

ABSTRACT

**ADAPTIVE DIGITAL SYMBOL RECOVERY FOR AMPLITUDE PHASE
KEYED DIGITAL COMMUNICATION SYSTEMS**

Improvements to amplitude phased keyed digital communications systems and to the processing of amplitude phase keyed symbols transmitted over radio frequency channels. A digital symbol recovery circuit (10) in accordance with the present invention, and a quadrature demodulator The adaptive baseband equalizer receives amplitude phased keyed signals and outputs in-phase and quadrature digital amplitude values corresponding to the received amplitude phased keyed signals. A digital symbol recovery circuit (10) comprises a programmable addressable random access memory (25) that stores a plurality of eight bit words comprising decoded symbol sets of the received amplitude phased keyed signals, and outputs the decoded symbol sets in response to addresses corresponding to the in-phase and quadrature output signals. A quadrature demodulator (12) processes the decoded symbol sets and outputs recovered amplitude phased keyed symbols corresponding to the received amplitude phased keyed signals. Eight bit I and Q amplitude values address 256 x 256 memory locations in the memory of the digital symbol recovery circuit. For example, at each memory location, a seven bit word, for example, is stored. The first four bits define a 4-tuple for the decoded symbol. The fifth bit is a bang-bang phase bit or carrier tracking bit. The sixth bit is a bang-bang automatic gain control bit. The seventh bit is a false lock indicator bit. The invention may be incorporated in an amplitude phased keyed digital communications system (20) including an adaptive baseband equalizer (11).

(FIGURE 1)