Sprite Graphics

Stephen A. Edwards

Columbia University

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TMS9918 Video Display Processor
TMS9918 Video Display Processor
TMS9918 Pattern Generation

BASE ADDRESS

0
1
2
N
M

8M
8M + 7

PATTERN NAME TABLE

766
767

PATTERN = M
(8 BYTES)

2046
2047

PATTERN GENERATOR TABLE

PATTERN PLANE

PATTERN POSITION 0

PATTERN POSITION 1

32 POSITIONS

PATTERN POSITION “N”

24 POSITIONS

PATTERN POSITION 767

PATTERN POSITION 31
TMS9918 Sprite Generation

Diagram showing the process of sprite generation involving VRAM, Y, X, NAME, TAG, PATTERN MAP, and SPRITE.
<table>
<thead>
<tr>
<th>BIT</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td></td>
<td>VERTICAL POSITION</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td>HORIZONTAL POSITION</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td>NAME</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>EARLY CLOCK BIT</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>COLOR CODE</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TMS9918 Sprite Attribute Table Entry**
Basic Operation

For each line,
▶ Fetch color palette
▶ Fetch tiles
▶ Fetch tile bitmaps
▶ Read sprite location data for 64 sprites
▶ Save and prioritize up to 8 visible sprites
Video RAM Memory Map

Palettes: Groups of 16 colors selected from ≈ 60

Name Table: Tile numbers

Attribute Table: Extra tile color information

Pattern Table: Tile bitmaps
A Sprite Attribute Table Entry

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>b3</th>
<th>b2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical Flip</td>
<td>Horizontal Flip</td>
<td>Priority</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>b3</td>
<td>b2</td>
</tr>
<tr>
<td>Y coordinate</td>
<td>Tile (bitmap) number</td>
<td>X coordinate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

64 sprites max; 8 per line max

Tiles are $2 \times 8$ bytes each. First 8 are bitmaps of LSB color value, next 8 are next color bit.

NES Development http://nesdev.parodius.com

NES Palette Generator http://nesdev.parodius.com/kevin_palette.txt

