

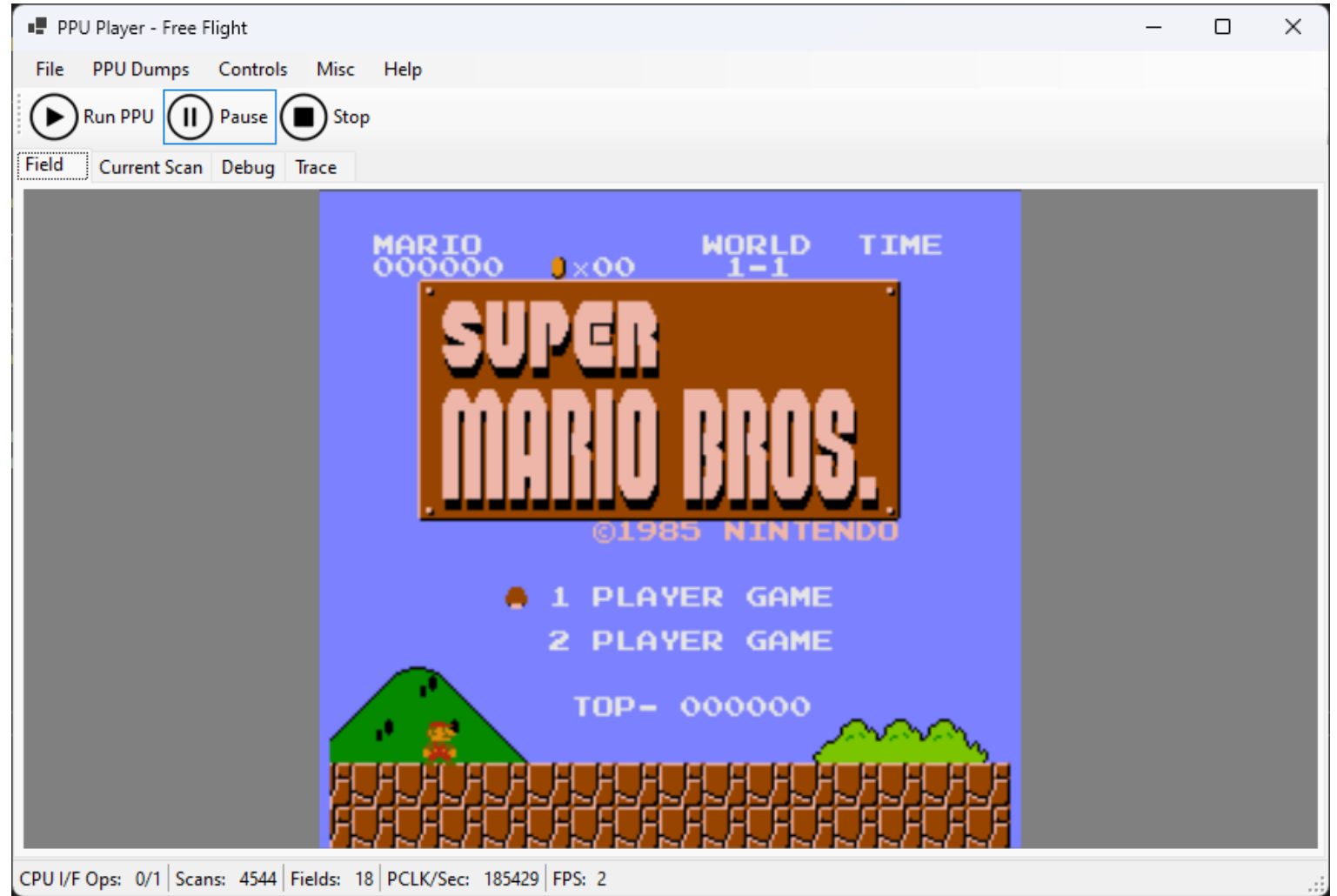
# PPU Player

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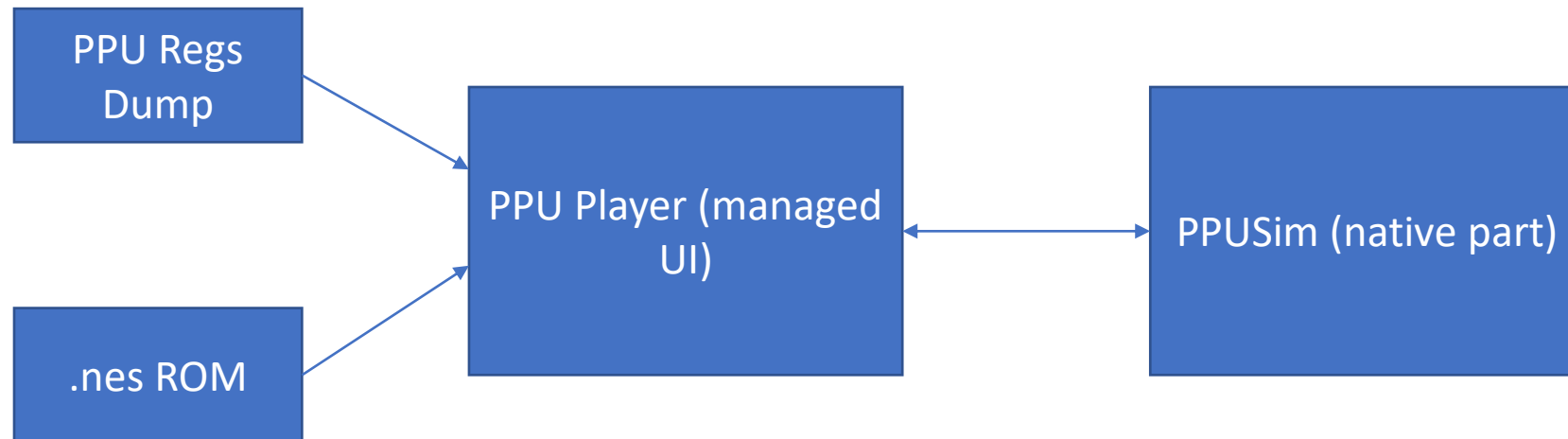
[breaknes/BreaksPPU/PPUPlayer at main · emu-russia/breaknes \(github.com\)](https://github.com/emurussia/breaknes/tree/main/breaknes/PPUPlayer)

# What is it

Essentially a PPU emulator



# Architecture

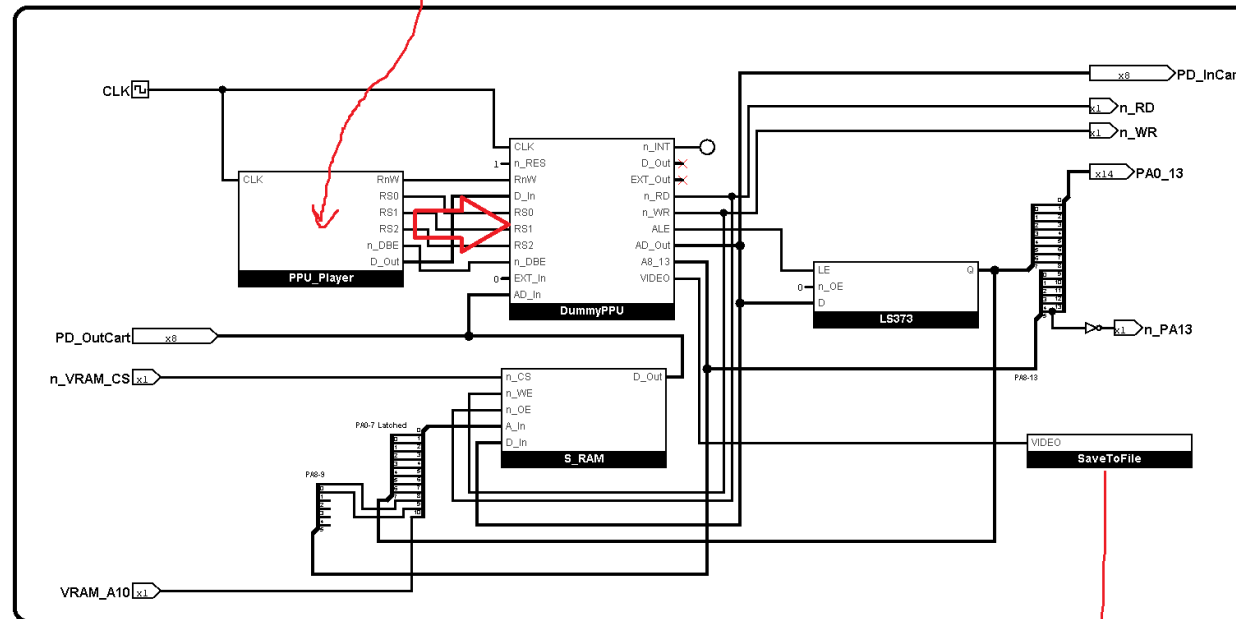


# A little more to make it clearer

A special version of the Nintendulator, which collects writes to the PPU registers in a dump (.bin file)

dump of writes into registers  
ppu\_dump.bin

PPUPlayer looks at the PCLK and writes to the PPU register when the moment comes



It sits in a .DLL

Samples are sampled.  
As it is sampled for 1 frame, it is output as Image.

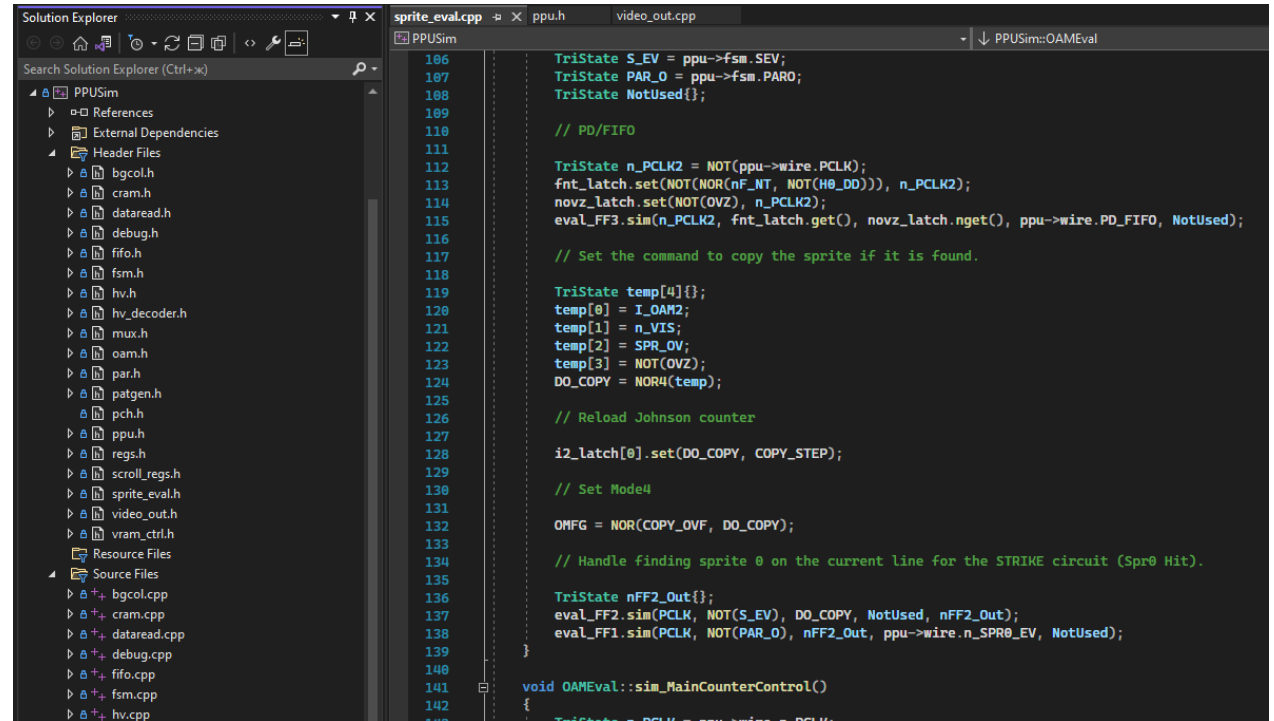
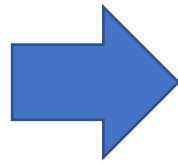
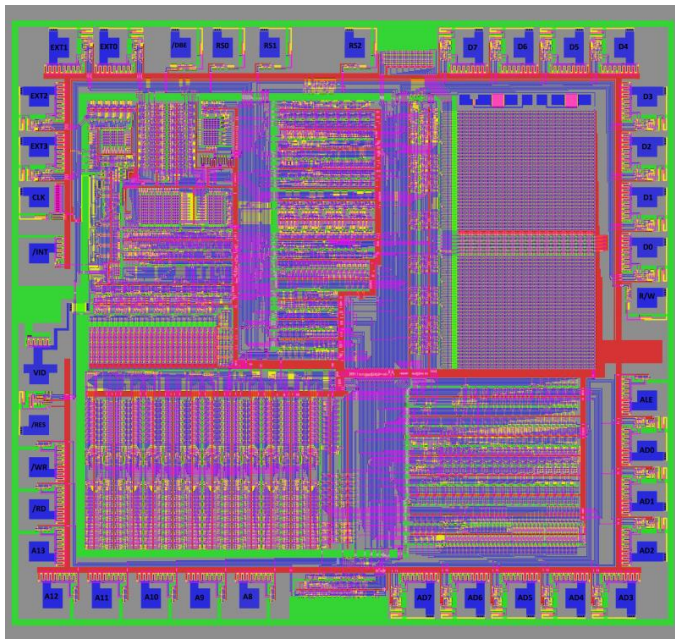


not required

bomberman.nes  
(or any other on Mapper 0)

# PPUSim

- A full-fledged C++ PPU simulator at the logic gate level



```
Solution Explorer
Search Solution Explorer (Ctrl+J)
PPUSim
  References
  External Dependencies
  Header Files
    bgcol.h
    cram.h
    dataread.h
    debug.h
    fifo.h
    fsm.h
    hv.h
    hv_decoder.h
    mux.h
    oam.h
    par.h
    patgen.h
    pch.h
    ppu.h
    regs.h
    scroll_regs.h
    sprite_eval.h
    video_out.h
    vram_ctrl.h
  Resource Files
  Source Files
    bgcol.cpp
    cram.cpp
    dataread.cpp
    debug.cpp
    fifo.cpp
    fsm.cpp
    hv.cpp
    sprite_eval.cpp
    ppu.h
    video_out.cpp

sprite_eval.cpp
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# NES ROM Images

- Simple dumps are supported, based on mapper 0 (NRROM)
- Bomberman, Super Mario etc.

# RegDump

- Dump of access to PPU registers on the CPU side
- Array of records in simple format

```
#pragma pack(push, 1)
struct PPULogEntry
{
    uint32_t    pclkDelta;    // Delta of previous PCLK counter value at the time of accessing to the register
    uint8_t     reg;         // PPU register index (0-7) + Flag (msb - 0: write, 1: read)
    uint8_t     value;       // Written value. Not used for reading.
    uint16_t    padding;     // Not used (yet?)
};
#pragma pack(pop)
```

# Free Flight Mode

- Press «Run PPU» and go
- PPU register dump or NES ROM are not required
- PPU outputs what is loaded in VRAM / CHR / OAM



# Settings

Settings

z

Board Features

OAMDecay

Keep

PPU\_Revision

RP2C02G

PpuRAWMode

False

ResetPPU

False

Debug

ColorDebug

True

RenderAlwaysEnabled

False

TraceCollapseSameRows

False

TraceEnable

False

TraceFilter

CLK;/CLK;PCLK;/PCLK;RES

TraceMaxFields

2

TraceTimeScale

23

Misc

FreeModeVMirroring

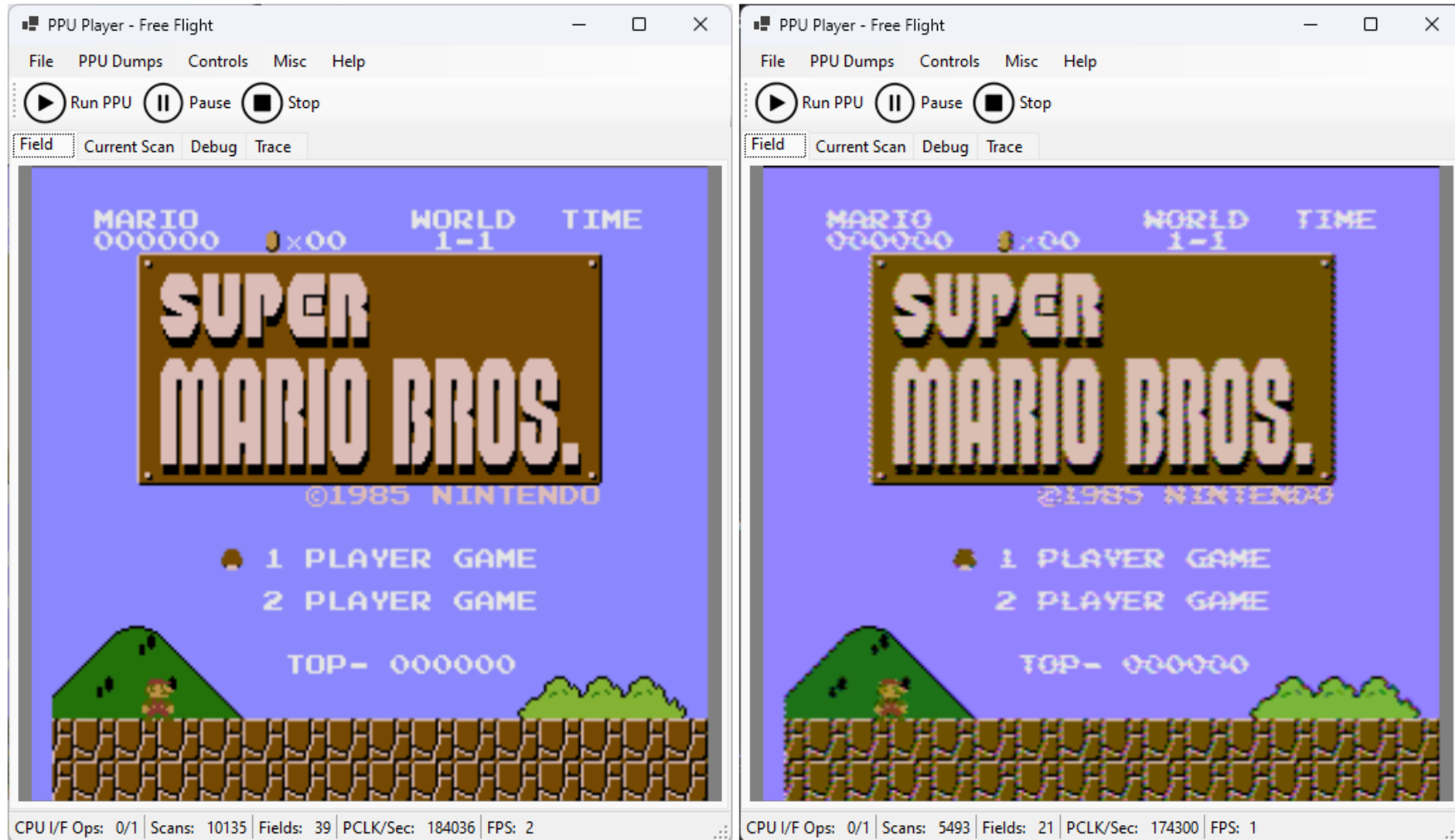
False

ColorDebug

Show color in the VRAM/Objects viewer. The CRAM currently in use will be loaded.

Save

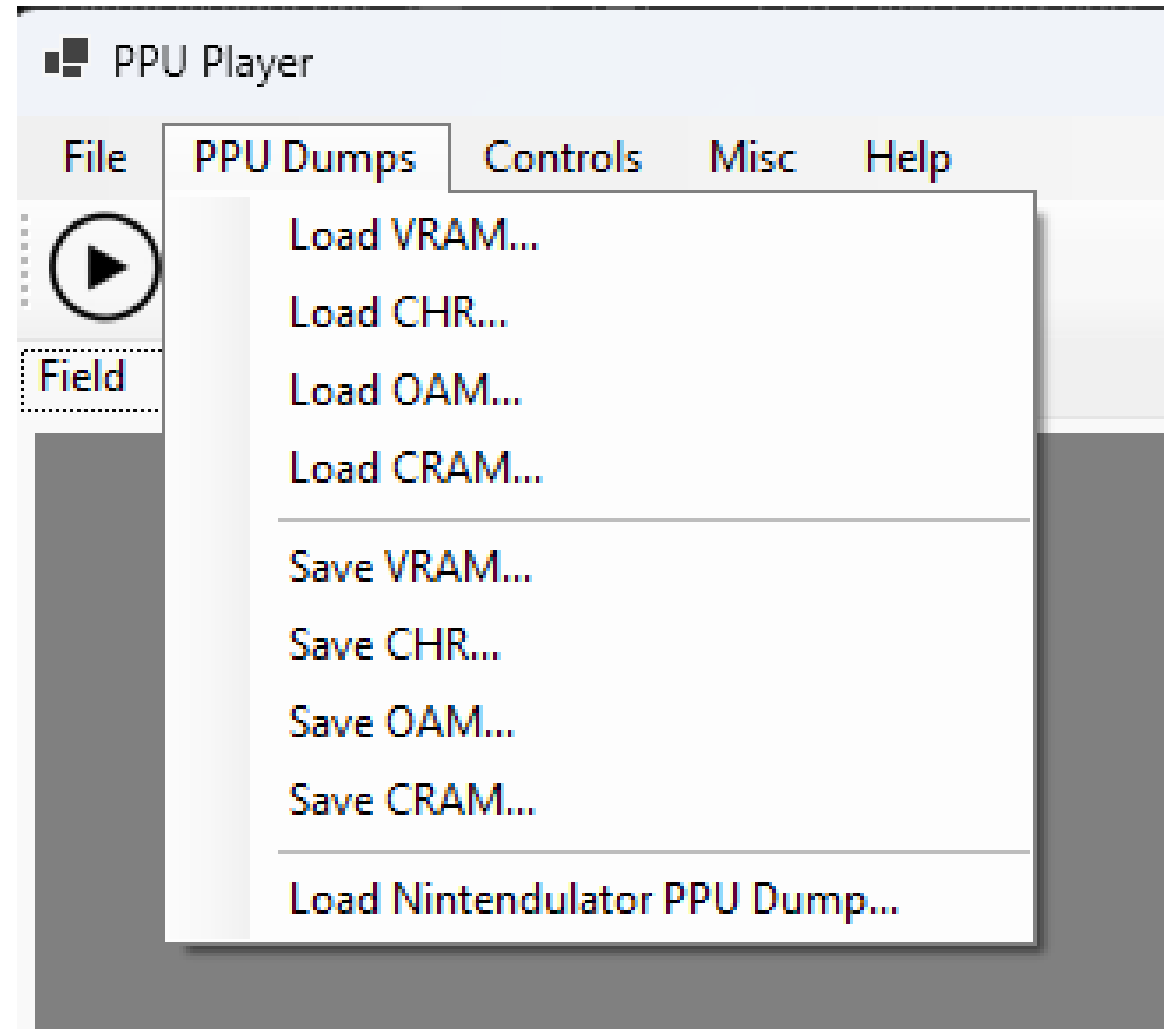
# RAW vs Composite



# Working with PPU memory dumps

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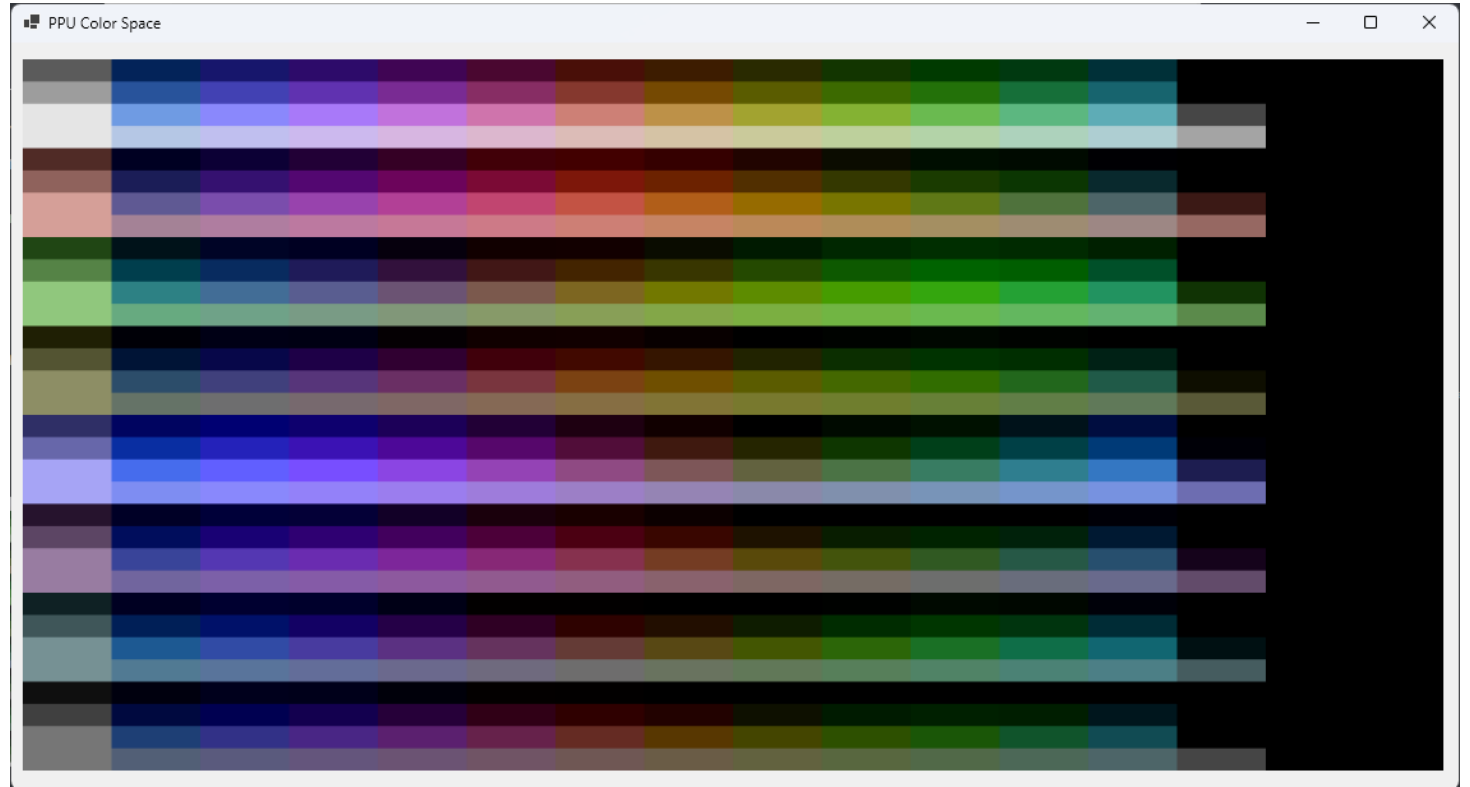
- VRAM / CHR / OAM / CRAM can be loaded and saved
- You can load a PPU memory dump from the Nintendulator



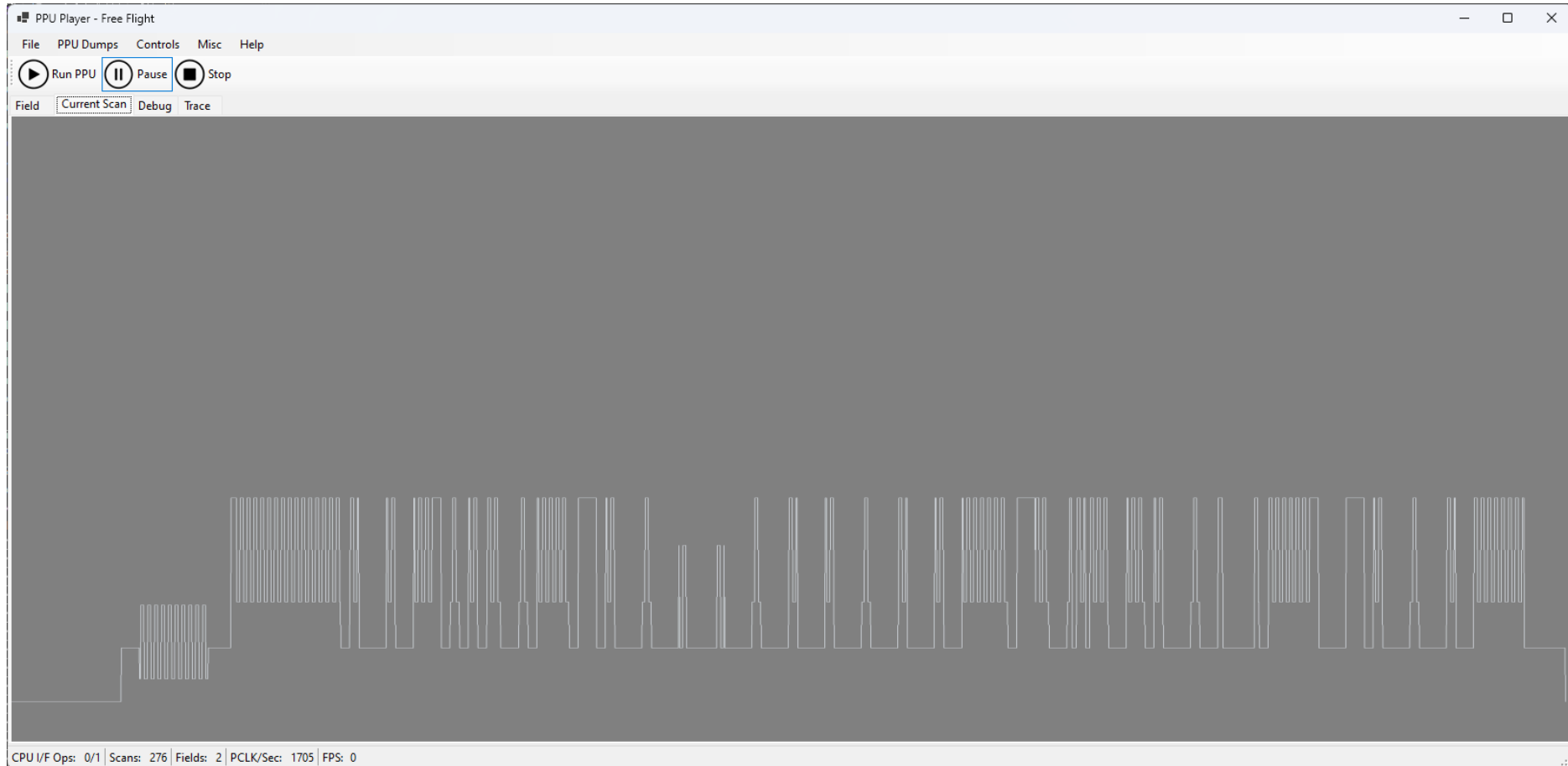
# PPU Color Space

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- Shows the color space ("palette") of the PPU
- Including Emphasis



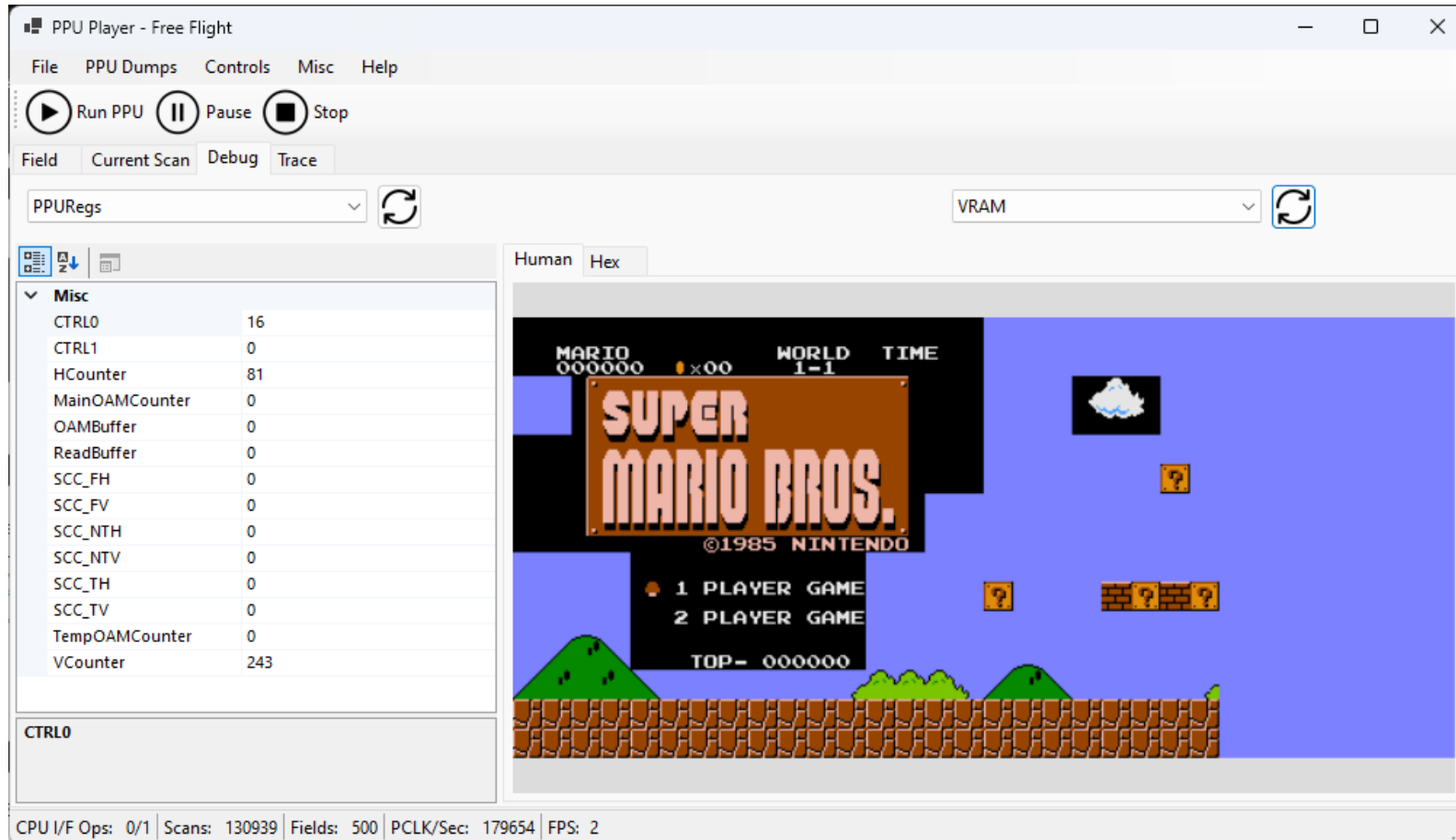
# Current video scanline



Makes brrrrr

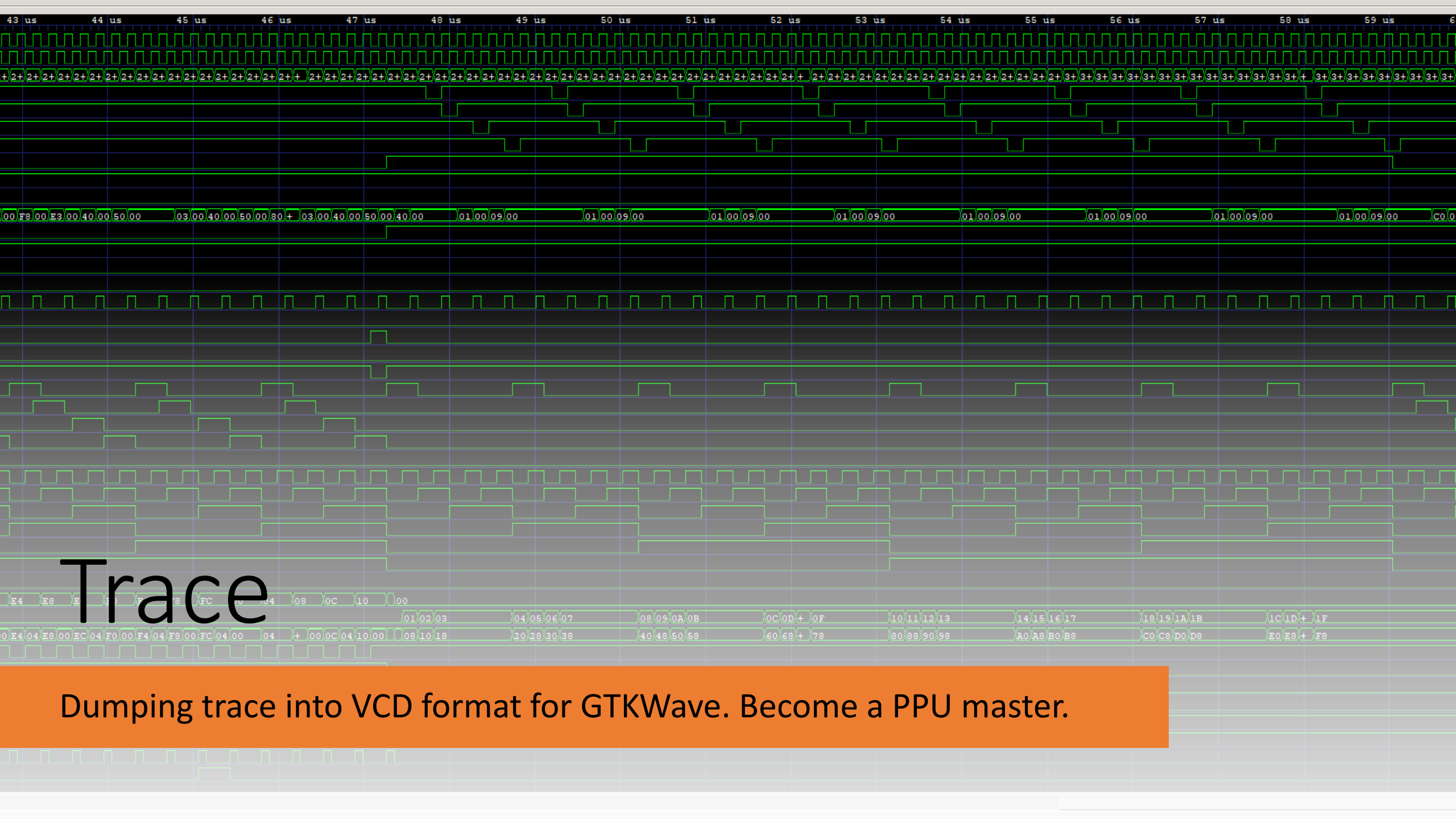
(\*) only for composite PPU's

# Debugging



# Debugging capabilities

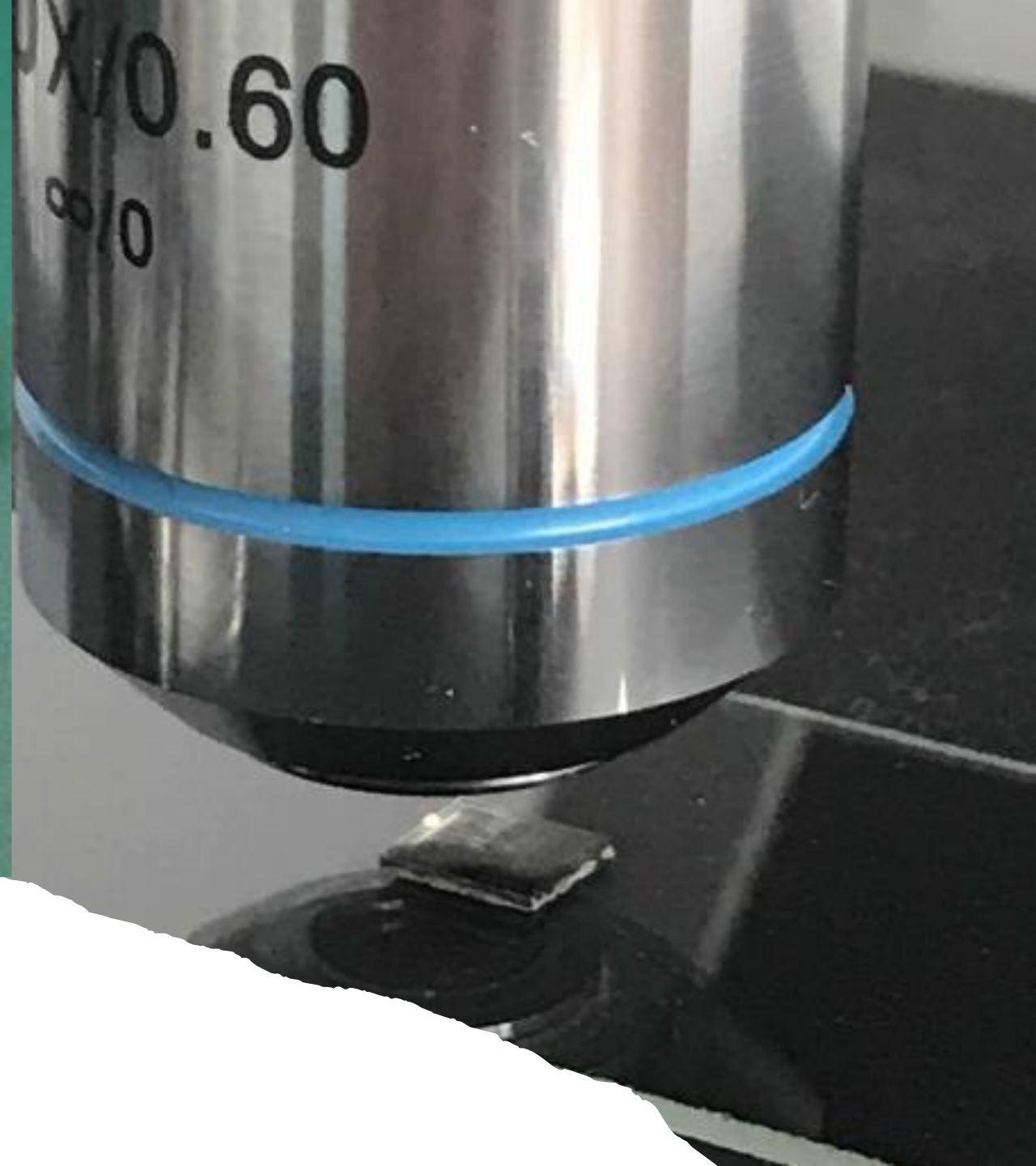
- Watch the state of PPU signals
- Watch the state of the PPU registers
- Change the value of PPU registers \$2000/\$2001 on the fly
- Watch VRAM / CHR / OAM / Temp OAM / CRAM memory in Hex
- Watching memory in a "human" representation



# Trace

Dumping trace into VCD format for GTKWave. Become a PPU master.





## Other PPU Revisions

Not ready yet, stay tuned ;)

# Questions?

- Ask @org / Discord