Basics:
- 100nF integrating capacitors between pins 9/10 and 11/12 result in overall unity gain from pin-15 to pin-12. 100nF appears to be preferable to the 82nF specified in the original data sheet.
- Internal resistors were measured at 5.6kΩ, rather than the 4.7kΩ specified on the data sheet.
- The delay-control pin is current sourcing, the voltage at pin 6 being fixed at Vcc/2.
- With a 5V supply, input headroom is ~3.5Vp-p maximum.
When using 100nF integrating capacitors, headroom is limited by clipping below 1kHz. Above 1kHz it is mainly slew-rate limited.

The data sheet quotes THD at <0.5%. This is highly unlikely; THD barely drops below 1% at the shortest delay times using a 1kHz 100mV input signal and 100nF integrating capacitors.

The heaviest load that the on-board opamps can drive is ~1kΩ.

**Delay:**

A delay-control resistance of less than 1kΩ is not recommended, due to excessive current demand. With a 100Ω delay resistor a delay time of 25ms is achieved with most samples. A zero-ohm delay resistor (dead short) gives almost no further decrease in delay time, and is not recommended.

**Latch up:**

If the delay resistance is less than 1kΩ then the PT2399 may latch up at power on, which can lead to catastrophic failure. If very short delay times are required, ensure that the delay resistance is greater than 1kΩ for the first 400ms after power on.

Some devices appear to latch up or fail to function properly if digital ground (pin 4) is left unconnected. This pin should usually be connected to analog ground (pin 3).

**Minimising noise:**

The data sheet quotes noise at <−90dB (32µV). This appears to be pure fantasy; it is difficult to reduce noise below −60dB (500µV) before filtering.

Noise is minimised by heavily filtering the audio, particularly at the output of the chip. For the longest delay times it may be necessary to severely limit the bandwidth to 1kHz or less.

Quantisation noise becomes worse as delay time is increased. Longer delay times may require larger integrating capacitors at the expense of bandwidth.

A significant source of noise is due to the internal clock modulating the power supply rail. The following advice may be used to minimise this noise:

- Use a dedicated power rail for the PT2399; do not use it to supply any other analog circuitry.
- Vcc (pin 1) must be decoupled directly to the analog ground. Even a few centimetres of PCB track will spoil this decoupling.
- A tantalum capacitor greater than 1µF is most effective for decoupling Vcc (and Vref). Ceramic or plastic capacitors can also be used and are nearly as good as tantalum. A combination of tantalum, ceramic, and aluminium electrolytic capacitors can be used in parallel for improved results.
- A 7805 regulator IC gives reasonable rejection of power supply noise. However, an alternative is to use a zener follower which gives superior load regulation at high frequencies, see fig. 2. This results in less power supply noise at the expense of poorer line regulation.