DML Sssaw
Assembly Manual
Rev.F

What you need:

- Presoldered PCB & Panel
- Components
  - Included in the full kit
  - If you have the PCB kit, consult the BOM
- Soldering iron (10-20W, fine tip)
- Solder (lead-free)

This kit is of medium difficulty, the board doesn’t have tightly packed or heat sensitive components.
You need approximately 3-4h, depending on your experience building modules.

General Tips:

Safety:

Soldering is dangerous. The iron is hot and so are the solder joints, at least for a few seconds.
The solder you use, lead-free or not, is not healthy. Don’t eat or drink while soldering, wash your hands when you are done or take a break.
The fumes coming off of the solder flux are toxic, don’t breathe them in. Work in a well ventilated area and use a fume extractor.
When cutting off component leads, keep one finger on them to prevent them flying into your eyes (caution, they might be hot.)

Assembly:

Sort the components before you start soldering.
Solder all components of the same value in groups, to avoid mistakes.
Components are placed on the board and soldered in order of their height.
Components are soldered on the side of the PCB that has their outline and part number printed. Most components are soldered to the same side of the board.
You can use painter’s tape (masking tape) to secure components while you solder them.
Don’t solder panel components right away. They might not line up with the panel and be at different heights, leading to stress on the solder joint which may cause it to fail.
This module has two boards. Leave them connected for now.

Notes:

Headers designated X1-X5 are for an optional modification and don’t need to be populated.

Step by Step:

Diodes:

Diodes have polarity. The white or black stripe on the diode and the white strip on the PCB must line up.

1N4001	2	D4 D5
1N4148	6	D1-D3 D6-D8

IC Sockets:

Sockets have a notch on one side that must line up with the notch on the PCB.

14-Pin Socket	5	U1-U5

Capacitors:

Electrolytic capacitors are labelled on the body.
Electrolytic capacitors have polarity. The stripe on the body and the shorter leg indicate the negative side. On the PCB, a stripe indicates the negative side and a plus symbol the positive side.

10u	2	C11 C12

Trimmer potentiometers:

The offset trimmers must be positioned so the screw is closest to the board edge.
The tracking trimmers orientation is not important (but should be consistent).

10k	6	Offset1-Offset6
1k	6	Track1-Track6

Transistors:

The flat sides of the transistors point towards each other.

BC548	6	Q4-Q6 Q10-Q12
BC558	6	Q1-Q3 Q7-Q9

Switch:

The orientation is not important.

SW_DIP_x06	1	SW1

Headers:

If the 2x5 power header is shrouded, the notch must line up with the silkscreen image.

Header 2x5 M	1	Pow1
Header 1x8 M	2	H1 H2
Header 1x8 F	2	H3 H4

Panel components:
Place all components but don’t solder them yet. Place the panel over the components and thread on the nuts. Push down to make sure all components are seated properly. Now solder the components.

10kB	4	Spread1 Mod1 Coarse1 Fine1
SPDT Switch	1	Sw1
3.5mm Mono Jack	1	Con1-Con4

ICs:
Place the ICs in their sockets.

TL072	1	U1
TL074	4	U2-U4 U6
CD40106	1	U5

Calibration:

Turn on the module and let it warm up for 10 minutes.
Connect a constant voltage source, such as a keyboard or sequencer, to the pitch input.
Connect the sssaw output to a tuner.
Turn the coarse and fine tune knobs to a middle position and the detune knob to it’s lowest position.
Put all six switches on the DIP-Switch in the off position.
Put the first switch on the DIP-Switch in the on position.
You should hear one sawtooth wave, coming from core 1.
Using the keyboard or sequencer, send octave intervals (1V) to the module.
Adjust the Track-1 precision trimmer until the output accurately outputs octaves.
Note that the module only tracks accurately within ±3V.
When core 1 tracks properly, switch it off and switch on the next core.
Repeat the process, adjusting the Track-2 precision trimmer.
Repeat the process for all six cores.
Remove the pitch CV cable.
You should hear one sawtooth wave from core 6.
Turn Offset-6 to a middle position.
Switch on core 5. You should now hear a second sawtooth wave.
Adjust Offset-5 until the two cores have the same frequency.
Repeat until all six cores are audible and have the same frequency.

Modifications:

Individual Cores:

You can access the oscillator cores individually:
Use a stacked header for H3. Pins 1-6 are the summing nodes for CV.
Connect -1V/Oct through a 100k, 1% resistor (inverters needed).
Header X3 makes the buffered core outputs available, with 3Vpp.

Sync Mod:

You need 5 diodes (1N4148 or equivalent)
This mod syncs the cores together.
Solder wires across X1 and X2. This makes the detune function unipolar and extends the range.
Solder diodes (1N4148 or equivalent) from X4-Pin1 to X5-Pin1, X4-Pin2 to X5-Pin2, etc.
Calibration instructions to be added soon.