

8.2 Operational Amplifier Applications

Figure 8-3, Figure 8-4 and Figure 8-5 illustrate typical amplifier circuits that could replace fixed resistors with the MCP4021/2/3/4 to achieve digitally-adjustable analog solutions.

Figure 8-4 shows a circuit that allows a non-inverting amplifier to have its' offset and gain to be independently trimmed. The MCP4021 is used along with resistors R1 and R2 to set the offset voltage. The sum of R1 + R2 resistance should be significantly greater (> 100 times) the resistance value of the MCP4021. This allows each increment or decrement in the MCP4021 to be a fine adjustment of the offset voltage. The input voltage of the op amp (V_{IN}) should be centered at the op amps V_W voltage. The gain is adjusted by the MCP4022. If the resistance value of the MCP4022 is small compared to the resistance value of R3, then this is a fine adjustment of the gain. If the resistance value of the MCP4022 is equal (or large) compared to the resistance value of R3, then this is a course adjustment of the gain. In general, trim the course adjustments first and then trim the fine adjustments.

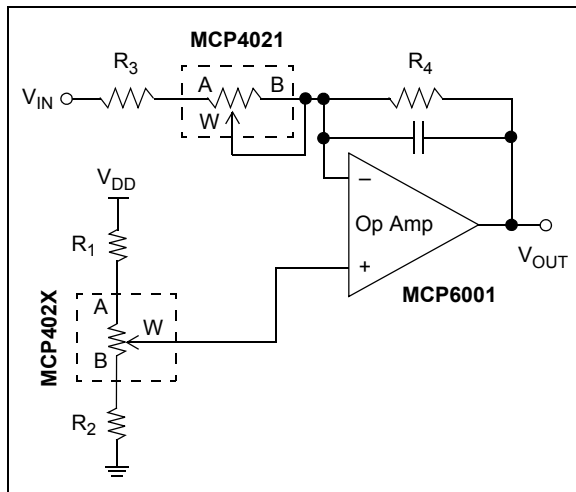


FIGURE 8-3: Trimming Offset and Gain in an Inverting Amplifier.

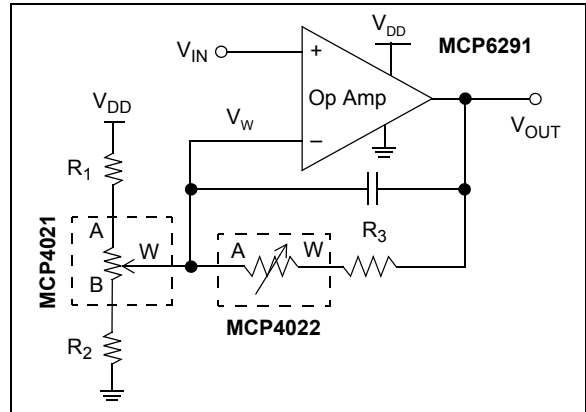


FIGURE 8-4: Trimming Offset and Gain in a Non-Inverting Amplifier.

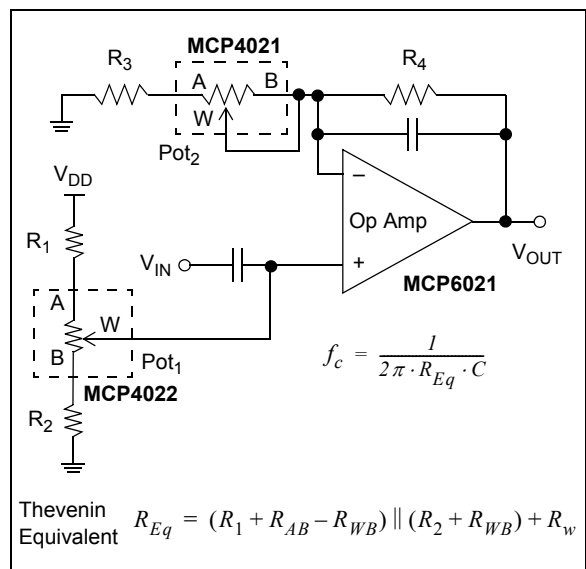


FIGURE 8-5: Programmable Filter.