

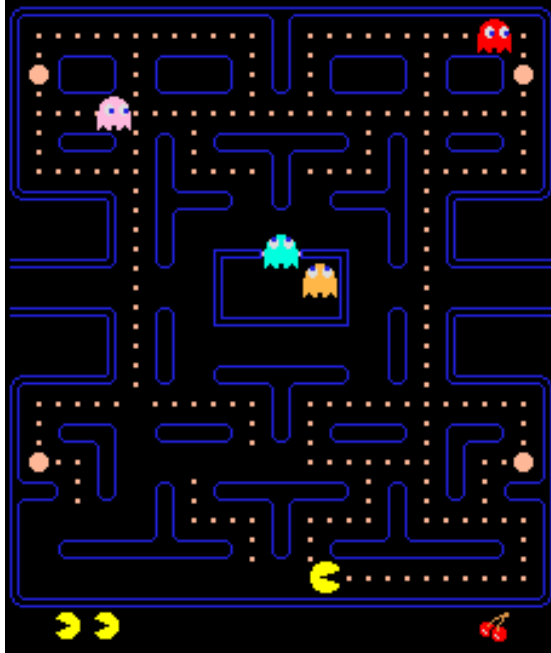
Sprite Graphics

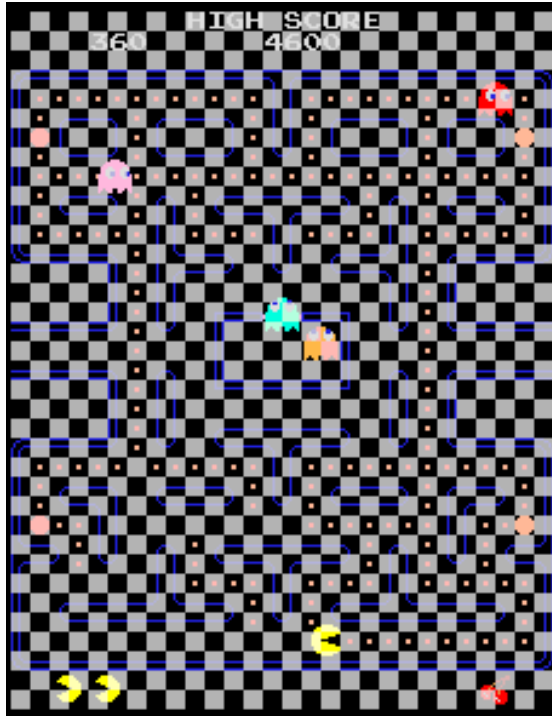
Stephen A. Edwards

Columbia University

Spring 2020

360 HIGH SCORE 4600





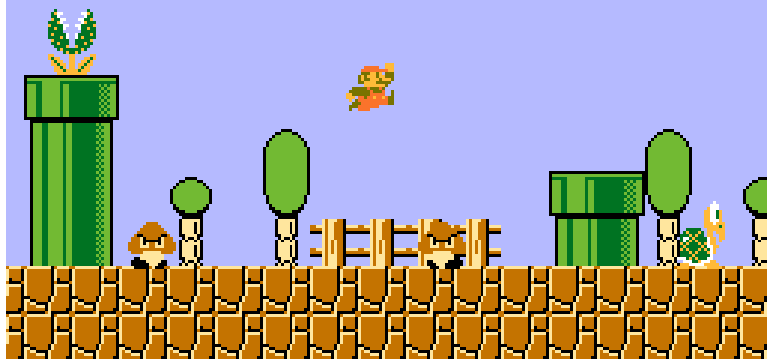
MARIO
000700

0 x 01

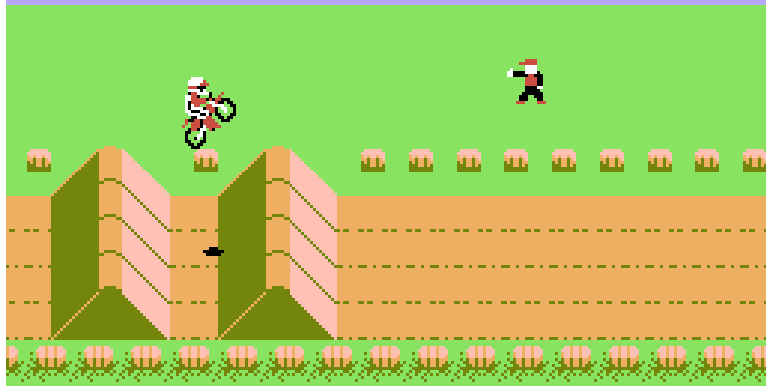
WORLD
8-1

TIME
242

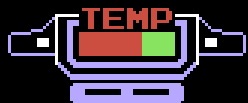
0 0



NINTENDO



3RD
1:24:00



TIME
0:13:15

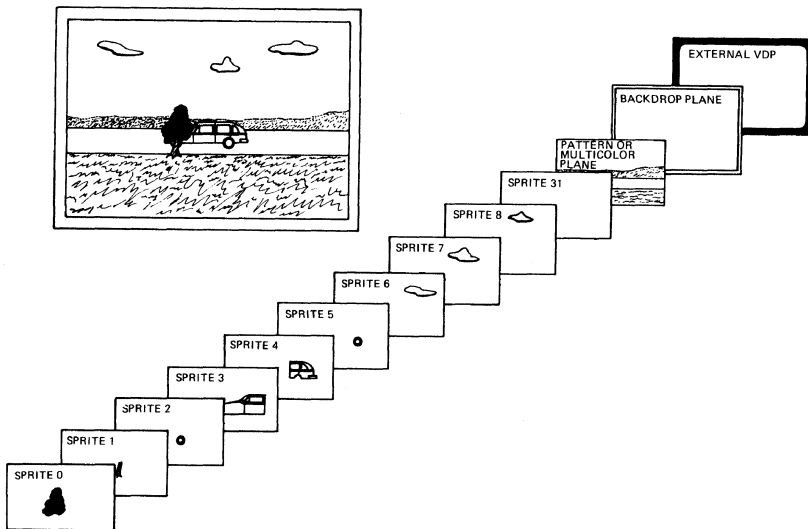
TUNNELS



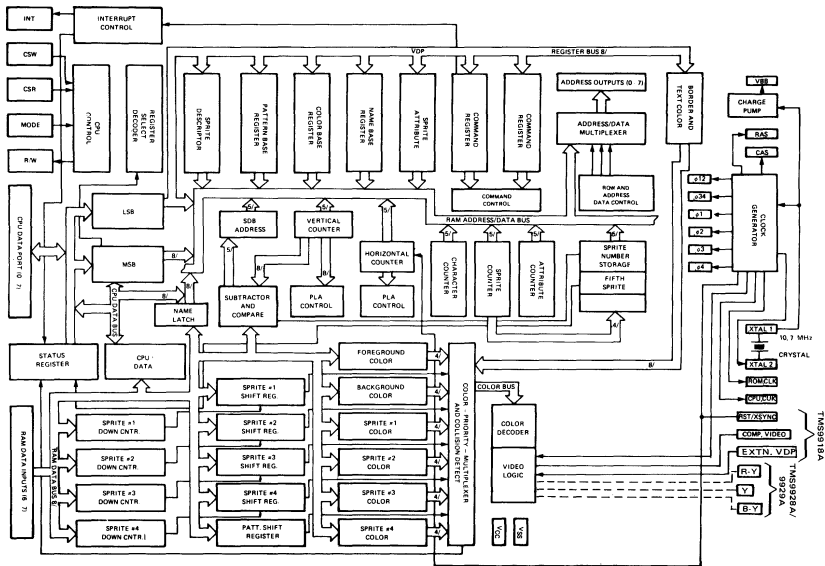
©1982

TEXAS INSTRUMENTS

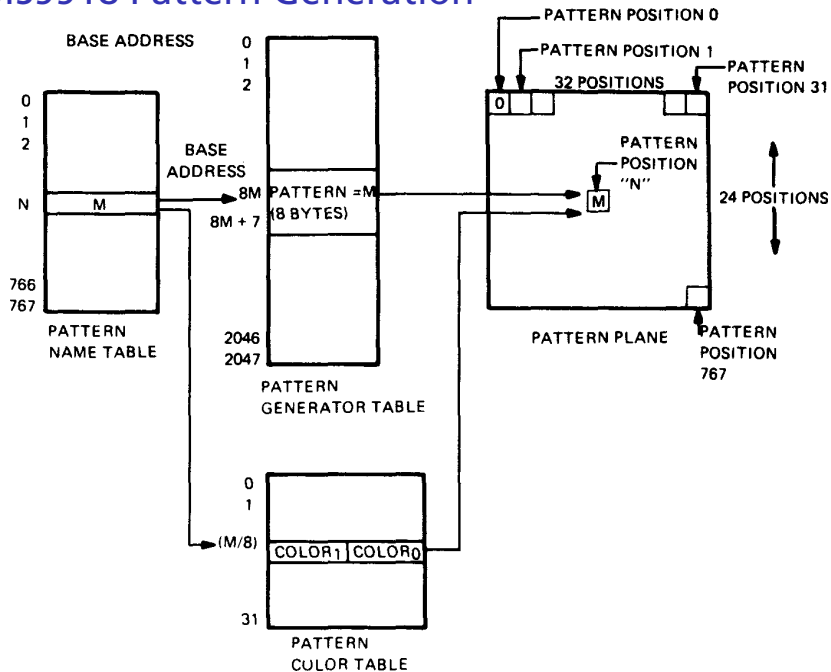
TMS9918 Video Display Processor



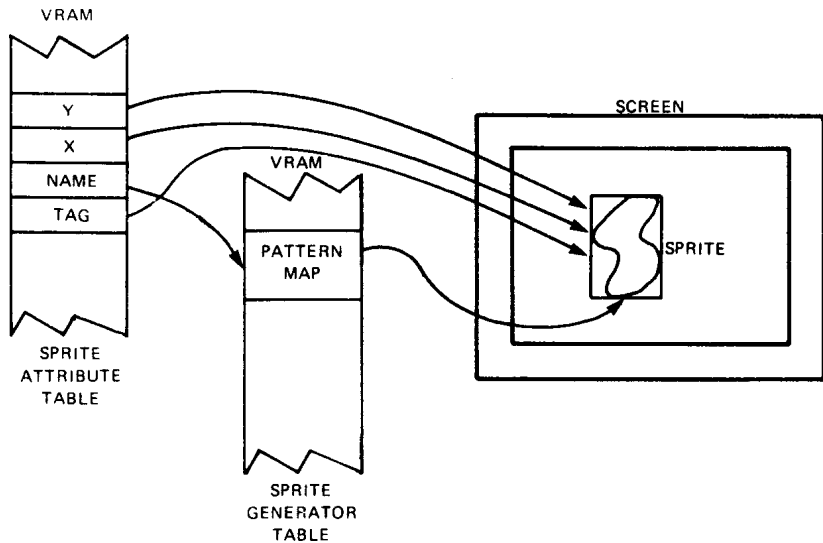
TMS9918 Video Display Processor



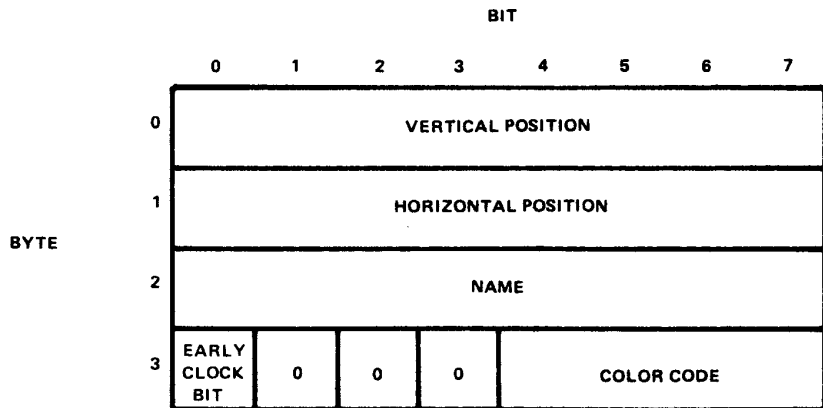
TMS9918 Pattern Generation



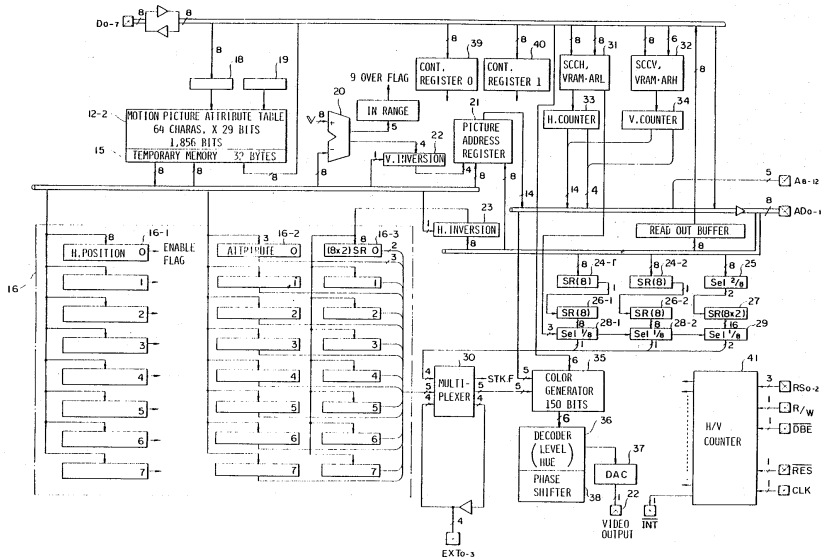
TMS9918 Sprite Generation



TMS9918 Sprite Attribute Table Entry



Nintendo NES/Famicom

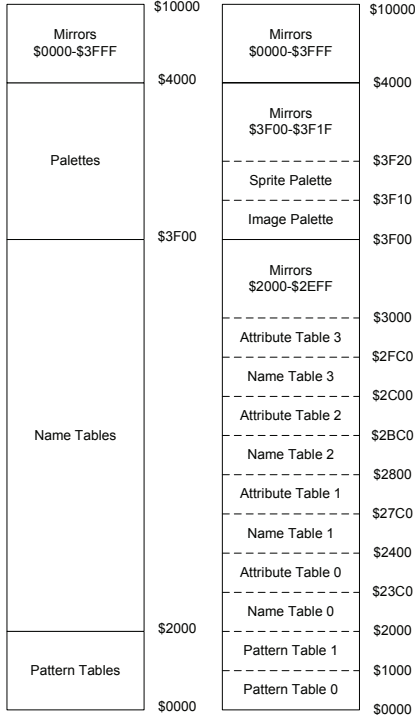


Basic Operation

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

64 sprites max; 8 per line max

7

0

Y coordinate							
Tile (bitmap) number							
Vertical Flip	Horizontal Flip	Priority	0	0	0	b3 color bits	b2
X coordinate							

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

References

Steven Collins. Computer Graphics during the 8-bit Computer Game Era. Siggraph Newsletter, 32(2) May 1998.

NES Development <http://nesdev.parodius.com>

NES Palette Generator

http://nesdev.parodius.com/kevin_palette.txt

Nintendo Entertainment System Documentation v. 0.40.

http://db.gamefaqs.com/console/nes/file/nes_tech.txt

Patrick Diskin, *Nintendo Entertainment System Documentation, Version 1.0*, August 2004, <http://nesdev.parodius.com/NESDoc.pdf>

Ueda et al. TV Game System Having Reduced Memory Needs. United States Patent #4,824,106. April 25, 1989.