

## FM Radio Instructions

To power on plug FM Radio into any center positive dc power source 9-12v 2,1mm connector.

Connect a mono 3,5mm jack to any of the filter outputs at the top left of the module. Low Pass, Band Pass, High Pass.

Turn Filter Input Volume up. Bottom Center dial. And adjust filter center frequency towards middle of the knob rotation. You should now hear signal.

//////////Adjusting the radio frequency//////////

Make sure CV in is in down position.

There are two knobs for adjusting the radio frequency: band and tune adjustment located at far right of the module. Band is the smaller at the top. Tune is larger and at the bottom.

FM frequencies are the strongest and most easily received. To receive FM, Band knob should be from far left up to around 11 'O clock or Noon. Then adjust Tune knob to suit.

As you move out of FM reception will become more static. It is possible especially if you are in a more rural area to pick up shortwave and AM. You must have patience to do this though. Sweeping the dial quickly will not work because the radio receiver requires a small amount of time to focus on a frequency and this time is even a little longer – we are talking about milliseconds here – but still a latency – to find the station. If you are feeling patient and lucky, turn the Band knob past the noon position, and move the Tune knob slowly across the spectrum and you might find some secret radio broadcast. Otherwise, this side might be useful as a variable white noise source, as there are many flavours or noise to be harvested here.

//////////Clock Divider//////////

The clock divider is really the nerve center for the self modulation characteristics of the FM Radio. To engage, simply patch the Radio Patch Point to the Clock Patch Point directly to its right at the top of the module.

Radio reception must be reasonably strong, to engage the clock divider. As a first experiment start with a strong FM station. The lights on the clock divider will start to dance in time with the dynamic peaks of the music.

Try taking the band pass or low pass output of the filter. Turn the filter frequency all the way down, so that you don't hear any sound any more. Connect one of the clock divider outputs to the filter mod input (At center top with outlined triangle) and turn filter mod amount knob up (center knob at top). The audio should now become gated and. Turning the filter mod amount knob will adjust the maximum filter frequency level.

//////////The Filter//////////

The controls of the filter are as follows:

Center Frequency – is the medium knob at the center of the module.

Resonance – is the far left knob. Far left is maximum resonance. Far Right is no resonance. The switch to the left of this knob changes the feedback path of the resonance and can cause the filter to self oscillate at lower frequency settings when in the up position.

Filter Input Volume – is a bottom of the module in the center.

Filter Mod Amount knob – in the center at the top of the module. Patch Point is just to the right.

Capacitor Switch – The filter has a unique capacitor switching mechanism controlled by 4 bit input which can be operated by connecting the outputs of the clock divider to these 4 patch points.

In the A and B (up and down positions) The capacitor switch will flip through 16 possible capacitor values based on the setting of the 4 bits (patchpoints underneath the Capacitor switch). In the center position, the capacitor switching will be disabled.

To illustrate more clearly what is happening with the capacitor switching, With the radio tuned to a strong channel so that the clock divider is active, connect some divider outputs to the capacitor switch patch points. Turn filter input volume all the way down. Turn filter mod input all the way down. Now turn resonance switch up and resonance all the way up and turn Filter Cutoff towards 10 or 11 o clock. You should now hear the filter oscillating at various frequencies which are designated by the switching capacitor values.

//////////Chaos Gen//////////

There is an onboard chaos generator whose data line is derived from the radio signal.

Like the clock divider, this works best with a strong FM signal.

The clock input here is at the bottom right of center. There are two digital outputs to the left of the clock, and there is a stepped voltage output to the right of the filter mod input.

The clock input can be activated just by touching with your fingers, so long as you are not touching any metal like the case to the module for instance, in which case will have no effect. You can also clock with the radio output, or with an external signal like an pulse oscillator from anti rave or 23. For easiest results with those devices, use a power splitter cable like you would use for guitar pedals to power all devices from the same power source. In this way ground connection is common and you can patch straight away with the crocodile clips.

Deriving the clock input from the clock divider outputs here, will have limited effect because the data tends to become synced with the clock and cancels itself out.

////////////////////Utility////////////////////////////////////

Logic patch point outputs a steady logic 1 bit. The data inputs of the capacitor switching are by default held at logic zero. You can switch them to 1 and hold at 1 by patching here.

Low Pass Gate – The low pass gate is pretty self explanatory. There is input, output, and control point. It can be helpful if you want the gating effect but want to also mod the filter frequency with another source.

Freely assignable jack – This is just above the low pass gate and is useful for routing audio out of the low pass gate back into the filter, since the filter’s input is by default normalized to the radio, in order to change the filter input a source needs to be connected into the 3,5mm socket. You can also use the jack to output the divider outputs to another device, for example – sync your drum machine with the radio.

////////////////////CV Mod of the radio////////////////////////////////////

To use an external CV source on the radio – flip the cv switch located to the upper left of Tune knob, to the up position. The tune knob now becomes an attenuator.

Note that the CV input is slightly slewed to allow for that slight latency needed by the radio to focus in on the channel and demodulate. Extremely fast switching of the station via CV like in the audio range will have varied results.

You can also feedback the radio signal to the input and get random tunings. It is possible though for the radio to get stuck at a certain position and you have to help it out by manually adjusting. I find that this function works best when the tune knob is around 11 – 1 position and Band knob is firmly in the FM range, but results will vary based on field strength etc..