

## Firmware Project Examples

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### Rail Network Fire Panel firmware

As part of the development of a new fire protection system for a major urban underground rail network, the embedded firmware in the fire panels, to be installed in stations and outbuildings, required extensive enhancements.

The firmware, written in C, and running on a Hitachi H8/534 microcontroller, required full support for a modem link to be added.

This was to provide remote control from a central monitoring station, and to automatically report any events or alarms on the system to the central monitoring station.

### Embedded software for locomotive fire protection system

A leading world-wide supplier of fire protection systems required a number of enhancements to a software system for on board fire protection in locomotives, the ultimate client being the state rail network of another European country.

This involved modifying existing C code, compiled under Keil C51, which runs on an 87C51 microcontroller in a proprietary embedded system.

### Fire Panel firmware

This project, undertaken for a major supplier of fire protection systems, involved extensive modifications to and enhancements of embedded assembly language code.

This code, running on a member of the National Semiconductor COP8 family of microcontrollers, controlled the operation of a range of self-contained multi-zone, programmable fire alarm panels.

### Embedded software for trenchless excavation system

A commercially available system, which was used in trenchless excavation operations for pipe laying, used a magnetic technique to accurately determine the position and orientation of a buried rotating drill head.

The embedded software for the system, was written in C.

Timestar carried out several modifications and enhancements to this software over a number of years, under contract or subcontract to both the original developers of the technology and the company later exploiting it. The enhancements have in particular involved improvements to the operator interface, based on a large LCD panel.

### Embedded software for North American locomotive fire protection system

Additional features were required to be added to the onboard locomotive fire protection system for a North American rail operator.

The code, written in C, ran on an embedded 87C51 microcontroller, part of a custom fire control unit. The microcontroller also interfaced via LonWorks™ to the locomotive internal network for communication between the various onboard systems.

Timestar successfully carried out the development under contract to the fire protection system manufacturer, in close co-operation with another company responsible for the LonWorks™ modifications.