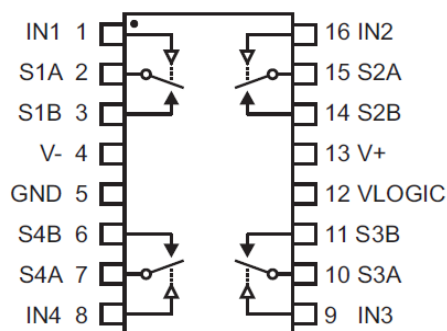


Introduction

This application note provides examples using Holt's analog switches in ARINC 429 and general purpose applications. Occasionally, there is a need in an ARINC 429 design to switch between two or more ARINC 429 Line Driver outputs onto a common output bus. The analog switches are also suitable for most general purpose analog switching applications. The HI-8195, HI-8196 and HI-8197 are quad analog CMOS switches fabricated with Silicon-on-Insulator (SOI) technology for latch-up free operation. A key feature of the HI-8195 family is the power down open-circuit of the switches. This feature is very useful in ARINC 429 bus applications.

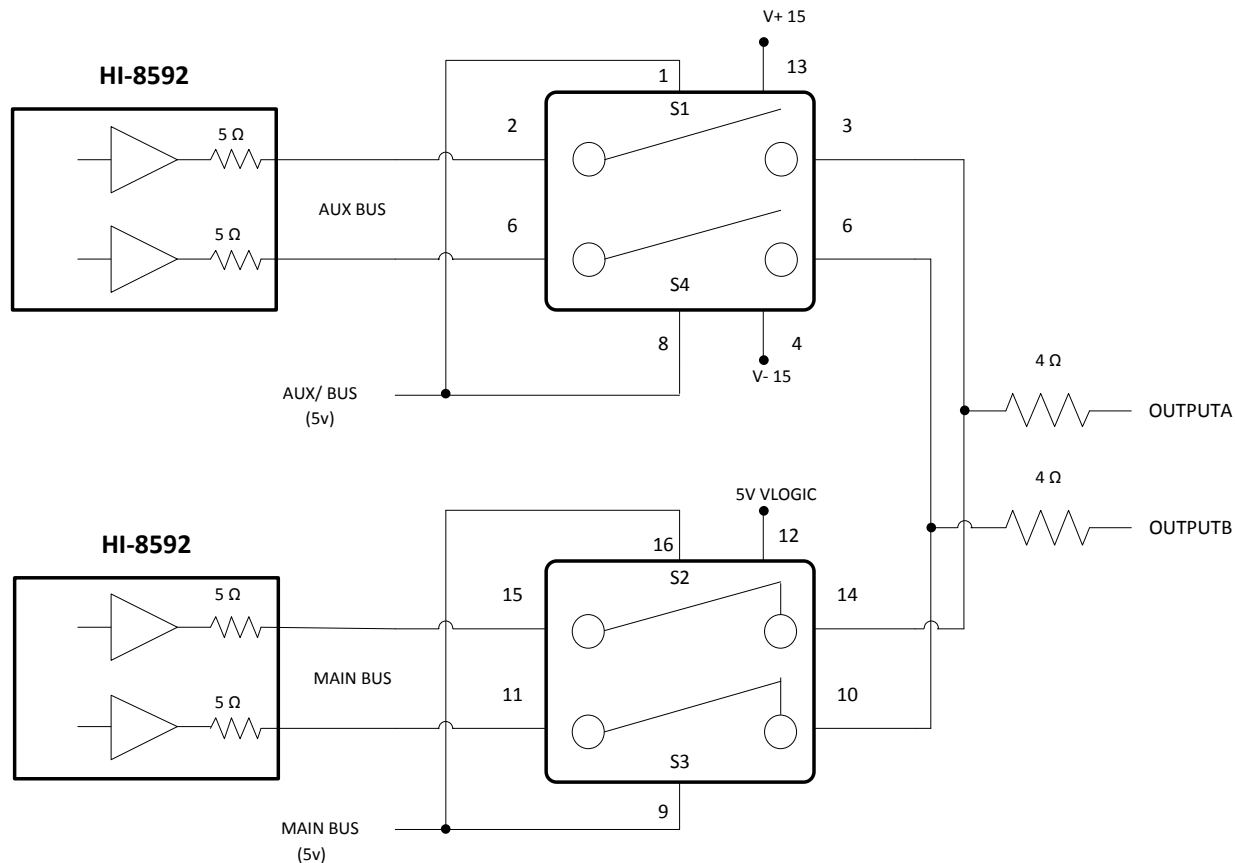
All analog switches exhibit very low supply current on the VLOGIC, V+ and V- pins. Three versions are available, featuring different combinations of normally open (NO) and normally closed (NC) operation shown in the table below.



PRODUCT	IN1	Switch 1	IN2	Switch 2	IN3	Switch 3	IN4	Switch 4
HI-8195	0	Open	0	Open	0	Open	0	Open
	1	Closed	1	Closed	1	Closed	1	Closed
HI-8196	0	Closed	0	Closed	0	Closed	0	Closed
	1	Open	1	Open	1	Open	1	Open
HI-8197	0	Open	0	Closed	0	Closed	0	Open
	1	Closed	1	Open	1	Open	1	Closed

ARINC 429 Application using the HI-8592 Line Driver

This application shows how the HI-8195 analog switch multiplexes two ARINC 429 transmitter outputs onto a common output bus. A typical need to do this is to add system redundancy or to allow a path for test equipment.



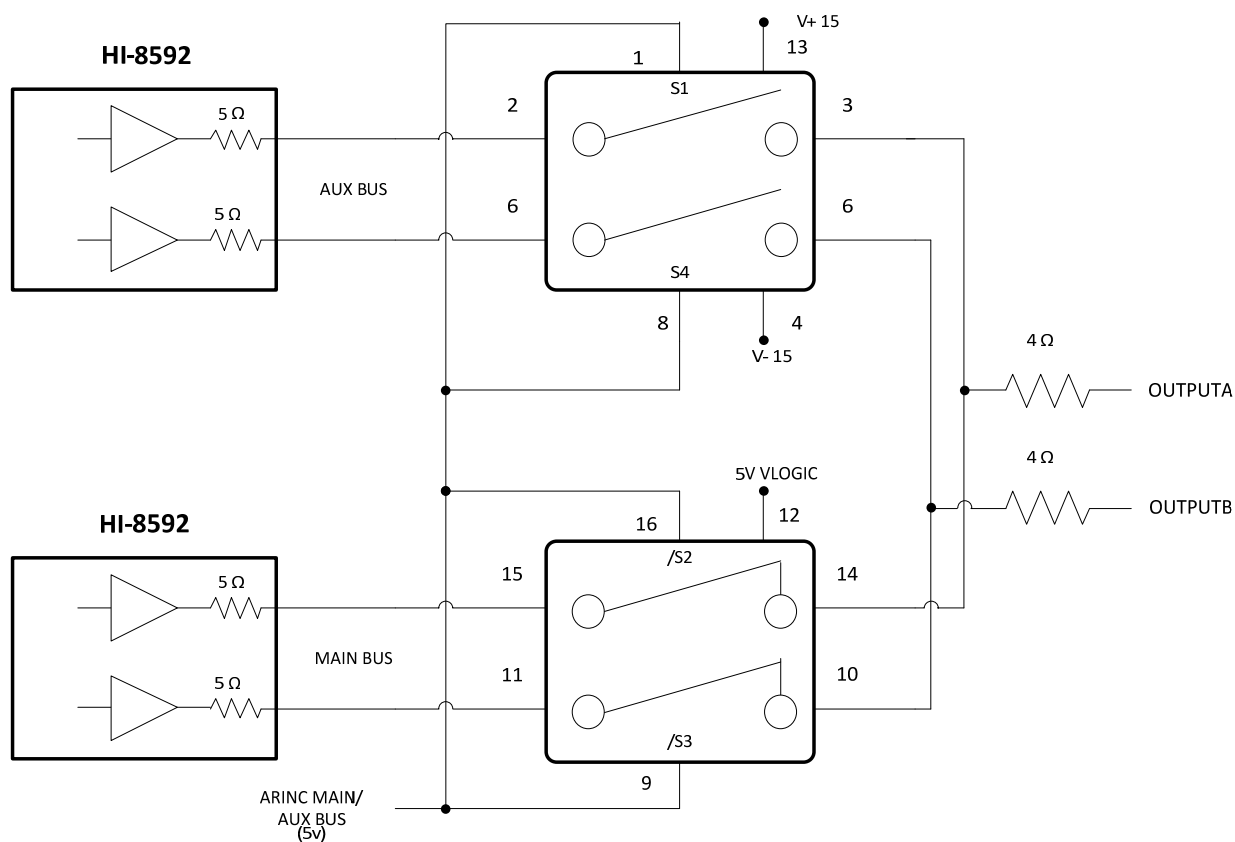
ARINC 429 specifies a $75(+/-5)$ ohms output impedance for the differential output, which is accomplished by each output having 37.5 ohms. The HI-8592 and most other Holt Line Drivers normally provide two types of output drive. The TXAOUT/TXBOUT outputs have an integrated 37.5 ohms resistance which can drive the ARINC bus directly. The AMPA/AMPB outputs have 5 ohms output resistance, typically used when implementing a lightning protection scheme using external components. The lightning protection components make up the remaining resistance to maintain 37.5 ohms. See the Holt AN-300 and AN-301 application notes for lightning protection schemes.

When the analog switch is powered using nominal VLOGIC, V+ and V- power supply voltages of (5V, +15V and -15V), the R_{On} resistance is optimal. When using an analog switch on the output of an ARINC Line Driver, the 5 ohm outputs should be used; this 5 ohms and the R_{On} resistance of the switch should be considered when determining the series resistor value needed to maintain 37.5 ohms. The R_{On} resistance value of 28 ohms will be used for this example.

To achieve 37.5 ohms utilizing the built-in 5 ohms of the line driver and 28 ohms for the R_{ON} resistance we need an external 4 ohm resistor. Since ARINC specifies the output impedance to be 75 +/- 5 ohms, choosing a 4 ohm resistor is suitable.

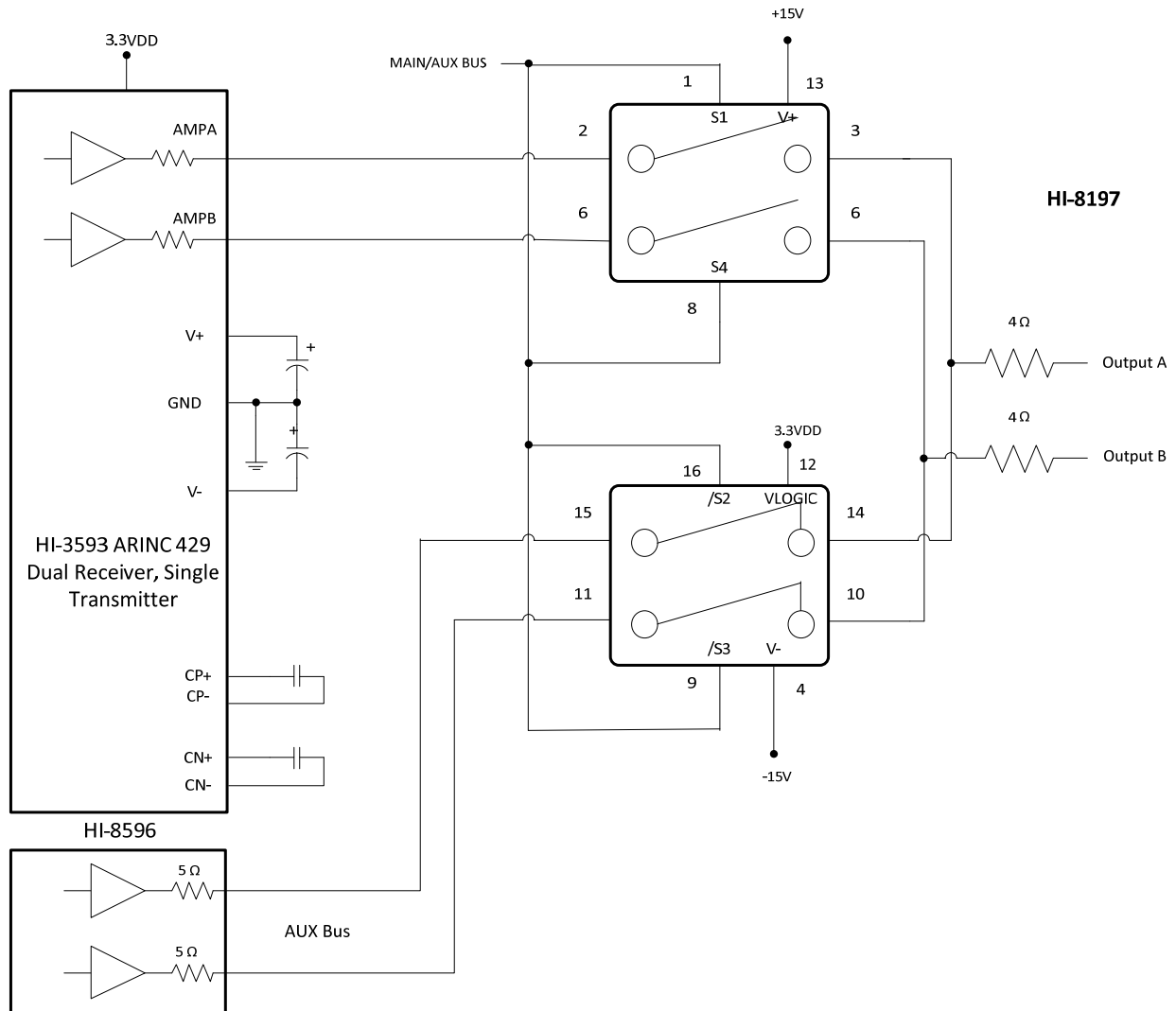
Mixed combination of NO and NC switches using the HI-8197

In some applications, the HI-8197 is a better choice, providing two NO switches and two NC switches in a single IC package. The previous diagram is now simplified with one control signal.



ARINC 429 Application using the HI-3593 and HI-8596

This configuration demonstrates switching between a HI-3593 output and an auxiliary bus driven by a HI-8596 line driver.

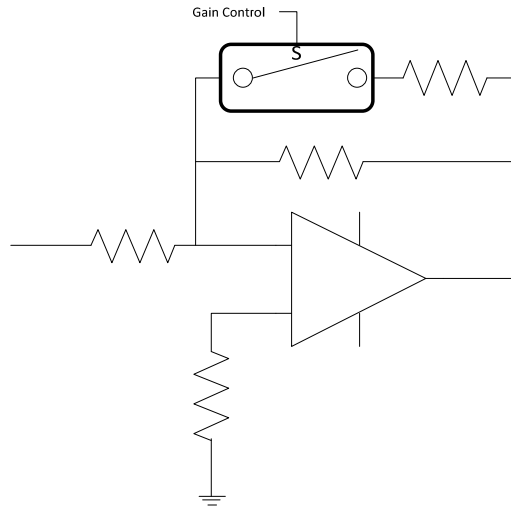
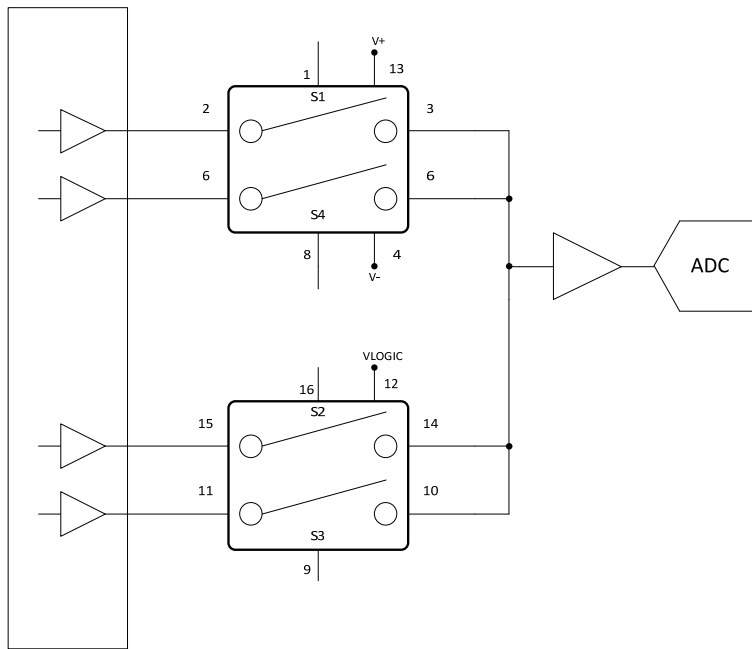


Power down open-circuit protection feature

The HI-8195/8196/8197 family exhibits open-circuit when the power is removed. This feature is sometimes required in ARINC applications where system redundancy between sub-systems or line cards is required. If one part of a system has a power failure that portion will not load down the bus.

General Purpose Applications

The Holt analog switches are well suited for general purpose analog signal switching. For example, they can be used to multiplex multiple sensor inputs to a common amplifier block preceding an ADC, or to switch other components in or out of a circuit to alter the gain or filtering response of an amplifier or filter block. Typical examples are shown below.



General Considerations

The use of high frequency .1uF decoupling capacitors are recommended on the V-, V+ and the VLOGIC pins to ground of the IC and any unused pins should be grounded.

Summary

This application note demonstrates how to use the Holt analog switches in ARINC 429 bus switching and in general purpose applications.

REVISION HISTORY

P/N	Rev	Date	Description of Change
AN-178	NEW	05/16/12	Initial Release
