DISK SUPPORT ERS

G. Andrade
F. Bachman
R. Montagne

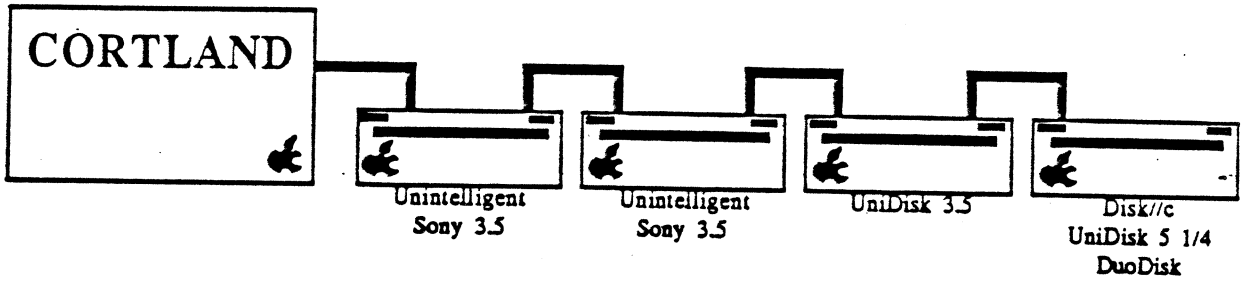
November 6, 1985

Revision History:

First Draft June 18, 1985	V00.00	F. Bachman
Revised November 6, 1985	V00.10	G. Andrade / R. Montagne

Disk Support Overview

Columbia has a built in IWM (Integrated Woz Machine) chip which handles, with appropriate firmware, Disk][(Duodisks, Unidisks), Sony 3.5 inch drives without built in intelligence, and Sony 3.5 inch drives with built-in intelligence (Unidisk3.5). Port 6 will be the standard Disk][support slot. Disk][boot routines will be built into ROM. Disk][routines in DOS, ProDOS, and PASCAL will still work as they currently do on a //e and //c computer. Port 5 (internal slot 5) will control both the intelligent and unintelligent Sony 3.5 inch drives as well as the RamDisk. The user will be able to hook up, up to 2 Disk][s, 2 unitelligent Sony 3.5 inch drives, and 2 or more intelligent Sony 3.5 inch drives depending on IWM output specs. The attached disks must be physically hooked up as follows. Please note that 2 unintelligent Sony 3.5 inch drives are shown below. That is the maximum number of those devices supported. There may be more than 1 Unidisk3.5 or no Unidisk3.5s attached where the Unidisk3.5 is show.

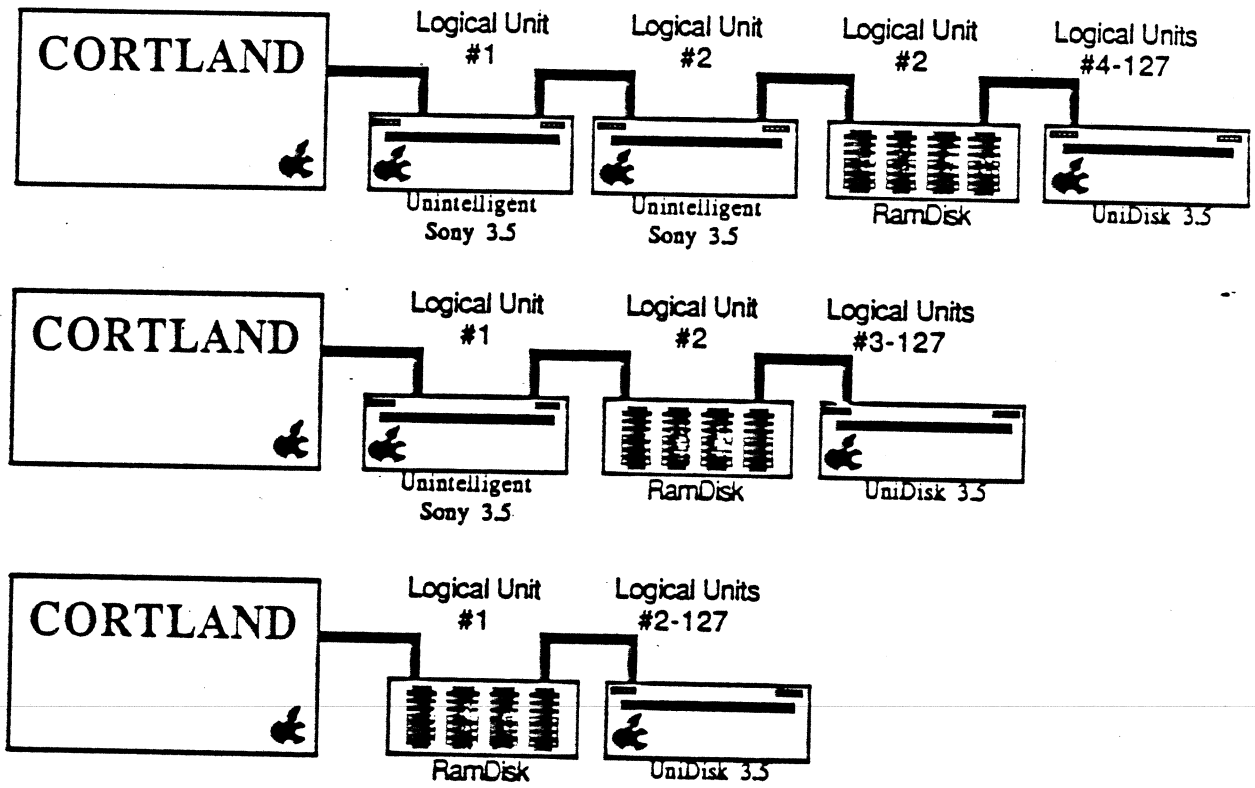


Both Port 5 and Port 6 disk interface routines will access the IWM using slot 6 softswitches. The firmware will arbitrate between slot use of the same softswitches. If a peripheral card is plugged into slot 6, the firmware in Port 5 can still access the disks plugged into Port 6's IWM connector by disabling the external peripheral card temporarily, doing the disk access, and then reenabling the exteral peripheral card.

The Port 5 disk interface for Unidisk3.5 is called Smart Port. It consists of a superset of the Protocol Converter software used in the 32K//c Rom rev. Smart port supports 2 unintelligent Sony 3.5 inch drives, the RamDisk, and the Unidisk3.5 up to a total of 127 combined devices. Current estimates are that the IWM can physically support up to 6 devices maximum. This number could be increased somewhat if we buffer (and boost) the IWM signals in the unintelligent Sonys. Nothing can be done in the Disk][or Unidisk3.5 drives to buffer the signals since those devices are already in production.

Slot 5 Initialization

At power up initialization time, or during the slot 5 boot process, a reset of all devices supported by the slot 5 driver will be initiated to be followed by a device ID assignment process. During the ID assignment process, the firmware will determine the quantity of devices connected to the protocol converter bus, and assign a logical unit number to each device starting with a unit number of 1. Devices are assigned unit numbers starting with unintelligent Sony 3.5 inch drives followed by the RamDisk, and then the Unidisk3.5 devices. The logical location of devices on the protocol converter chain may differ from the physical location due to the assignment of the logical unit number just prior to the first Unidisk3.5 device to the RamDisk as shown below.



During the device ID assignment process, the logical unit number assigned to the RamDisk is saved in bank $E1. When the slot 5 driver is called, the driver compares the unit number, passed as one of the input parameters, to the RamDisk unit number. If the unit number is less than the RamDisk unit number, control is passed to the Unintelligent Sony driver. If the unit number is equal to the RamDisk unit number, control is passed to the RamDisk driver. If the unit number is greater than the RamDisk unit number, control is passed to the Protocol Converter Bus driver.

Slot 5 Boot

A call to the slot 5 boot entry point will force all devices on the protocol converter chain to be reset, followed by the device ID assignment process. Then the boot block will be read from the first logical device on the protocol converter chain. If the boot block is found, then a jump to $000801 will occur. If the boot block is not found, and the boot was called from the boot scan routine (powerup or auto boot), then control will be passed back to the slot scan routine. If the boot was not from the scan routine (such as PR#5 or 00/C500G from the monitor) then an error message will be displayed to indicate the boot failure.

NOTE: Some unresolved issues regarding the slot 5 boot process remain. Specifically, if no unintelligent sony drives are installed, it is not possible to boot from logical unit 1, or the RamDisk on powerup. Though we could avoid boots from the RamDisk, it may be desirable to boot from the RamDisk after ProDOS has been installed in it via a PR#5. Some method of specifying the RamDisk as the boot device needs to be developed.

All devices connected as a smart port device such as Unidisk3.5 should respond to all protocol converter calls, and hand back appropriate status information.

Information specific to the RamDisk driver will be covered in a seperate document.

Information specific to the Unintelligent Sony drives follows.....

Dumb Sony

The Dumb Sony (Dsony) drive is a 800K byte capacity disk drive which will be used with the new Cortland system. This drive is essentially a Unidisk 3.5 without the controller card. The Cortland will contain all the intelligence required to access the drive. The Dsony will behave as a protocol converter device. The only way to access the driver is through the protocol converter firmware built into the Cortland. Parameters will be passed to the Dsony driver through nine bytes of zero page. The parameter passing area has the following layout.:

Parameter List:

X reg = Unit number

$42	Command
$43	param_count = 3
$44	Buffer_addr_low
$45	Buffer_addr_high
$46	Block_number_low
$47	Block_number_med.
$48	Block_number_high
$49	Spare Block number
$4A	Buffer_Bank_address

Depending on the specific call being made some of the parameter fields may not be required. On exit from a call to the Dsony firmware, the accumulator will contain a status byte indicating the success of failure of the call. If the call is successful the Carry bit will be cleared, otherwise it will be set and the accumulator will contain the error code.
The list of calls supported are; Status, read block, write block, format disk, control, init, read and write. Please refer to the Protocol Converter specification for a description of the individual calls.