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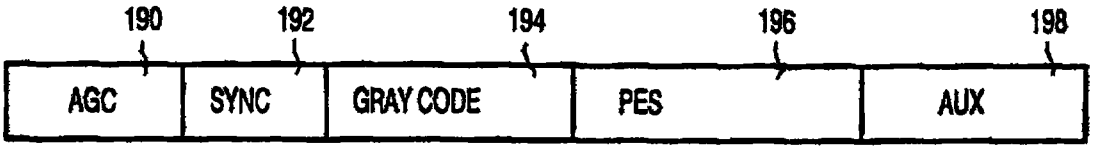
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(57) Abstract

A new embedded–servo format is proposed for use in disk drives, preferably hard disk drives. It is based on biphase modulation (more generally, p–phase modulation, where $p > 1$) and offers significant advantages, in terms of SNR and timing content, over existing formats. It is shown that for biphase, at the low linear densities typically employed for servo information, near maximum–likelihood performance may be attained by a simple bit–detector consisting of a full–response linear equalizer and a binary slicer. When compared with an optimal detector for the commonly used technique of dibit signalling, an SNR gain of some 4 dB is achieved. The same equalizer may be used as the basis for near–maximum–likelihood Position Error Signal (PES) amplitude estimation and timing recovery. Investigations carried out on a practical servo demodulator based on a 5th order analog filter show that, at typical linear densities, this ideal performance is closely approached. The equalizer has a band–pass character and yields excellent suppression of the effects of thermal asperities and magneto resistive (MR) head asymmetry.