BARR group
The Embedded Systems Experts

Case Study

BTE: Outsourced Embedded Software Development

BTE Technologies ("BTE") makes physical therapy equipment for muscular testing and (re)training. Among the company's successful products is the Primus PR20. But when the engineers at BTE first hired Barr Group, the new product was in big trouble: the company had a $500,000 order backlog for the PR20 but the engineer who had designed a critical embedded computer and its firmware had just quit. The exiting engineer's software for the Microchip PIC microcontroller was found to be riddled with bugs and more incomplete than thought. BTE needed this embedded software finished properly, and they needed it yesterday.

Risk-Mitigating Approach

BTE's engineering director hired Barr Group to help get the project back on track. A quick review by Barr Group showed that the electronics was in fine shape, but that the exited programmer's assembly language software was virtually unusable. Barr Group recommended rewriting the firmware entirely in C rather than trying to patch and finish the buggy assembly code. However, Barr Group and BTE agreed that engaging a dedicated assembly programmer in a parallel fix-and-finish effort with the assembly code would be a smart move for risk mitigation on a project so critical to the company's survival.

This parallel effort offered a rare opportunity to answer several recurring engineering questions, including:

- Is it faster to ditch an existing design and start over?
- Is assembly or C better for firmware development?

In this case, there were clear answers. Barr Group completed a replacement C program within just a few weeks. By that time, only a few of the many bugs in the old assembly code had been eliminated. In addition, the easily extended C code included features not yet made part of the increasingly fragile assembly code. Finally, the working C program was found to consume just 4KB of code space compared to the larger 6KB of assembly code.

Long-Term Relationship

With the new firmware from Barr Group complete and the new product thoroughly tested, BTE was able to quickly fulfill its backlog of orders for the new product, recognize critical revenues, and move on to the next new product development. BTE's engineering director concluded from this experience that it was valuable to maintain a long-term relationship with an outside team of electronics and firmware consultants rather than rely on an internal staff for such specialized expertise outside the company's core business. Embedded software and electronics designed by Barr Group engineers now lie at the heart of many of BTE's products.