Something about the CPEN 311 Lab 2

Something about the SOF File

It is located here: ./rtl/simple_ipod_solution.sof

Something about the status

All parts complete, including music playback, pause, resume, speedup, speed down, speed reset, forward, backward.

R key is implemented

44KHz is implemented

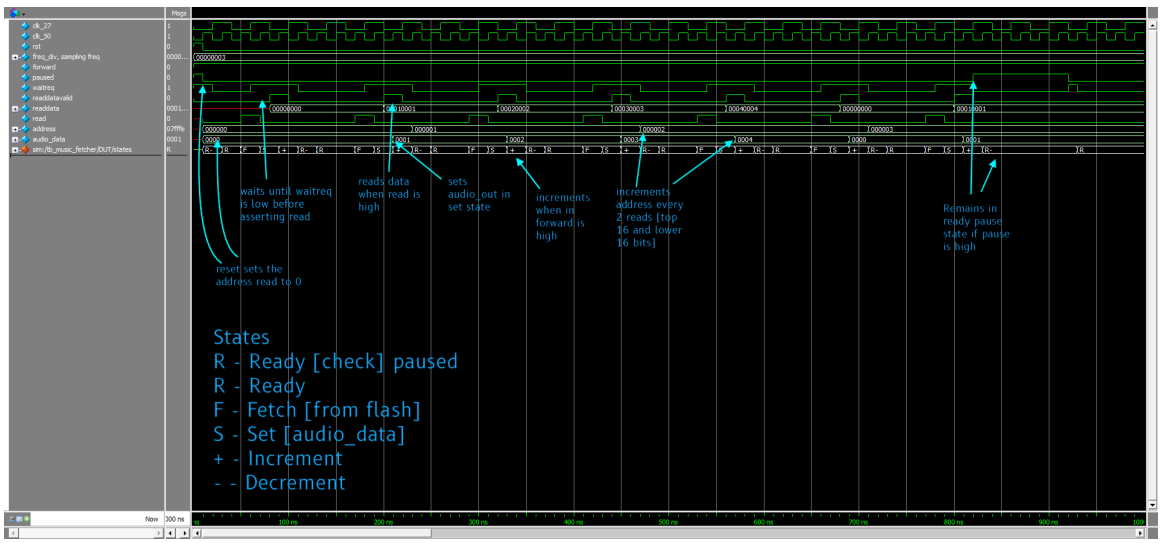
Additional titanic.jic for your listening pleasure.

Annotated Screenshots

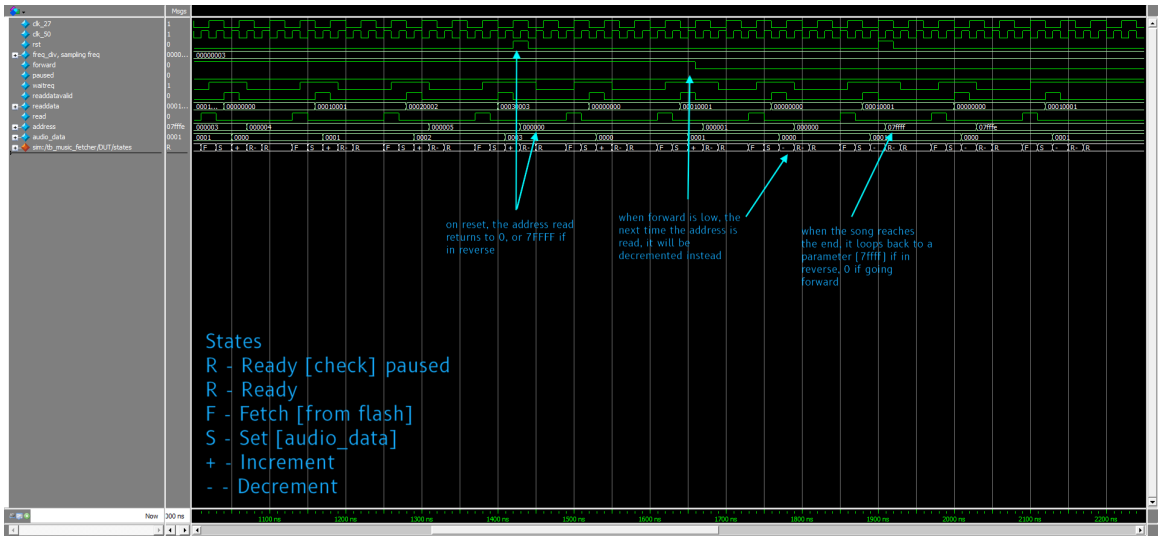
Full sized screenshots are located in the ./doc folder

Simulations

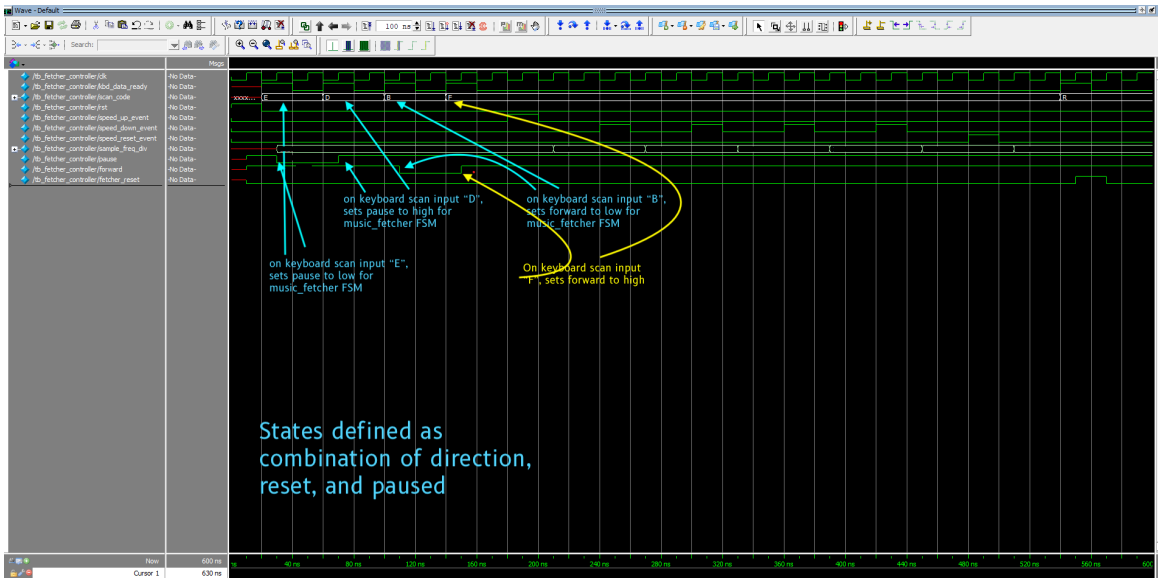
Music fetcher FSM 1 - Wait, read, increment



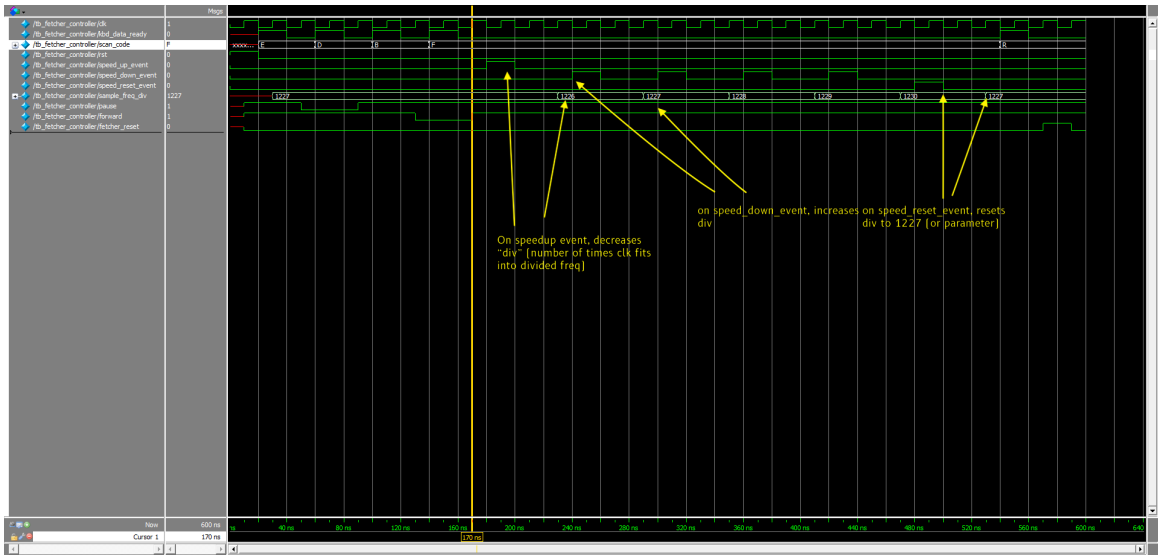
Music fetcher FSM 2 - Reset, reverse, and song end



Fetcher Controller FSM 1 - Keyboard inputs

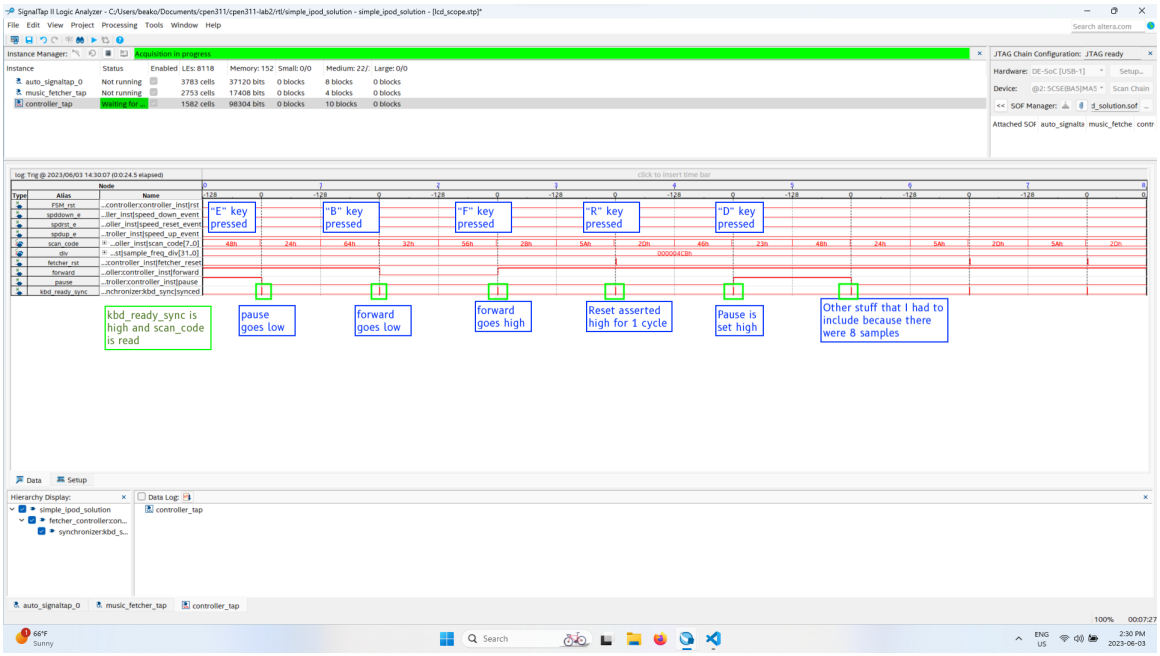


Fetcher controller FSM 2 - Pushbutton events

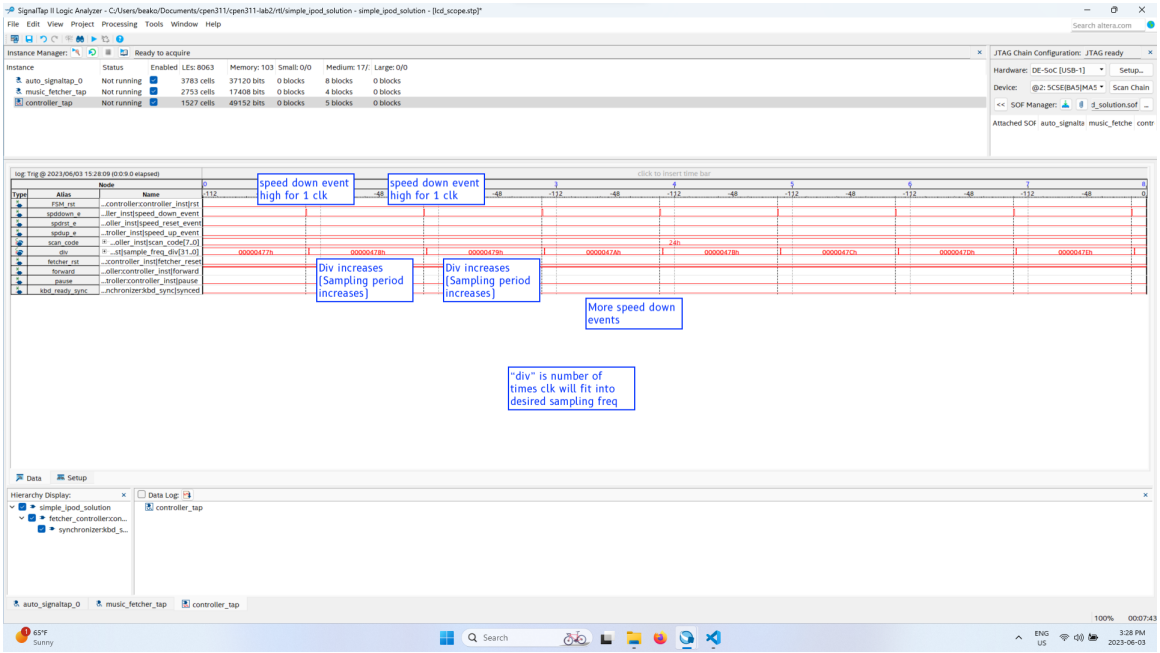


Signaltap screenshots

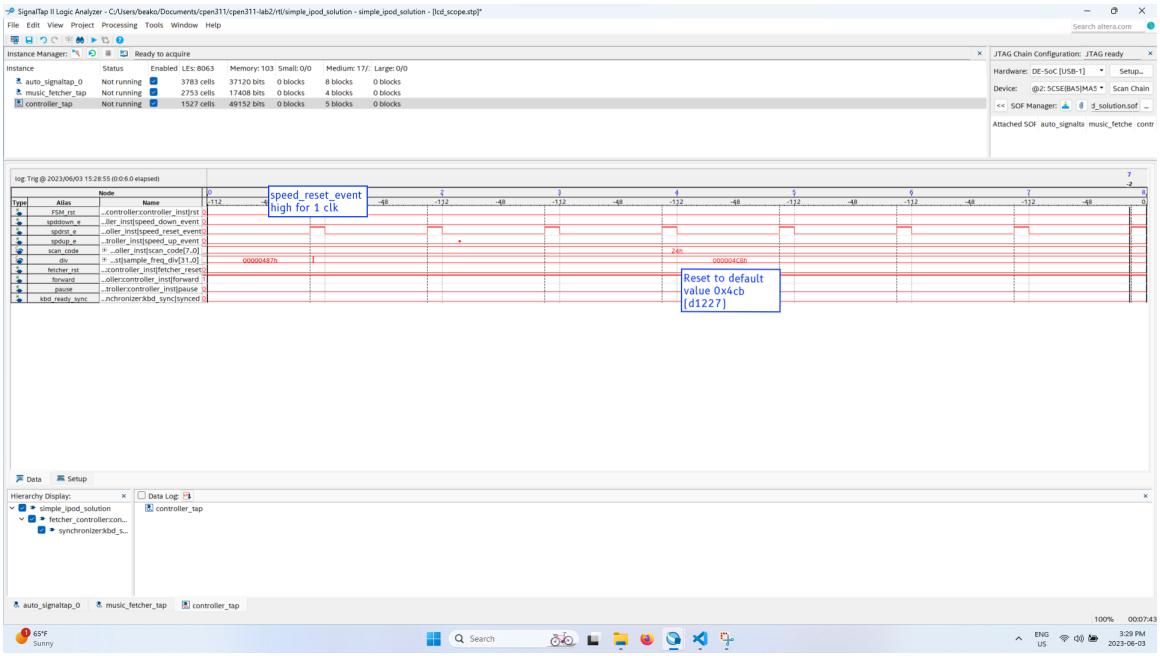
Fetcher controller FSM 1, keyboard E, B, F, R, D



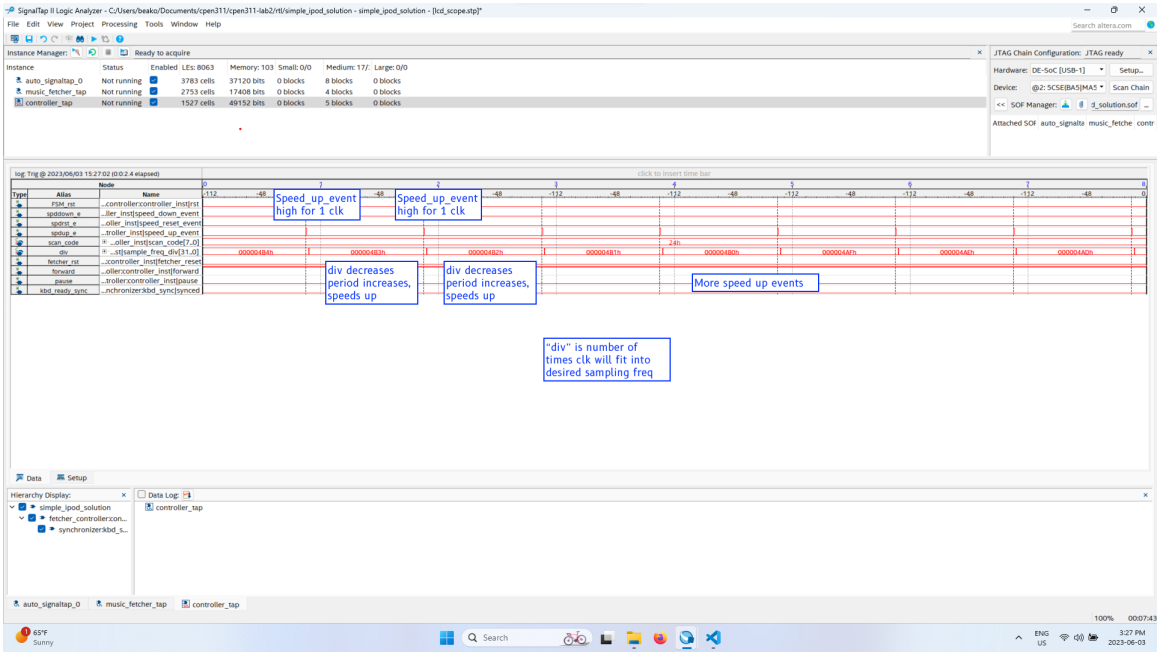
Fetcher controller FSM 2 - Speed reset event



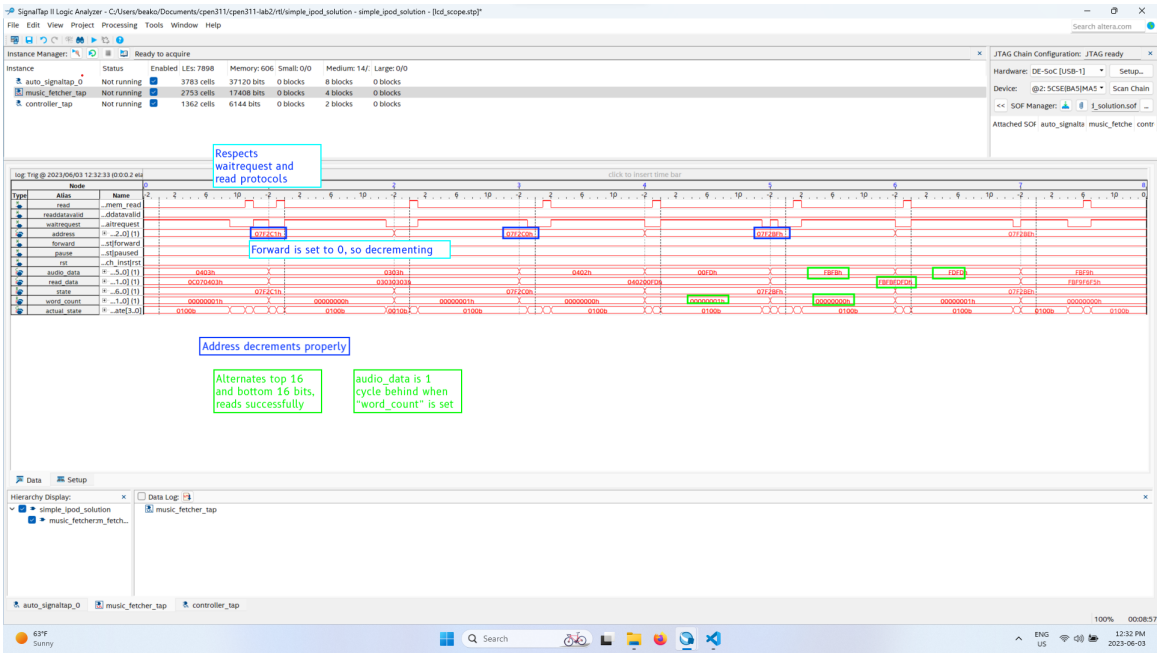
Fetcher controller FSM 3 - Speed up event



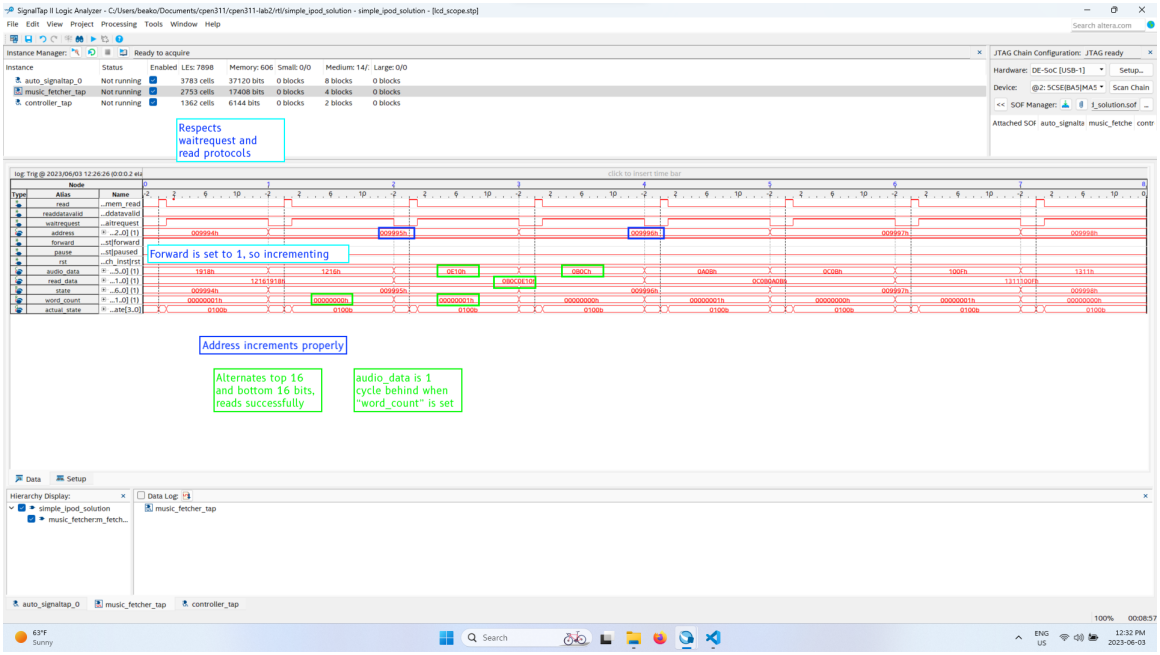
Fetcher controller FSM 4 - Speed up event



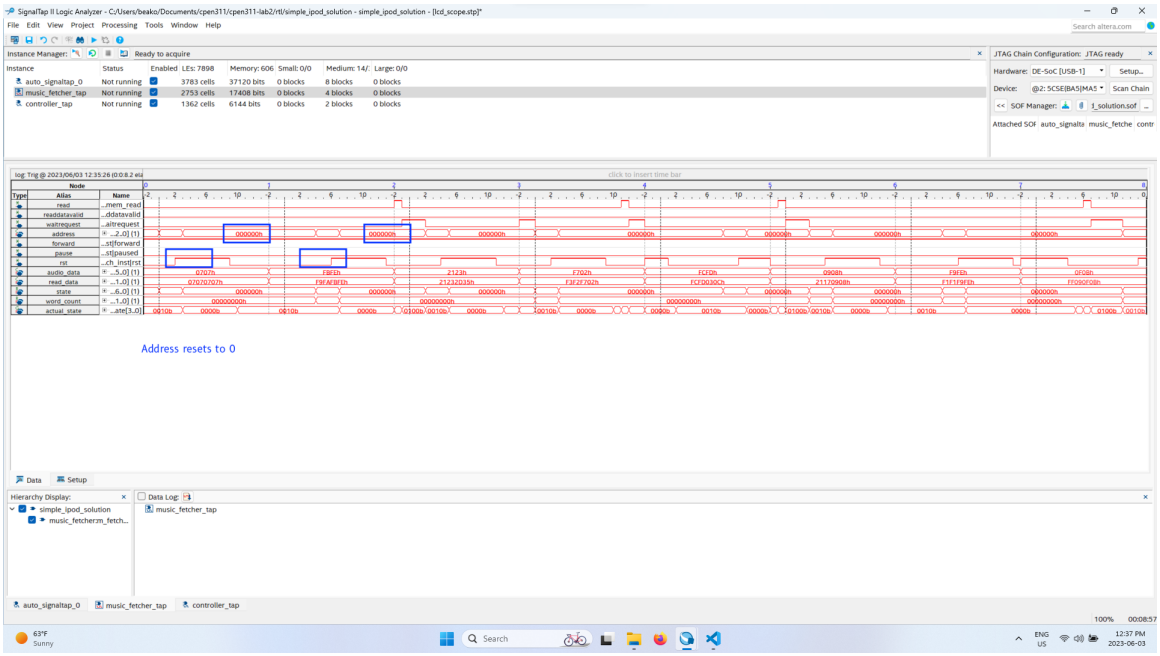
Music fetcher FSM 1, Decrementing addresses



Music fetcher FSM 2 - incrementing addresses



Music fetcher FSM 3 - Resetting



Something about the simulations

They are located in ./sim They were created using modelsim 10.5b. There is the fetcher controller and music fetcher, which each have their own simulations.

The test benches are prefixed to the device under test by “tb”. You should load that file into modelsim when you start your simulation.

A waves.do file is included so you can see the waves as I intended. There are also some custom radices included so you can see the states and button presses more clearly like my screenshots.

A vsim.wlf is included so you can load the simulations in if you don’t want to simulate them again.

FSM Diagrams

./doc/FSMs, or see PDF version below.

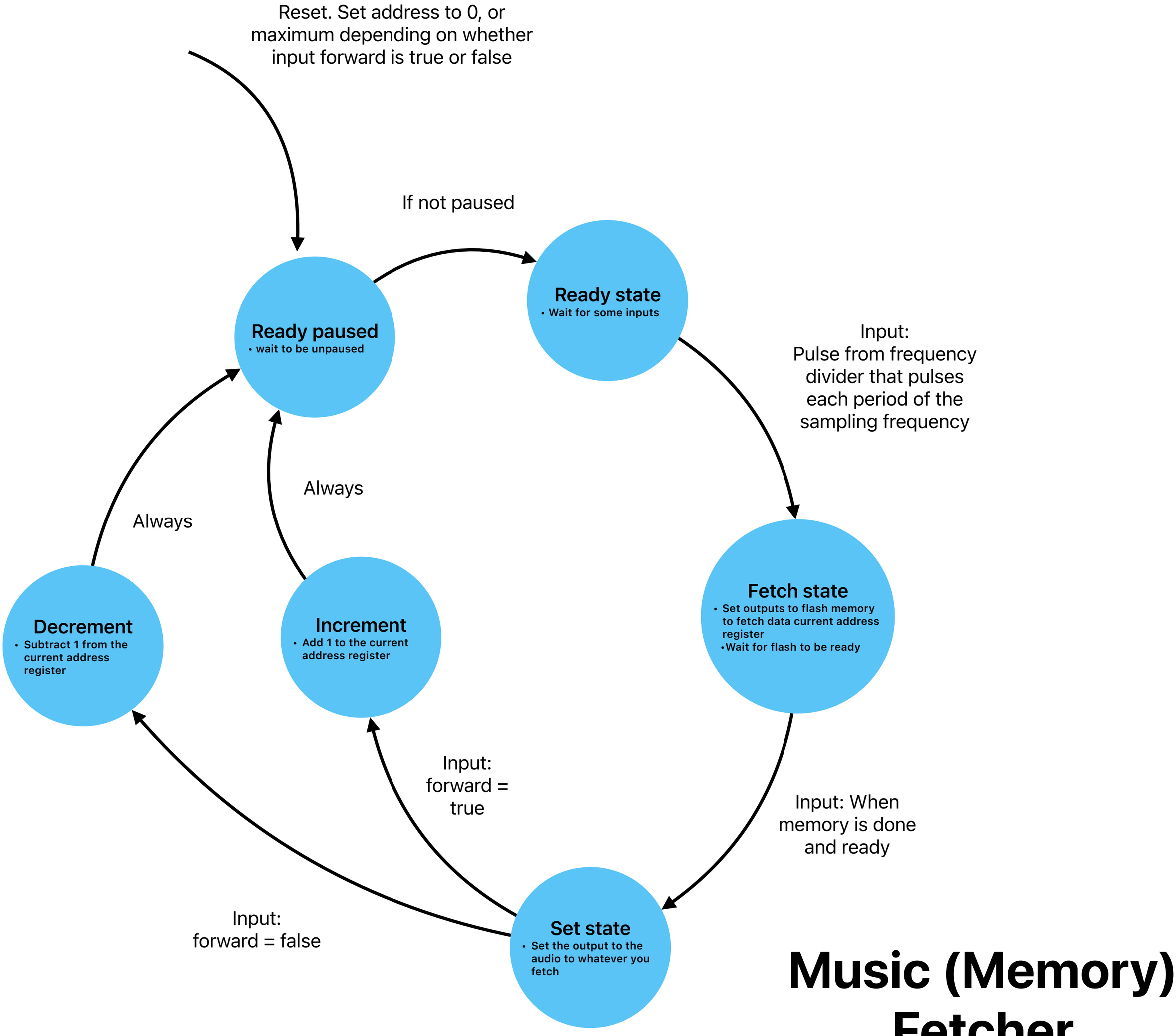
Additional Information

How to customize your songs?

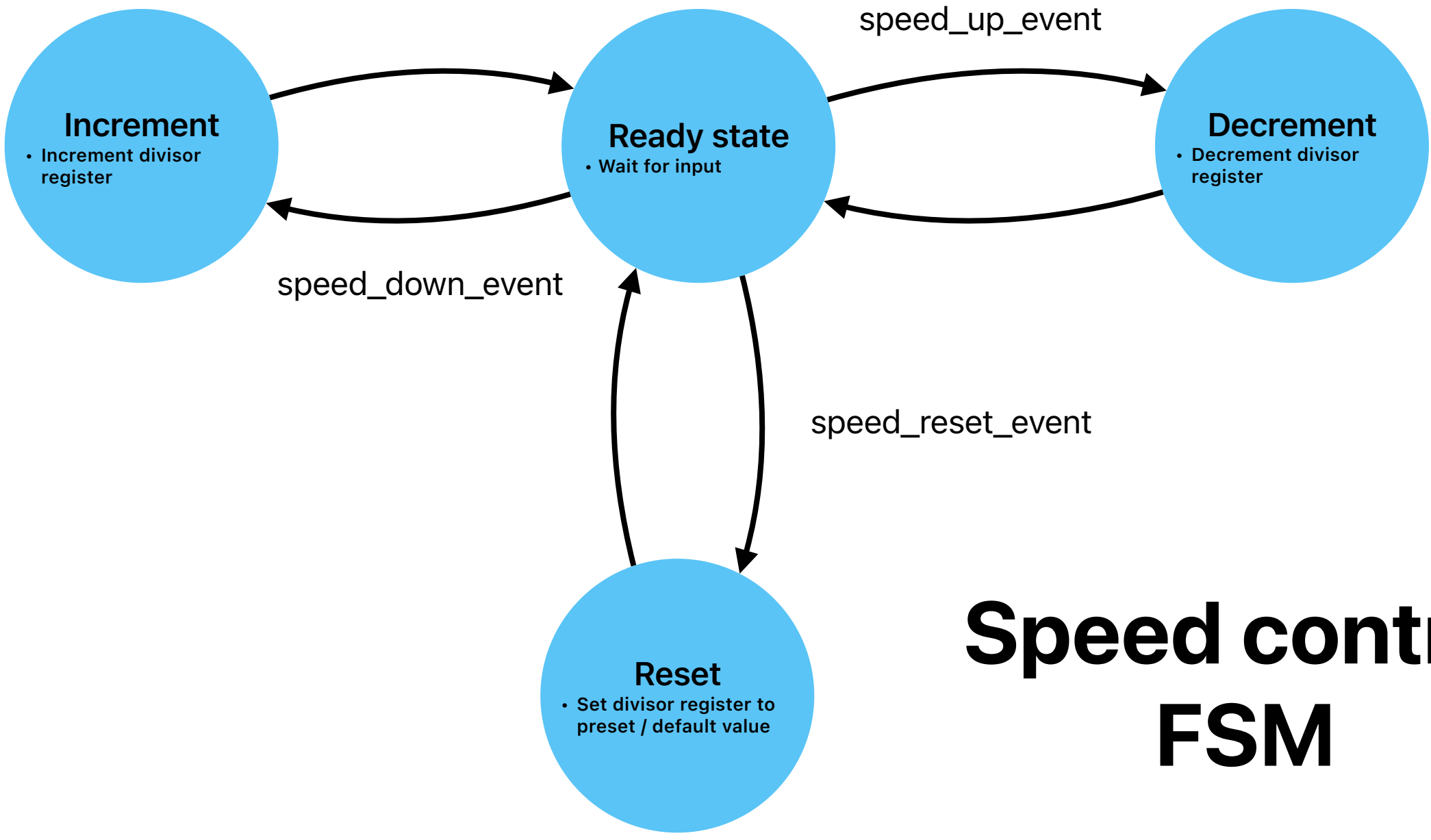
1. Download an mp3 file
2. export as RAW binary
3. Using the intelHex Utility, convert binary to hex
4. using the quartus programmer file converter (or something similar, on file)
5. Set EPCS128
6. Add the Hex file in, the device, and generate.

7. Use JIC file as ususal

RTL_44 contains the version that works with 44KHz 8 bit samples.

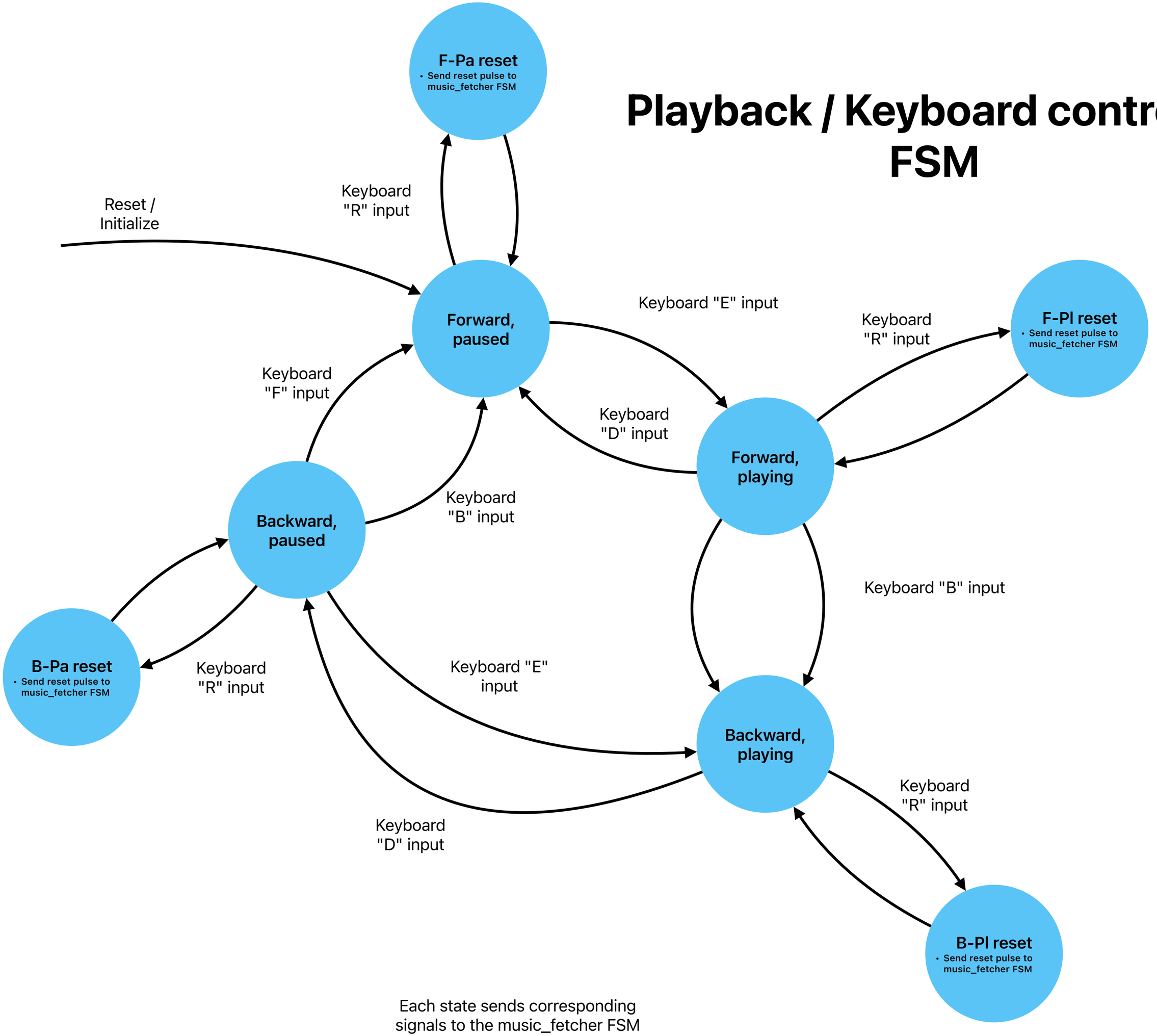


Music (Memory) Fetcher FSM



Speed control FSM

Playback / Keyboard controller FSM



Each state sends corresponding signals to the music_fetcher FSM