

Cortland Tools

A summary
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Overview

The tools on the Cortland computer have many similarities to those found in the 128K of ROM on the Macintosh. Indeed, those features/functions found to be most valuable on the Mac were copied as closely as possible (given the difference in architecture). Every attempt was made to take advantage of the hindsight gained from the Macintosh tools designers.

The tools provided are divided into logical groups called "tool sets". Each individual routine in a tool set that can be called by an application is called a "function". For example, the routines that allow graphics to be displayed on the super hi-res screen are in a tool set called *Quickdraw II*, and *framerect* is a function in that set.

All tools are not contained in ROM. However, a mechanism was developed for calling tools independent of their location. Using this scheme, an application program does not have to care where a tool is located. It can be in RAM in one release of the firmware, and in ROM in some future release. The application will run the same regardless of which case is true. Therefore, it is easy to send out new tool releases as software patches.

Calling Cortland tools

Cortland tools are all referenced by name. The exact mechanism is determined by the language from which the tool is called. For example, in assembly language, a Macro library provides the function name, and the tool is entered in the following manner:

- 1) Push space on the stack for the result returned (if any)
- 2) Push the inputs onto the stack
- 3) Invoke the macro
- 4) Pull the result from the stack (if any)

For higher level language calls, such as PASCAL or "C", appropriate coding conventions are established to provide correct stacking of parameters as in assembly language above, and libraries contain all of the known functions.

Cortland tools compared to Macintosh tools

As stated above, Macintosh "Style" was copied whenever applicable. That is, Cortland tools have Quickdraw functions, Window managers, Menu Managers, and other "managers" in much the same manner as on the Mac. They will not however be identical. Many of the difference derive from the following factors:

- 1) The existence of color. Cortland tools will, wherever it is appropriate, take advantage of color.
- 2) Less powerful processor. The 65816 is not as powerful as the 68000.
- 3) Different memory configuration. The Cortland memory is logically divided into 64K banks. Parts of various banks are dedicated to special tasks (video buffers, i/o, softswitches, etc.).

Tools in ROM

Tool Locator

The tool locator provides the method by which tool calls are dispatched. Work to handle housekeeping of ROM- and RAM-based calls takes place here.

Memory Management

This tool does all bookkeeping for the memory in the system.

Quickdraw II

The "core" routines (most fundamental routines) of Quickdraw II reside in ROM. The remainder of Quickdraw II is RAM-based.

SANE

The Standard Apple Numeric Environment resides in ROM and contains the floating point engine, elementary numeric functions, and a formatter/scanner unit for conversions between ASCII and binary notation.

Desk Manager

The desk manager allows two forms of desk accessories: *CLASSIC* desk accessories, such as those found in existing APPLE II family environments and *NEW* desk accessories similar to those found in the Macintosh desktop environment.

Event Manager

The event manager allows interaction with the user with respect to such inputs as keystrokes and mouse events. An attempt was made to be as similar to the Mac as possible for this manager.

Sound Manager

This manager provides an easily understood interface to the sound chip on the Cortland.

Integer Math Tools

This includes a variety of routines working on data types which are INTEGER, LONG INTEGER, FIXED, AND FRAC (i.e. fractional parts) and do Multiplication, division, sqrt, some trig functions, rounding, and conversions between data types.

Text Tools

The text tools make it possible to deal with the text screen without switching modes and moving to bank zero (old APPLE II firmware can only be called in emulation mode from bank zero)

Scheduler

Facility for the delayed execution of tasks requiring serially reusable resources.

Miscellaneous Tools

This includes such things as :

- 1) Battery RAM access routines
- 2) Clock routines
- 3) I/O card access routines
- 4) Firmware vector manipulation routines
- 5) Heartbeat interrupt Queue Management routines
- 6) Mouse access routines
- 7) Interrupt control routines

RAM based tools

Those tools remaining, which will not fit into the Cortland ROM include the following:

- 1) Menu Manager
- 2) Window Manager
- 3) Control Manager
- 4) Line Edit
- 5) Dialog Manager
- 6) Scrap Manager
- 7) Print Manager
- 8) File Operations

Each of these contain functions quite similar to those found in the Mac.