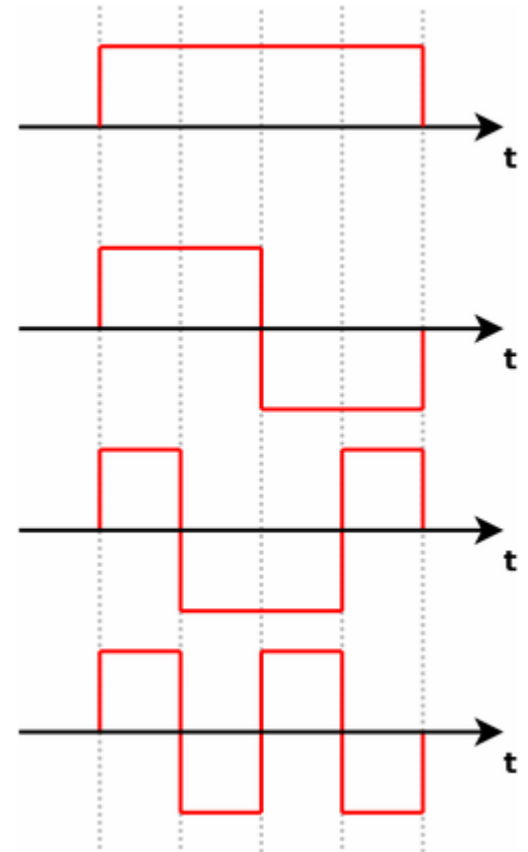


Local Decoding of Walsh Codes to Reduce CDMA Despreading Computation

Matthew Doherty

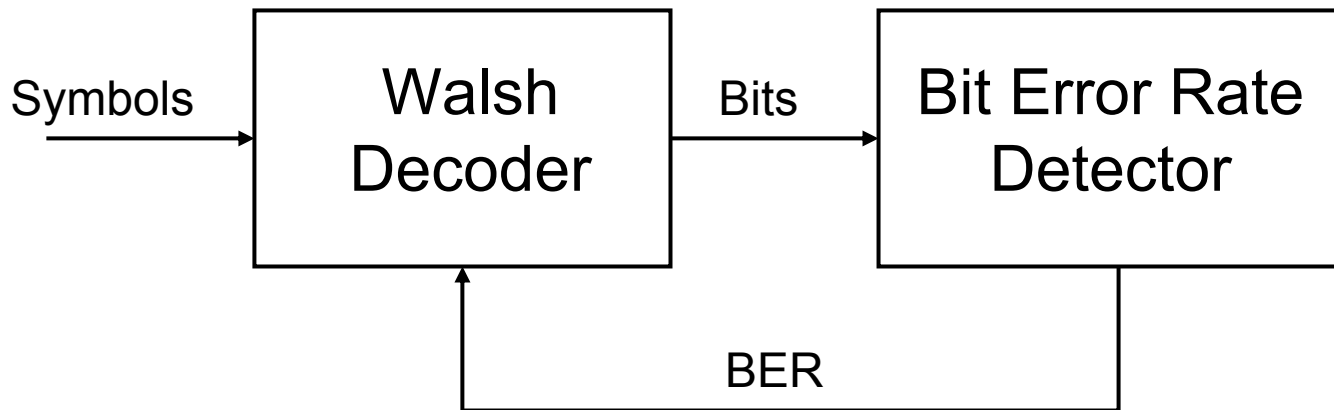
CDMA Cell Sites Are Power-Hungry

- Code Division Multiple Access
 - Moves multiple access problem to DSP
- Computation uses more power than other standards (TDMA, GSM, etc.)



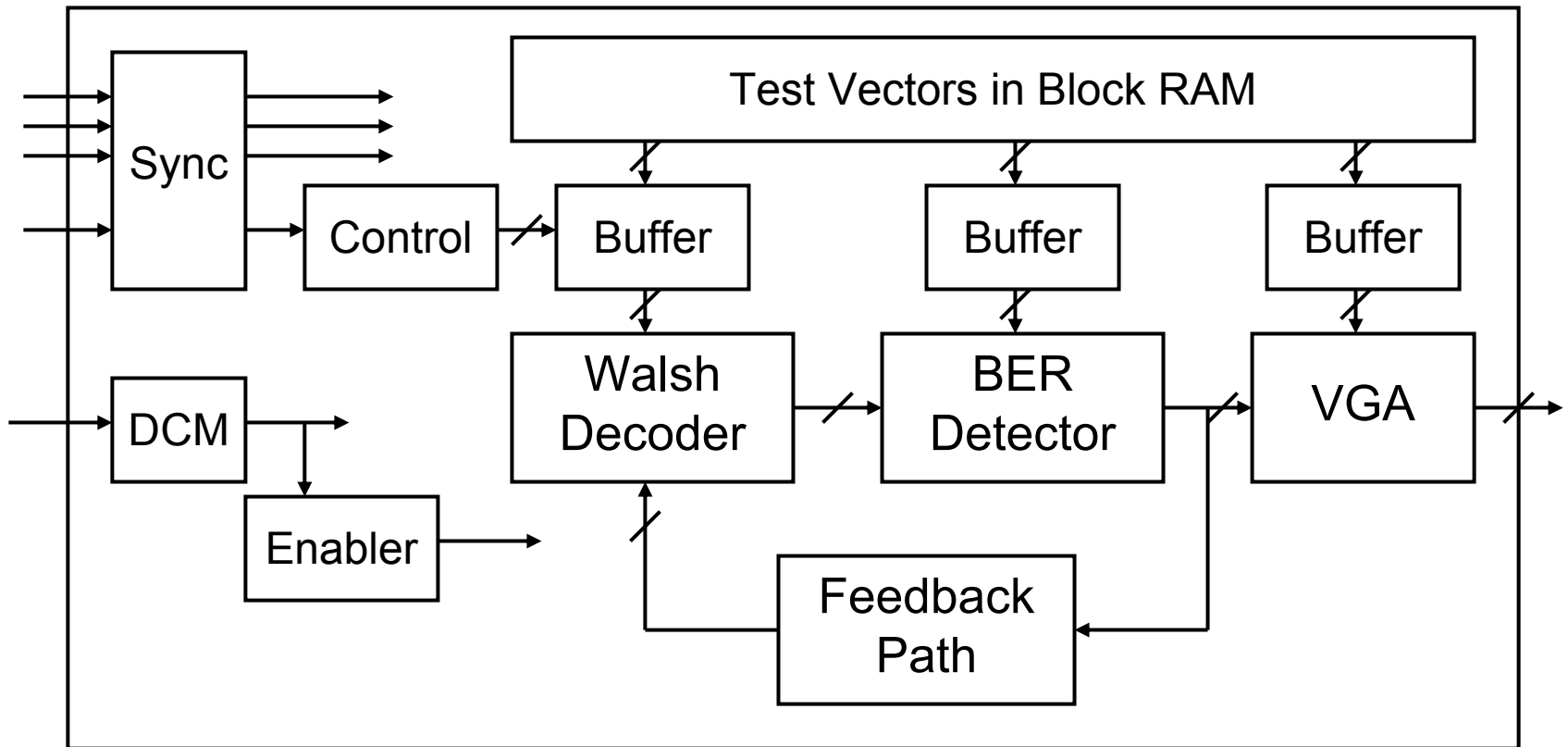
Orthogonal coding functions
(Source: wikipedia.org/Cdma)

Suboptimal Walsh Decoder with Feedback

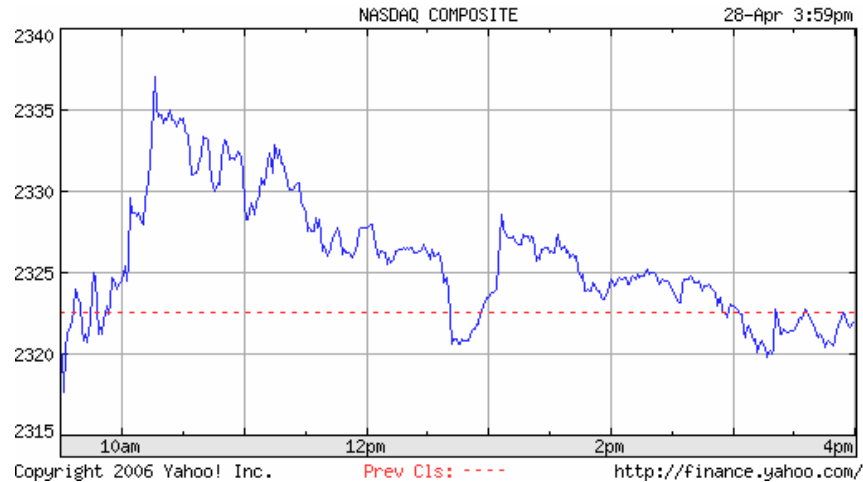


- Exploit structure of Walsh codes to estimate bits using fewer symbols
- Use feedback to choose number of symbols to use and maintain bit error rate

Test Setup



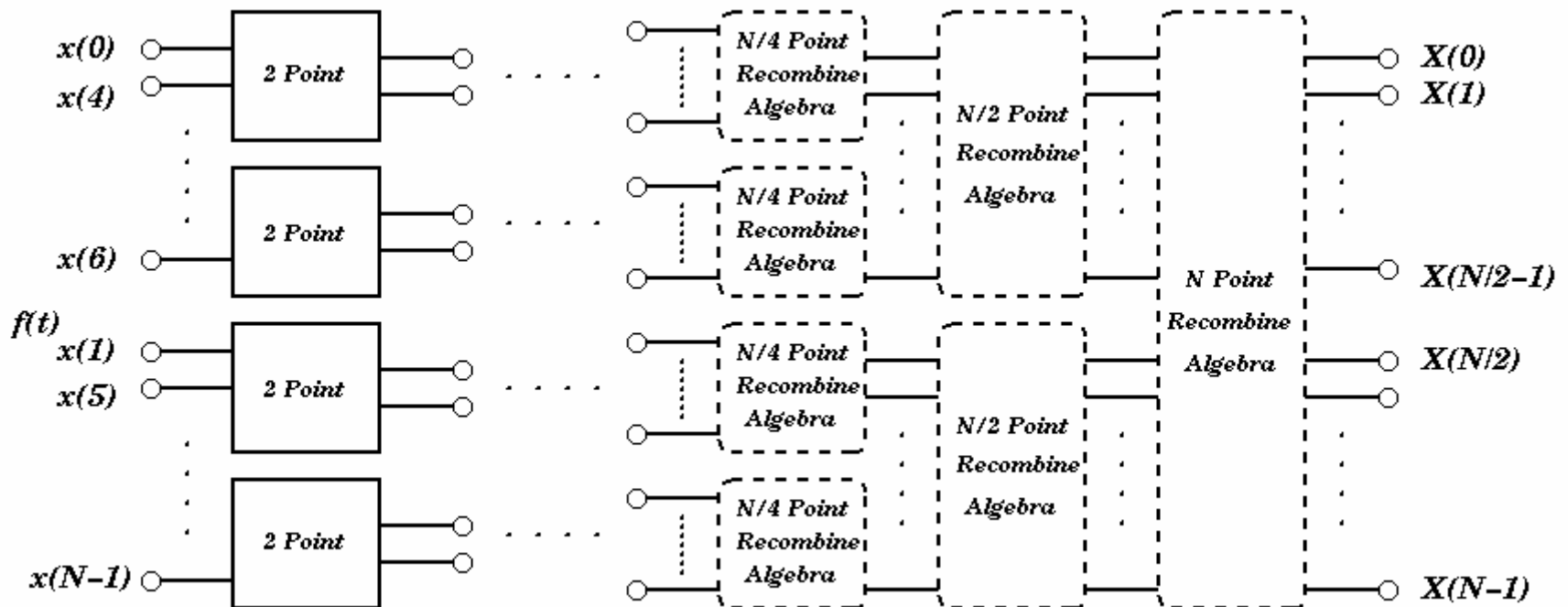
Bit Error Rate and Power Usage



Source: <http://finance.yahoo.com/q/bc?s=%5eIXIC&t=1d&c=>

Walsh Decoder FHT

Same algorithm as FFT but with real (1 or -1) coefficients



FHT Recombine Algebra

- FFT butterfly structure

$$y_0 = x_0 + x_1$$

$$y_1 = x_0 - x_1$$

