



UIT
TRƯỜNG ĐẠI HỌC
CÔNG NGHỆ THÔNG TIN

TÊN ĐỒ ÁN: THIẾT KẾ MẠCH FIFO8x4

Giáo viên phụ trách: Lâm Đức Khải

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MỤC LỤC

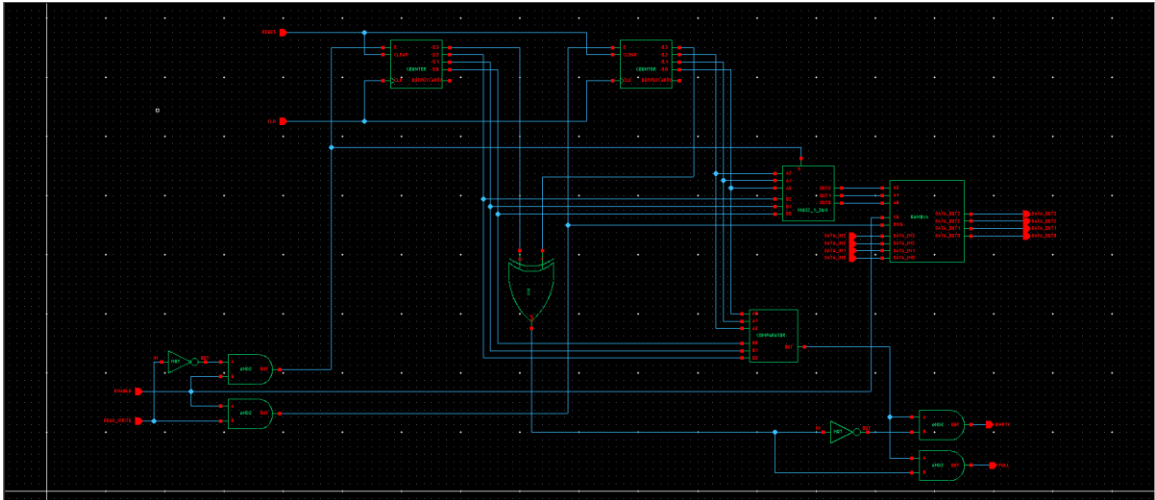
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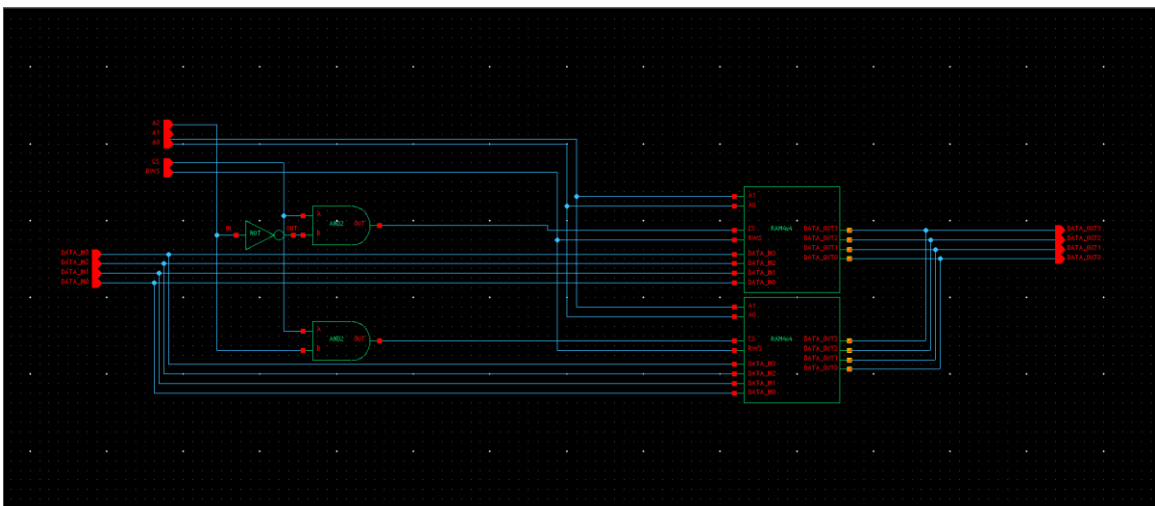
MỤC 1: Theory

MỤC 2: Schematic design

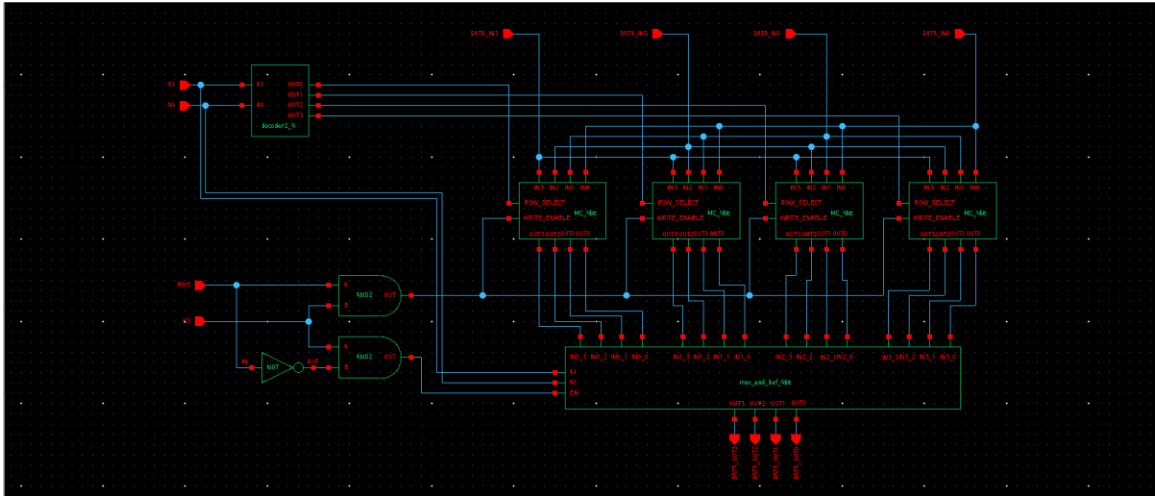
2.1. Schematic FIFO8x4



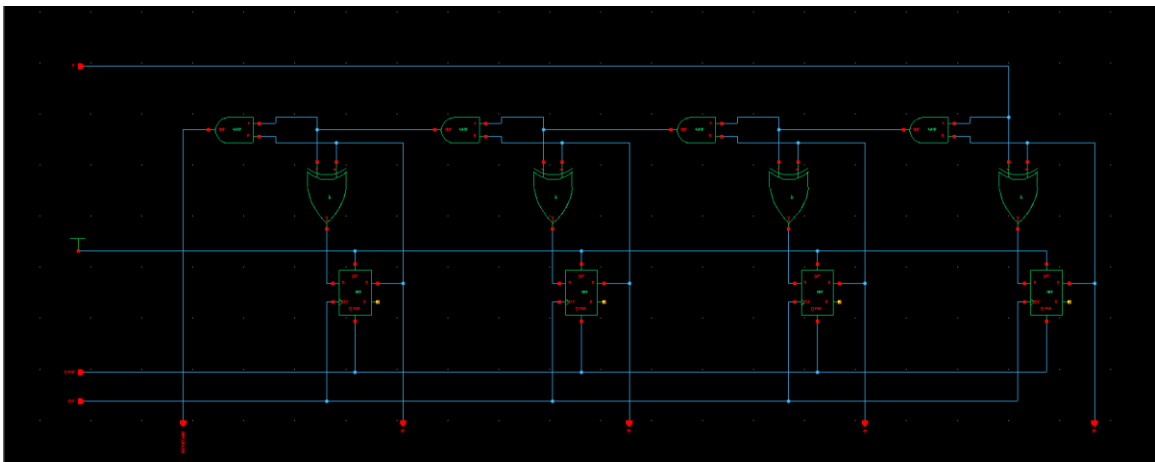
2.2. Schematic RAM8x4



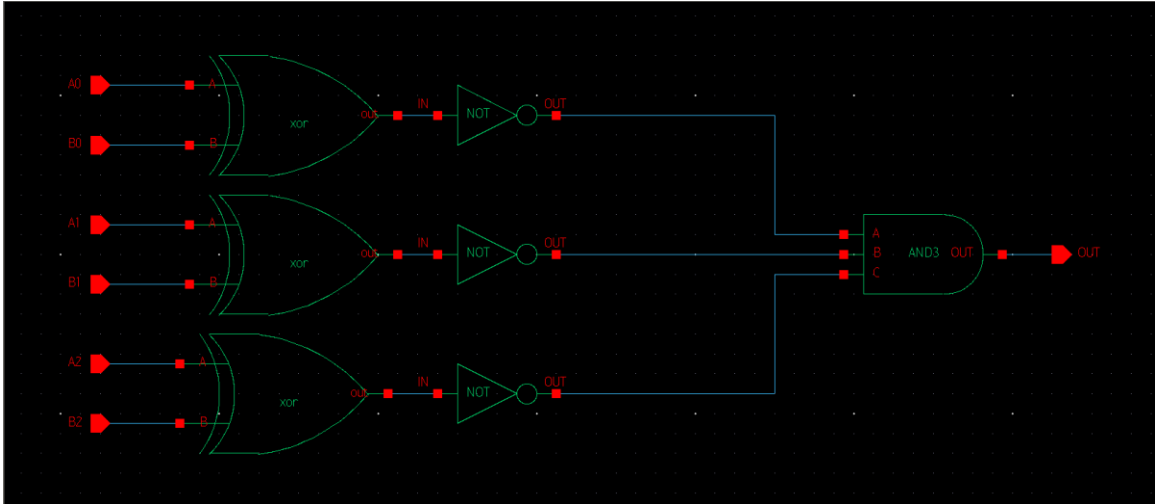
RAM8x4 được thiết kế từ RAM4x4.



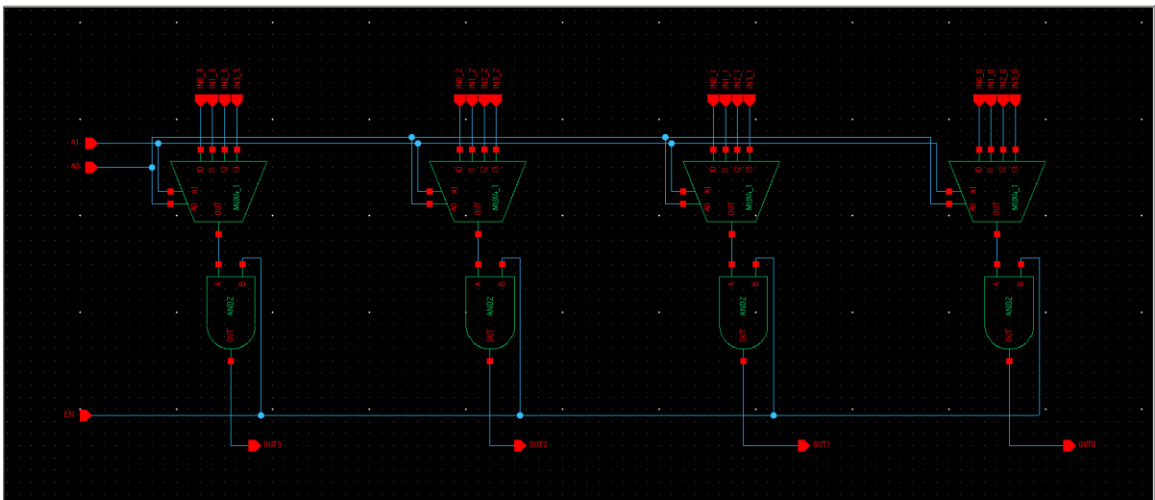
2.3. Schematic Counter 4BIT



2.4. Schematic Comparator 3BIT

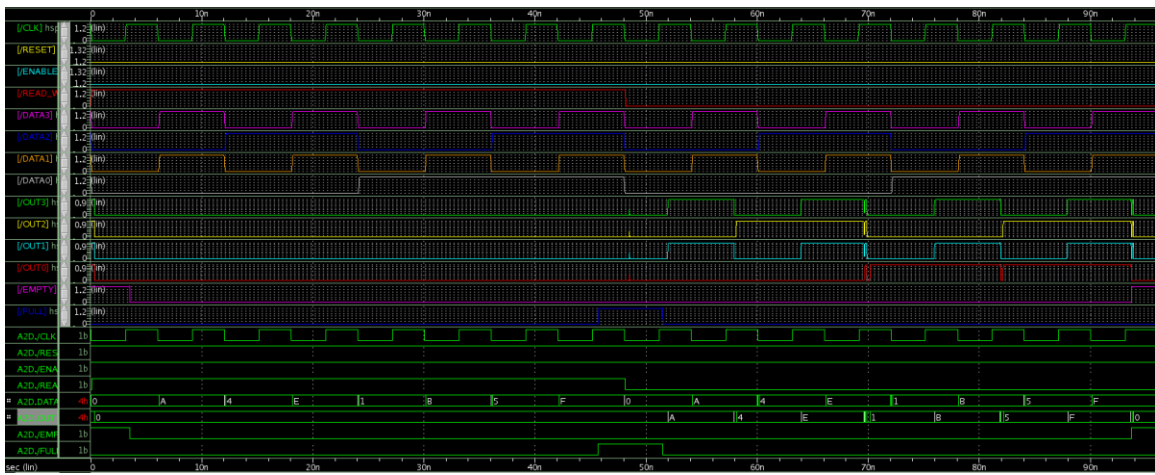


2.5. Schematic MUX41 4BIT

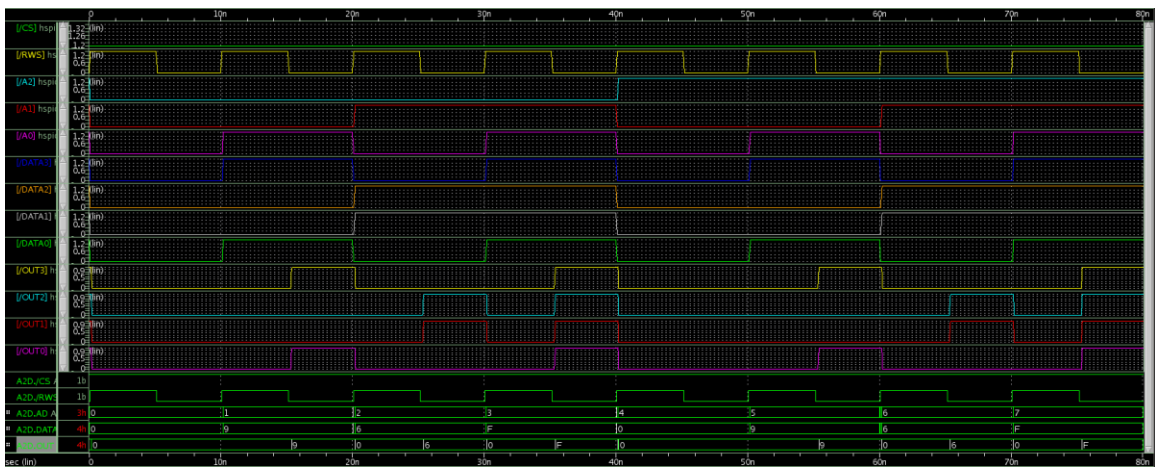


MỤC 3: HSPICE pre-layout simulation results and comments

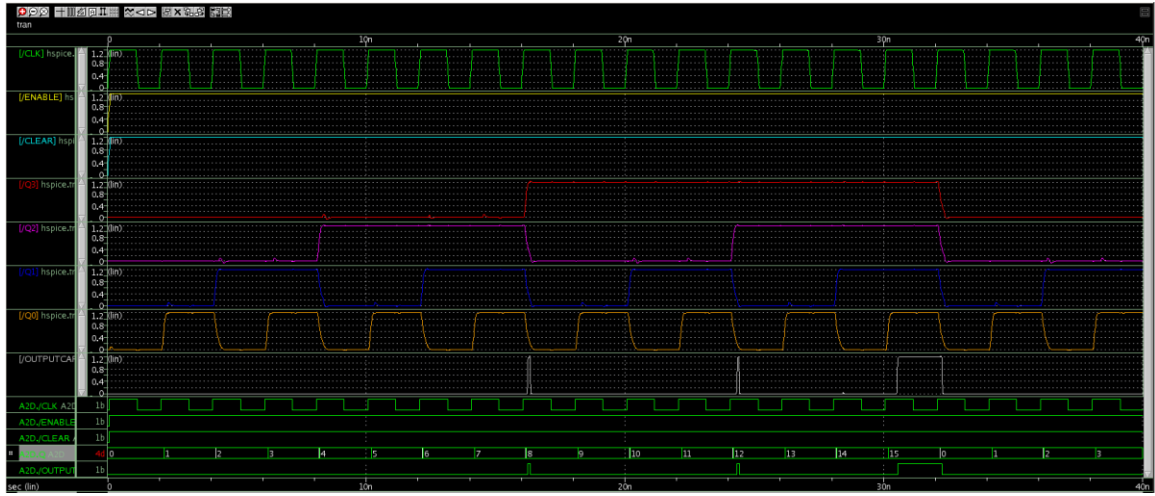
3.1. HSPICE pre-layout FIFO8x4



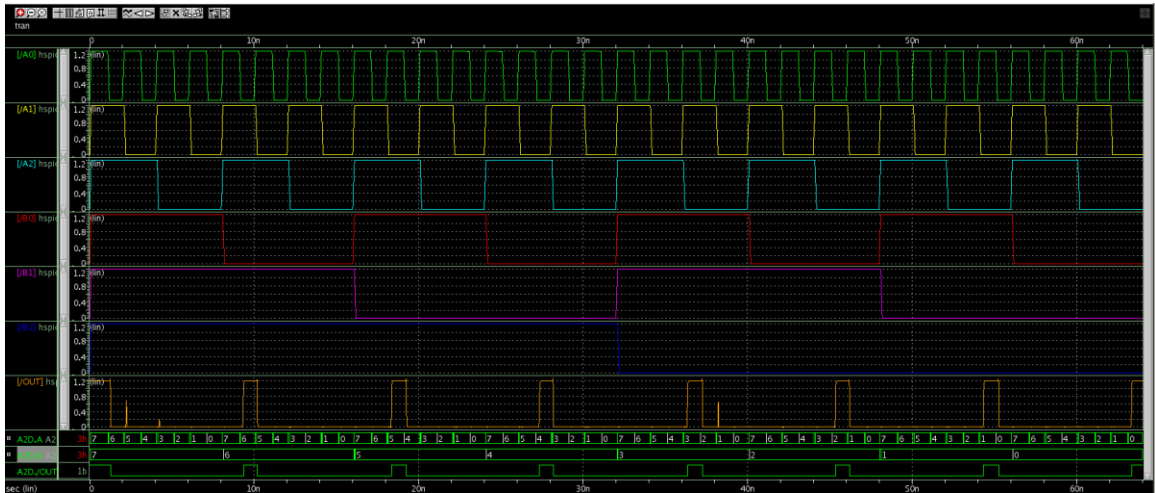
3.2. HSPICE pre-layout RAM8x4



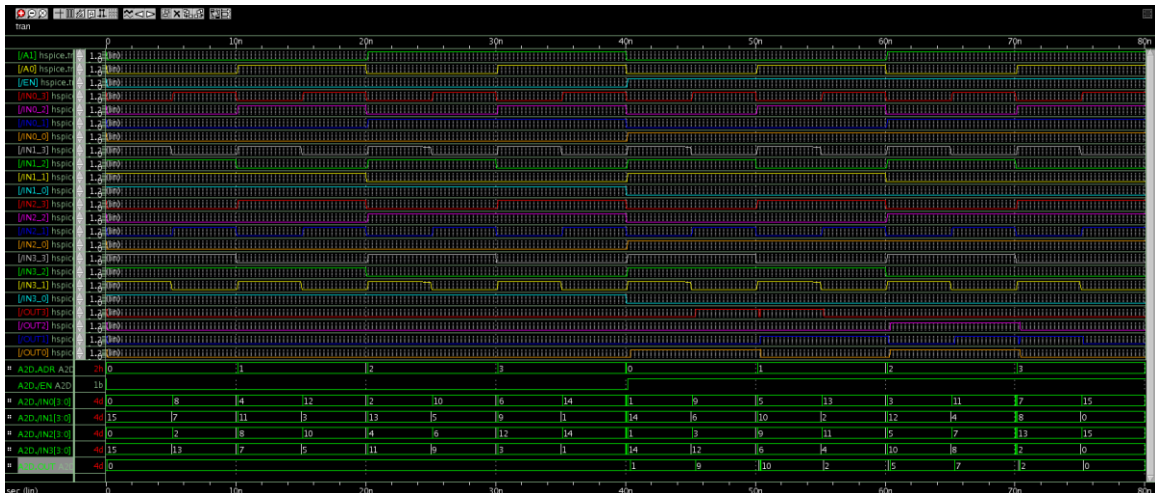
3.3. HSPICE pre-layout Counter 4BIT



3.4. HSPICE pre-layout Comparator 3BIT

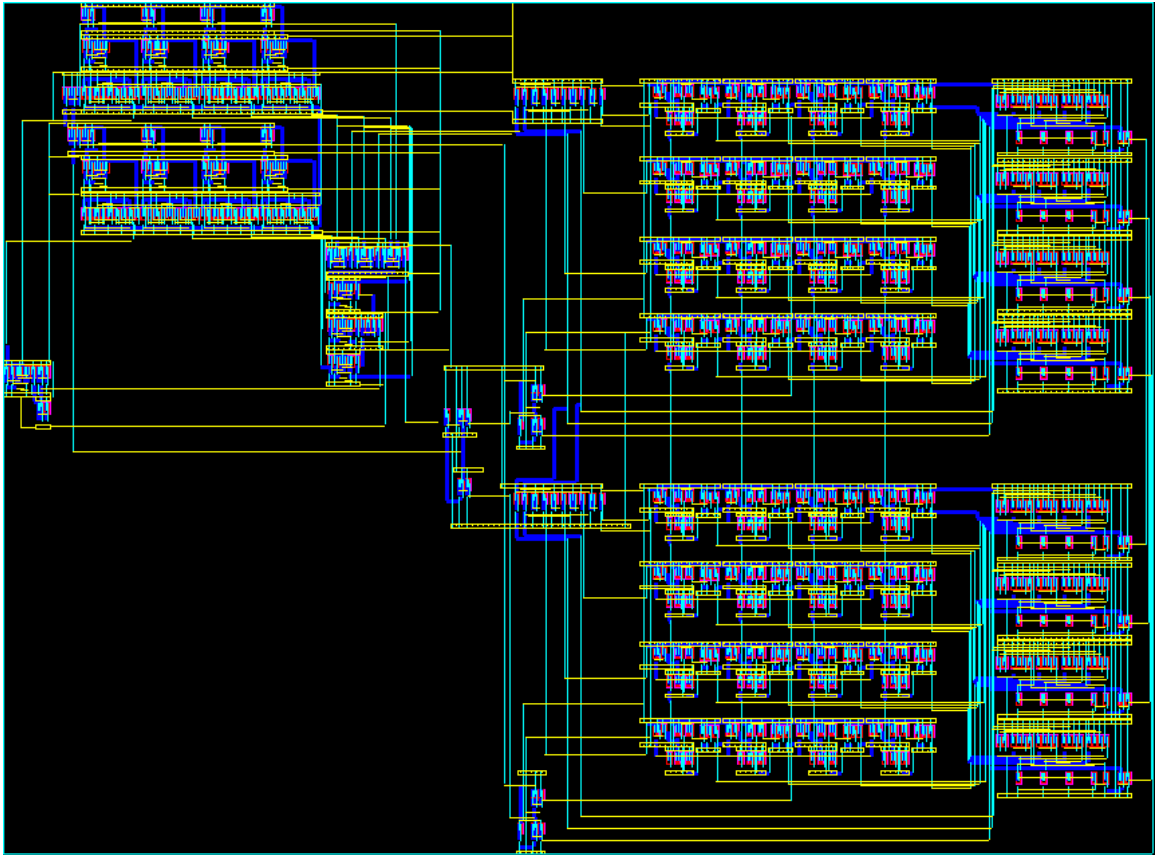


3.5. HSPICE pre-layout MUX41 4BIT

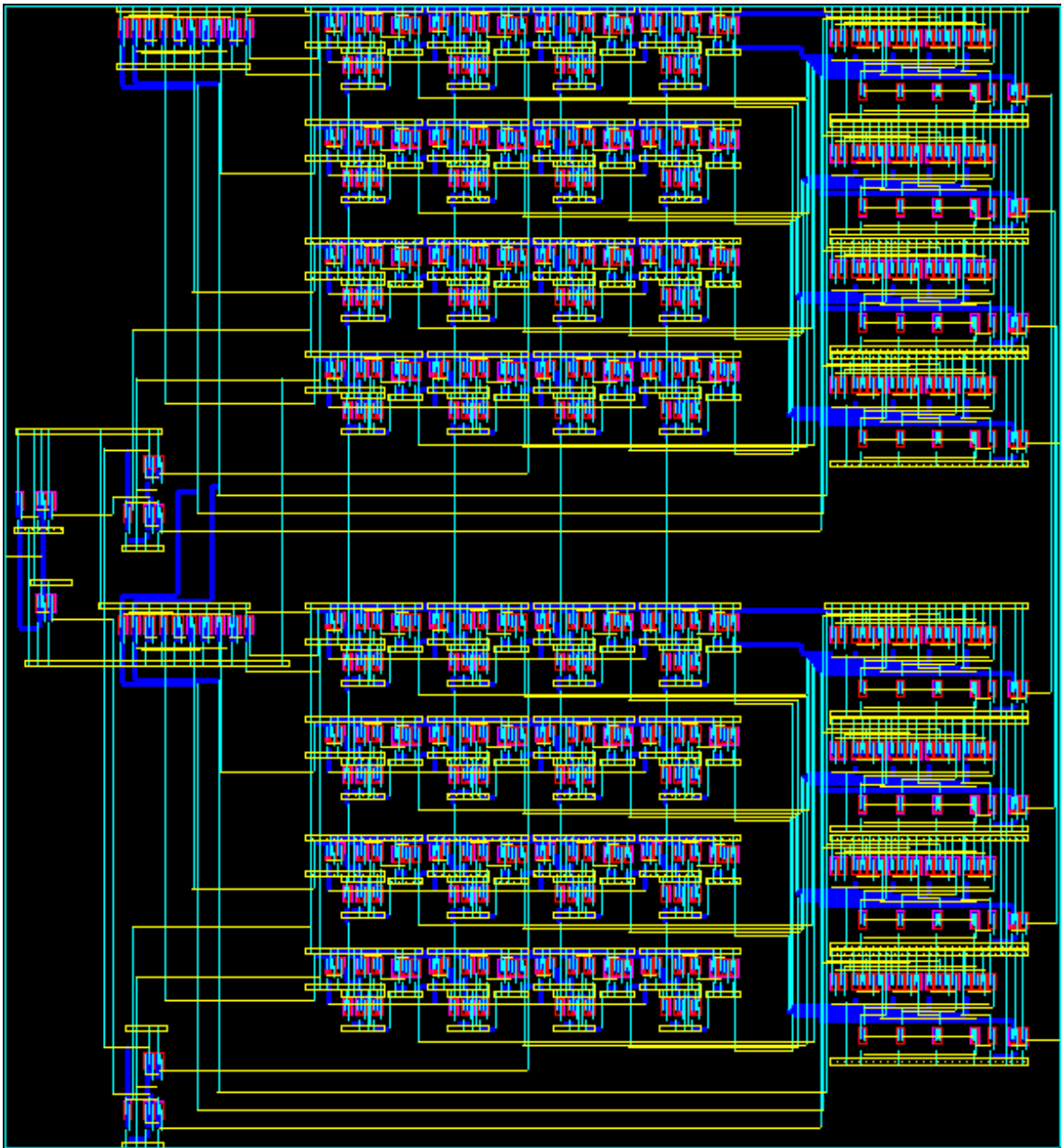


MỤC 4: Layout design

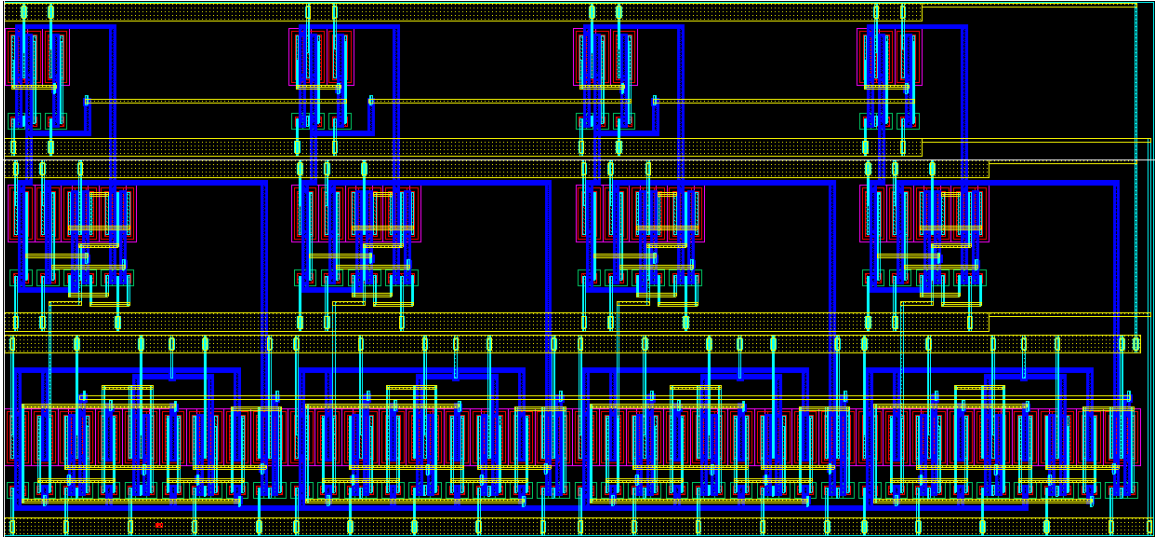
4.1. Layout FIFO8x4



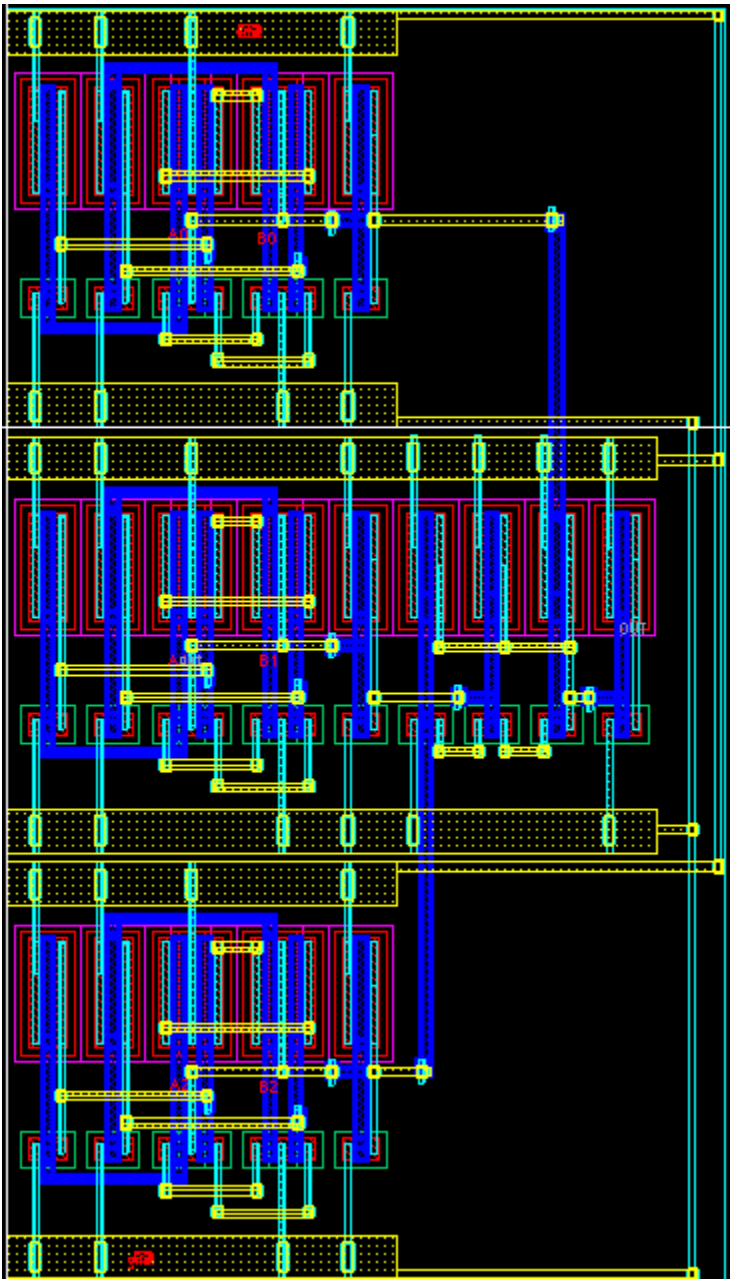
4.2. Layout RAM8x4



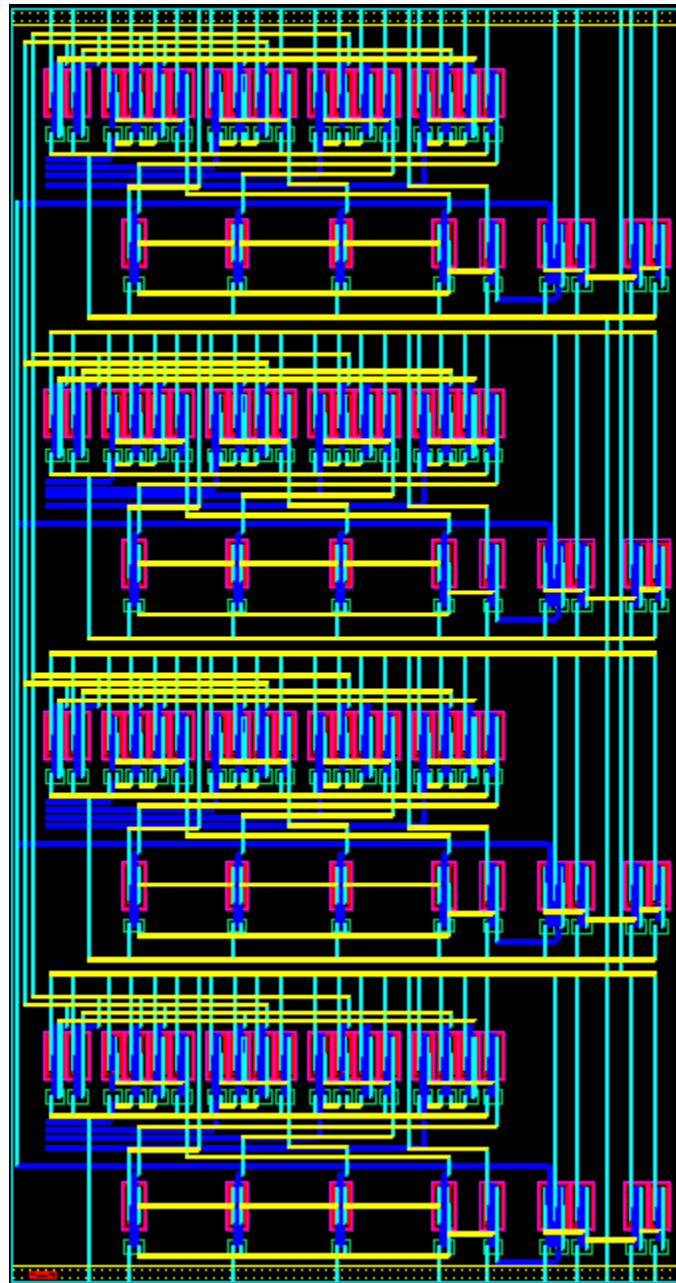
4.3. Layout Counter 4BIT



4.4. Layout Comparator 3BIT



4.5. Layout MUX41 4BIT



MỤC 5: DRC, LVS , Area check results

5.1. FIFO8x4

Kết quả đạt được : No rule violation ở tất cả các khối.

```
Checking "ThangLibrary/testbench_fifo8x4/schematic"
No rule violations found in "ThangLibrary/testbench_fifo8x4/schematic"
No hierarchical rule violations found in "ThangLibrary/testbench_fifo8x4/schematic"
Information: "Starting netlisting..." (NETLISTING-010)
No hierarchical rule violations found in "ThangLibrary/testbench_fifo8x4/schematic"
Information: "Netlisting finished successfully." (NETLISTING-012)
Information: "Composing simulator input file..."
Information: "Simulator input file composed successfully"
Information: "Starting HSPICE simulation"
Information: "Simulation completed successfully."
Information: "Evaluating and plotting outputs..."
Information: Launching Waveform Viewer "cd /root/simulation/ThangLibrary/testbench_fifo8x4/config/HSPICE/nominal/results && wv -k -c-designer > /root/simulation/ThangLibrary/testbench_fifo8x4/config/HSPICE/nominal/results"
Information: Waveform Viewer exited normally.
Information: License 'Schematic Editor' checked in. (LICENSE-004)
Information: License 'Simulation Environment' checked in. (LICENSE-004)
Information: License 'Layout Editor' checked out. (LICENSE-003)
=====
JobID: hercules_drc_1
Completed with no errors.
=====
```

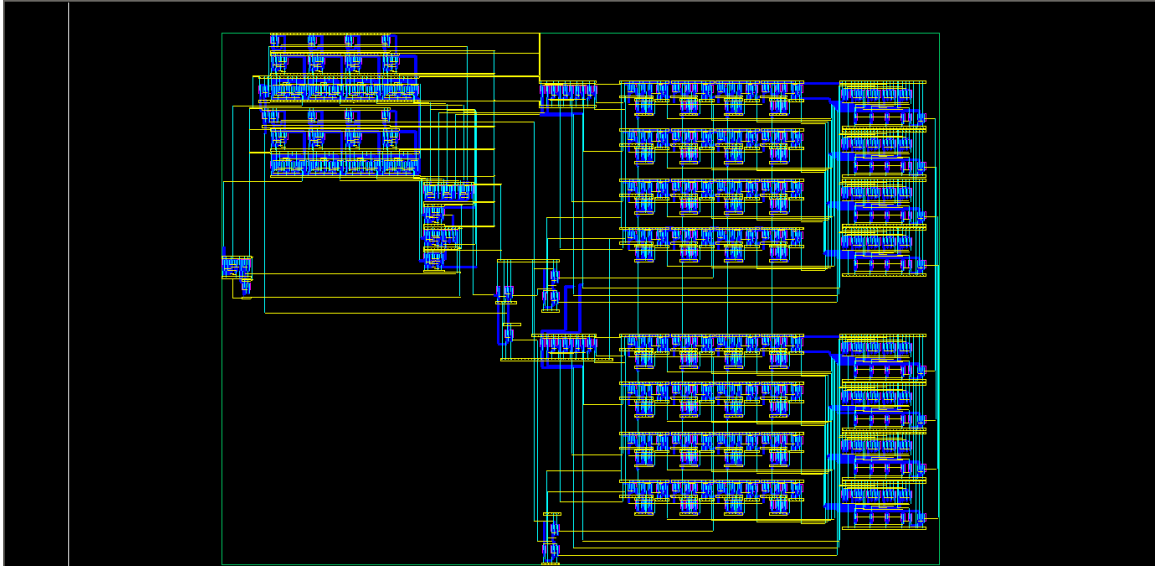
Hình 5.1. 1 DRC FIFO8x4

```
No hierarchical rule violations found in "ThangLibrary/Fifo8x4/schematic"
Information:
Checking "ThangLibrary/and2/schematic"
No rule violations found in "ThangLibrary/and2/schematic"
Information:
Checking "ThangLibrary/xor/schematic"
No rule violations found in "ThangLibrary/xor/schematic"
Information:
Checking "ThangLibrary/dff/schematic"
No rule violations found in "ThangLibrary/dff/schematic"
Information:
Checking "ThangLibrary/and3/schematic"
No rule violations found in "ThangLibrary/and3/schematic"
Information:
Checking "ThangLibrary/ram8x4/schematic"
No rule violations found in "ThangLibrary/ram8x4/schematic"
Information:
Checking "ThangLibrary/mux_and_buf_4bit/schematic"
No rule violations found in "ThangLibrary/mux_and_buf_4bit/schematic"
Information:
Checking "ThangLibrary/mux4_1/schematic"
No rule violations found in "ThangLibrary/mux4_1/schematic"
Information:
Checking "ThangLibrary/or4/schematic"
No rule violations found in "ThangLibrary/or4/schematic"
Information:
Checking "ThangLibrary/nor4/schematic"
No rule violations found in "ThangLibrary/nor4/schematic"
Information:
Checking "ThangLibrary/mux2_1_3bit/schematic"
No rule violations found in "ThangLibrary/mux2_1_3bit/schematic"
Information:
Checking "ThangLibrary/mux2_1/schematic"
No rule violations found in "ThangLibrary/mux2_1/schematic"
Information: "Netlisting finished successfully." (NETLISTING-012)
=====
JobID: hercules_lvs_1
Completed with no errors.
=====
```

Hình 5.1 2 LVS FIFO8x4

```
Checking "ThangLibrary/xor/schematic"
No rule violations found in "ThangLibrary/xor/schematic"
Information:
Checking "ThangLibrary/dff/schematic"
No rule violations found in "ThangLibrary/dff/schematic"
Information:
Checking "ThangLibrary/and3/schematic"
No rule violations found in "ThangLibrary/and3/schematic"
Information:
Checking "ThangLibrary/ram8x4/schematic"
No rule violations found in "ThangLibrary/ram8x4/schematic"
Information:
Checking "ThangLibrary/mux_and_buf_4bit/schematic"
No rule violations found in "ThangLibrary/mux_and_buf_4bit/schematic"
Information:
Checking "ThangLibrary/mux4_1/schematic"
No rule violations found in "ThangLibrary/mux4_1/schematic"
Information:
Checking "ThangLibrary/or4/schematic"
No rule violations found in "ThangLibrary/or4/schematic"
Information:
Checking "ThangLibrary/nor4/schematic"
No rule violations found in "ThangLibrary/nor4/schematic"
Information:
Checking "ThangLibrary/mux2_1_3bit/schematic"
No rule violations found in "ThangLibrary/mux2_1_3bit/schematic"
Information:
Checking "ThangLibrary/mux2_1/schematic"
No rule violations found in "ThangLibrary/mux2_1/schematic"
Information: "Netlisting finished successfully." (NETLISTING-012)
=====
JobID: hercules_lvs_1
Completed with no errors.
=====
JobID: starc_lpe_7
Completed with no errors.
=====
```

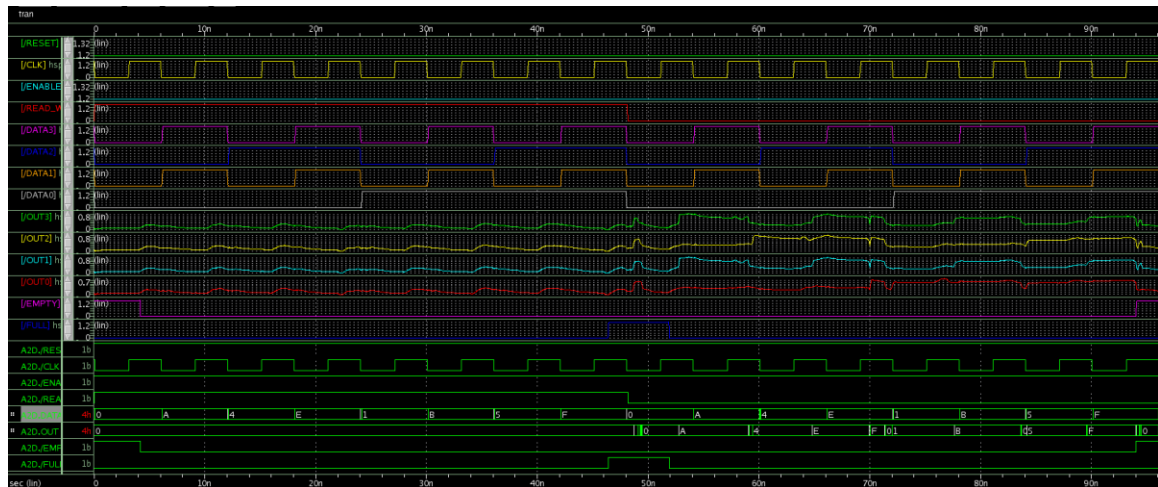
Hình 5.1 3 LPE FIFO8x4



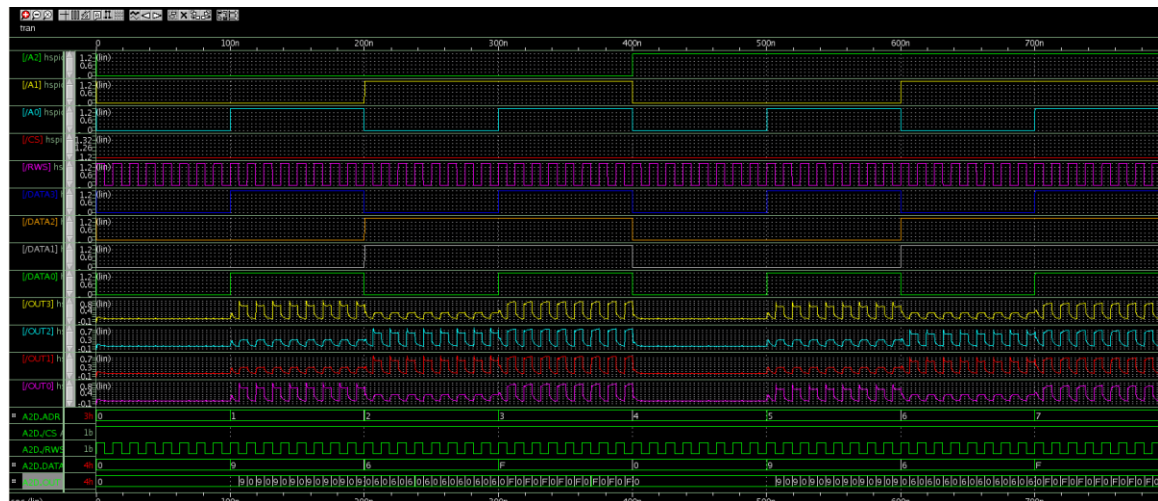
Hình 5.1 4. Starrrc FIFO8x4

CHƯƠNG 6: HSPICE post-layout

6.1. HSPICE post-layout FIFO8x4



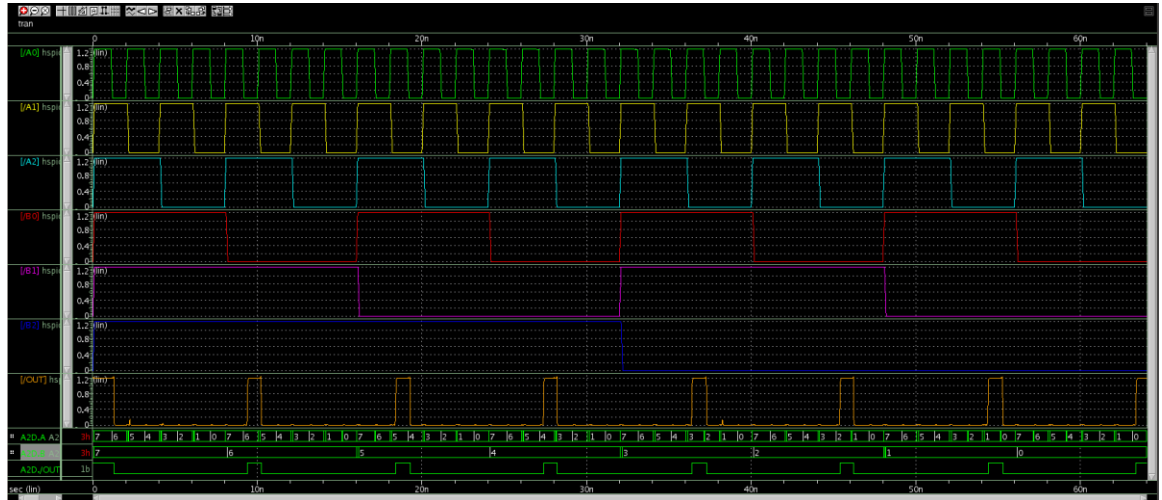
6.2. HSPICE post-layout RAM8x4



6.3. HSPICE post-layout Counter 4BIT



6.4. HSPICE post-layout Comparator 3BIT



6.5. HSPICE post-layout MUX41 4BIT

