Abstract

In this paper, we present a design for a full-duplex echo-cancelling data modem based on a combined adaptive reference echo canceller and adaptive channel equalizer. The adaptive reference algorithm has the advantage that interference to the echo canceller caused by the far-end signal can be eliminated by subtracting an estimate of the far-end signal based on receiver decisions. This technique provides a new approach for full-duplex far-echo cancellation in which the far echo can be cancelled in spite of carrier frequency offset. To estimate the frequency offset, the system uses a separate receiver structure for the far echo which provides equalization of the far-echo channel and tracks the frequency offset in the far echo. The feasibility of the echo-cancelling algorithms is demonstrated by computer simulation with realistic channel distortions and with 4800 bits/s data transmission at which rate frequency offset in the far echo becomes important.