

February 2003

## ARINC 429 LINE RECEIVER

### DESCRIPTION

The HI-8588 is an ARINC 429 bus interface receiver and is available in a SO 8 pin package. The technology is analog/digital CMOS. The circuitry requires only a 5 volt supply.

The ARINC bus can be connected directly to the chip. The typical 10 volt differential signal is translated and input to a window comparator and latch. The comparator levels are just below the standard 6.5 volt minimum ARINC data threshold and just above the standard 2.5 volt maximum ARINC null threshold.

The TESTA and TESTB inputs bypass the analog for testing purposes. Also if TESTA and TESTB are both taken high, the analog powers down and the digital outputs tri-state allowing wire-or possibilities.

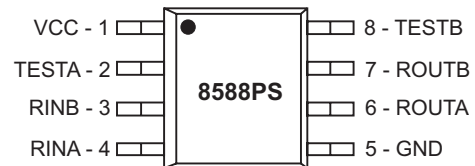
Please refer to the HI-8588-10 for applications where an external resistance in series with the ARINC inputs is required for lightning protection or when the digital outputs need to be a logic zero rather than open circuit when TESTA and TESTB are both high.

See Holt Application Note AN-300 for more information on lightning protection.

### FEATURES

- Direct ARINC 429 line receiver interface in a small outline package
- Receiver input hysteresis at least 2 volts
- Test inputs that bypass analog input and can power down and tri-state outputs
- Plastic and ceramic package options - surface mount and DIP
- Mil processing available

### PIN CONFIGURATION



8 - PIN PLASTIC NARROW BODY SOIC

### SUPPLY VOLTAGES

VCC = 5.0V ± 5%

### FUNCTION TABLE

#### RECEIVER

RINA	RINB	TESTA	TESTB	ROUTA	ROUTB
-1.25V to 1.25V	-1.25V to 1.25V	0	0	0	0
-3.25V to -6.5V	3.25V to 6.5V	0	0	0	1
3.25V to 6.5V	-3.25V to -6.5V	0	0	1	0
X	X	0	1	0	1
X	X	1	0	1	0
X	X	1	1	HI-Z	HI-Z

### PIN DESCRIPTION TABLE

PIN	SYMBOL	FUNCTION	DESCRIPTION
1	VCC	SUPPLY	5 VOLT SUPPLY
2	TESTA	LOGIC INPUT	CMOS
3	RINB	ARINC INPUT	RECEIVER B INPUT
4	RINA	ARINC INPUT	RECEIVER A INPUT
5	GND	POWER	GROUND
6	ROUTA	LOGIC OUTPUT	RECEIVER CMOS OUTPUT A
7	ROUTB	LOGIC OUTPUT	RECEIVER CMOS OUTPUT B
8	TESTB	LOGIC INPUT	CMOS

# FUNCTIONAL DESCRIPTION

## RECEIVER

Figure 1 shows the general architecture of the ARINC 429 receiver. The receiver operates off the VCC supply only. The inputs RINA and RINB each have series resistors, typically 35K ohms. They connect to level translators whose resistance to Ground is typically 10K ohms. Therefore, any series resistance added to the inputs will affect the voltage translation.

After level translation, the inputs are buffered and become inputs to a differential amplifier. The amplitude of the differential signal is compared to levels derived from a divider between VCC and Ground. The nominal settings correspond to a One/Zero amplitude of 6.0V and a Null amplitude of 3.3V.

The status of the ARINC receiver input is latched. A Null input resets the latches and a One or Zero input sets the latches.

The logic at the output is controlled by the test signal which is generated by the logical OR of the TESTA and TESTB pins. If TESTA and TESTB are both One, then the receiver is powered down and the output pins float. The powerdown does not disconnect the internal resistors at the ARINC input.

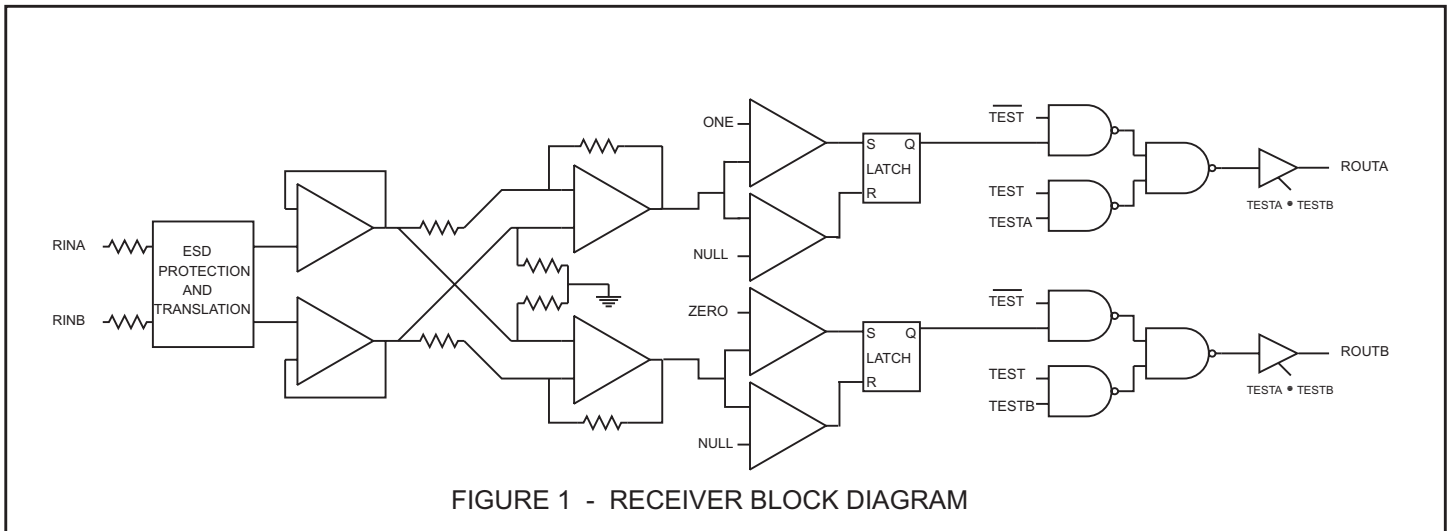


FIGURE 1 - RECEIVER BLOCK DIAGRAM

## APPLICATION INFORMATION

Figure 2 shows a possible application of the HI-8588 interfacing an ARINC receive channel to the HI-6010 which in turn interfaces to an 8-bit bus.

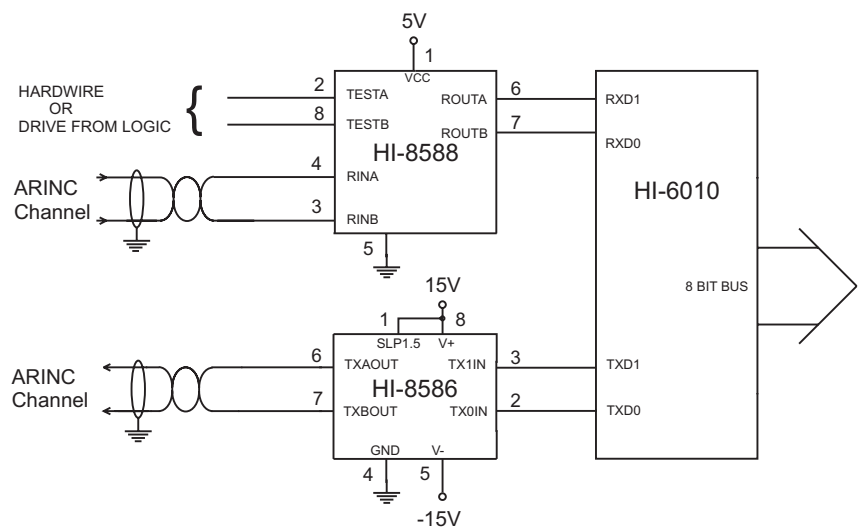


FIGURE 2 - APPLICATION DIAGRAM

**ABSOLUTE MAXIMUM RATINGS**

Voltages referenced to Ground

Supply voltages VCC.....7V
ARINC input - pins 3 & 4 Voltage at either pin.....+29V to -29V
DC current per input pin..... ±10mA
Power dissipation at 25°C plastic DIP.....0.7W ceramic DIP.....0.5W
Solder Temperature .....275°C for 10 sec
Storage Temperature.....-65°C to +150°C

**RECOMMENDED OPERATING CONDITIONS**

Supply Voltages VCC.....5V ± 5%
Temperature Range Industrial Screening.....-40°C to +85°C Hi-Temp Screening.....-55°C to +125°C Military Screening.....-55°C to +125°C

*NOTE: Stresses above absolute maximum ratings or outside recommended operating conditions may cause permanent damage to the device. These are stress ratings only. Operation at the limits is not recommended.*

**DC ELECTRICAL CHARACTERISTICS**

OPERATING TEMPERATURE RANGE, VCC = 5.0V UNLESS OTHERWISE STATED

PARAMETERS	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
ARINC input voltage one or zero	V <sub>DIN</sub>	differential voltage, pins 3 & 4	6.5	10	13	volts
null	V <sub>NIN</sub>	" " "	-	-	2.5	volts
common mode	V <sub>COM</sub>	with respect to Ground	-	-	5.0	volts
logic input voltage high	V <sub>IH</sub>		3.5	-	-	volts
low	V <sub>IL</sub>		-	-	1.5	volts
ARINC input resistance RINA to RINB	R <sub>DIFF</sub>	supplies floating	30	75	-	Kohm
RINA or RINB to Gnd or VCC	R <sub>SUP</sub>	" "	19	40	-	Kohm
logic input current source	I <sub>IH</sub>	V <sub>IN</sub> = 0 V	-	-	0.1	µA
sink	I <sub>IL</sub>	V <sub>IN</sub> = 5 V	-	-	0.1	µA
logic output drive current one	I <sub>OH</sub>	V <sub>OH</sub> = 4.6V	-	-1.6	-0.8	mA
zero	I <sub>OL</sub>	V <sub>OL</sub> = 0.4V	3.6	5.6	-	mA
Current drain operating	I <sub>CC1</sub>	pins 2, 8 = 0V; pins 3, 4 open	-	2.3	6.3	mA
powerdown	I <sub>CC2</sub>	pins 2, 8 = 5V; pins 3, 4 open	-	0.36	0.6	mA

**AC ELECTRICAL CHARACTERISTICS**

OPERATING TEMPERATURE RANGE, VCC = 5.0V UNLESS OTHERWISE STATED

PARAMETERS	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Receiver propagation delay		defined in Figure 3, $C_L = 50\text{pF}$				
Output high to low	$t_{\text{plhr}}$		-	600	-	ns
Output low to high	$t_{\text{plhr}}$		-	600	-	ns
Receiver output transition times						
Output high to low	$t_{\text{fr}}$		-	50	80	ns
Output low to high	$t_{\text{rr}}$		-	50	80	ns
Input capacitance (1)						
ARINC differential	$C_{\text{AD}}$		-	5	10	pF
ARINC single ended to Ground	$C_{\text{AS}}$		-	-	10	pF
Logic	$C_{\text{IN}}$		-	-	10	pF

Notes:

1. Guaranteed but not tested

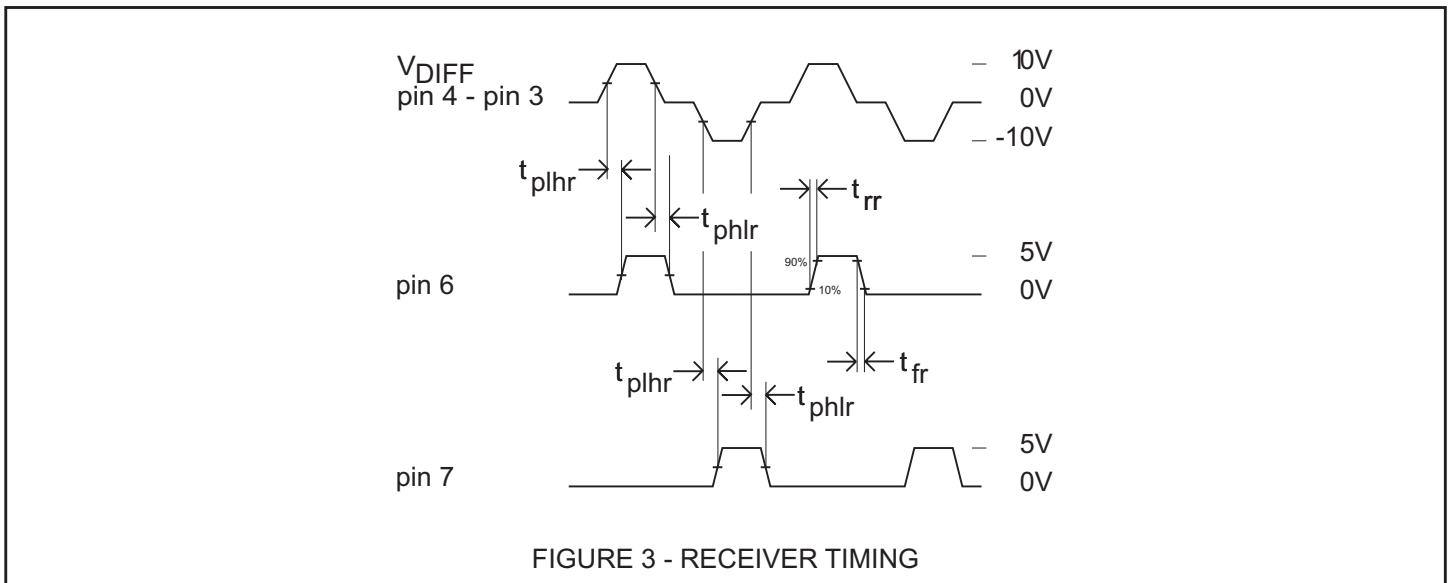


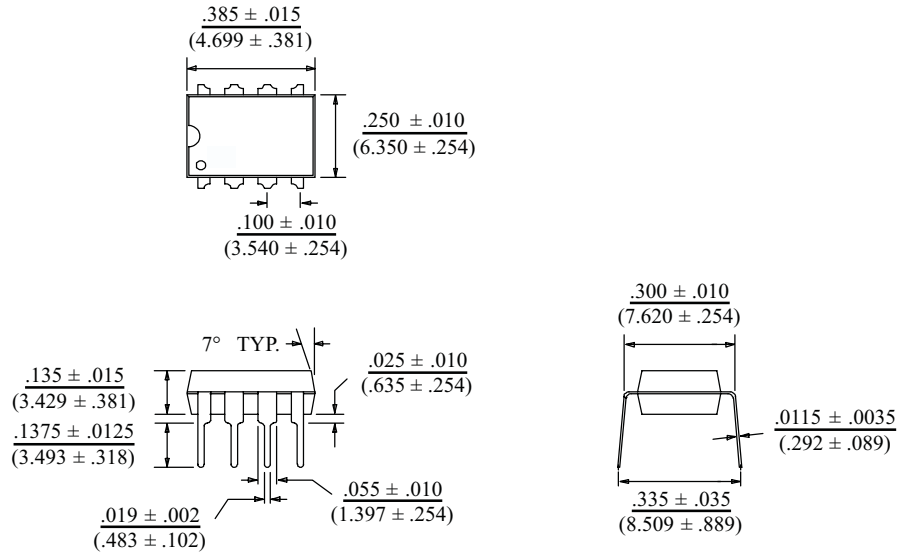
FIGURE 3 - RECEIVER TIMING

**ORDERING INFORMATION**

PART NUMBER	PACKAGE DESCRIPTION	TEMPERATURE RANGE	FLOW	BURN IN	LEAD FINISH
HI-8588PDI	8 PIN PLASTIC DIP	-40°C TO +85°C	I	NO	SOLDER
HI-8588PDT	8 PIN PLASTIC DIP	-55°C TO +125°C	T	NO	SOLDER
HI-8588PDM	8 PIN PLASTIC DIP	-55°C TO +125°C	M	YES	SOLDER
HI-8588PSI	8 PIN PLASTIC NARROW BODY SOIC	-40°C TO +85°C	I	NO	SOLDER
HI-8588PST	8 PIN PLASTIC NARROW BODY SOIC	-55°C TO +125°C	T	NO	SOLDER
HI-8588PSM	8 PIN PLASTIC NARROW BODY SOIC	-55°C TO +125°C	M	YES	SOLDER
HI-8588CRI	8 PIN CERDIP	-40°C TO +85°C	I	NO	SOLDER
HI-8588CRT	8 PIN CERDIP	-55°C TO +125°C	T	NO	SOLDER
HI-8588CRM	8 PIN CERDIP	-55°C TO +125°C	M	YES	SOLDER

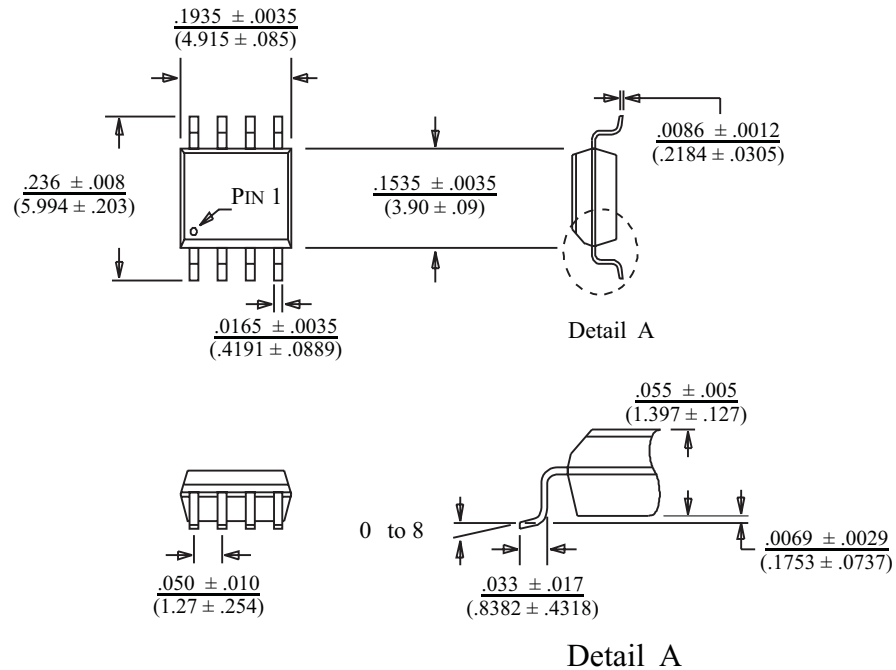
**8-PIN PLASTIC DIP**

Package Type: 8P



**8-PIN PLASTIC SMALL OUTLINE (SOIC) - NB**  
(Narrow Body)

Package Type: 8HN



**8-PIN CERDIP**

Package Type: 8D

