# Steganographic Audio Processor

**Background**

A client was investigating the practicality of embedding Steganographic (i.e., hidden) signals in television programs and advertisements. These signals would be part of the audio stream and would trigger bonus points in a small handheld giveaway device. The client hired Bolton Engineering to develop a small credit card-sized battery powered device for a limited marketing test of the concept. In under four weeks, Bolton Engineering delivered fully working, debugged boards and driver code.

**System Overview**

Bolton Engineering Inc constructed the Audio Processor using a low-power DSP. Although future devices would need to use a much less expensive processor, the client wanted to be able to experiment with a variety of algorithms without having to spend significant time optimizing the code. The system included a DSP, one megabyte of Flash memory, a small Programmable Logic Device (PLD) for glue logic, an audio codec and microphone amplifier, an interface to a two-line sixteen character LCD, and a two-voltage battery-powered power supply.

**Project Scope**

Bolton Engineering wrote the specification, designed the schematics, designed the 6-layer circuit board, wrote diagnostic and driver software in 'C', debugged the system, and delivered ten working prototypes.