

Advantages of Microchip's Cascaded Op Amps

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INTRODUCTION

Microchip has introduced cascaded dual op amps: MCP627X (2 MHz), MCP628X (5 MHz) and MCP629X (10 MHz). Features of this new topology include:

- Chip Select (\overline{CS}) pin for both amplifiers
- Small 8-pin packages (PDIP-8, SOIC-8, MSOP-8)
- Pinout similar to the industry standard for duals

The two op amps are connected so they will support many application circuits.

FUNCTIONALITY

The output of op amp A is connected internally to the non-inverting input of op amp B (see Figure 1). Combining these into one pin ($V_{OUTA}/V_{INB+} = \text{pin \# 1}$) makes it possible to add a \overline{CS} input (pin # 5) to an 8-pin package. Both op amps function as normal op amps.

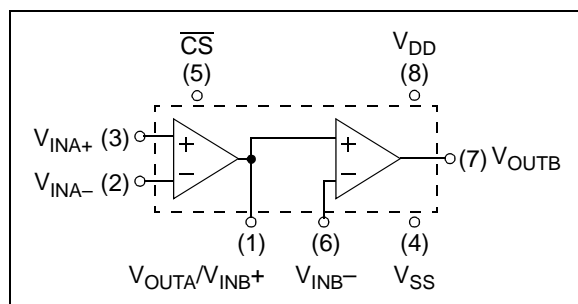


FIGURE 1: Pinout Configuration.

The \overline{CS} input helps conserve power in many popular dual op amp applications. This pinout makes it relatively easy to modify many existing designs for these parts.

APPLICATIONS

The most common application circuit supported by these parts is cascaded amplifiers (see Figure 2). These parts allow for easy layout in this common application. Usually, most of the gain is produced by the first stage.

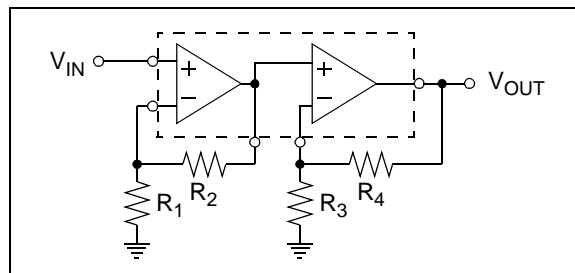


FIGURE 2: Cascaded Amplifiers.

There are several interesting variations of the circuit in Figure 2 that are supported by these parts. For instance, the input op amp (op amp A) can be configured as an inverting amplifier, as an inverting (Miller) integrator or as a difference amplifier. The output amplifier can be set up as a unity-gain buffer to isolate the load from op amp A. This results in an overall performance improvement when driving heavy loads (e.g., 1 k Ω).

It is also possible to make a low-pass filter using just resistors (no capacitors) (see Figure 3). This is a high bandwidth, second-order filter. The resistors R_1 and R_2 set the DC gain, while R_3 maintains stability and controls the filter Q. The filter cutoff frequency is typically 10% to 50% of the op amp gain bandwidth product (GBWP).

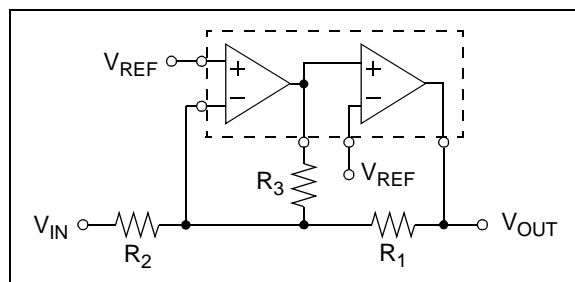


FIGURE 3: Low-pass Filter with no Capacitors.

The MCP627X (DS21810), MCP628X (DS21811) and MCP629X (DS21812) data sheets provide more application circuits (e.g., an inverting integrator with improved performance). These data sheets also shed more light on the circuits shown in this Technical Brief.

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