



Microcontrollers

IEC 60730

Software safety requirements for automatic embedded control systems

Overview

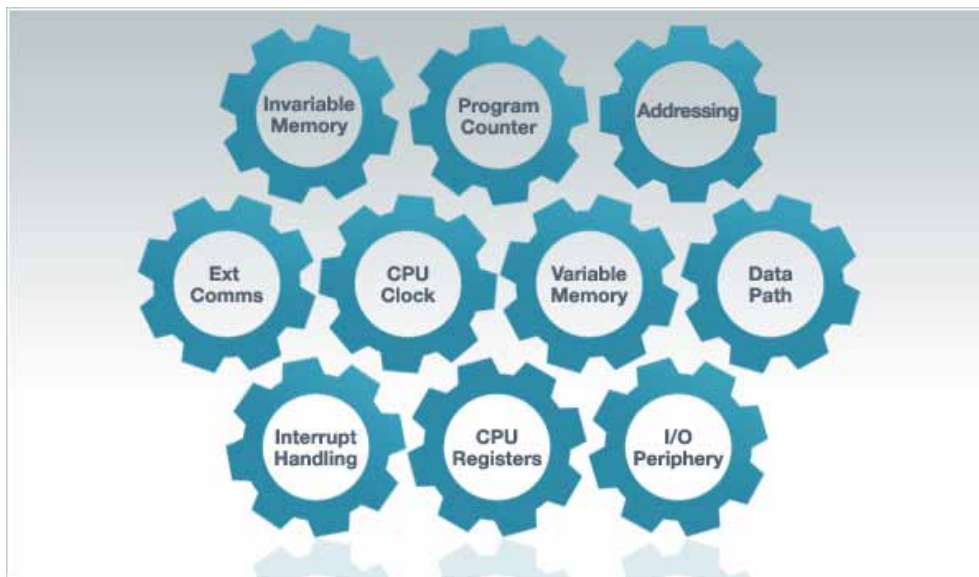
The IEC 60730/EN 60335 safety standard for household appliances is designed for automatic electronic controls, to ensure safe and reliable operation of their products.

IEC 60730/EN 60335 segments automatic control products into three different classifications:

- Class A: Not intended to be relied upon for the safety of the equipment
- Class B: To prevent unsafe operation of the controlled equipment
- Class C: To prevent special hazards

Solution

Freescall has developed safety features to help manufacturers of automatic controls in the large appliance and industrial control market meet the IEC 60730/EN 60335 safety standard. These safety features consist of both hardware and software, and have been developed for the 8-bit S08, the 16-bit digital signal controller (DSC) and the ColdFire V1 family of microcontrollers.



Applications

- Cooking Products
- Boiler and Heater Control
- Dishwashers
- Household Actuators
- Dryers
- Motor Control
- Refrigerators and Freezers
- Elevators
- Vacuum Cleaners
- Automatic Gates
- Washing Machines

Hardware

In line with IEC 60730 requirements, Freescale has incorporated the following key hardware features into microcontroller products:

- Independent clocked watchdog timer, providing a safety mechanism to monitor:
 - o The flow of the software
 - o Interrupt handling and execution
 - o CPU clock (too fast, too slow and no clock)
- CRC engine, providing a fast mechanism for:
 - o Testing the flash memory
 - o Check on serial communication protocols (UARTS, I²C, SPI)

Periodic Text Routines

IEC 60730 Periodic Tests	IEC 60730 Class B			IEC 60730 Class C		
	8-bit S08	16-bit DSC56F80	32-bit MCF51XX	8-bit S08	16-bit DSC56F80	32-bit MCF51XX
CPU Register Text	Struck at	Struck at	Struck at*	Walkpat**	Walkpat**	Walkpat**
CPU Instruction Text	NA	NA	NA	CPU Instr. Text	CPU Instr. Text**	CPU Instr. Text**
RAM Test	March C, X	March C	March C*	Walkpat	Walkpat**	Walkpat**
Flash Test	CRC 16-bit	CRC 16-bit	CRC 16-bit*	CRC 16-bit	CRC 16-bit	CRC 16-bit*
Watchdog Test	Timeout and Reset	Timeout and Reset	Timeout and Reset*	Timeout and Reset	Timeout and Reset	Timeout and Reset*

Note: All items available with the exception of products marked with the following: *In development. **Planned

Software

IEC 60730 recommends various periodic test routines of specific key components of the embedded microcontroller design. Freescale has developed specific periodic test routines for these components for the 8-bit S08 family and 16-bit DSC56F80xx family.

These periodic test routines are available for the MC9S08AC family and the 56F80xx DSC family of microcontrollers, and are being developed for MCF51xx family. The software routine has been certified by external product compliance bodies, and allows manufacturers to speed up their development time in gaining compliance to Class B and Class C IEC 60730. To obtain these routines please contact your local Freescale sales or technical representative. For further information, please refer to freescale.com/IEC60730.

Learn more: For more information on Freescale appliance solutions or the IEC 60730 standard, please visit freescale.com/appliance or freescale.com/IEC60730.