

PRODUCT AVAILABLE IN 0° TO +75°C TEMP. RANGE ONLY.

REFER TO PAGE 19 FOR A AND F PACKAGE PIN CONFIGURATIONS.

## DIGITAL 8000 SERIES TTL/MSI

### DESCRIPTION

The 8T16 Dual Communications Line Receiver provides receiving capability for data lines between Data Communication and Terminal Equipment. The device meets or exceeds the requirements of EIA Standard RS-232B and C, MIL-STD-188B and CCITT V24.

The receivers accept single (EIA) or double ended (MIL) inputs and are provided with an output strobing control. Both EIA and MIL input standards are accommodated.

When using the EIA input terminal (with the Hysteresis terminal open), input voltage threshold levels are typically +2V and -2V with a guaranteed minimum Hysteresis of 2.4V. By grounding the "Hysteresis" terminal, the EIA input voltage threshold levels may be shifted to typically +1.0V and +2.1V with a minimum guaranteed Hysteresis of 0.75V. (Note that when using the EIA inputs, the MIL inputs—both positive and negative—must be grounded).

The MIL input voltage threshold levels are typically +0.6V and -0.6V with a minimum guaranteed Hysteresis of 0.7V. A MIL negative terminal is provided on each receiver per specification MIL-STD-188B to provide for common mode noise rejection.

Each receiver includes a strobe input so that:

- A "1" on the strobe input allows data transfer.
- A "0" on the strobe input holds the output high.

### ABSOLUTE MAXIMUM RATINGS\*

Input Voltage (EIA and MIL)	±25V
V <sub>CC</sub>	+7.0V
Storage Temperature	-65°C to +175°C
Operating Temperature	0°C to +75°C

\* Limiting values above which serviceability may be impaired.

### ELECTRICAL CHARACTERISTICS (Over Recommended Operating Temperature And Voltage)

CHARACTERISTICS	LIMITS				TEST CONDITIONS					OUTPUTS	NOTES
	MIN.	TYP.	MAX.	UNITS	INPUTS						
					EIA	MIL (+)	MIL (-)	HYS	STROBE		
"1" Output Voltage (EIA) ("Hysteresis" Open)	2.6	3.5		V	-3.0V	0V	0V		2.0V	-800μA	8, 10
"1" Output Voltage (EIA) ("Hysteresis" grounded)	2.6	3.5		V	+0.3V	0V	0V	0V	2.0V	-800μA	8, 10
"1" Output Voltage (MIL)	2.6	3.5		V		-0.1mA	0V		2.0V	-800μA	8, 11
	2.6	3.5		V		-0.9V	0V		2.0V	-800μA	8, 11
"1" Output Voltage (Strobe)	2.6	3.5		V	+3.0V	0V	0V		0.8V	-800μA	8
"0" Output Voltage (EIA) ("Hysteresis" Open)			0.4	V	+3.0V	0V	0V		2.0V	9.6mA	9, 12
"0" Output Voltage (EIA) ("Hysteresis" grounded)			0.4	V	+3.0V	0V	0V	0V	2.0V	9.6mA	9, 12
"0" Output Voltage (MIL)			0.4	V		+0.1mA	0V		2.0V	9.6mA	9, 13
			0.4	V		+0.9V	0V		2.0V	9.6mA	9, 13

T<sub>A</sub> = 25° C and V<sub>CC</sub> = 5.0V

CHARACTERISTICS	LIMITS				TEST CONDITIONS					OUTPUTS	NOTES
	MIN.	TYP.	MAX.	UNITS	INPUTS						
					EIA	MIL(+)	MIL(-)	HYS	STROBE		
"1" Output Voltage (EIA) ("Hysteresis" open)	2.8	3.5		V	+1.2V	0V	0V		2.0V	-800μA	8, 10
"1" Output Voltage (MIL)	2.8	3.5		V		+0.35V	0V		2.0V	-800μA	8, 13
"0" Output Voltage (EIA) ("Hysteresis" open)		0.2	0.4	V	-1.2V	0V	0V		2.0V	9.6mA	9, 10
"0" Output Voltage (MIL)		0.2	0.4	V		-0.35V	0V		2.0V	9.6mA	9, 11
Input Resistance (EIA)	3	5	7	kΩ	±25V	0.0V	0.0V				
Input Resistance (MIL)	7.5	11.4		kΩ	0.0V	±25V	0.0V				

$T_A = 25^\circ\text{C}$  and  $V_{CC} = 5.0\text{V}$  (Cont'd)

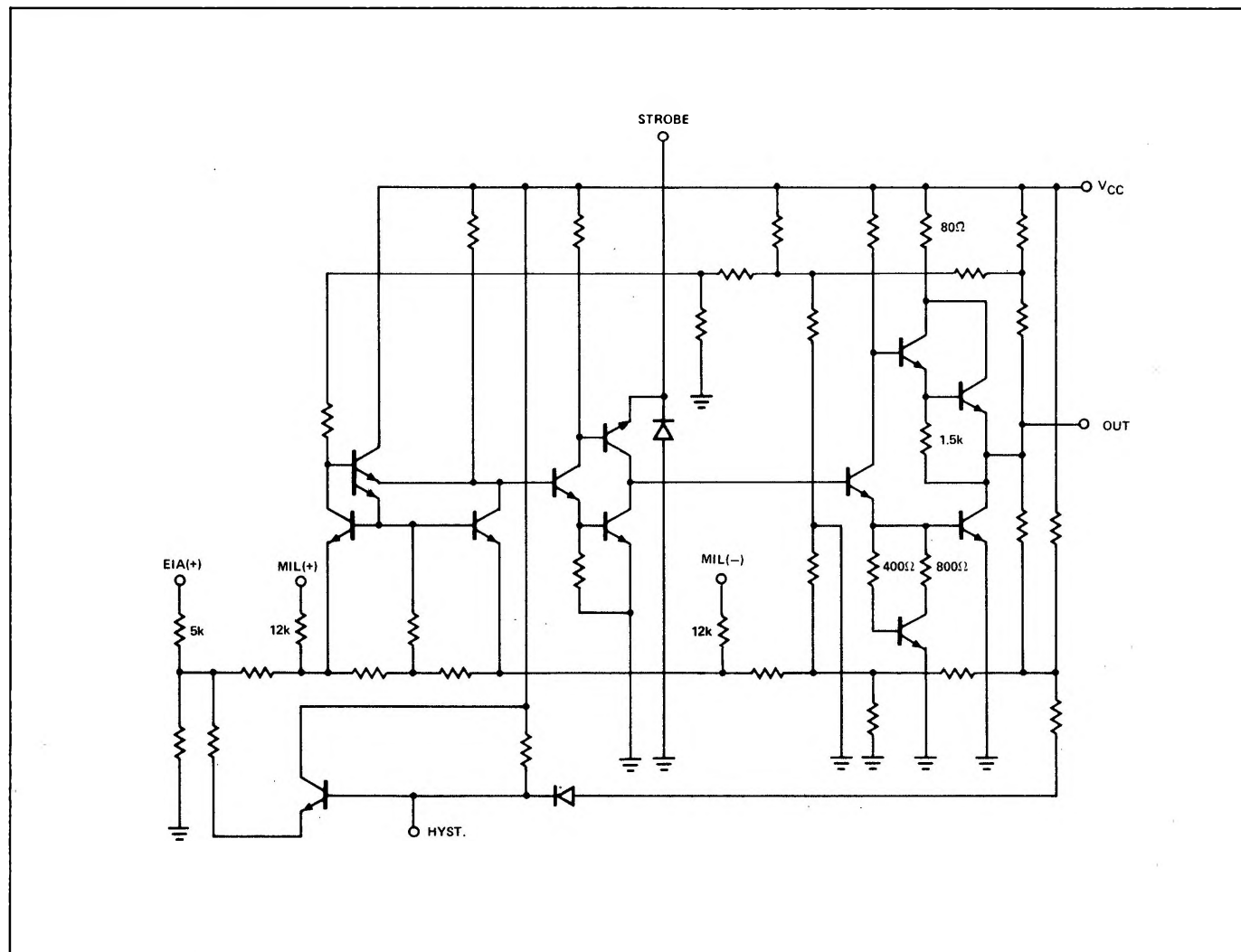
CHARACTERISTICS	LIMITS				TEST CONDITIONS					OUTPUTS	NOTES
	MIN.	TYP.	MAX.	UNITS	INPUTS						
					EIA	MIL (+)	MIL (-)	HYS	STROBE		
Power Consumption (per receiver)		44	75	mW	3.0V	0V	0V				17
Output Short Circuit Current	-10		-70	mA	-3.0V	0.0V	0.0V		5.00V	0.0V	16, 17
Propagation Delay		100	150	ns					5.00V		14
Signal Switching Acceptance	20			kHz					5.00V		

## NOTES:

1. All voltage measurements are referenced to the ground terminal. Terminals not specifically referenced are left electrically open.
2. All measurements are taken with ground pin tied to zero volts.
3. Positive current is defined as into the terminal referenced.
4. Positive logic definition:  
"UP" Level = "1", "DOWN" Level = "0".
5. Precautionary measures should be taken to ensure current limiting in accordance with Absolute Maximum Ratings should the isolation diodes become forward biased.
6. Manufacturer reserves the right to make design and process changes and improvements.

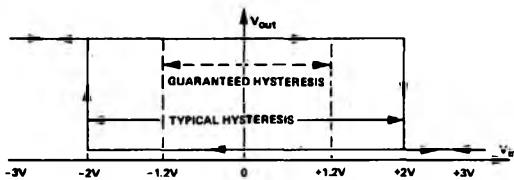
7. This test guarantees operation free of latch-up over the specified input voltage range.
8. Output source current is supplied through a resistor to ground.
9. Output sink current is supplied through a resistor to  $V_{CC}$ .
10. Previous EIA input: +3V (See hysteresis curve).
11. Previous MIL input: +0.9V (See hysteresis curve).
12. Previous EIA input: -3V (See hysteresis curve).
13. Previous MIL input: -0.9V (See hysteresis curve).
14. Reference AC Test Figure.
15. This test guarantees transfer of signals of up to 20kHz. Connect 1000pF between the output terminal and ground.
16. Each receiver to be tested separately.
17.  $V_{CC} = 5.25\text{V}$ .

## SCHEMATIC DIAGRAM

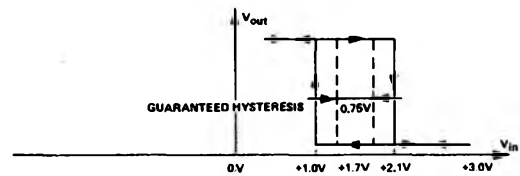


## HYSTERESIS CURVES

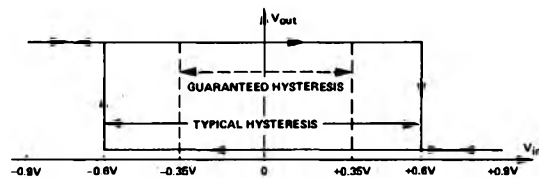
EIA – "HYSTERESIS" OPEN



EIA – "HYSTERESIS" GROUNDED

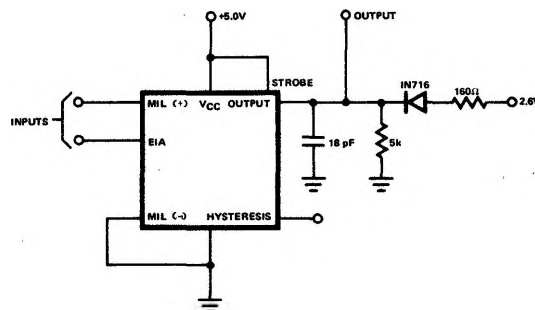


MIL – HYSTERESIS

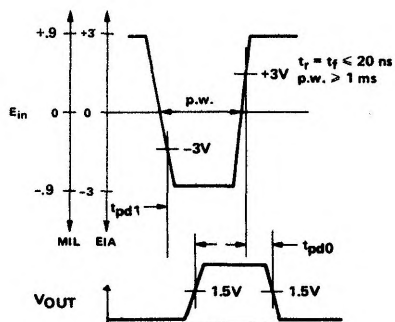


\* $V_{in}$  IS REFERENCED TO THE MIL (-) INPUT TERMINAL

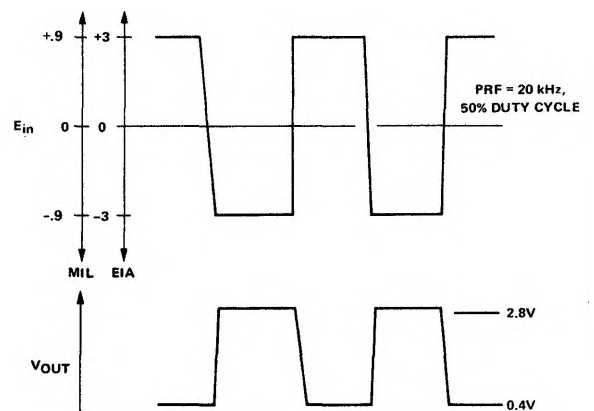
## AC TEST FIGURE AND WAVEFORMS



PROPAGATION DELAY

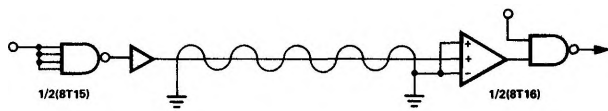


SIGNAL SWITCHING ACCEPTANCE

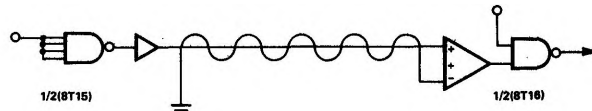


TYPICAL APPLICATIONS

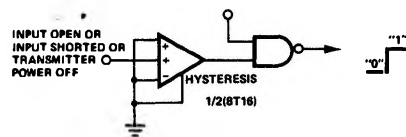
HIGH COMMON MODE NOISE IMMUNITY  
(MIL + INPUT)



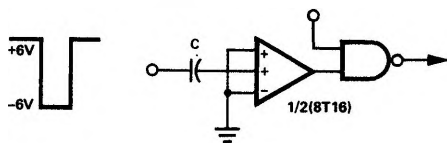
HIGH DIFFERENTIAL NOISE IMMUNITY  
(EIA + INPUT)



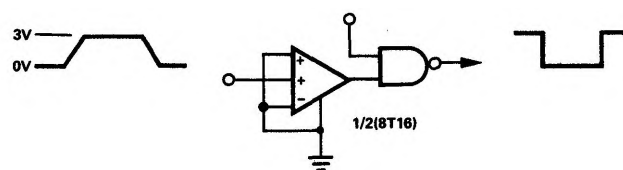
EIA FAIL-SAFE OPERATION



AC COUPLED OPERATIONS



SCHMITT TRIGGER



SINE TO SQUARE WAVE CONVERTER

