



[54] APPARATUS AND METHODS FOR MODULATION AND DEMODULATION OF DATA

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[52] U.S. Cl. 341/11

[58] Field of Search 341/111, 112, 341/114, 113, 115, 116; 332/103; 375/61, 67

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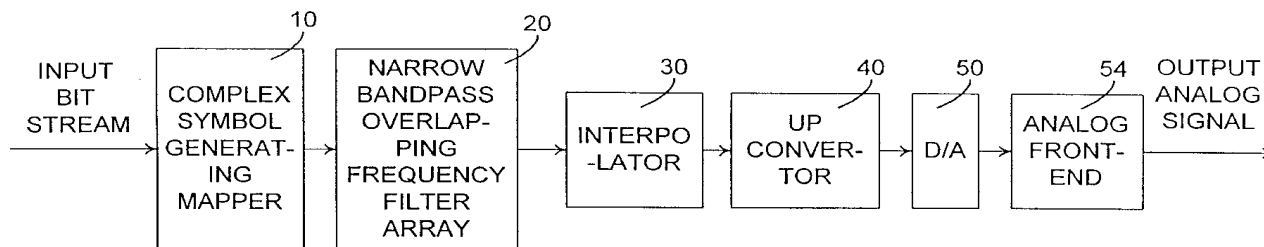
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[57] ABSTRACT

A signal modulation method comprising receiving at least first and second synchronized incoming streams of complex symbols, thereby to define a plurality of incoming vectors each including at least first and second synchronized complex symbols, mapping each complex symbol into a signal component comprising a linear combination of an in-phase signal and a quadrature signal, the quadrature signal comprising a Hilbert transform of said in-phase signal, wherein all of the signal components are substantially mutually orthogonal and wherein the frequency spectrums of all signal components mapped from a single incoming stream are centered around a common frequency location which is unique to the single incoming stream and wherein the frequency spectrums of signal components mapped from different incoming streams having adjacent common frequency locations are partially overlapping and wherein signal components mapped from sequential incoming symbols partially overlap in time and combining all of the signal components into a representation of an output signal.

30 Claims, 15 Drawing Sheets



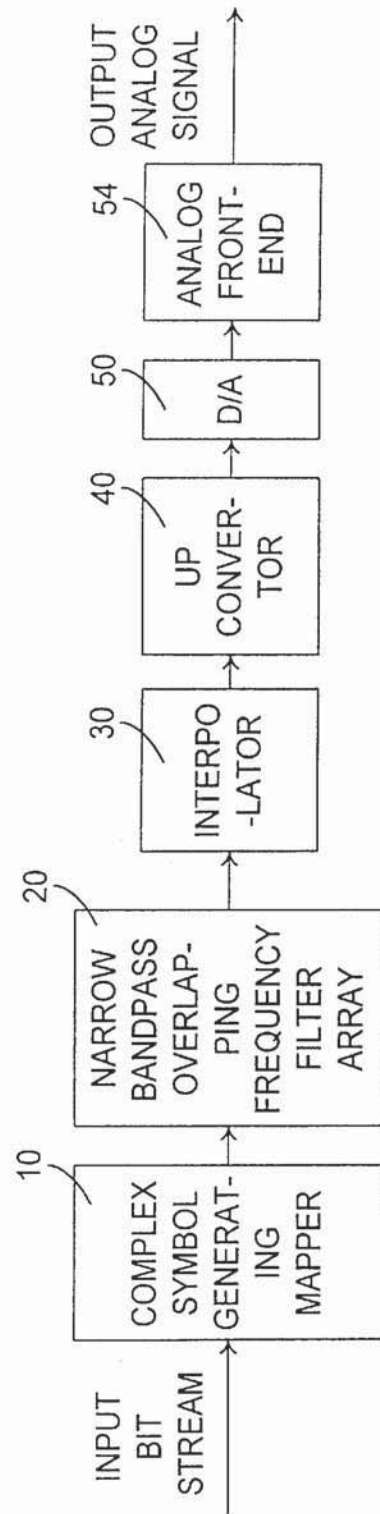


FIGURE 1

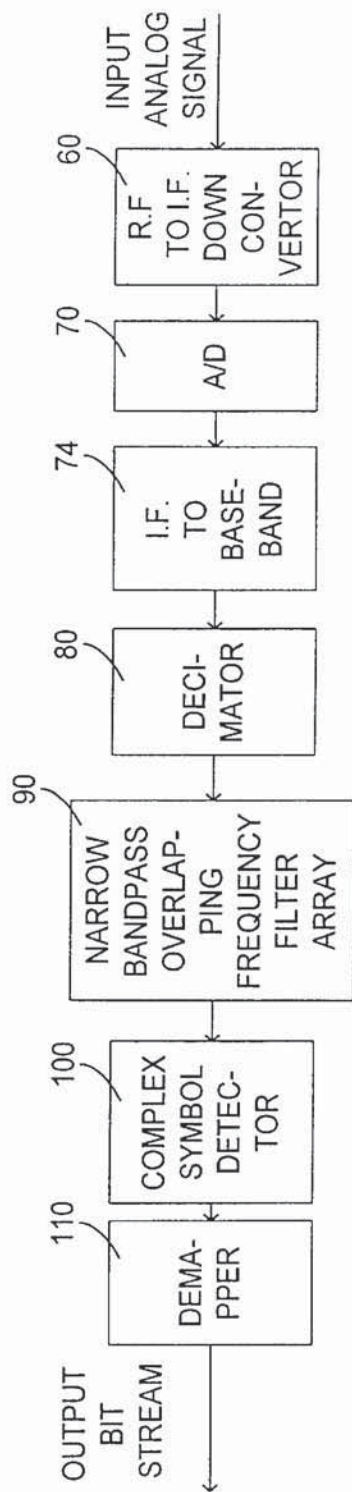


FIGURE 2

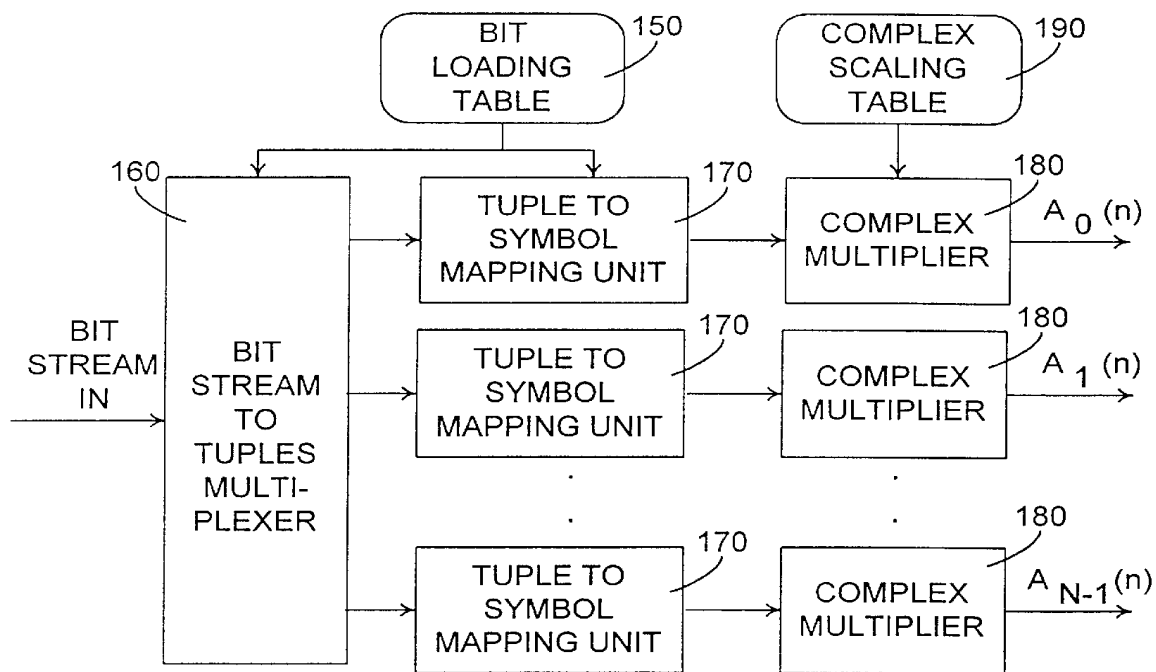


FIGURE 3

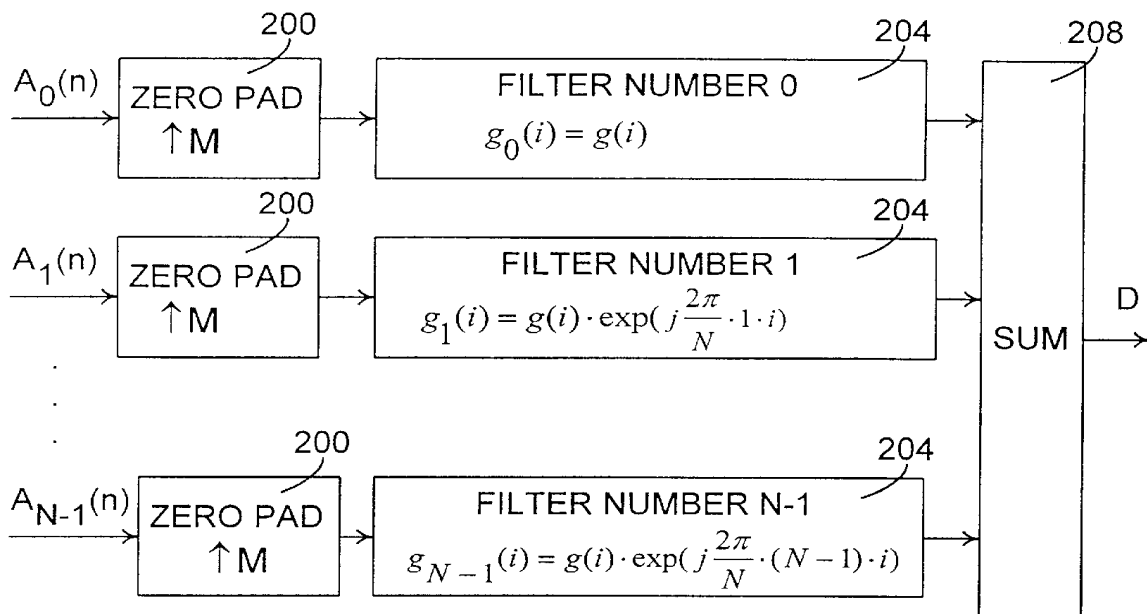


FIGURE 4A

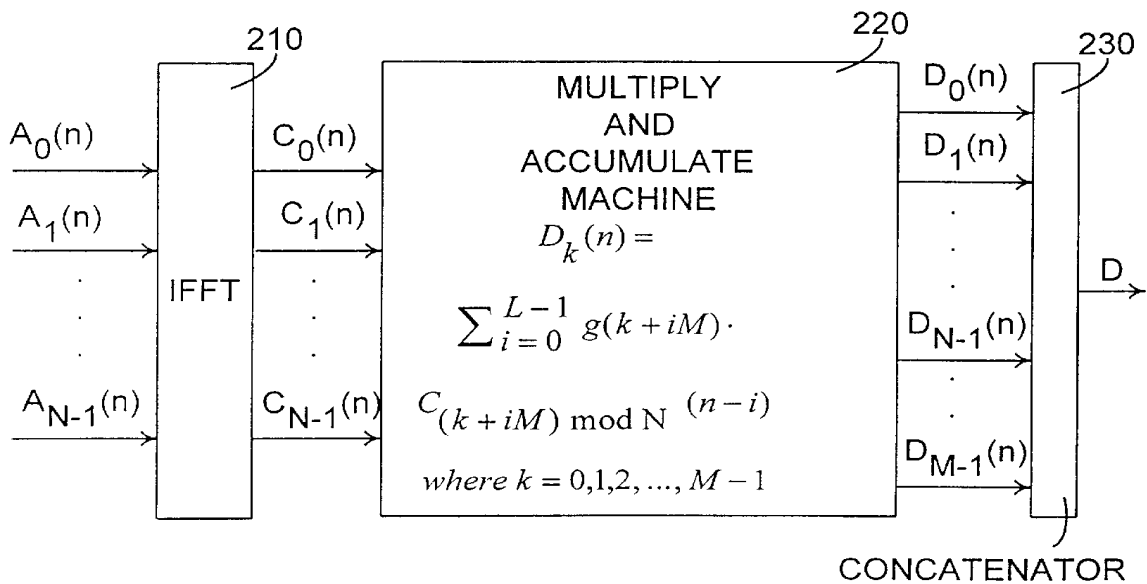


FIGURE 4B

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