



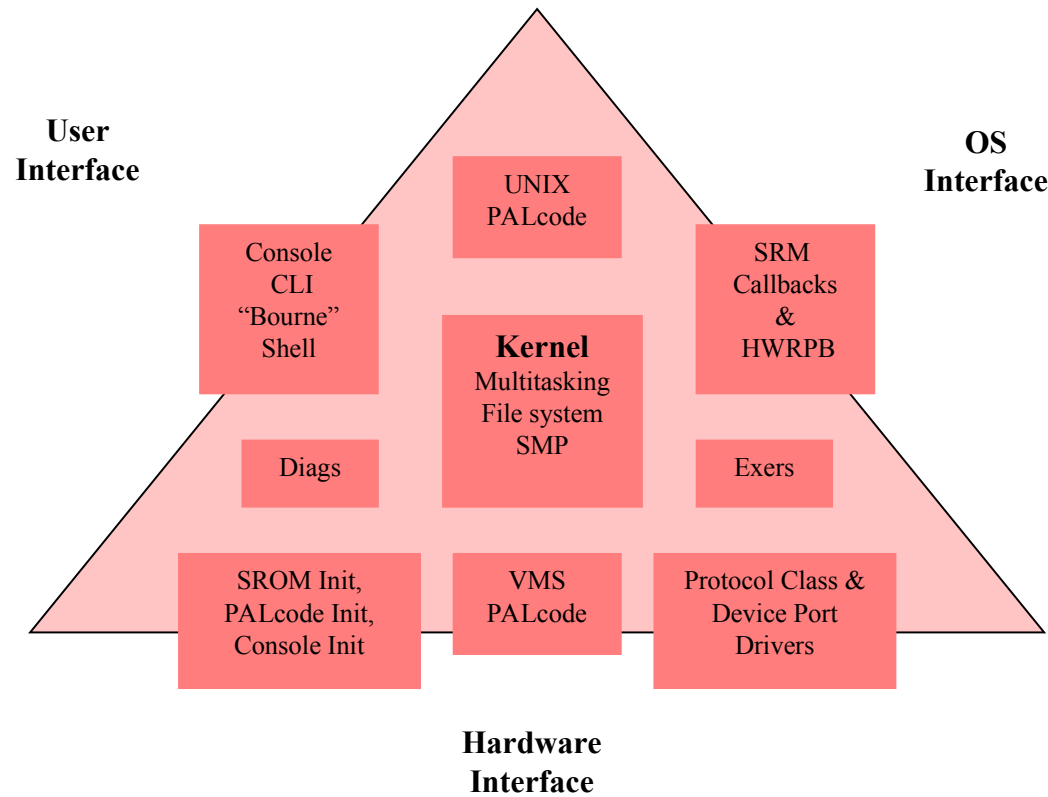
Clipper Firmware

Alan Palmeri
Firmware Project Leader

- Introduction
- Firmware Overview
- **SROM** (Serial ROM/Flash SROM)
- **RMS (Remote Management System - RMC/SPC)**
- Dual Ported RAM (DPR)
- **SRM Console** (System Reference Manual)
- PALcode (privileged Architecture Library)
- AlphaBIOS
- **LFU Utility** (Loadable Firmware Update)
- Galaxy / FRU configuration
- Summary

- **Al Palmeri - Project Leader**
- **Bill Clemence - SROM / Update Utility**
- **Harold Buckingham - SRM / PALcode**
- **Connie Lau - RMS (RMC/SPC)**
- **Sean McGrane (Alpha BIOS)**

Overview: Structure



- **System Reset**
- **RMC - SPC powerup sequence**
- **Serial SRAM load, init, core diags**
- **Flash SRAM**
- **Console load, init, mem config, driver init, *pwrup***
- **Optional AlphaBIOS load, init**
- **OS boot**

SROM: Implementation

- Serial bit stream loaded into Alpha I-cache at reset
- Two SROMs - serial and Flash
 - Serial SROM is default conditions
 - Flash SROM systems specific
- EV serial port used for “mini-console” port
- Code in Alpha Macro

- **Powerup sequence**
- **CPU & Bcache Initialization**
- **Base memory config and diags**
- **IO path init**
- **Flashload**
- **Optional jumper selectable alternate images**
 - Failsafe loader for LFU

Remote System Management

- **RMC - Remote Management Console**
 - Provides some power up diags
 - Two pieces of firmware, one socketed one flashable
 - Controls all the environmental monitoring this includes fans/temp/voltages monitoring
 - Loads EV information into DPR, sends IRQ to SRM
 - Monitors and controls modem port messages out modem port for commands from SRM
 - Sends alert
 - Monitors DPR
 - Loads all EEROM data into DPR
 - Socketed RMC loads and verifies flashed RMC
 - Provides support for Hot swap PS and Fans
- **SPC - System Power Controller**
 - Monitors VTERM faults, PS*_FAULTS, CPUx_Faults, temperature fault over

Dual Port RAM

- **Dual Port RAM - 16k bytes of RAM**
- **Can be accessed by RMC, SRM, SROM , OS's**
- **Is not hardware read/write protected**
- **Contains latest copy of all EEROMs, except SCSI backplane**
- **Contains status information from TIG / SROM / RMC**
- **Has a RMC - SROM/SRM interface**
- **Copy of DPR layout is on Clipper Website**
- **Is power by AUX5 volts**
- **Is tested by RMC and SROM**

- a.k.a. “the SRM”, “the console”, “the 3rd OS”
- CLI with flow control, pipes, IO redirection, etc.
- Built-in commands
- Built-in and loadable scripts
- Environmental variables
- Diagnostics
- Exercisers

- **Monolithic**

- Single compressed image of PAL and console
- Small relocater and decompressor prepended
- Used on most “low-end” machines

- **Modular**

- Collection of functional overlays
- PALcode, overlay pager, kernel, drivers,...
- Used on TurboLaser and Rawhide

- **Processor, platform, and OS specific code**
- **Two flavors:**
 - VMS (used by the console)
 - UNIX
- **Handles exceptions and interrupts**
- **Builds machine check logout frames**
- **Initializing certain system registers**
- **Implements OS specific primitive functions**
- **Written in Alpha assembly language**

- **AlphaBIOS - is the firmware for the NT OS**
- **Provides PC BIOS like GUI**
- **Maintains it's own EV's. boot drivers, etc**
- **Loaded after SRM is executed**
- **Depends on some information being loaded by SRM into DPR**
- **AlphaBIOS has the other half of the 2MB FlashROM**

Loadable Firmware Update

- **Loadable Firmware Update Utility - LFU**
- **Bootable via floppy, network, CD, or website**
- **CD is distributed quarterly**
- **CD update uses APB to automatically load platform**
- **Network protocol supported**
 - **MOP**
 - **bootp/TFTP**
- **Image contains SRM / AlphaBIOS / RMC Flash/ TIG image and flashable SROM**

FRU Table and Galaxy

- **Galaxy** - allows two instances of a OS to be executing on the same hardware.
- **Galaxy** implementation on Clipper will be VMS only in the Jan/Feb 1999 timeframe.
- **Galaxy** support does add some new SRM commands
- **FRU** - field replaceable unit by default the Clipper firmware will build a FRU configuration table
- **Clipper SRM** will conform to the V5.0 Config Tree Spec

Summary

- **Clipper is breaking some new ground in the areas of environmental support and serviceability**
- **In the ENV area some details are still being worked**
- **Galaxy support is new, has been done on the 8400 and will be supported on Wildfire**
- **We have made every effort to insure that Goldrush, Monet and to a lesser degree Wildfire are compatible in the SRM space.**

COMPAQ

© 1998