ANALOG SPOTLIGHT

MCP642x

90 kHz EMI Hardened Operational Amplifiers

General Information

Electromagnetic Interference (EMI) results in signal degradation and in amplifiers specifically, it increases the DC errors, current consumption and introduces unwanted tones at the output. There are circuit/PCB design techniques to improve EMI robustness in the system. Even so, the systems designers have appreciated that the MCP642x has Electromagnetic Interference Rejection Ratio (EMIRR) combined with low 1 mV (max.) offset voltage (for less DC error) and low 5.5 µA (max.) current consumption (for extended battery life).

Test Results

We implemented a three op amp instrumentation circuit used to condition the signal from the pressure sensor to show the effects of EMI. There interference (shown as the orange signal) is the RF signal transmitted by a cell phone. The pink waveform indicates the output of the amplifier in the figures below.

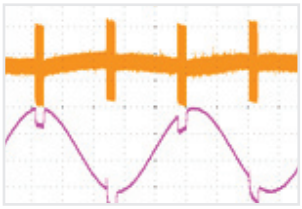


Figure 1: A standard op amp without internal or external EMI filtering.

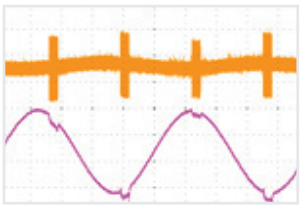


Figure 2: With external filtering, the output of the standard op amp shows some improvement.

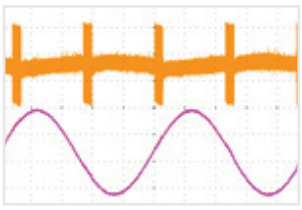


Figure 3: While the MCP6424 EMI-hardened op amp produced a clean output waveform, the difference between the two types of op amps is clearly visible.

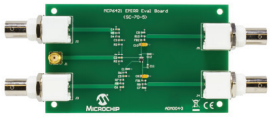
Applications

- Battery-powered wireless systems
- Wireless security systems
- Temperature sensing
- Asset protection systems
- IoT systems

Benefits

- Increased EMI immunity
- Less complicated PCB design
- Increase system reliability
- Faster time to market

Development Tool



MCP6421 EMIRR Evaluation Board (ADM00443)

The MCP6421 EMIRR Evaluation Board is intended to support the Electromagnetic Interference Rejection Ratio (EMIRR) measurement and to show the EMI rejection capability of the MCP6421 operational amplifier.

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