RTEMS for CSB3xx Overview

RTEMS, Real-Time Executive for Microprocessor Systems

RTEMS, a real-time executive (kernel), provides a high performance environment for embedded applications development.

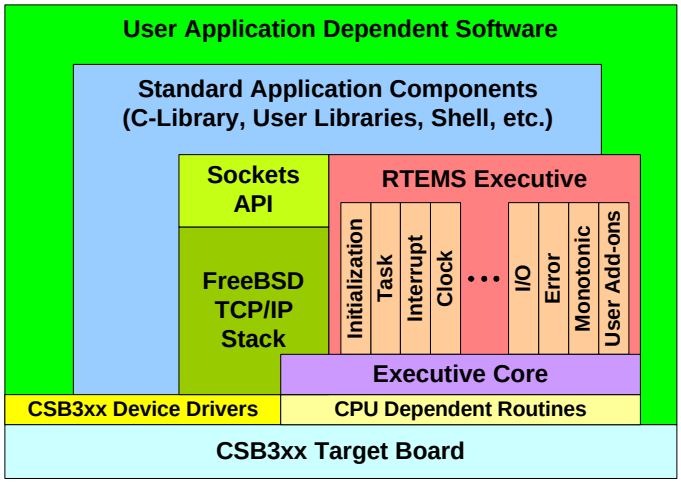
Overall Features:

- Standards Compliant, POSIX 1003.1b API including threads and RTEID/ORKID based Classic API (similar to pSOS+)
- High performance port of FreeBSD TCP/IP stack
- Debugging via GNU debugger (gdb) and DDD GUI interface to GDB that is thread aware, debug over Ethernet or Serial Port
- Filesystem Support, In-Memory Filesystem (IMFS), TFTP Client Filesystem, MS-DOS FAT32, FAT16, and FAT12 and NFS client

Kernel Features:

- multitasking capabilities
- event-driven, priority-based, preemptive scheduling
- optional rate monotonic scheduling
- intertask communication and synchronization
- priority inheritance
- responsive interrupt management
- dynamic memory allocation
- high level of user configurability

RTEMS is designed to provide a bridge between two critical layers of typical real-time systems. As the following figure shows, RTEMS serves as a buffer between the project dependent application code and the target hardware (though applications can directly access hardware via drivers).



The RTEMS I/O interface manager provides an efficient tool for incorporating these hardware dependencies into the system while simultaneously providing a general mechanism to the application code that accesses them.

Flexible, Layered Components for Target Optimization

RTEMS is a set of layered components (or Resource Managers) working in harmony to provide services to a real-time application system. Each Resource Manager is a set of functions that form the Executive Interface to the Application. Executive Core Functions (such as scheduling, dispatching, and object management) are available to each Resource Manager. The Executive, in turn, builds upon a small set of CPU dependent routines. Together these components provide a powerful run time environment that promotes the development of efficient real-time application systems. RTEMS conserves target resources by including only those Resource Managers actually used by an application in the executable image.

RTEMS Resource Managers:

- Initialization
- Task
- Interrupt
- Clock
- Timer
- Semaphore
- Message
- Event
- Signal
- Partition
- Region
- Dual ported memory
- I/O
- Fatal error
- Rate monotonic
- User extensions
- Multiprocessing

High Performance TCP/IP Stack:

RTEMS is complimented by the highly regarded FreeBSD TCP/IP stack. This stack supports the well known sockets interface.

FreeBSD Stack Protocols:

- UDP, TCP, ICMP, DHCP, RARP, BOOTP, PPPD
- Client Services include:
  Domain Name Service (DNS) client
  Trivial FTP (TFTP) client
  Network Filesystem System (NFS) client
- Servers include:
- FTP server (FTPD)
- Web Server (HTTPD)
- Telnet Server (TELNETD)
- Sun Remote Procedure Call (RPC)
- Sun eXternal Data Representation (XDR)
- CORBA

CSB3xx RTEMS Ports:

CSB3xx RTEMS ports support the Serial Console I/O, the Real-Time Clock, OS and General Purpose Timers and Ethernet I/O. Future releases will provide support for: CAN I/O (low level library only); LCD Controller (low level graphics library); and MS-DOS Filesystem via Compact Flash and SD/MMC Card Socket. Contact Cogent regarding expected availability of any of these future features.

COGENT

"ALWAYS COMPLETE"

For more information contact us at:
Cogent Computer Systems, Inc.
1130 Ten Rod Road, Suite A-201
North Kingstown, RI 02852
tel: 401-295-6505, fax: 401-295-6507
www.cogcomp.com

Embedded With RTEMS
www.rtems.com

"OPEN SOURCE - ROYALTY FREE"