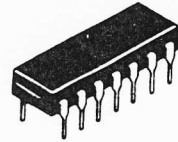


INTERFACE (RECEIVER)

MC1489
276-2521

QUAD LINE RECEIVER



GENERAL DESCRIPTION

The 1489 monolithic quad line receiver is designed to interface data terminal equipment with data communications equipment in conformance with specifications of EIA Standard No. RS-232C.

FEATURES

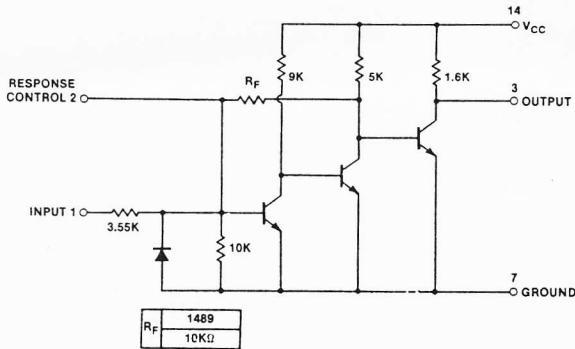
- Input Resistance—3.0 k to 7.0 K ohms
- Input Signal Range— ± 30 Volts
- Input Threshold Hysteresis Built In
- Response Control
 - a) Logic Threshold Shifting
 - b) Input Noise Filtering

ABSOLUTE MAXIMUM RATINGS

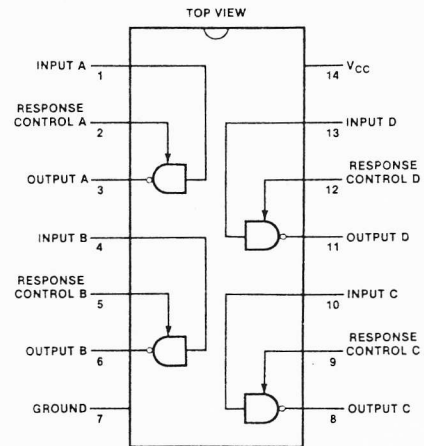
Supply Voltage (V_{CC})	10 V
Input Voltage Range (V_{IR})	± 30 V
Output Load Current (I_L)	20 mA
Power Dissipation (P_D)	1 W
Operating Temperature Range (T_A)	0°C To $+75^\circ\text{C}$
Storage Temperature Range (T_{stg})	-65°C To $+175^\circ\text{C}$

INTERNAL CIRCUIT

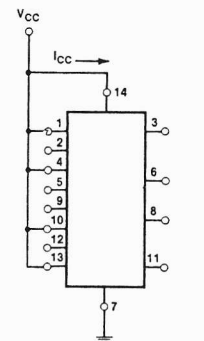
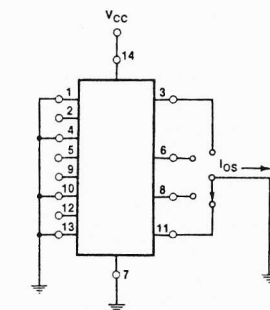
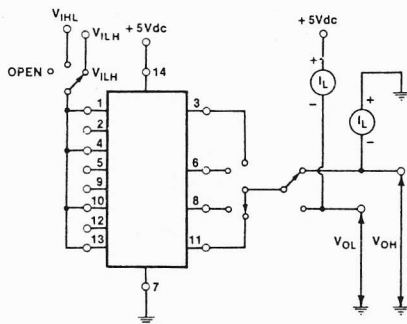
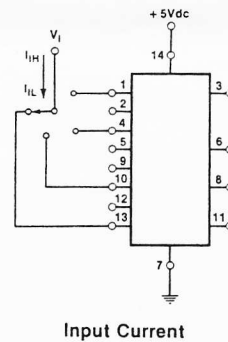
($\frac{1}{4}$ of Circuit Shown)



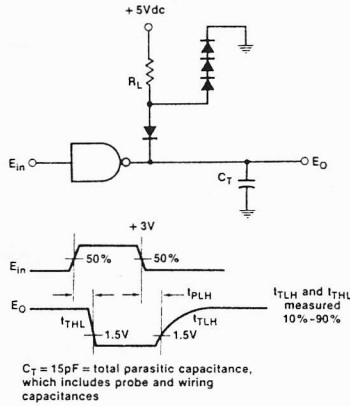
PIN CONNECTION



TEST CIRCUITS



TYPICAL CHARACTERISTICS



Switching Response

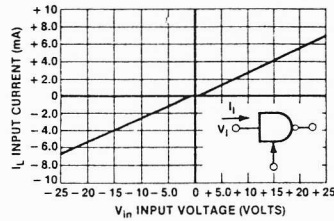


Figure 1—Input Current

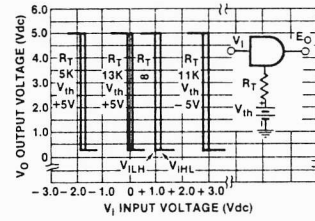


Figure 2—Input Threshold Voltage Adjustment

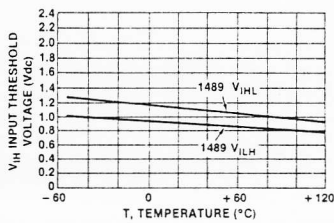


Figure 3—Input Threshold Voltage vs Temperature

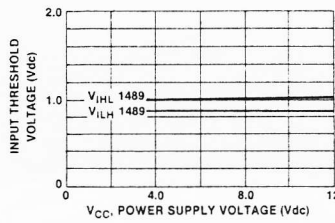


Figure 4—Input Threshold vs Power—Supply Voltage

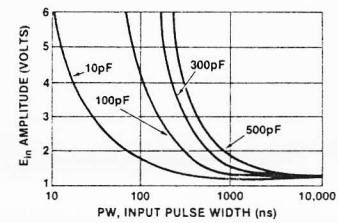


Figure 5—Turn-on Threshold vs Capacitance from Response Control Pin to Gnd

APPLICATIONS INFORMATION

The Electronic Industries Association (EIA) has released the RS-232C specification detailing the requirements for the interface between data processing equipment and data communications equipment. This standard specifies not only the number and type of interface leads, but also the voltage levels to be used. The 1488 quad driver and its companion circuit, the 1489 quad receiver, provide a complete interface system between DTL or TTL logic levels and the RS-232C defined levels. The RS-232C requirements as applied to receivers are discussed here. The required input impedance is defined as between 3000 ohms and 7000 ohms for input voltages between 3.0 and 25 volts in magnitude; and any voltage on the receiver input in an open circuit condition must be less than 2.0 volts in magnitude. The 1489 circuits meet these requirements with a maximum open circuit voltage of one V_{BE} .

The receiver shall detect a voltage between -3.0 and -25 volts as a logic "1" and input between $+3.0$ and $+25$ volts as a logic "0". On some interchange leads, an open circuit or power "OFF" condition (300 ohms or more to ground) shall be decoded as an "OFF" condition or logic "1". For this reason, the input hysteresis thresholds of the 1489 circuits are all above ground. Thus an open or grounded input will cause the same output as a negative of logic "1" input.

TYPICAL APPLICATIONS

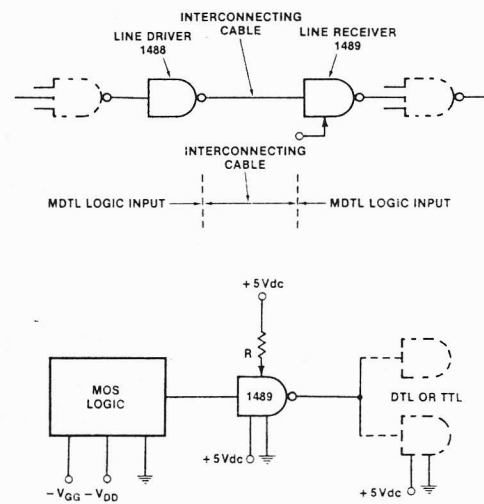


Figure 7—Typical Translator Application—MOS to DTL or TTL

TECHNICAL DATA

AN EXCLUSIVE RADIO SHACK SERVICE TO THE EXPERIMENTER

QUAD LINE RECEIVER

The 1489 monolithic quad line receiver is designed to interface data terminal equipment with data communications equipment in conformance with the specifications of EIA Standard No. RS-232C.

Fully interchangeable with MC1489, SN75189, DS1489, XR1489, etc.

FEATURES:

- Input Resistance – 3.0k to 7.0 kilohms
- Input Signal Range – ± 30 Volts
- Input Threshold Hysteresis Built In
- Response Control
 - a) Logic Threshold Shifting
 - b) Input Noise Filtering

APPLICATIONS INFORMATION

GENERAL INFORMATION

The 1489 quad receiver and its companion circuit the 1488 quad driver, provide a complete interface system between DTL or TTL logic levels and the RS-232C defined levels. The RS-232C requirements as applied to receivers are discussed herein.

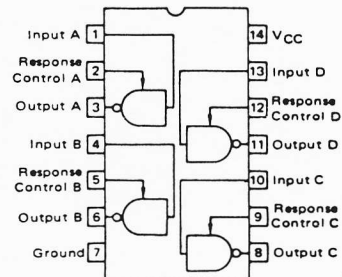
Useful for interfacing peripheral devices (such as modems, ham radio terminal units, auxiliary keyboards, controller or controlling units, sound synthesizers, etc.) to microcomputers and data terminals. Also suitable for mixing logic families within the same circuit.

The required input impedance is defined as between 3000 ohms and 7000 ohms for input voltages between 3.0 and 25 volts in magnitude; and any voltage on the receiver input in an open circuit condition must be less than 2.0 volts in magnitude. The 1489 circuit meets these requirements with a maximum open circuit voltage of one V_{BE} .

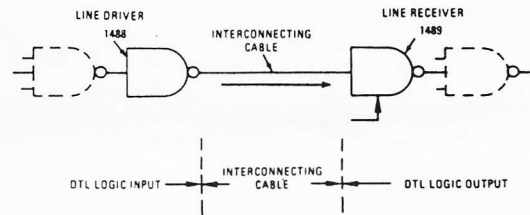
The receiver will detect a voltage between -3.9 and -25 volts as a logic "1" and inputs between +3.0 and +25 volts as a logic "0". On some interchange leads, an open circuit or power "OFF" condition (300 ohms or more to ground) shall be decoded as an "OFF" condition or logic "1". For this reason, the input hysteresis threshold of the 1489 circuit is above ground. Thus an open or grounded input will cause the same output as a negative or logic "1" input.

A separate response control terminal is provided for each receiver. A resistor or resistor and bias voltage source may be connected between this terminal and ground to shift the input threshold voltage levels. An external capacitor (typically 0.1 MFD) may be connected between this terminal and ground to provide input noise filtering.

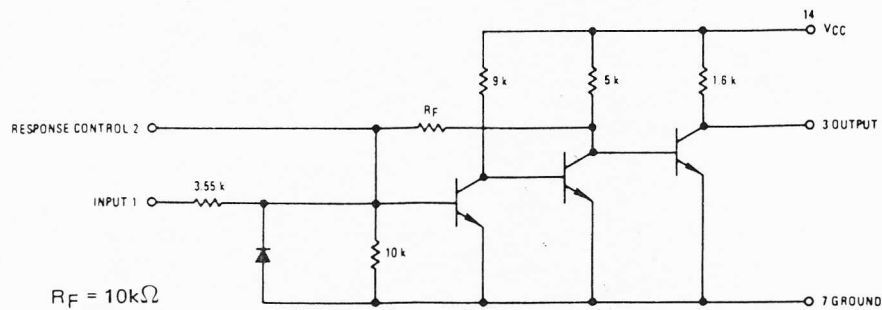
PIN CONNECTIONS



TYPICAL APPLICATION



CIRCUIT SCHEMATIC (1/4 OF CIRCUIT SHOWN)

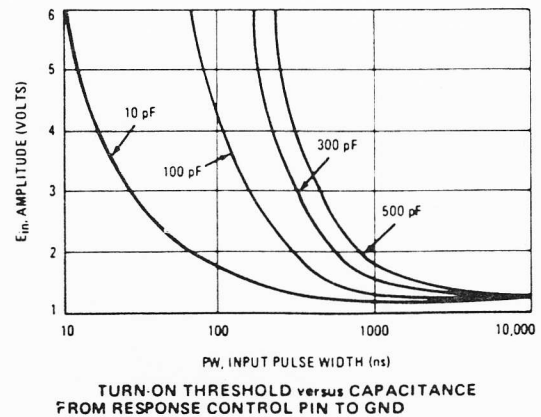
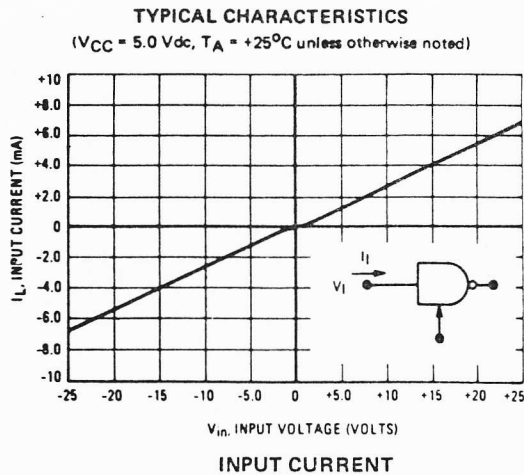
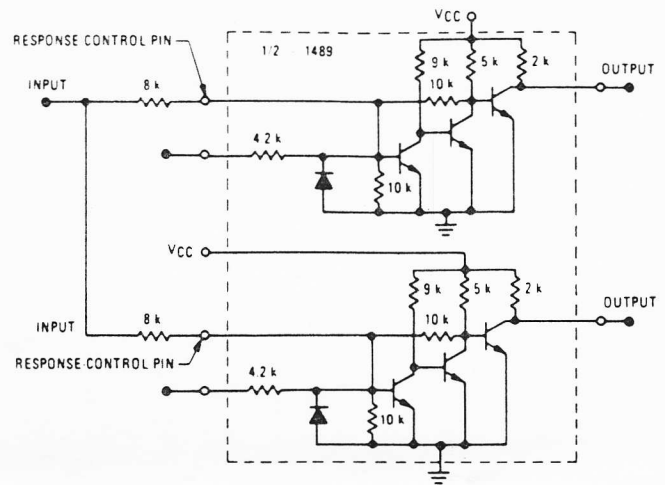
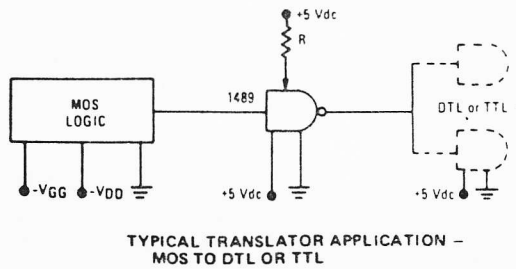


ELECTRICAL CHARACTERISTICS (RESPONSE CONTROL PIN IS OPEN) ($V_{CC} = +5.0 \text{ Vdc} \pm 1\%$, $T_A = 0 \text{ to } +75^\circ\text{C}$ UNLESS OTHERWISE NOTED)

CHARACTERISTICS	SYMBOL	MIN	TYP	MAX	UNIT
POSITIVE INPUT CURRENT ($V_{IH} = +25 \text{ Vdc}$) ($V_{IH} = +3.0 \text{ Vdc}$)	I_{IH}	3.6 0.43	—	8.3 —	mA
NEGATIVE INPUT CURRENT ($V_{IL} = -25 \text{ Vdc}$) ($V_{IL} = -3.0 \text{ Vdc}$)	I_{IL}	-3.6 -0.43	—	-8.3 —	mA
INPUT TURN-ON THRESHOLD VOLTAGE ($T_A = +25^\circ\text{C}$, $V_{OL} \leq 0.45 \text{ V}$)	V_{IHL}	1.0	—	1.5	Vdc
INPUT TURN-OFF THRESHOLD VOLTAGE ($T_A = +25^\circ\text{C}$, $V_{OH} \geq 2.5 \text{ V}$, $I_L = -0.5 \text{ mA}$)	V_{ILH}	0.75	—	1.25	Vdc
OUTPUT VOLTAGE HIGH ($V_{IH} = 0.75 \text{ V}$, $I_L = -0.5 \text{ mA}$) (Input Open Circuit, $I_L = -0.5 \text{ mA}$)	V_{OH}	2.6	4.0	5.0	Vdc
OUTPUT VOLTAGE LOW ($V_{IL} = 3.0 \text{ V}$, $I_L = 10 \text{ mA}$)	V_{OL}	—	0.2	0.45	Vdc
POWER SUPPLY CURRENT ($V_{IH} = +5.0 \text{ Vdc}$)	I_{CC}	—	20	26	mA
POWER CONSUMPTION ($V_{IH} = +5.0 \text{ Vdc}$)	P_C	—	100	130	mW

MAXIMUM RATINGS ($T_A = +25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

RATING	SYMBOL	VALUE	UNIT
POWER SUPPLY VOLTAGE	V_{CC}	10	Vdc
INPUT VOLTAGE RANGE	V_{IR}	-30	Vdc
OUTPUT LOAD CURRENT	I_L	20	mA
OPERATING AMBIENT TEMPERATURE RANGE	T_A	0 to +75	$^\circ\text{C}$



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