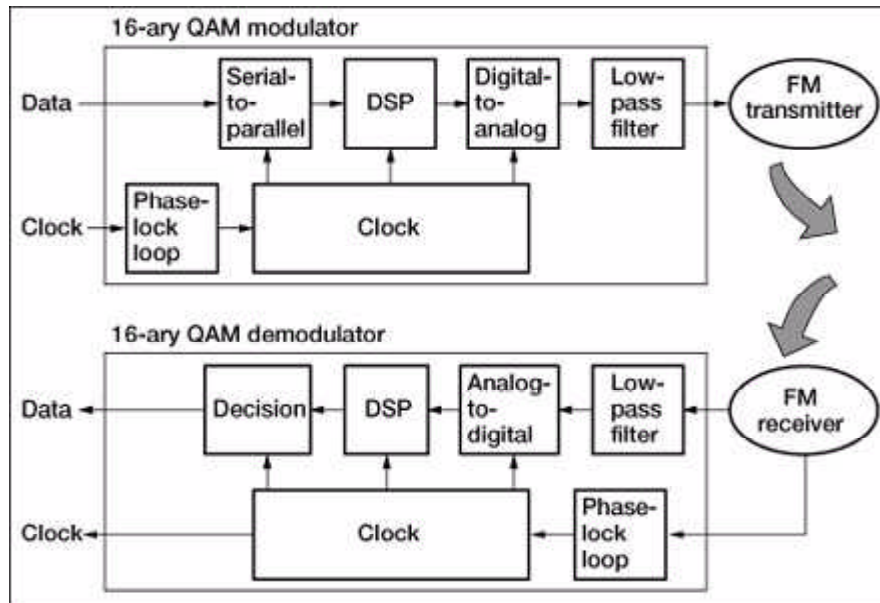


# Bandwidth Efficient Wireless Digital Modem Developed



*Bandwidth-efficient wireless digital modem with 16-ary quadrature amplitude modulation (QAM) and digital signal processing (DSP).*

NASA Lewis Research Center has developed a digital approach for broadcasting high-fidelity audio (nearly compact disk (CD) quality sound) in the commercial frequency-modulated (FM) broadcast band. This digital approach provides a means of achieving high data transmission rates with low hardware complexity—including low mass, size, and power consumption. Lewis has completed the design and prototype development of a bandwidth-efficient digital modem (modulator and demodulator) that uses a spectrally efficient modulation scheme: 16-ary rectangular quadrature amplitude modulation, or 16-ary QAM. The digital implementation is based strictly on inexpensive, commercial off-the-shelf digital signal processing (DSP) hardware to perform up and down conversions and pulse shaping. The digital modem transmits data at rates up to 76 kilobits per second (kbps), which is almost 3 times faster than standard 28.8-kbps telephone modems. In addition, the modem offers improved power and spectral performance, flexible operation, and low-cost implementation.

The resulting technology, digital audio broadcasting, can provide listeners with greatly enhanced, near-CD quality sound for FM radio, the consumer electronics industry with a great commercial opportunity, and radio broadcasters with the ability to provide improved sound and services to listeners. Other potential uses for this modem include digital wireless data applications (commercial, industrial, or educational), wireless transmission of point-of-sale data and hospital records, and automation of factory control signals. Its main benefits are low cost, high throughput, and small board size, comparable to that of a computer modem.

Lewis designed this bandwidth efficient digital modem under a nonreimbursable Space Act Agreement with Telos System Inc., which is based in Cleveland, Ohio. Telos Systems Inc. has explicit potential markets and applications for the modem in the commercial FM broadcast band, both in transmitting data-reduced digital signals and in broadcasting high-fidelity audio.

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