



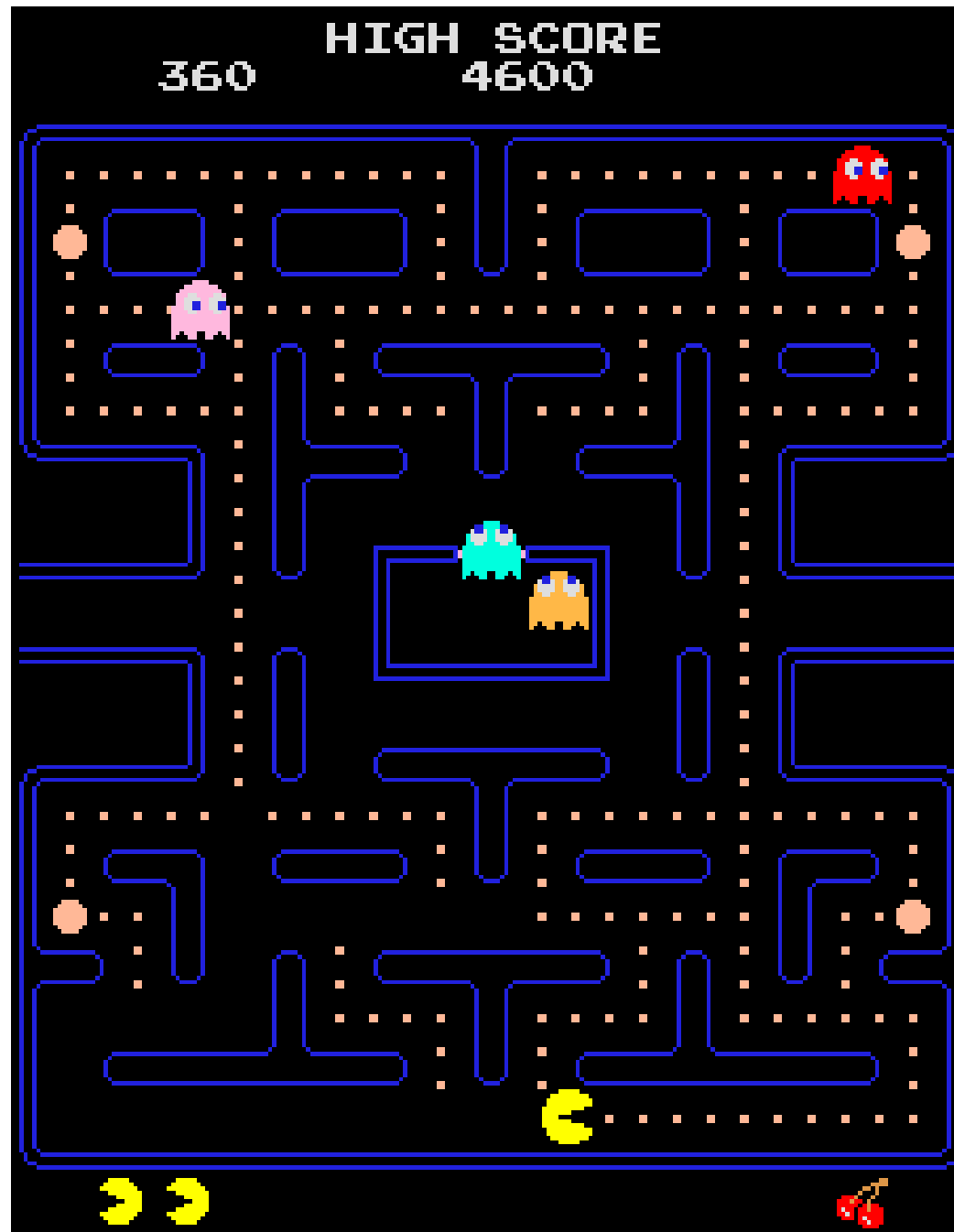
Sprite Graphics

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Sprite Graphics: Pac-Man



Sprite Graphics: Super Mario Bros



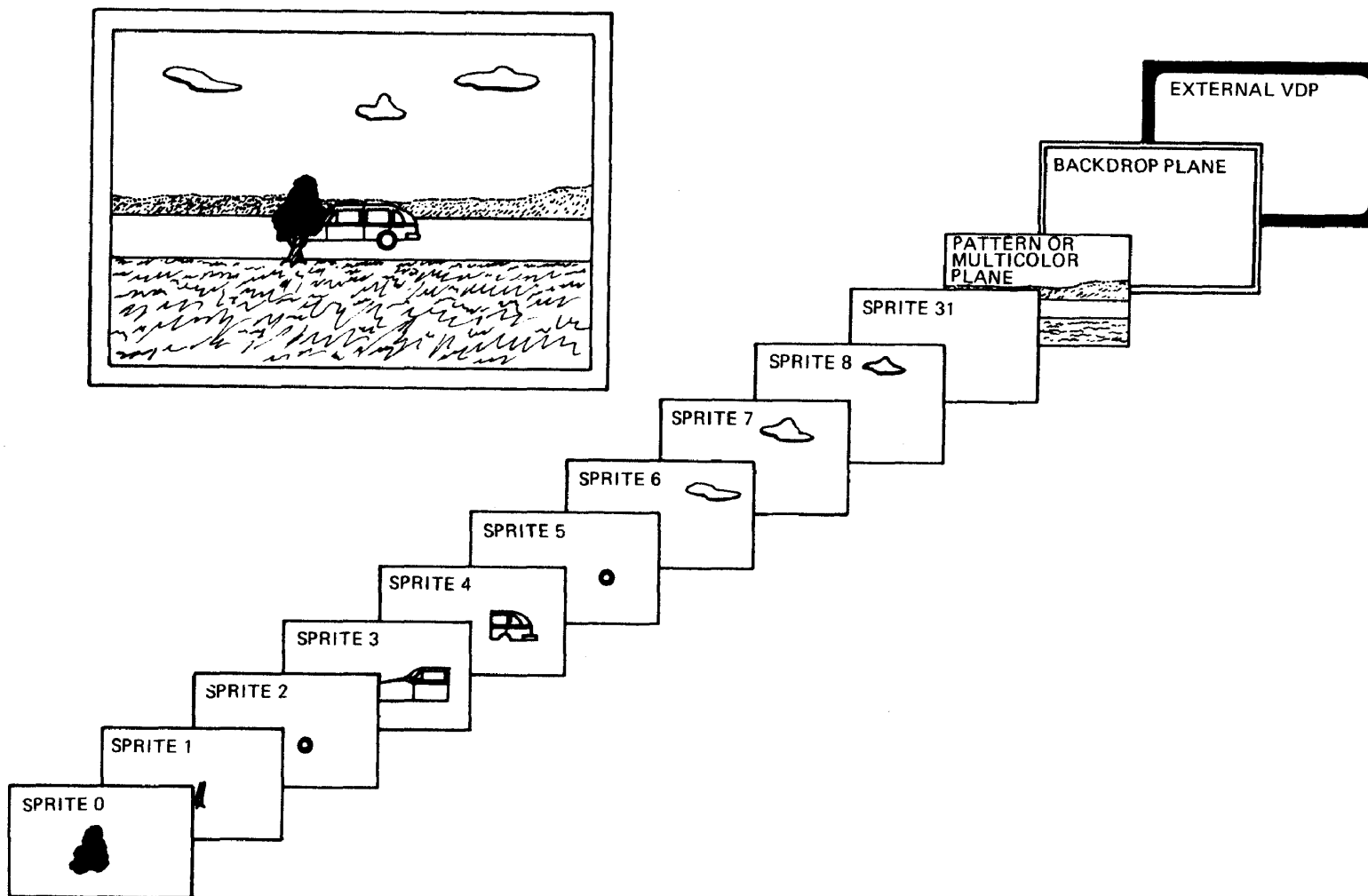
Sprite Graphics: Excitebike



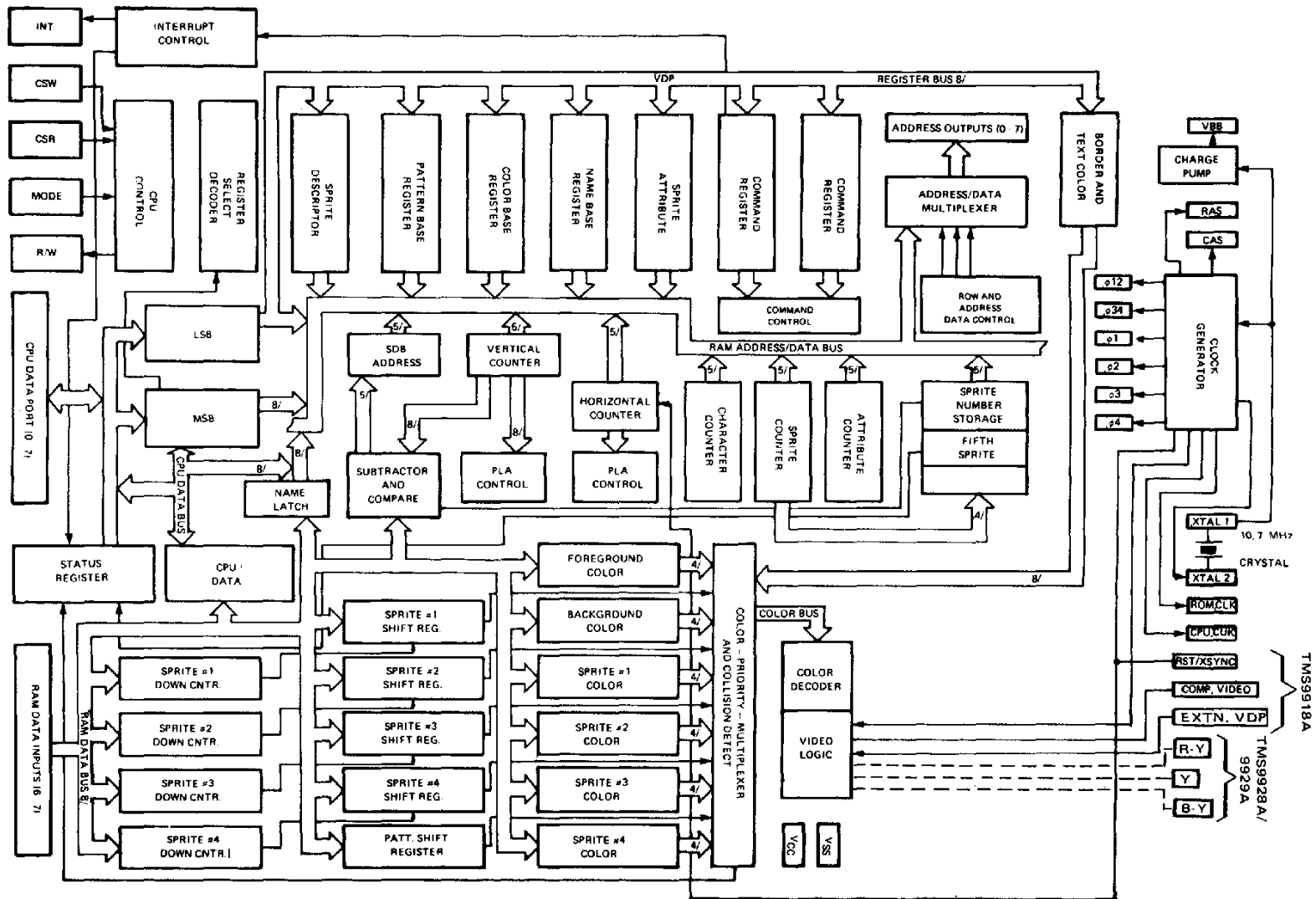
Sprite Graphics: Tunnels of Doom



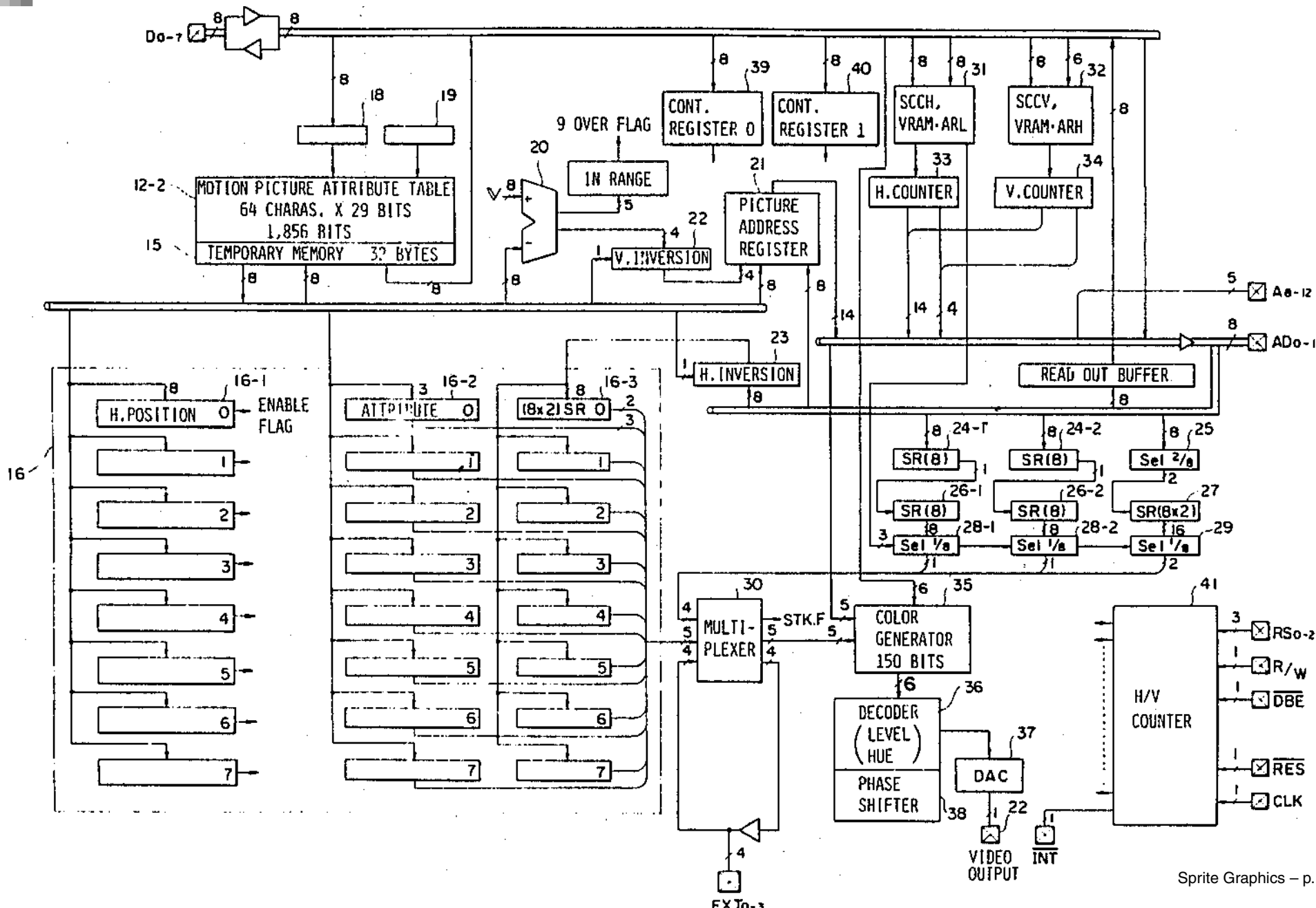
TMS9918 Video Display Processor

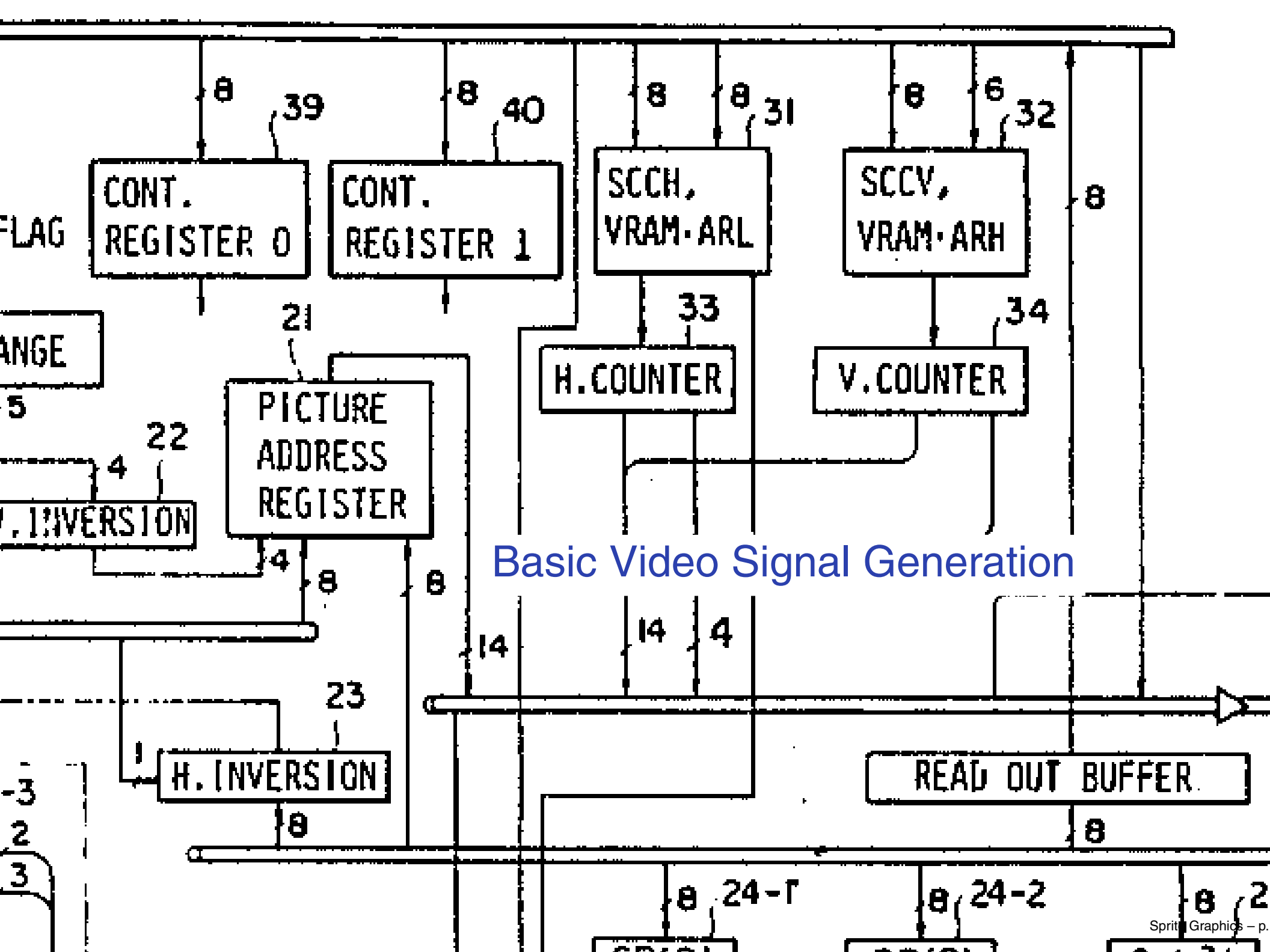


TMS9918 Video Display Processor



Nintendo NES/Famicom





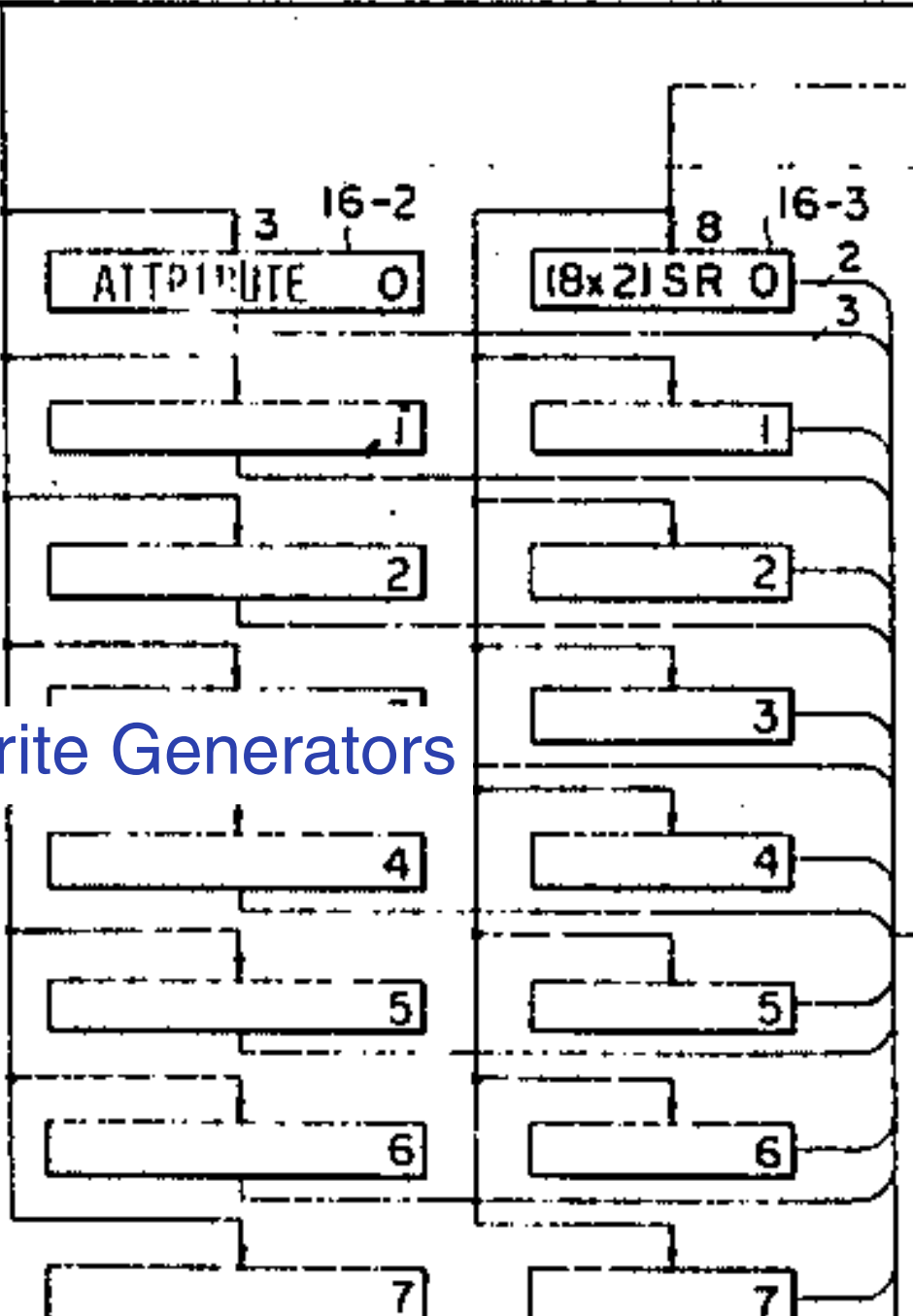
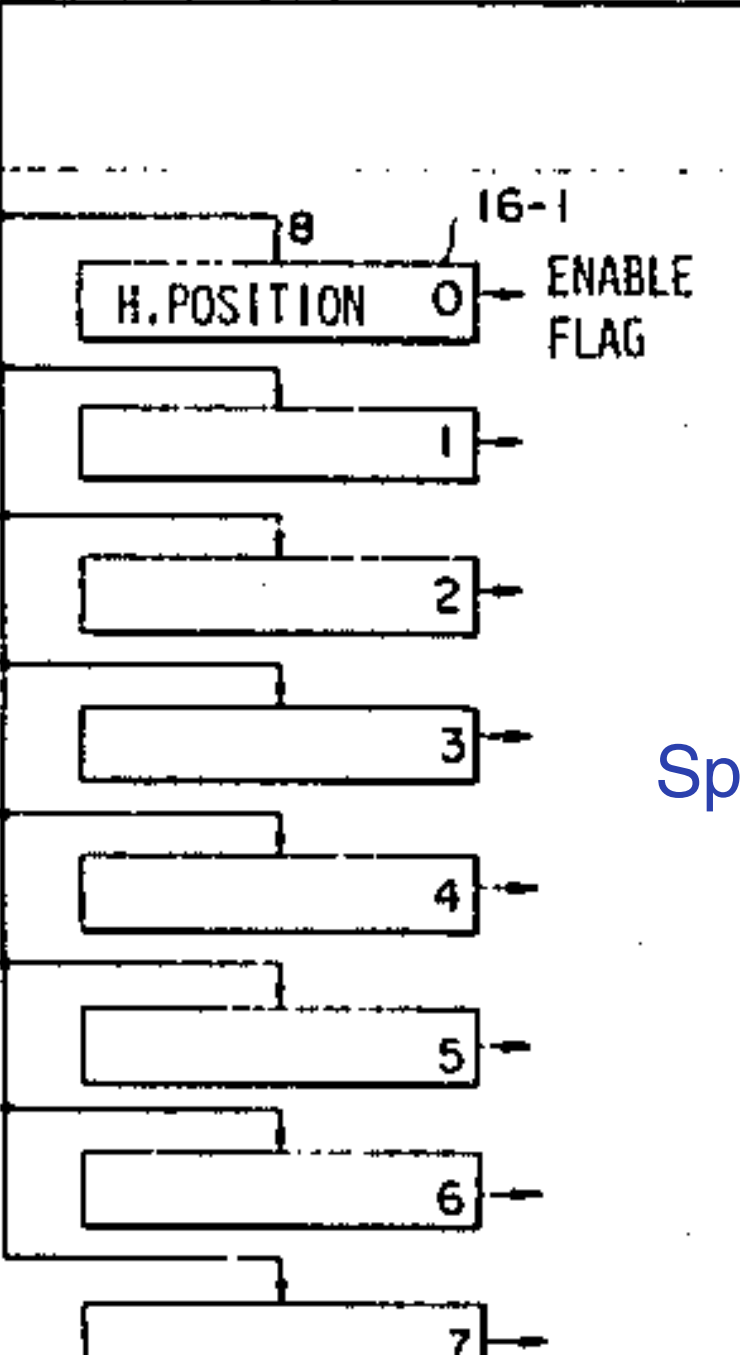
Basic Video Signal Generation

15

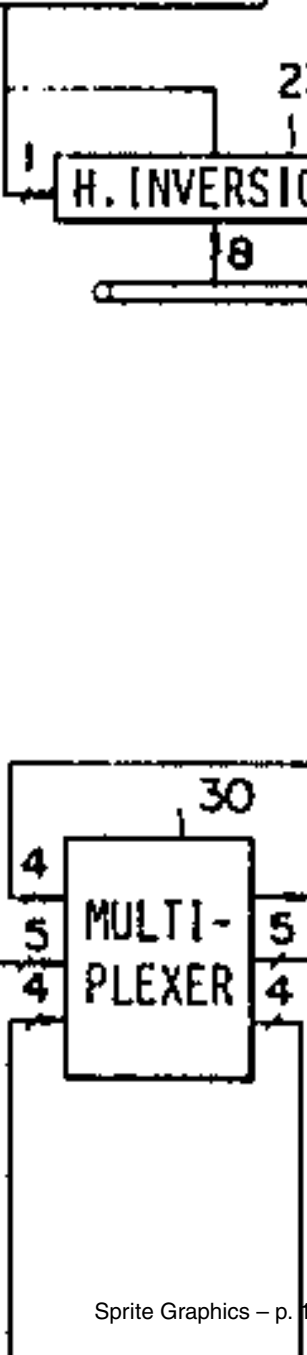
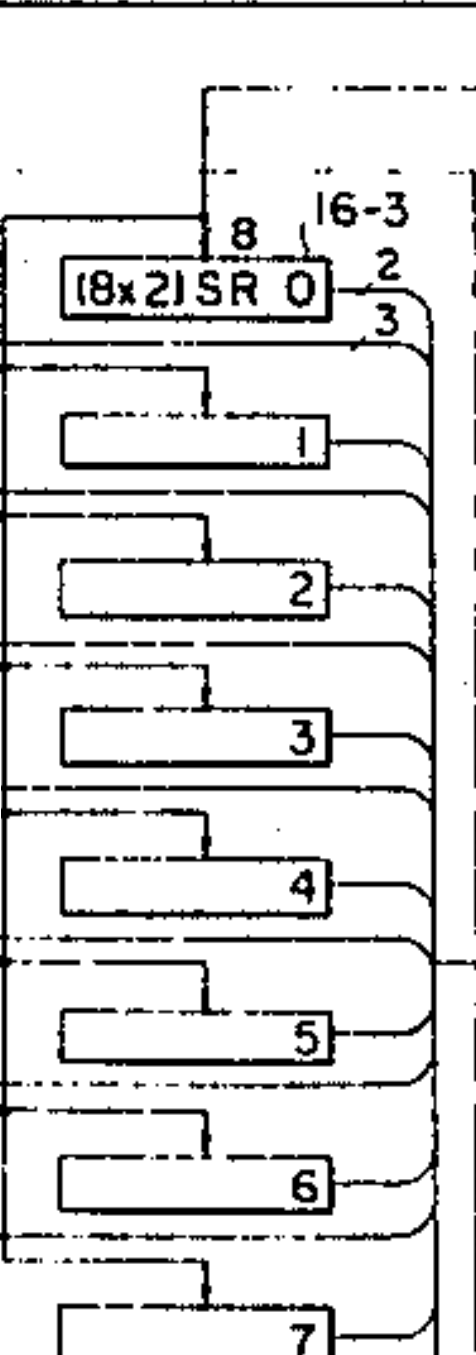
1,850 BITS
TEMPORARY MEMORY 32 BYTES

REGIS

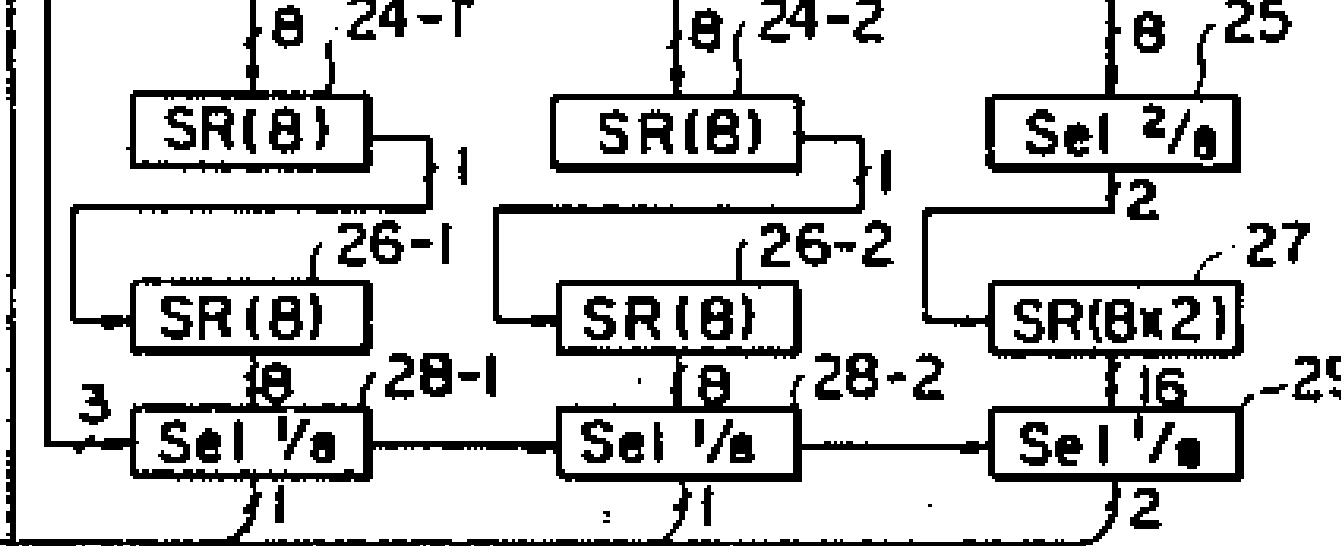
V. INVERSION



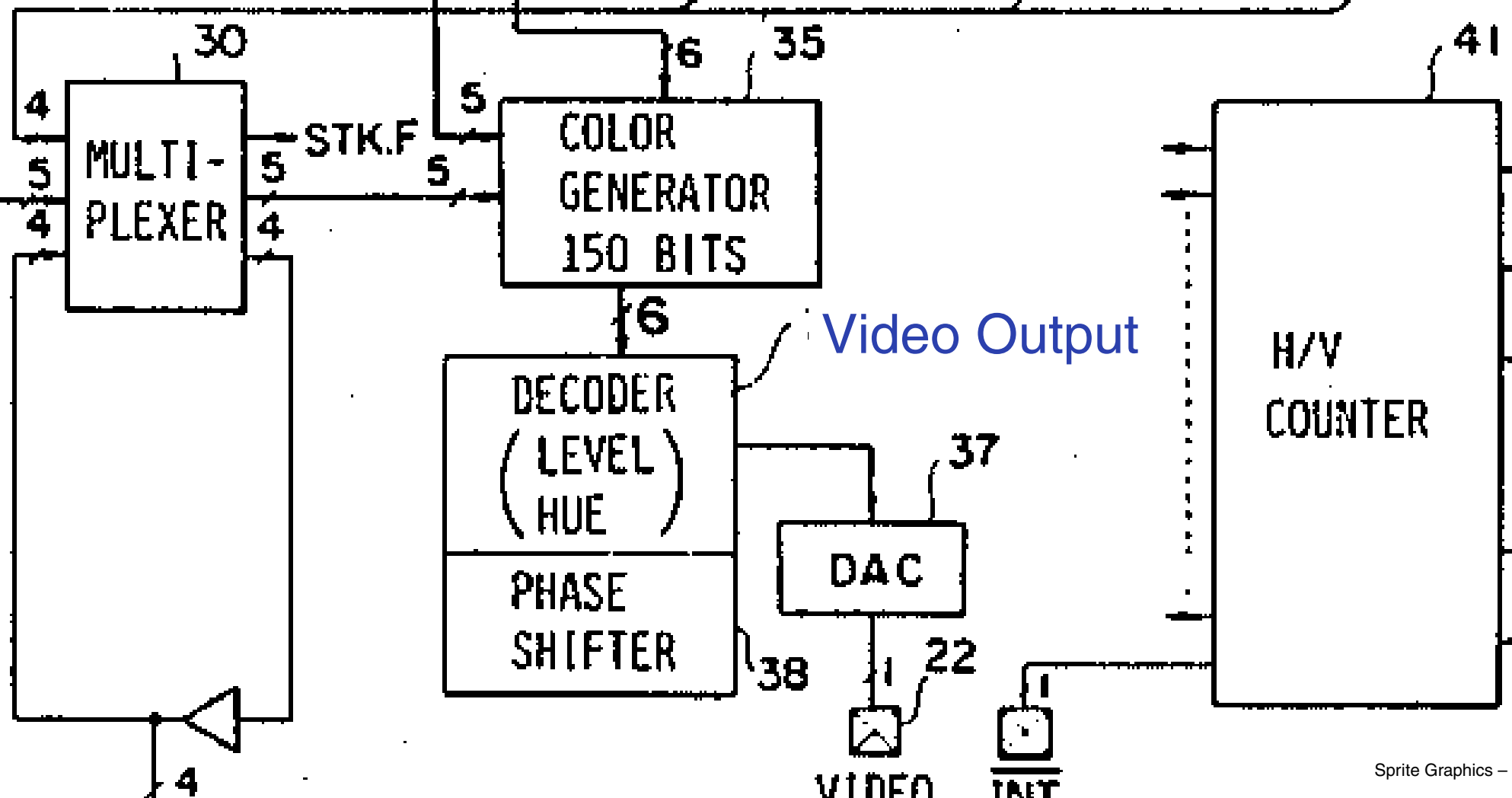
Sprite Generators



Tile Output



Video Output



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

Simplified Memory Map

Pattern Table: bitmaps for tiles & sprites

Name Table: Tile numbers

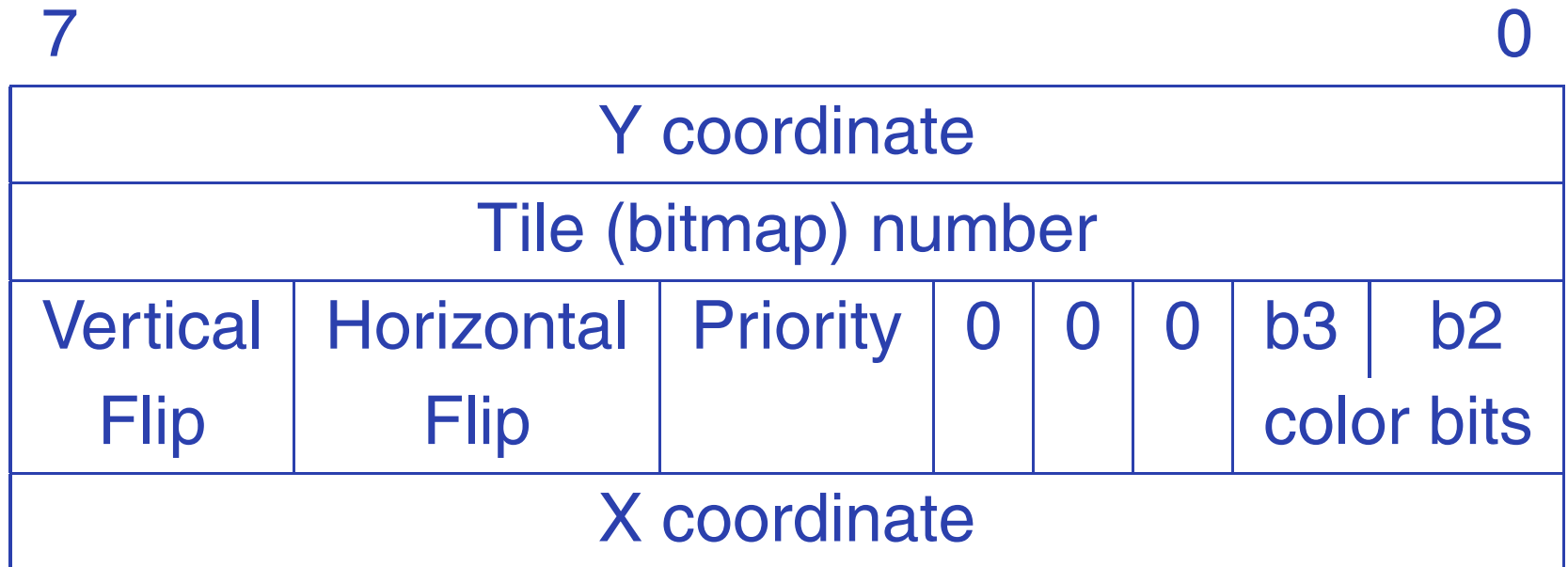
Attribute Table: Extra tile color information

Sprite Palette: 16 colors

Tile Palette: 16 colors

Sprite Information

Sprite Information



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.

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