# Volt32 GPU

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## General

- The GPU is a 2D one, with sprites and backgrounds.
- Tiles are 8x8.
- The screen resolution of the console is 320x240, or 40 tiles by 30 tiles.
- There are 76,800 bytes, or 320 * 240 bytes, of tile VRAM. This is enough for 1,200 tiles, which is a whole BG's worth of tiles.
- The GPU can also be set to treat tile VRAM as a single framebuffer.

# Sprites

- There are 128 sprites.
- Sprites can be of two different sizes: 8x8 and 16x16.
- There can be up to 64 sprites per scanline.
- Sprites have a 3-bit drawing priority field. If two sprites have the same drawing priority and collide with one another, the lower numbered sprite's pixel will be drawn instead of the one with the higher number's pixel. If a sprite has the same or more priority as a background, it will be drawn on top of the background, not counting when a sprite will be drawn on top of that sprite.
- The format of a sprite attribute table (SAT) entry is as follows:

| Name | Bit Range | Description |
|---|---|---|
| Reserved[8] | [31:24] | *Reserved for future expansion* |
| Size[0:0] | [23] | `0b0` for 8x8, `0b1` for 16x16 |
| Priority[3] | [22:20] | Drawing priority |
| Tile Index[17] | [19:3] | Which tile to draw |
| Horizontal Flip[1] | [2] | Whether or not to flip the sprite horizontally when it's drawn |
| Vertical Flip[1] | [1] | Whether or not to flip the sprite vertically when it's drawn |
| Reserved[1] | [0] | *Reserved for future expansion* |

## Backgrounds

- There are 4 backgrounds.
- Backgrounds have a 3-bit drawing priority field. In the case of a tie in drawing priority between two backgrounds, the lower numbered background's pixel will be drawn on top of the higher numbered background's pixel.
- Backgrounds can be scrolled vertically and horizontally.
- Tilemaps are 512x256, or 64 tiles by 32 tiles. There is a grand total of 16 kiB of tilemap space, or 16 bits per every background tile.
- The format of a tilemap entry is as follows:

| Name | Bit Range | Description |
|---|---|---|