Commodore Amiga Chips

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CES 1984: “Boing Ball” demo on the “Lorraine”
1985: Amiga 1000

- Motorola 68000 @ 7.16 MHz
- 256K RAM
- 256K ROM (w/ OS)
- 4096 colors
- 640 × 400 interlaced
- 6 bitplanes
- 8 sprites/scanline
- 4 8-bit audio @ 24 kHz
- Hardware blitter
1987: Amiga 2000

- Motorola 68000 @ 7.16 MHz
- 512 KB “Chip” + 512 KB “fast” RAM
- 512K ROM (w/ OS)
- 4096 colors
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Fat Agnus

- Blitter
- Display Synchronized Coprocessor ("Copper")
- 25 Channel DMA controller
- System clock generator
- DRAM controller
Fat Agnus Block Diagram
Figure 6-2: BLT_xPTR and BLT_xMOD calculations

\[
\text{BLT_xPTR} = \text{Mem.Addr} + (40 \times 13) + 12 \\
= \text{Mem.Addr} + 532
\]

\[
\text{BLT_xMOD} = 12 + 18 \\
= 30 \text{ bytes}
\]
Figure 6-13: Blitter Block Diagram
- 320 × 200 to 640 × 400 resolution (interlaced)
- 4096 colors
- Eight sprite controllers
- Sprite collision detection
- 60 or 80 column text
Figure 3-3: How Bitplanes Select a Color
Figure 3-8: Combining Bitplanes
Both playfields appear on screen, combined to form the complete display.

The background color shows through where there are transparent sections of both playfields.

Figure 3-12: A Dual-playfield Display
Display position in these example is shown with 0-bits of delay.

Figure 3-24: Horizontal Scrolling
Figure 4-1: Defining Sprite On-screen Position
Each image of this sprite may be placed at any desired spot, horizontally or vertically. However, at least one video line must separate the bottom of one usage of a sprite from the starting point of the next usage.

Figure 4-9: Typical Example of Sprite Reuse
Figure 4-13: Sprite Control Circuitry
COLOR SELECTION IN HOLD-AND-MODIFY MODE

In hold-and-modify mode, the color register contents are changed as shown in Table 3-19. This mode is in effect only if bit 10 of BPLCON0 = 1.

<table>
<thead>
<tr>
<th>Bitplane 6</th>
<th>Bitplane 5</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>Normal operation (use color register itself)</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>Hold green and red</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>Hold green and blue</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>Hold blue and red</td>
</tr>
</tbody>
</table>

B = Bitplane 4-1 contents
R = Bitplane 4-1 contents
G = Bitplane 4-1 contents

Table 1-19: Color Selection in Hold-and-modify Mode
Paula

- Four voices; two channels
- Nine octaves
- Complex waveforms
- Both amplitude and frequency modulation
- I/O controller for disk and controller ports
- Floppy controller
- Interrupt controller
PAULA BLOCK DIAGRAM