subject to production testing.

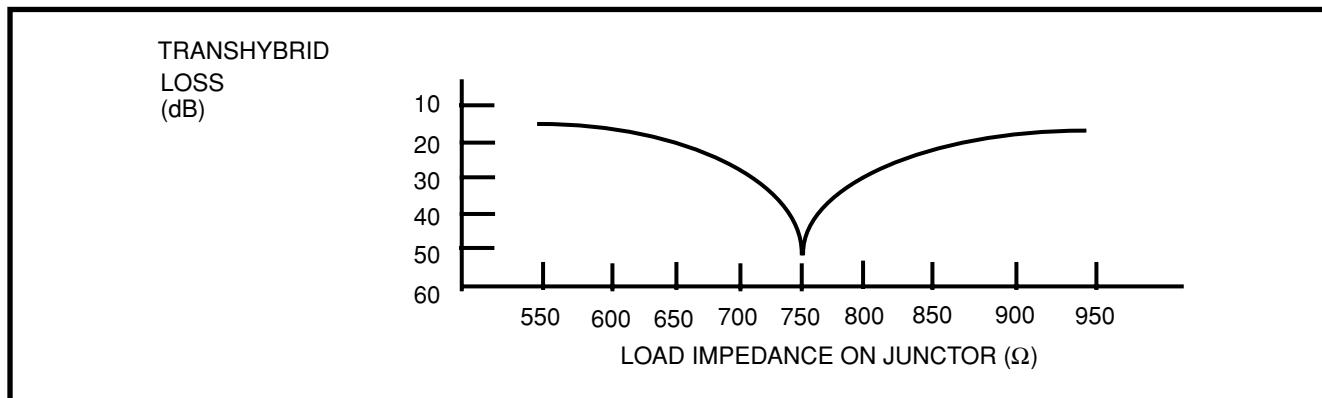


Figure 4 - Return Loss VS Junctor Load Impedance

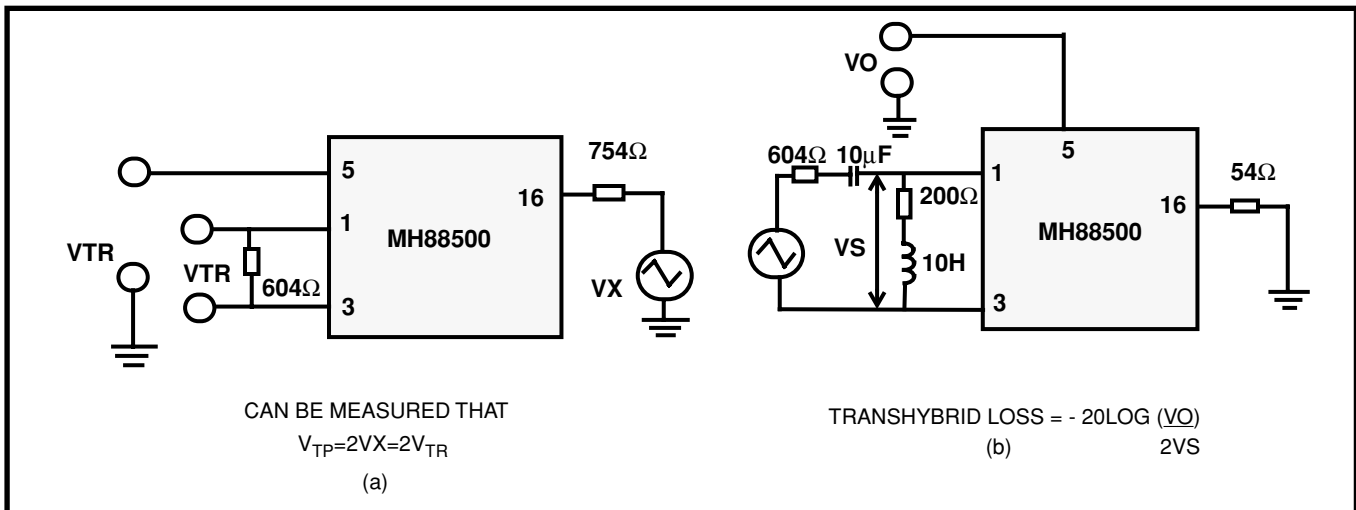


Figure 5 - Transhybrid Loss Test Circuit

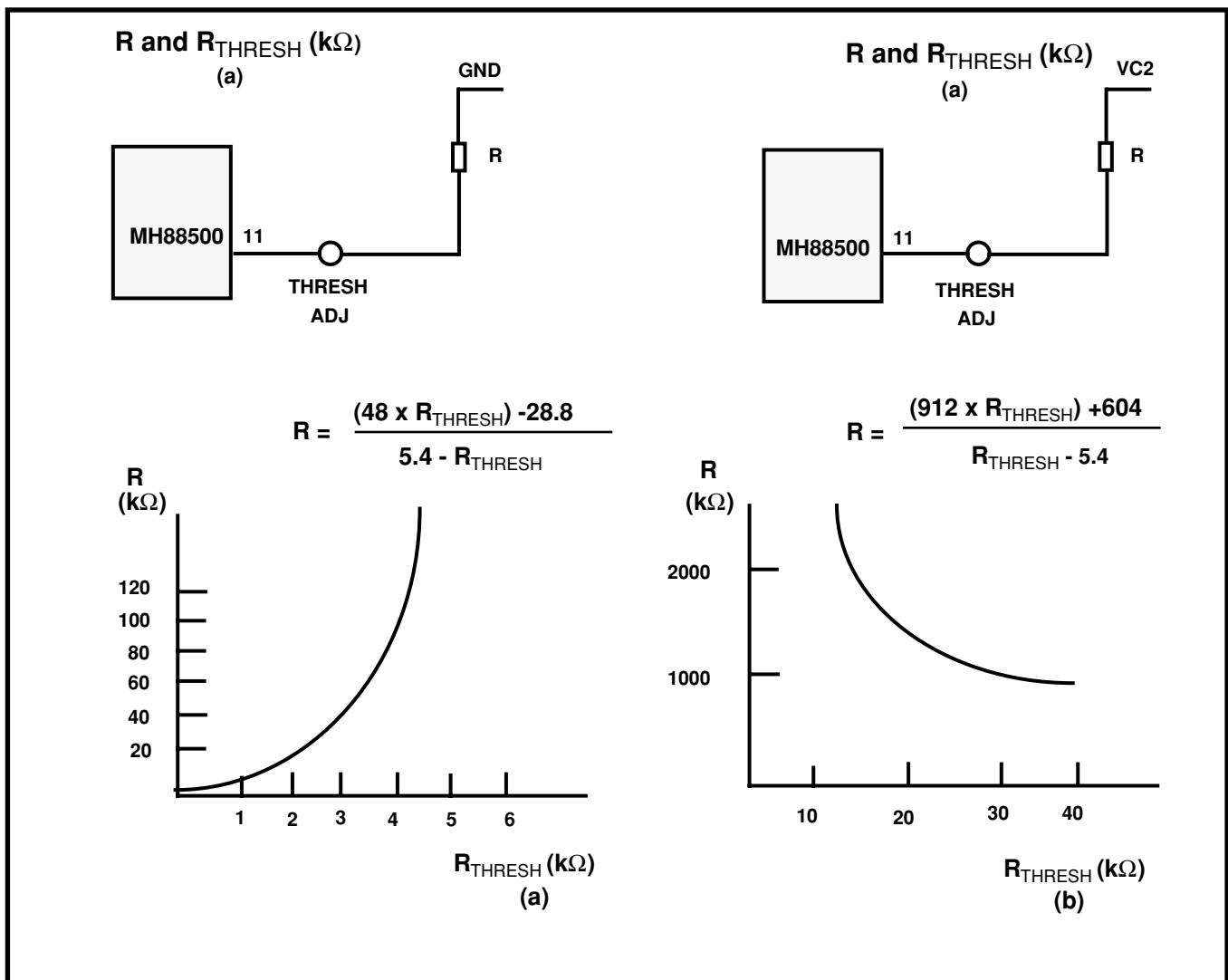


Figure 6 - Off-Hook Threshold Adjust

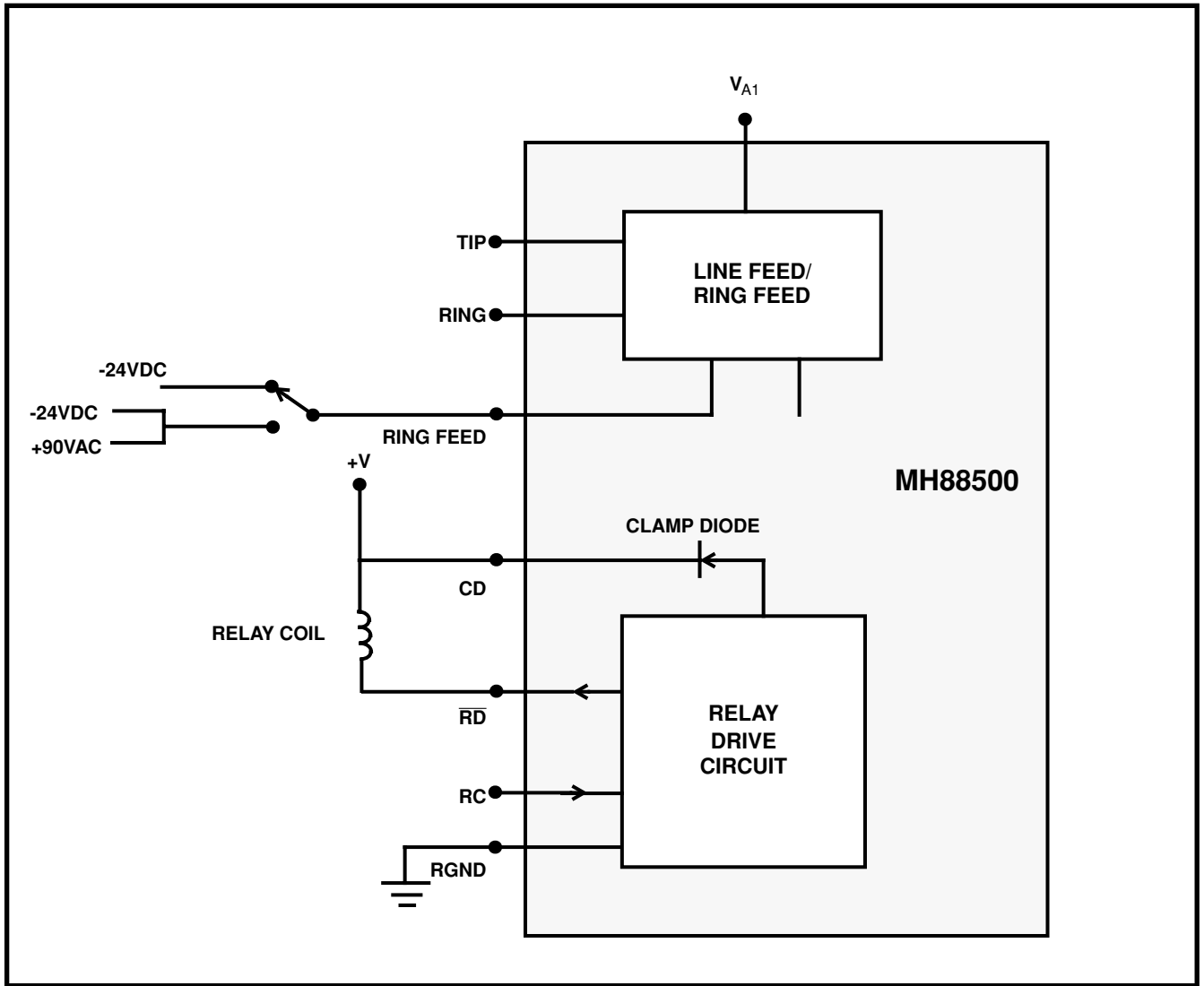


Figure 7 - Relay Drive Circuit

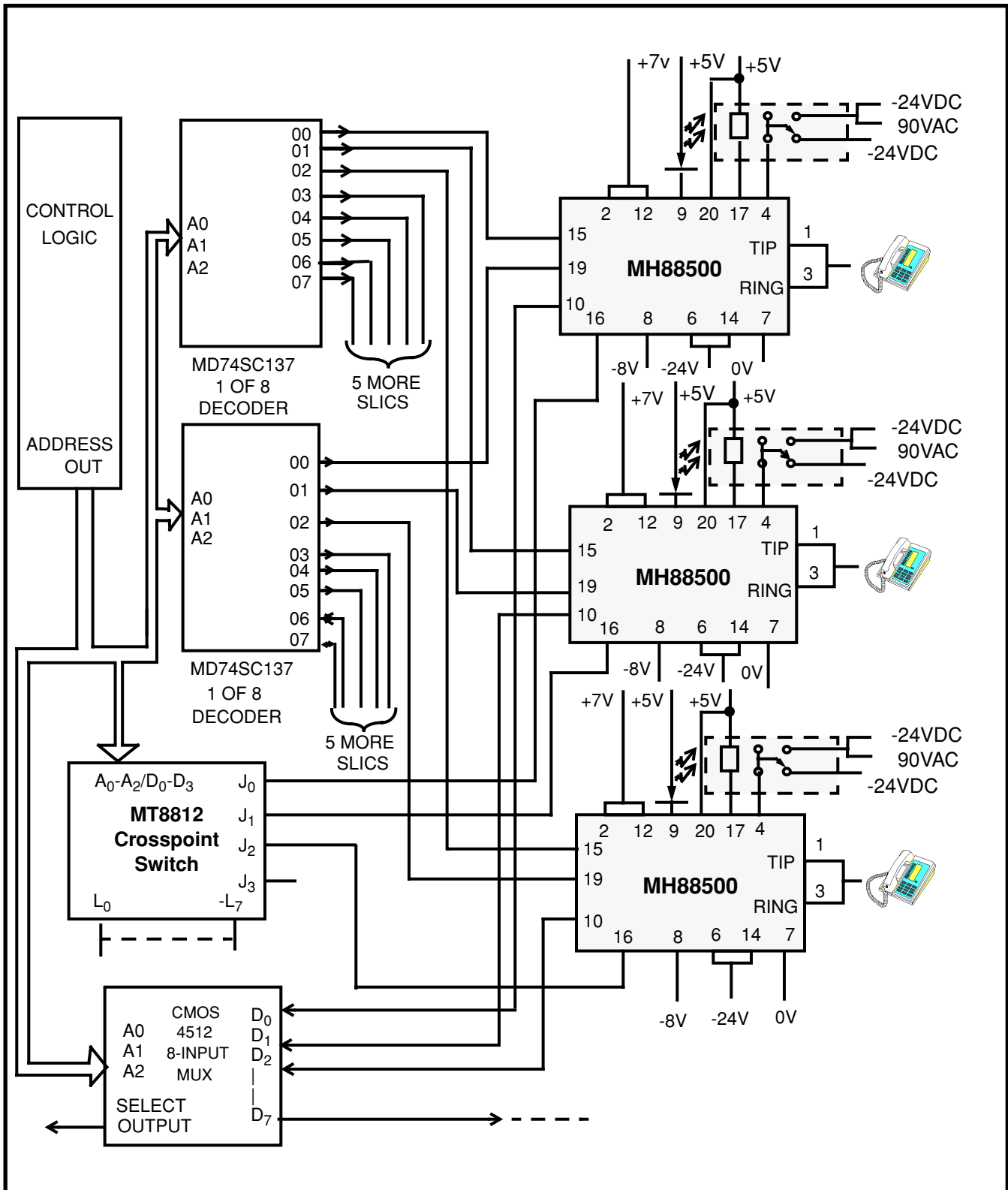


Figure 8 - PABX Typical Application

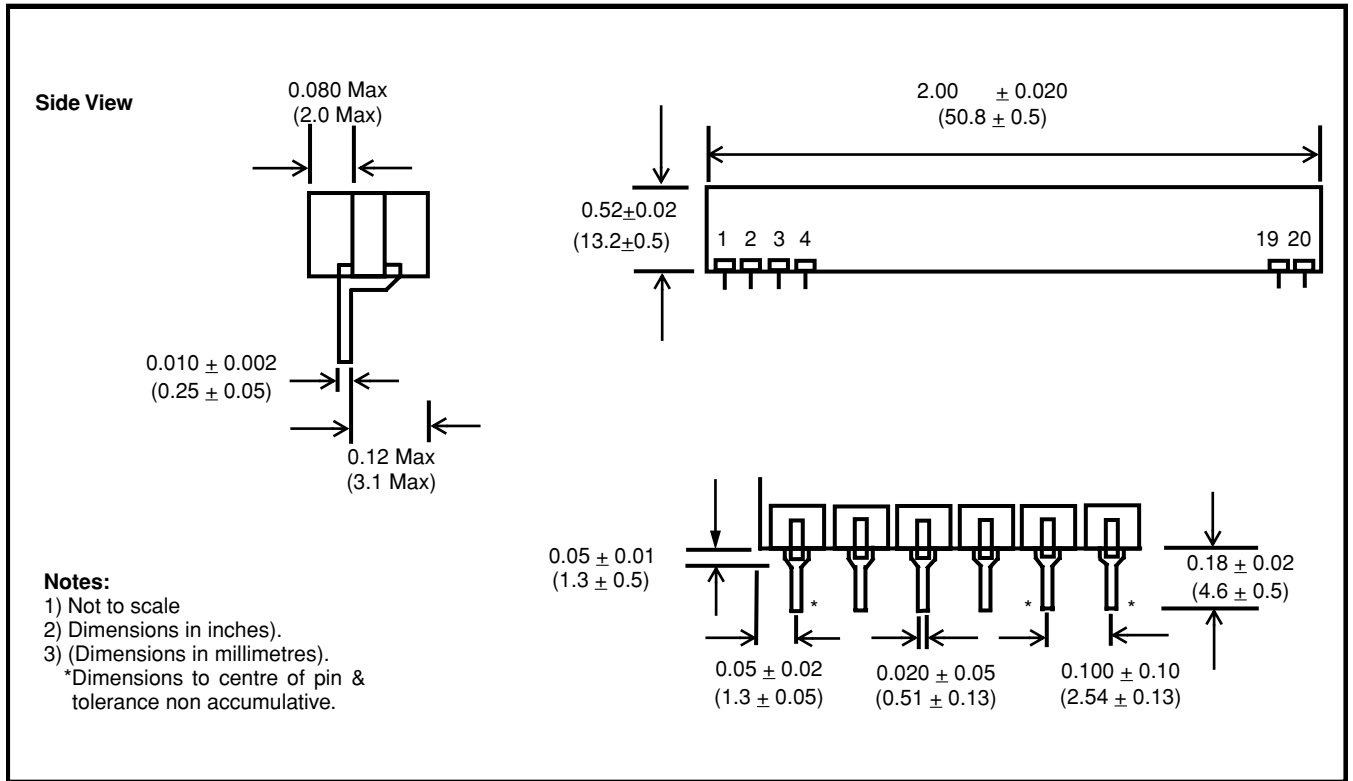


Figure 9 -Mechanical Data

Notes:



**For more information about all Zarlink products
visit our Web Site at
www.zarlink.com**

Information relating to products and services furnished herein by Zarlink Semiconductor Inc. or its subsidiaries (collectively "Zarlink") is believed to be reliable. However, Zarlink assumes no liability for errors that may appear in this publication, or for liability otherwise arising from the application or use of any such information, product or service or for any infringement of patents or other intellectual property rights owned by third parties which may result from such application or use. Neither the supply of such information or purchase of product or service conveys any license, either express or implied, under patents or other intellectual property rights owned by Zarlink or licensed from third parties by Zarlink, whatsoever. Purchasers of products are also hereby notified that the use of product in certain ways or in combination with Zarlink, or non-Zarlink furnished goods or services may infringe patents or other intellectual property rights owned by Zarlink.

This publication is issued to provide information only and (unless agreed by Zarlink in writing) may not be used, applied or reproduced for any purpose nor form part of any order or contract nor to be regarded as a representation relating to the products or services concerned. The products, their specifications, services and other information appearing in this publication are subject to change by Zarlink without notice. No warranty or guarantee express or implied is made regarding the capability, performance or suitability of any product or service. Information concerning possible methods of use is provided as a guide only and does not constitute any guarantee that such methods of use will be satisfactory in a specific piece of equipment. It is the user's responsibility to fully determine the performance and suitability of any equipment using such information and to ensure that any publication or data used is up to date and has not been superseded. Manufacturing does not necessarily include testing of all functions or parameters. These products are not suitable for use in any medical products whose failure to perform may result in significant injury or death to the user. All products and materials are sold and services provided subject to Zarlink's conditions of sale which are available on request.

Purchase of Zarlink's I²C components conveys a licence under the Philips I²C Patent rights to use these components in and I²C System, provided that the system conforms to the I²C Standard Specification as defined by Philips.

Zarlink, ZL and the Zarlink Semiconductor logo are trademarks of Zarlink Semiconductor Inc.

Copyright Zarlink Semiconductor Inc. All Rights Reserved.

TECHNICAL DOCUMENTATION - NOT FOR RESALE
