A High Speed Differential Analog to Digital Converter Driver

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élantec

A class of Analog to Digital Converters require closely matched differential inputs in terms of amplitude and phase. At the same time, it is also important to provide input signals that exhibit distortion levels that are at least -60dB down from nominal inputs of nominal 1V at frequencies in excess of 25MHz. A to D's which run on a single 5V supply can be damaged or misbehave if the input range is exceeded. The circuit of Figure 1 satisfies these diverse requirements.

Circuit Description

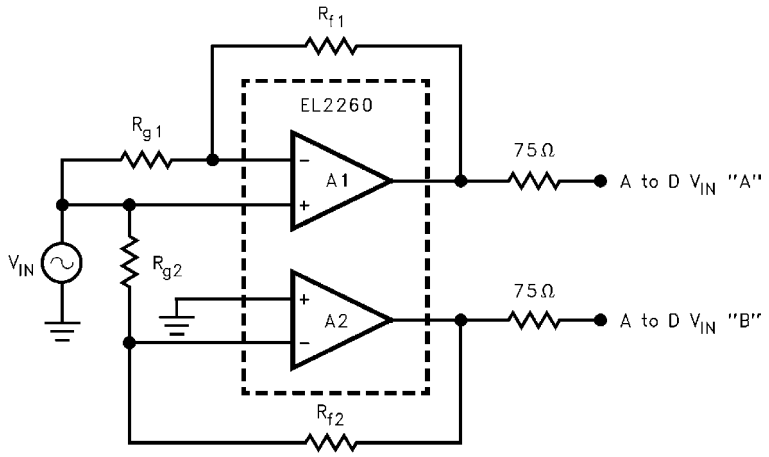
A1, one half of an EL2260 (Dual Current Feedback Amplifier-CFA) is operated as a non-inverting gain of 2 amplifier, while A2 is connected for an inverting gain of 2. The bandwidths of these current feedback amplifiers are adjusted with R_{f1} and R_{f2} with the (noise) gains set by R_{g1} and R_{g2}. The outputs are terminated in 75Ω allowing the circuit to drive a remotely located A to D through coaxial cable or isolating the outputs from the capacitive loads of the converter. Operating the EL2260 from ±5V supplies ensures that the input signals will not exceed the requirements of the A to D converter while using a dual CFA ensures close matching of the AC characteristics of the driver.

Performance Results

The circuit of Figure 1 achieves less than 0.1dB and 0.1° matching between channels 1 and 2 at 20 MHz and output voltages of 1V peak to peak. Distortion was less than -62dB at the same frequency.

Conclusion

A cost effective driver suitable for driving A to D's requiring closely matched differential inputs has been presented. The driver also exhibits superb distortion and precludes damage to the A to D in the event of an overdriven situation.



$V_{CC} = V_{CC} = 5V$
$R_{f1} = R_{g1} = 590\Omega$, 1%
$R_{f2} = R_{g2} = 610\Omega$, 1%

FIGURE 1.