PT2399 Analysis

The PT2399 is a CMOS echo/delay processor developed by Princeton Technology Corp. This digital chip includes an ADC (Analog to Digital converter), 44Kb of RAM to store the samples and a DAC (Digital to Analog converter). Although this chip was created as a simple solution to add delay/reverb/echo to karaokes and set-up entertainment systems, it became very popular in the guitar pedal community due to its ability to emulate BBD-based delay circuits, good price, through-hole package, 5V power supply and tolerance to modifications.

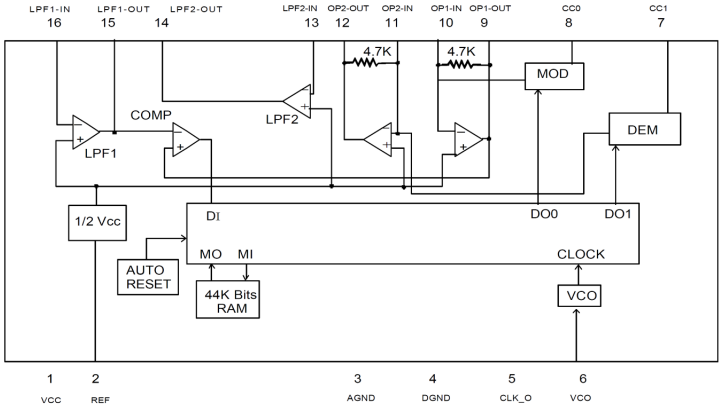
This integrated circuit has also demonstrated that with a careful design and good tuning, could be a fantastic sounding solution. Many well-known effects like Belton/Accu-Tronics reverb module, Danelectro FAB-Echo, and the Rebote Delay use this chip as the core of the circuit.

With a minimum delay of 30ms and a maximum of 340ms (that could be extended up to 1 second at the expense of sound quality) makes it perfect for delay, echo and reverb effects.

The official Princeton Technology PT2399 datasheet is vague and many of the internal functions of the IC are not explained either, giving the foundations for mods and think-out-of-the-box solutions. In this article, we are trying to give more insights and information about how this chip works.

PT2399 Internal Circuit

The main problem with the PT2399 is to understand the internal circuit, the Princetown datasheet is not very helpful:



This block diagram could be redrawn in a more logical and simpler way: