

Embedded Solutions For EPICS Based Control Systems

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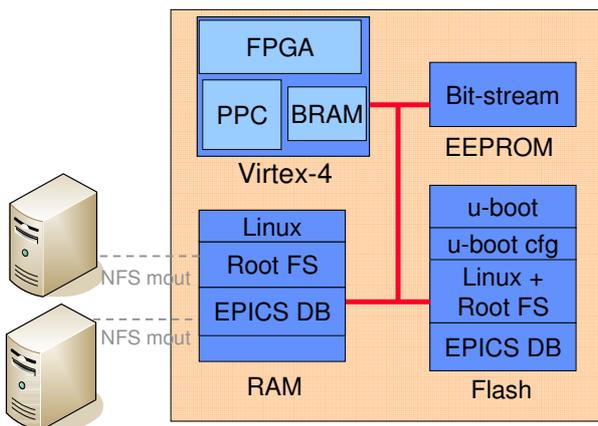
Generic Board with Xilinx FPGA



- Virtex-4 with PPC405
- FLASH 4MB
- EEPROM 4MB
- RAM 32MB
- 1 UART
- 1 LAN
- 3 AUX Sockets

The challenge was to interface this board to the EPICS control system. In order to achieve this goal it was built the cross development environment. Next it was built u-boot boot loader, Linux OS and root file system. At the end EPICS and GPMM driver were compiled.

System Operation

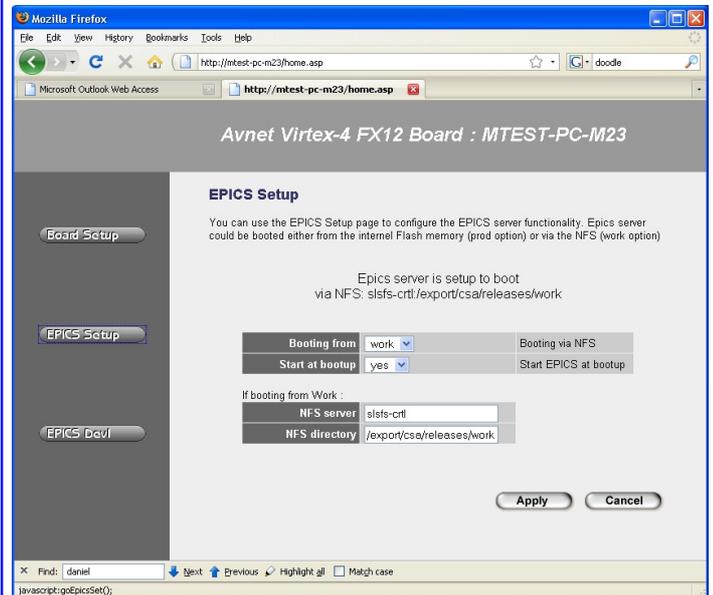


The system can boot and operate either by means of Flash or remotely using tftp and nfs servers.

Software Implementation

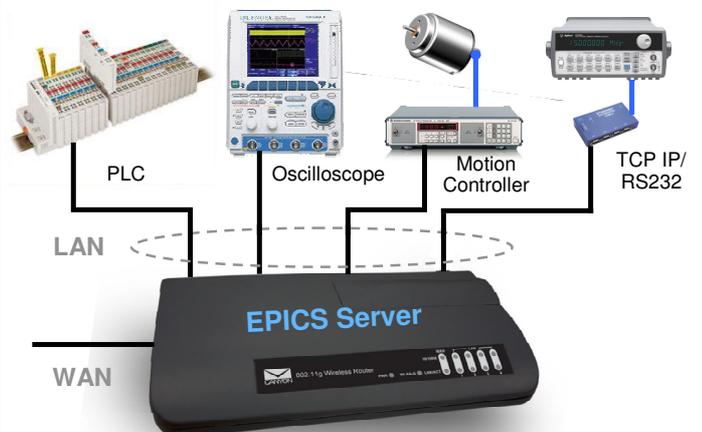
- Boot loader: U-Boot 1.2.0
- Linux kernel 2.6.23
- Root File System
 - Busybox 1.4.2
 - Ntpd (openntpd-3.9p1)
 - Sshd (dropbear-0.49)
 - Screen (screen-4.0.3 with ncurses-5.6 library)
 - Web server (goahead-2.1.8)
- EPICS 3.14.8.2
 - GPMM (General Purpose Memory Mapped) driver with interrupt support
 - Asyn device support
 - Stream device support

System Setup



The system could be setup easily through web pages

Embedded Network Interface



Another embedded solution for EPICS based Control system is a network router. Such a router runs EPICS server with stream device support. It decouples the network devices connected to the local network LAN from the EPICS control system on Wide area network WAN.

EPICS router runs EPICS on top of Linux OS. All software components (boot loader, Linux OS, EPICS server) are stored in the Flash memory. The router does not require any boot server. EPICS database could be accessed via nfs or from Flash.

The router's configuration resides in Flash and it could be modified through web pages. The WAN interface could be configured with static or dynamic IP address. The LAN interface is configured with the static IP address. The LAN offers the DHCP and DNS services.