Abstracts

A chirp spread spectrum DPSK modulator and demodulator for a time shift multiple access communication system by using SAW devices

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We have developed a modulator and a demodulator for DPSK modulated chirp signals using a SAW dispersive delay line and a SAW matched filter. The SAW chirp modulator spreads the 100 MHz spectrum between every 1 bit data interval of 1.5 /spl mu/sec and provides DPSK modulation, depending upon data. The SAW demodulator demodulates data using exclusive output pulses from two output ports of a newly designed SAW matched filter. By employing nonlinear chirp modulation, the modulator generates a frequency-weighted chirp signal that keeps a flat amplitude in the time domain. The demodulator has a 19 dB process gain, and it has good correlation characteristics of less than -30 dB time sidelobe. By using these modulator and demodulator, we have examined a multiple access of the chirp spread spectrum (SS) system. The multiplexity is achieved by the time shift of chirp SS signals, which are easily produced by the SAW modulator. We have confirmed 20 multiplex accesses experimentally, and have measured the bit error rate up to 9 multiplexity. In the case of one chirp signal, the bit error rate degrades 2 dB from the theoretical level, and the degradation of multiplexity up to 9 was only 1 dB.

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