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Subj: v1.75

Here is what is hopefully close to the final definition of 1.75. As you
recall, 1.75 is the current Lisa with a new logic cage assembly and a new
disk drive assembly.

System Configuration

- 10 MHZ 68010 processor
- 720 x 364 video display
- 10 MB built-in hard disk
- Built in floppy disk
- MMU with 512 byte pages
- 896 Kbytes RAM
- 128/256 Kbytes ROM
- Dual serial ports
- Parallel port (if needed)

[handwritten annotations:]
① what about substitutes in s/w for 6522 timers? if no 6522. These are used extensively.
② A rops/6522. for Keyboard/mouse? new interface
③ which functions (on the I/o board) are different? Keyboard/mouse
④ of course, or expected to use expansion slots? yes
same? Yes

The MMU and Memory Address Space

The 512 byte page size will remain. This makes the use of 256K RAMS a
little more difficult, but doable. To compensate for the 2 megabyte
limitation of the 512 byte page scheme, another 2 megabyte address space
has been added, for a total of 4 megabytes of address space. The standard
memory cycle time will be 500ns, including time through the MMU.

Parity Errors

It was earlier thought that Motorola had corrected the problem that
inhibits us from generating bus errors due to memory parity errors. This
is not the case however. Therefore the current scheme of generating an NMI
on a parity error will have to remain.

Disk Drives

The design of 1.75 has relied on controlling the floppy disk with the
68000. This does not appear to be a problem.

The hard disk will probably also be controlled directly by the 68000, this
eliminates the problems of missing interleves due to excessive recopying of
data at slow rates.

Review

There will be a review of 1.75 on Tuesday, March 22nd at 3:30 in The Big
Apple. Those interested are welcome.

1.75 Memory Configurations

With 2-2 Megabyte mapped address spaces with 512 byte resolution

3/4 Megabyte memory board

First 2 Megabyte address space	0 3/4M 2M	On Board RAM 3/4 MB
Second 2 Megabyte address space	0 1M 2M	Slot 4 - 1 MB / Slot 5 - 1 MB

1 1/2 Megabyte memory board

First 2 Megabyte address space	0 1 1/2M 2M	On Board RAM 1 1/2 MB
Second 2 Megabyte address space	0 1M 2M	Slot 4 - 1 MB / Slot 5 - 1 MB

3 Megabyte memory board

First 2 Megabyte address space	0 2M	On Board RAM 3 MB
Second 2 Megabyte address space	0 1M 2M	Slot 4&5 - 1 MB (Slot selected by status bit)

Slots 4&5 are the old
memory card locations

1.75 Memory Allocation

Virtual Address Space	Main Memory	"Special" Address Space
Segment 0,32,64,96		32K ROM
Segment 1,33,65,97		32K ROM
Segment 2,34,66,98		32K ROM
Segment 3,35,67,99		32K ROM
Segment 4,36,68,100		32K ROM
Segment 5,37,69,101		32K ROM
Segment 6,38,70,102		32K ROM
Segment 7,39,71,103		32K ROM
Segment 8,40,72,104		Future Expansion
Segment 9,41,73,105		
Segment 10,42,74,106		Do not use
Segment 11,43,75,107	Any	
Segment 12,44,76,108		Internal I/O
Segment 13,45,77,109		Slot 1
Segment 14,46,78,110		Slot 2
Segment 15,47,79,111		Slot 3
Segment 16,48,80,112	Mapped	or
Segment 17,49,81,113		
Segment 18,50,82,114		/
Segment 19,51,83,115		
Segment 20,52,84,116		
Segment 21,53,85,117	Memory	
Segment 22,54,86,118		
Segment 23,55,87,119		
Segment 24,56,88,120		Future Expansion
Segment 25,57,89,121		
Segment 26,58,90,122		Do not use
Segment 27,59,91,123		
Segment 28,60,92,124		
Segment 29,61,93,125		
Segment 30,62,94,126		Video Memory
Segment 31,63,95,127		Future Expansion

(handwritten note: standard + alternate screens? 4 pages available)

In "Set-up" mode (MMU Registers are accessed by a program in the "special" address space):

For MMU register access:

Segment	1	B L	Not Used

23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0

For ROM/Video RAM access:

x x	Special Addr	0	Special Address

23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0

3/14/83 GM

Cost Breakdown

One interesting way
of looking at the
cost breakdown is
to look at each
system component
as part of the total
system cost.
The components can
then be broken into
two major classifications,
program/data storage,
and "stuff" to manipulate
that program and data.

In defining 1.75 it is
important to note that
the major area that is
being changed (CPU &
I/O) is a relatively
small portion of the
total system cost.
In fact, the major
cost saving over 1.5
comes from reducing
total RAM by 128K
and eliminating the
cost of two (bare) PC
boards by moving the
floppy controller to
the 68000 and moving
memory onto the old
CPU board.

Lisa

Memory
Twiggies
Packaging
CPU Board
I/O Board
Keyboard & Mouse
Video
Power Supply
Profile

1.5

Floppy
Profile
Packaging
CPU Board
I/O Board
Keyboard & Mouse
Video
Power Supply
Memory

1.75

Floppy
Hard
Disk
CPU Board
Packaging
Keyboard & Mouse
Video
Power Supply
Memory