FREAQ FM

8-BIT GENERATIVE DIGITAL FM SYNTHESIZER

QUICK START CONSTRUCTION GUIDE

The kit is quite simple, but there are some important things to know before starting.

ERRORS ON SILKSCREEN

The capacitor nearest the audio jacks is incorrectly labelled as **100n**. It should be **1uF** (the blue monolithic capacitor).

POLARISED COMPONENTS

Components with a polarity will only work if they are inserted in the correct orientation. Incorrect placement will cause them to not work correctly, and…

IN SOME CASES THIS WILL DESTROY THE COMPONENT!

- Illuminated switches SW1 – SW6
- 100uF Electrolytic capacitors C2, C4, C6
- NPN transistor Q1
- Diode D1
- Arduino Nano V3
- MAX7219/MAX7221 LED matrix driver IC
- 8x8 LED Matrix

All other components can either be inserted any orientation, or the PCB will only allow the correct orientation.

ALIGNMENT WITH FRONT PANEL

To ensure the interface components align with the holes in the front panel, it is good practice to place them firmly into the PCB and then…

TEST-FIT THE FRONT PANEL BEFORE SOLDERING

Even small misalignment of these components can make things not fit together during assembly or can make knobs and switches fail to function smoothly.

- Switches SW1-SW6
- Potentiometers
- 3.5mm jacks
- LED matrix

ARDUINO NANO PINS

To enable the Arduino Nano to fit into the DIP30 socket, the legs must be shorter than a standard Nano. The best way to do this is to insert the long-ends of the pin header into the Nano, then trim the excess from the top-side of the Nano.

IMPORTANT - SOLDERING TEMPERATURE

Some components are very sensitive to overheating, especially the LED switches. Be careful not to apply heat for too long, otherwise switches and knobs may not operate correctly.

DETAILED INSTRUCTIONS

Detailed construction and operations manuals are available at www.meebleeps.com/support

MEEBLEEPS FREAQ FM – BILL OF MATERIALS – PCB REVISION 1.3

PCB Reference	Part Type	#	Description
	FREAQPCB13	1	Main PCB Revision 1.3
	FREAQFACE13	1	Front panel Revision 1.3
	FREAQREAR11	1	Rear Panel Revision 1.1
MAX7219	MAX7221 / MAX7219	1	8-Digit LED Display Driver IC with SPI. MAX7221 and 7219 are functionally interchangeable, however the 7221 is classed as low-EMI so in theory should introduce less noise
U1	ARDNANO3	1	Arduino Nano v3.0 with micro-USB connector. Note to fit into the dip socket I have shortened the legs when soldering the pin headers.
	LED8X8	1	8x8 LED matrix display common cathode
R LED	R270	6	270Ω resistor. If desired this value can be replaced with higher resistance to reduce current draw and LED matrix brightness.
1M	R105	3	1MΩ resistor
1K	R102	1	1KΩ resistor
10K	R103	1	10KΩ resistor
100K	R104	1	100KΩ resistor
3k9	R392	1	3.9KΩ resistor
R ISET	R203	1	20KΩ resistor. If desired this value can be replaced with higher resistance to reduce current draw and LED matrix brightness.
C8	C472CER	1	4.7nF ceramic capacitor
C1, C3, C5	C104CER	3	100nF ceramic capacitor
C9	C106MON	1	1uF monolithic capacitor **(note silkscreen incorrectly labelled as 100n, near audio output jack)**
C2, C4, C6	C107ELEC	3	100uF electrolytic capacitor
D1	1N4004	1	1N4004 diode
Q1	BC337TO92	1	BC337 NPN transistor
MAX7219	DIPSKT24	1	DIP socket for MAX7219/MAX7221
U1	DIPSKT30	1	DIP socket for Arduino Nano
J2, J3	IDCSKT8X1	2	1x8 pin header socket 8.5mm height
J6, J7, J8	PJ360A	3	3.5mm audio jack stereo 3-pin, unswitched
SW1, SW2, SW3, SW4, SW5	PB6149L-4 or PB6149L-1	5	Illuminated LED tact switch (main colour blue/red)
SW6	PB6149L-1 or PB6149L-4	1	Illuminated LED tact switch (secondary colour red/blue)
Various	PTV09A-4025U-B103	8	9mm 10k linear potentiometer (25mm shaft, 40-knurl)
7-12VDC	PWRDCSKT2.1	1	2.1mm pin DC power socket
	SCREWHEXM310	4	10mm long M3 hex-head screws (for rear panel)
	NUTHEXM3	4	M3 nut (for between the main pcb and the rear panel)
	SPACEHEXM312	4	12mm M3 nylon spacer
	SCREWHEXM306	4	6mm long M3 hex-head screws (for front panel)