

**METHOD AND APPARATUS FOR REDUCING  
TRACK MISREGISTRATION DUE TO  
DIGITAL-TO-ANALOG CONVERTER QUANTIZATION NOISE**

**Abstract**

A method and apparatus for reducing track misregistration due to digital-to-analog converter quantization noise. In hard disk drive (HDD) servo control systems (300), quantization noises (or roundoff errors) (324) due to the finite precision of the D/A converter (DAC) (312) driving the VCM contribute a significant portion of the total track-misregistration (TMR). The quantization error feedback (QEF) technique reduces TMR due to DAC quantization noises. The QEF technique offers a simple method of reshaping the spectrum of this noise to minimize its contribution to TMR. In the digital signal processor (DSP) implementation of the QEF schemes, the quantization error is monitored and accumulated in the DSP (310); when sufficient error has accumulated, the MSB feeding the DAC are modified such as to cancel the effect of the error.

Fig 3