Inter-Office Memorandum

To	Dorado Users	Date	September 19, 1979
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Subject	How to Operate Dorados	Organization	CSL

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This document describes the procedures naive programmers may follow to operate the Dorado. There are four sections:

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Once you get started, the Dorado behaves like a big, fast Alto. Getting started requires booting the emulator (Mesa, Lisp, or Smalltalk) of your choice. The section, *Loading* Your *Emulator*, discusses what you need to know to force the Dorado to run the language of your choice. The section, *Simulated Alto Disk*, discusses the way the Trident disk is formatted to look like a collection of "double Model 44" disks.

Here are some terms you need to know:

Emulator refers to the microcode that implements some language. The Dorado has Alto, Mesa, Lisp, and Smalltalk emulators. Due to current software limitations, users may have to manually change the microcode in the Dorado. The Mesa, Lisp, and Smalltalk emulators include support for Alto emulation as well their "target" language. For example, the Smalltalk emulator will run the Alto executive.

Midas is an Alto program that can control Dorados when it executes on an Alto with the right "umbilical" connections to a Dorado. We use Midas for hardware and microcode debugging. For the present time, users who want to use Mesa, Lisp or Smalltalk may have to use Midas to load the Dorado with the appropriate emulator.

Baseboard refers to part of the Dorado hardware that actually contains a microcomputer of its own. This microcomputer can boot the Dorado and even reload the microcode, using an emulator stored in the microcomputer's memory. That memory is small and *there is room for an Alto emulator only.*

Power On/Off and Booting

Turning the POWER ON. If the power is off, turn on the power switch in the lower left hand corner in the front of the Dorado. After about 45 seconds, the Dorado will boot the Alto executive. If power switch is on and the display is dark, the baseboard has "turned off" the Dorado. Push the boot button on the back of the keyboard to cause the baseboard to turn on the rest of the Dorado's power, spin up the disk, if there is one loaded, and boot the executive.

Turning the POWER OFF. Push the boot button four times. This causes the baseboard to begin the power down sequence. When the Dorado display goes blank, all the power execpt for the baseboard's power is off. *Only then* should the user turn off all power supplies by turning OFF the power switch at the lower left corner in the front of the Dorado.

BOOTING. The boot button on the back of the Dorado keyboard performs a superset of Alto-style boot activities for the user. Single pushes of the boot button work as you expect, more pushes do something extra! There are three things to remember about this:

> If you push the button too fast, the baseboard may loose count and do the wrong thing.

> However you can escape from this situation by keeping the button pushed "in" for more than 2.5 seconds, or

> You can escape from this situation by pushing the boot button more than 4 times.

The Dorado's baseboard sees the boot button and boots the machine if the boot button is pushed enough times. NOTE: Baseboard booting does not work if Midas is active in the controlling Alto.

If the machine has crashed, a single push on the boot button may restart your world (hot boot). If that doesn't work, escalate! Two button pushes will cause the baseboard to force the current microcode through its boot sequence (warm boot). *The hot and warm boot sequences leave the Dorado microcode intact.*

Three button pushes will cause the baseboard to reload the current microcode with the default, Alto-only microcode (tepid boot). Four button pushes will cause the microcomputer to power down the Dorado. After you see the display go blank, hit the boot button again, and the baseboard will perform a warm boot. This power-down then power up sequence is a cool boot.

Boot Type	Button Clicks	What it does
Hot boot	1	Display microcode boots the emulator
Warm boot	2	Baseboard boots current emulator
Tepid boot	3	Baseboard loads Alto emulator and boots
⟨power down⟩	4	Baseboard turns off most power supplies
Cool boot boots.	1	Only after ⟨power down⟩; baseboard powers up Dorado, then loads and

Simulated Alto Disk

HOW IT WORKS. To make it easier for a diverse community to use the Alto and to avoid changing disk packs, special arrangements regarding the disk have been made for the Lisp and Smalltalk emulators. The Trident is so large that it can hold the contents of many Model 31 disk packs. Thus, the Lisp and Smalltalk emulators each use a separate region of the Trident. The consequence is that once your emulator is running, it accesses a separate disk, all its own.

WHEN YOUR FILES AREN'T THERE. If, for example, you boot a machine that has Lisp microcode and want to run Smalltalk, you'll be disturbed to find that none of your files appear to be on the disk. (Smalltalk won't work, either, since the proper emulator isn't loaded in the Dorado.) Take heart. Follow the procedure below (Loading Your Microcode, p.4) for loading your own microcode. After you boot the machine you will find that your files reappear, given that the correct Trident disk pack is loaded in the Dorado.

CHANGING DISK PACKS. If that doesn't work, you must replace the current Trident pack with the one with your "Alto disk" on it. If you've never switched packs on the Dorado, you may wish to get help, otherwise this reminder may be sufficient. Release the catch on the top front of the Dorado and lift the Dorado's hood up and over to the back. Now you can access the Trident disk drive and change packs.

1.   Flip the right hand toggle switch to STOP.
2.   When the green light stops blinking, your must replace the current pack:

    a. Remove the current pack.

        1. Release the catch on the top front of the Trident and lift the Trident's hood up. It will not travel up and over to the back.
        2. Place an empty cover onto the pack currently in the Trident.
        3. Turn the handle counter-clockwise until it makes loud clicks.
        4. Remove the pack and place it on the base of its container. Remember fasten the top to the base by clenching and then releasing the handles on the bottom of the base.

    b. Add your pack.

        1. Gently place your pack in the Trident. Twist the handle clockwise until it does not twist any more.
        2. Remove the pack's top, close the Trident, flip the toggle switch back to START, then close the Dorado.

    c. Boot the machine.

INITIALIZING A NEW ALTO DISK. Occasionally you may wish to initialize a new simulated Alto disk on a Trident pack. The process is similar to what you would do on an Alto: Ether boot copydisk or a new operating system. You can use copydisk to copy any other disk on the ethernet, even a single disk, model 31 pack. If you boot a new operating system, you will perform a full initialization on the disk.

Remember that the Lisp and Smalltalk emulators use different regions on the Trident pack, so you must be running the proper emulator when you follow this procedure.

For lots of disk space use "both disks as a single file system" when performing the initialization -- the simulated Alto disk will look like a "double 44" rather than a "double 31". However, current software limitations require that you immediately delete "diskdescriptor" when the machine enters the executive. That will cause the executive to crash. Boot from the ethernet again and run the scavenger. When the scavenger is done you will have a new, improved "diskdescriptor" (remember the scavenger should treat both disks as a single file system).

Loading Your Emulator

Until the software gets enhanced, users often may be forced to load an emulator from Midas. This may require invoking Midas from the emulator and aborting the Dorado, if it is still executing, before you can load and execute your emulator.

INVOKING MIDAS. If Midas is not already running on the controlling Alto, invoke Midas from the Alto executive:

>*Midas*^{cr}

ABORTING THE DORADO'S EXECUTION. When Midas runs there is a display with information in columns at the top and up to three lines of menu commands at the middle. Exactly what you see will depend upon what your Dorado is doing. If the Dorado is still executing, the bottom of the screen will appear something like:

> Midas <date> DlMidas <date>
> Serial# <number> ZVer=<number>, running
> Abort Dtach

If the Dorado halted for some reason, you'll see something like:

> Midas <date> DlMidas<date>
> Serial# <number> ZVer=<number> halt at <number>:<number>
> <other info>

If the Dorado is still running, button "Abort" with the left button of the mouse. Now the Dorado is halted. Midas may print two lines as follows:

> Continue Abort-CFile   ·
>
> Some Error occured.   Log the particulars and begin again.

This happens because Midas doesn't notice the difference between the user *Aborting* the execution of the Dorado and an actual error. If this happens, "left-bug" either the *Continue* or the *Abort-CFile* menu item. Then you may proceed as below.

LOADING AND RUNNING YOUR EMULATOR. Type the name of your emulator. You will see it appear in the lower left corner of the screen. Backspace and control-A will "edit" the name you type. Then use the mouse to "left button" RunProg in the first line of the command menu.

Emulator names are Alto, Mesa, Lisp, and Smalltalk.

After the Midas display reappears and the Dorado is in its boot sequence, you can shift-swat out of Midas and begin working on the Dorado.

Elementary Checkout

When things don't seem to be working well, there are three microcoded, Dorado specific diagnostics you may wish to run. Microcoders may find this a useful technique to help distinguish between hardware and microcode problems. The proper order to execute the diagnostics is "Kernel", "MemA", then "Ifu". The procedure for loading and beginning them requires Midas and is identical:

1. Get Midas to execute on the controlling Alto. If it is already there, that is fine.
2. Halt the Dorado if it is running.
3. Type the diagnostic name, then "left button" Run-Prog in the Midas menu.
4. When all the activity on the screen halts, type "BEGIN;G". Now the diagnostic is running. If the Dorado halts with a breakpoint at ERR, the microcode believes it has found a problem. If this happens, report it to Charlie Sosinski or Herb Yeary.

Each diagnostic has a breakpoint assembled at "DONE" so that the user can tell easily that at least one pass of the diagnostic has successfully executed on the machine. For Kernel and Ifu, a pass executes fairly quickly. The amount of available memory causes MemA to take a long time before one iteration is complete. Consequently there is an extra breakpoint assembled at SDPATL, and it indicates that a considerable amount of the memory system has been tested.

In all cases, if you wish to remove a breakpoint and proceed (the diagnostics are infinite loops), type ";K" to Midas after the machine halts at a breakpoint. That kills the breakpoint. Then type ";P" to proceed executing the diagnostic. WARNING: The diagnostics will NOT proceed after an error.

Logging Errors

The Dorado will halt when it detects a machine failure. While Dorados are still fairly new it will be helpful for users to log information regarding what error has occured. There are two situations that users must deal with to log error information. There is the case when Midas is still executing in the Alto and when it is not.

MIDAS IS STILL EXECUTING. When Midas is still executing in the controlling Alto, Midas will detect that an error has occured and print relevant information. Recall from a previous section that after the Dorado has halted, the middle of the screen will have information like the following:

> Midas <date> D1Midas<date>
> Serial# <number> ZVer=<number> halt at <number>:<number>   .
> <other info>

Please record the information beginning with Serial#.

Midas may print a comment something like:

> Continue Abort-CFile
>
> .   Some Error occured.   Log the particulars and begin again.

This happens because Midas doesn't notice the difference between the user *Aborting* the execution of the Dorado and an actual error. If this happens, "left-bug" either the *Continue* or the *Abort-CFile* menu item. After recording information about the crash, proceed by running the emulator of your choice (see the section above, *Loading Your Microcode*).

MIDAS IS NOT EXECUTING. If Midas is not executing in the controlling Alto after a machine failure, the Dorado's state is preserved. Invoke Midas from the Alto executive, and record the information as requested above.

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