Why RTEMS?

- RTEMS and a small MC68360-based system could upgrade the existing Power Supplies (previously controlled through CAMAC)
- CLS (SAL) Stepper Motor Controllers already using RTEMS and the same MC68360 CPU
- A simple hardware addition would result in a 25 Mhz computer with a 10mbit ethernet port and 5 RS232 lines (one dedicated for console)

RTEMS & EPICS At The CLS

- RTEMS freely available; board support for MC68360 already existed
- Larger design philosophy of many IOC's, each performing a small number of tasks (preferably one) made a commercial O/S expensive
- RTEMS available for x86 CPU's, should the requirement arise

RTEMS & EPICS At The CLS

Overview of CLS Controls Environment

- IOC O/S – RTEMS and Linux
- IOC Hardware – CLS EROC, Dell Rackmount x86, potential for PC/104 x86
- Support for:
  - CLS Power Supply Controller
  - CLS Stepper Motor Controller
  - E2050A LAN/GPIB gateway
  - RS232 devices (fieldpoint + many others)
  - Modicon PLC

Building an Application for RTEMS

- Complete specification for all components in the App/src/Makefile
- Result is an executable file which contains the RTEMS O/S and all applications to run on the IOC – no dynamic linking components
- The executable, st.cmd, the dbd file, and all db files are copied to a tftpboot directory on a server

RTEMS & EPICS At The CLS

- The only embedded software is a bootp initialization client – all configuration comes from the dhcp/bootp server, including the boot file to be loaded

Differences when Executing

- the ‘iocsh’ for st.cmd and console command execution is part of EPICS
- The specification of ‘st.cmd’ is part of the EPICS/RTEMS startup
- No support to ‘telnet’ to the IOC
- No remote debugging support
- No dynamic linking support

What have been the RTEMS challenges?

- Needed to upgrade to a newer RTEMS ‘snapshot’ when R3.14.B1 arrived (which had a BSP level bug)
- Debugging has been by console access (sometimes a terminal server) or Background Debug Module hardware
- Limited number of drivers for peripheral devices

Are there any EPICS/RTEMS advantages?

- Up-front cost
- Supports many different CPU's (a29k, hppa, i386, i960, m68k, mips, powerpc, sparc)