

SSI2144 Filter Cutoff Frequency Considerations in Modular Systems

In most fixed signal-path synthesizers, cutoff frequency is limited to the audio range. Modular systems, however, may allow sub-audio cutoffs.

The SSI2144 - and its predecessor SSM2044 - can exhibit undesirable behavior when voltage at the Frequency Control (Pin 15) exceeds approximately 175mV. Current in the ladder becomes smaller than the output amplifier's bias current, causing the common-mode voltage of the output stage to suddenly drop. Under these conditions, the filter no longer passes any signal and the output transitions to an unrelated fixed voltage.

Normal operation resumes once the control voltage is reduced to approximately 135mV, and may be accompanied by an audible "thump." Note that actual control voltage levels at which these transitions occur may vary slightly from part-to-part or batch-to-batch.

A network attached to both C4 pins provides a simple solution. Place a pair of matched low leakage diodes (or diode-connected transistors, as shown) with cathodes connected to C4A and C4B (Pins 4 and 5). Tie the anodes together and to a diode connected to ground, and bias this point with a resistor to the negative supply. The bias current magnitude is relatively unimportant. This circuit will prevent the output stage common-mode voltage from dropping, allowing the filter to gracefully degrade in performance at extremely low cutoff frequencies. See Figure 1.

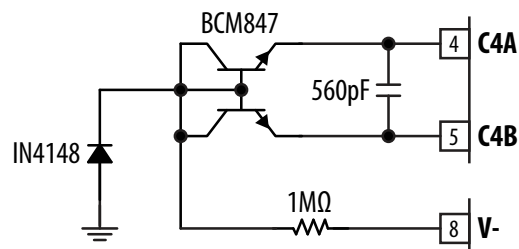


Figure 1