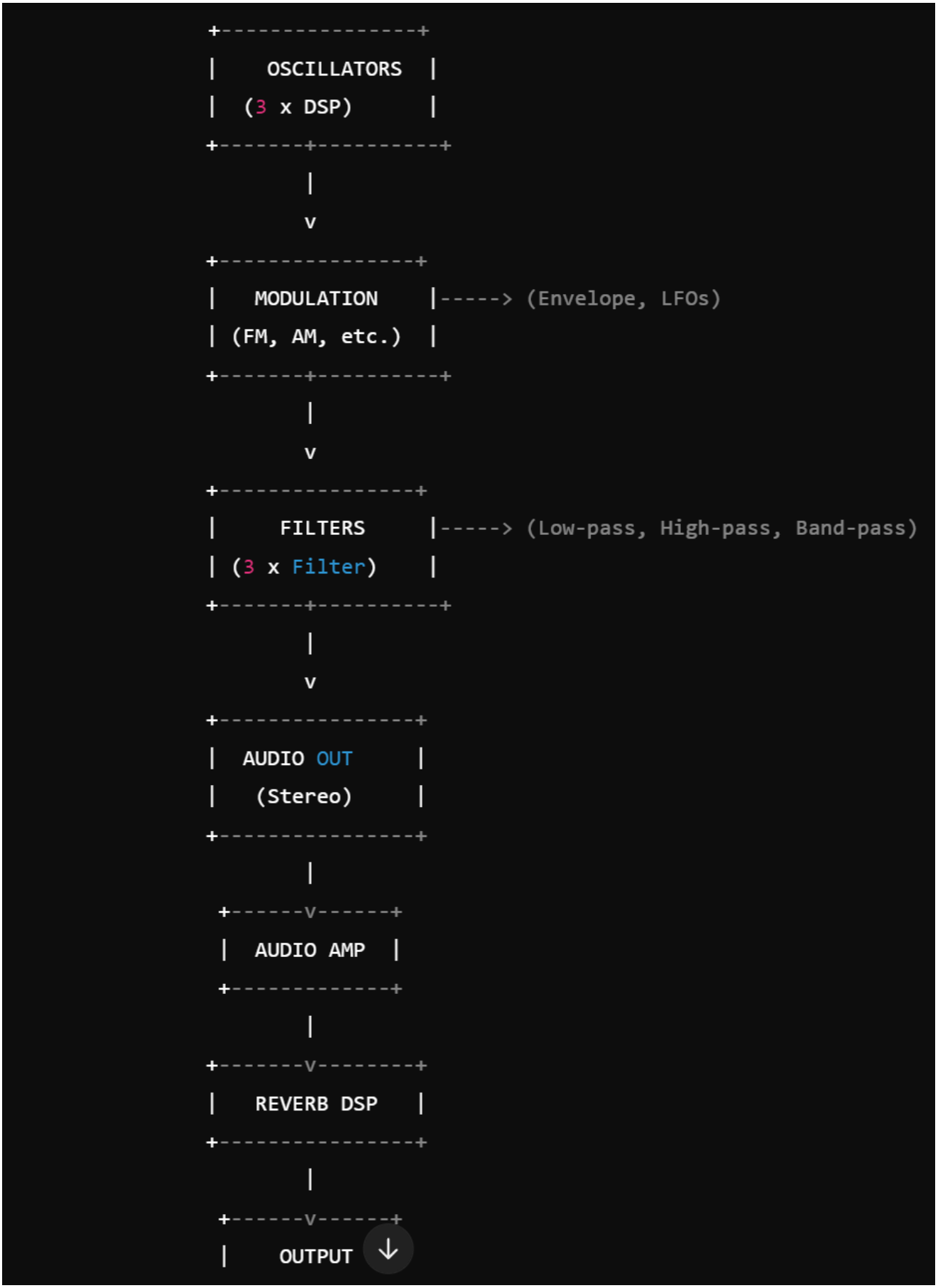
Below is the signal flow and block diagram that represents the hardware layout of the Chimera synthesizer.



The physical layout is carefully designed to allow easy access to all essential controls while maintaining an ergonomic interface. Below is the layout description:

1. **Front Panel**:
    - **Display**: Positioned centrally at the top of the panel for optimal visibility.
    - **Oscillator Section**: 3 independent sets of knobs for waveform selection and pitch control.
    - **Filter Section**: 3 knobs for cutoff and resonance control, with a toggle switch to select filter type.
    - **Envelope Section**: Knobs for adjusting attack, decay, sustain, and release for both envelopes.
    - **Pitch Control**: A dedicated pitch-bend wheel or touch strip located to the left or right of the keyboard section.
    - **Reverb Control**: A knob to adjust reverb depth.
    - **Knobs and Buttons**: Additional buttons for preset saving, loading, and modulation routing.
2. **Rear Panel**:
    - **MIDI Input/Output**: 5-pin DIN connectors or USB for MIDI control.
    - **Audio Output**: 1/4" stereo TRS jack or USB output.
    - **Power Input**: 12V DC input or USB input for power.
    - **USB Port**: For data transfer and future updates.

Oscillator Schematic

Each oscillator in the Monstruosinthy: Chimera synthesizer is based on a simple but effective analog design, ensuring rich and dynamic waveform generation.

Component List:

- **Power Supply**: 12-18V DC.
- **Resistors**:
    - 1k resistor (current limiting).
    - 10k potentiometer (waveform tuning).
    - 100k resistor (signal to audio output).
- **Capacitor**: 10 µF for signal smoothing.
- **Transistor**: N23904 (used for waveform generation and amplification).
- **Indicator**: LED to visually indicate oscillator activity.
- **Ground (GND)**: Common ground for all components.

Circuit Description:

- The **1k resistor** limits the current to the transistor and prevents overload.
- The **10k potentiometer** allows fine-tuning of the waveform characteristics.

- The **100k resistor** connects the oscillator's output to the synthesizer's audio path.
- The **10 µF capacitor** smoothens the signal, reducing noise and ensuring clean output.
- The **N23904 transistor** generates and amplifies the waveform.
- The **LED** provides visual feedback, lighting up when the oscillator is active.
- The circuit is grounded to maintain stability and eliminate interference.

Signal Flow:

1. Power is supplied to the circuit (12-18V DC).
2. The transistor generates the waveform based on the resistance and capacitance values.
3. The potentiometer adjusts the waveform characteristics.
4. The output signal is filtered and sent through the 100k resistor to the audio output.

Oscillator Frequency Analysis

Frequency Calculation for the Chimera Synth Oscillator

The operating frequency range of the oscillator depends on its RC (resistor-capacitor) time constant. This can be calculated using the formula for a basic RC oscillator:

$f = \frac{1}{2 \pi R C}$

Where:

- f: Frequency in hertz (Hz).
- R: Resistance in ohms (Ω).
- C: Capacitance in farads (F).

Component Values

- **Capacitance (C)**: 10 µF = 10×10^{-6} F.
- **Resistance (R)**: Varies depending on the potentiometer setting:
  - Minimum Resistance: $R = 1k\Omega$ (fixed resistor only).
  - Maximum Resistance: $R = 1k\Omega + 10k\Omega = 11k\Omega$.

Frequency Range

The oscillator frequency range can be derived for both minimum and maximum resistance values.

Minimum Resistance ($R = 1k\Omega$):

$f_{\text{minR}} = \frac{1}{2 \pi (1,000 , \Omega)(10 \times 10^{-6} , \text{F})} \approx 15.92 , \text{kHz}$

Maximum Resistance ($R = 11k\Omega$):

$f_{\text{maxR}} = \frac{1}{2 \pi (11,000 , \Omega)(10 \times 10^{-6} , \text{F})} \approx 1.45 , \text{kHz}$

Resulting Frequency Range

The oscillator is capable of generating frequencies between **1.45 kHz and 15.92 kHz**. This range is suitable for mid to high-frequency audio signals.

Adjustments for Lower Frequencies

To expand the oscillator's capability to produce lower frequencies (e.g., for bass tones), consider the following adjustments:

1. **Increase Capacitance (C)**:
   - Doubling C to $20\mu F$ halves the frequency range: $f = \frac{1}{2 \pi R C} \quad \text{with higher } (C)$
2. **Increase Resistance (R)**:
   - Using a larger potentiometer (e.g., $100k\Omega$) expands the lower range: $f_{\text{lowR}} \to \text{lower frequencies}$

Adjustments for Higher Frequencies

To achieve higher frequencies:

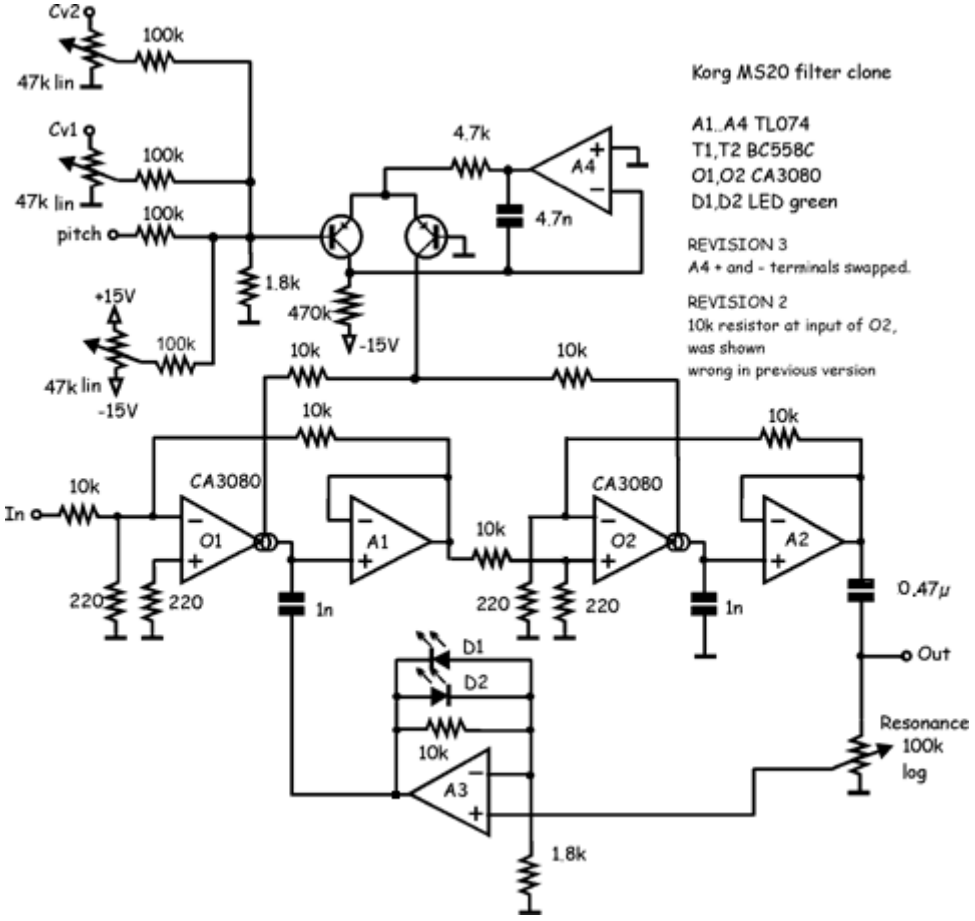
1. **Reduce Capacitance (C)**: Smaller capacitance increases the frequency range.
2. **Reduce Resistance (R)**: A smaller potentiometer or fixed resistance results in higher frequencies.

Conclusion

The oscillator design for the Chimera Synth is optimized for a frequency range of approximately **1.45 kHz to 15.92 kHz**. Adjustments to the capacitor or resistor values can expand this range to suit specific musical requirements, ensuring flexibility in sound design.

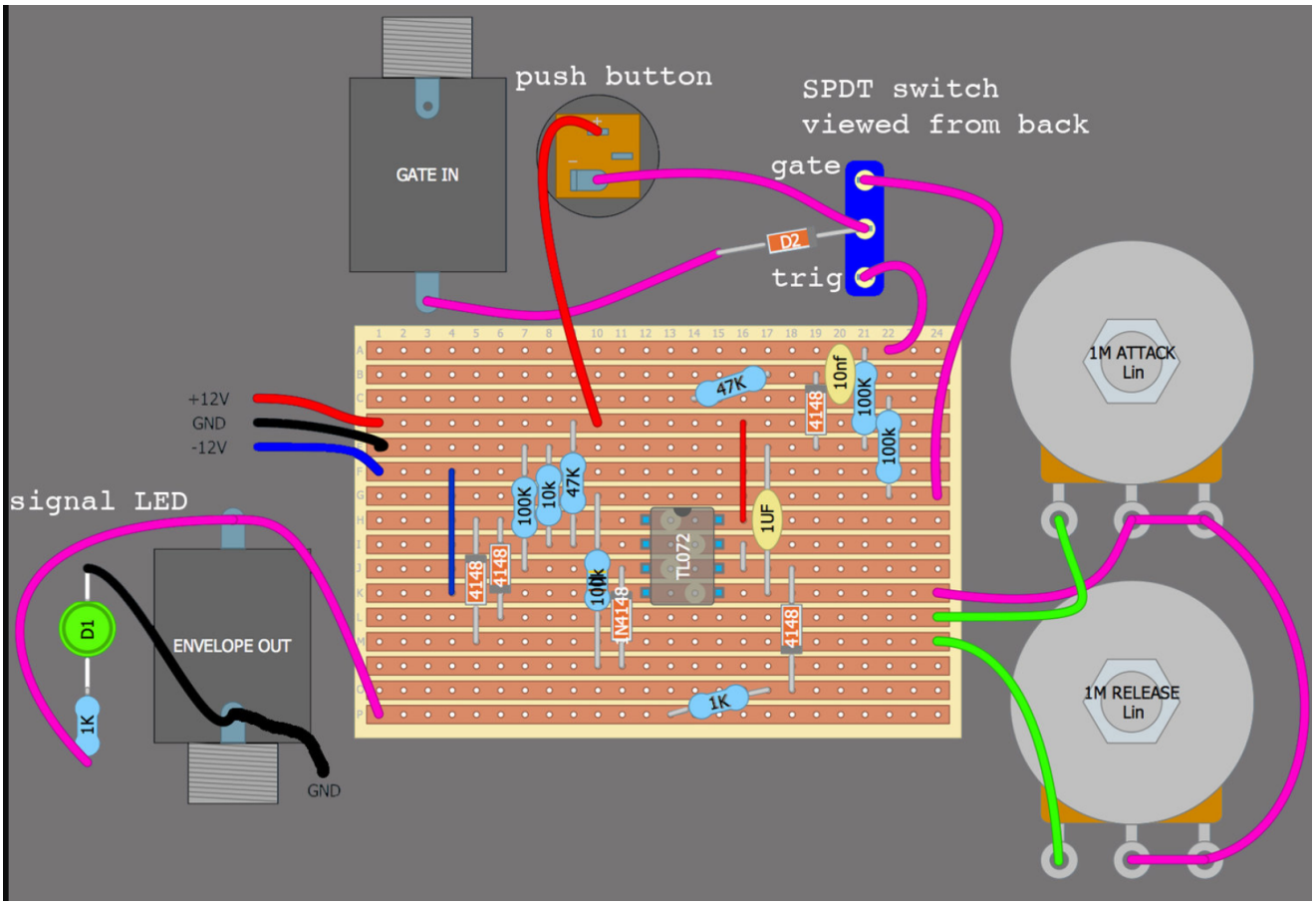
FILTER

OUR FILTER SYSTEM IS AN SIMPLY ADAPTATION OF THE Korg late MS20



AS A MODULAR SYNTH YOU CAN USE WHATEVER YOU WANT WE HAVE TESTED THIS VERION AND SOUNDS GREAT.

ENVELOPE


push button
SPDT switch
viewed from back
gate
trig
GATE IN
D2
+12V
GND
-12V
signal LED
D1
1K
ENVELOPE OUT
GND
47K
10nf
4148
100K
100k
100K
10k
47K
4148
4148
100K
N4148
TL072
1UF
4148
1K
1M ATTACK
Lin
1M RELEASE
Lin