UAV LMI system for Knuckle Boom Cranes

UAV is a Load moment limiter for truck cranes based on the pressure readings within the lifting cylinders, which are compared in real time with the thresholds representing the maximum lifting capacity of the crane.
The system using angle sensors on the arm is able to detect in case of overload which movements are allowed to back in safety condition and which others are not.
The system offers a series of functions and controls listed below:
- managing the possible movements in case of intervention of the moment limiter according to the position of the arm.
- handling the rotation;
- self-diagnostics in case of malfunctioning or breakdown;
- black box and statistics of use;
- scheduled maintenance management;

The device is equipped with a main control panel with a display of 2 lines x 16 characters for visualizing the pressure levels, utilization percentages, operative and warning messages and various programming and diagnosis.

There are 8 LEDs for operative indications which must be easily visible.

The 9 buttons present can be used to activate various operative functions, such as activating the electric horn, excluding the limiter (RESET), etc., management and browsing of the menus.

The main functions are on the other side of the truck via use of a secondary panel.

The device is also connected to the Remote control (optional) in order to optimize and safeguard the correct functioning of the whole crane.

The installed software has been elaborated so that it can obtain the best possible performance, whilst respecting the safety criteria.
**Microcontroller**

- main Cpu: freescale 16 bit, 40 mhz
- second Cpu: freescale, 8 bit, 40 Mhz, used as test equipment

**Memory**

- 12 kb RAM
- 256 kb flash
- 4 kb eeproM

**Real Time Clock (RTC)**

- yes, with additional 240 bytes sraM

**Programming**

- Master or slave mode (Canopen)
- C language
- IEC 61131 (vt3 Development tool)

**Power Supply Voltage**

- 8 - 32 v full operational, suitable for machine battery direct connection

**Cold ranking**

- 5.5 v without rest o iso 7637- 2

**Idle Current Consumption**

- 80 ma @ 24 v
- 145 ma @ 12 v

**Max current**

- 32 a @ tenv = +80 °C max, full loads

**Load Dump protection**

- 3 A, 7 A peak