Abstract

The On board computer (OBC) of an aerospace vehicle carries out control, guidance and navigation operations during the flight. It consists of a processor and IO board to execute the real time embedded software and to read input data from other subsystems & send commands to control system. In the specific system, the Power-PC 7410 based processor board is used and the IO board supports four UART, two Ethernet, four Arinc channels, two MIL-1553 nodes, eight ADC's, eight DAC channels. It consists of 128MB SD-RAM, 8MB boot flash, and 64MB user flash. The OBC has to execute the control and guidance software which is bounded by hard real-time constraints. To achieve the hard real time constraints of the OBC, the Linux kernel is patched with the PREEMPT-RT and ported on to it. The customization of real time Linux kernel for PowerPC-7410 based hardware, and application development on the same platform using kernel primitives are presented in this paper. The software requires an extensive use of the kernel primitives like THREADS, TIMERS, SEMAPHORES, MUTEXES, SIGNALS, and PIPES etc. Application modules demonstrating the apt usage of the kernel primitives for real time application development have been created. These application modules will be used in the development of the Real-time-embedded flight software for the onboard computer of an
aerospace vehicle.

Refernces

- Compact versatile OBC, VOL. 1, version 2, pages 55-66.

Index Terms

Computer Science Software Engineering

Keywords

PREEMPT-RT  On Board Computer  MPC-7410  threads  semaphores  mutexes
pipes.