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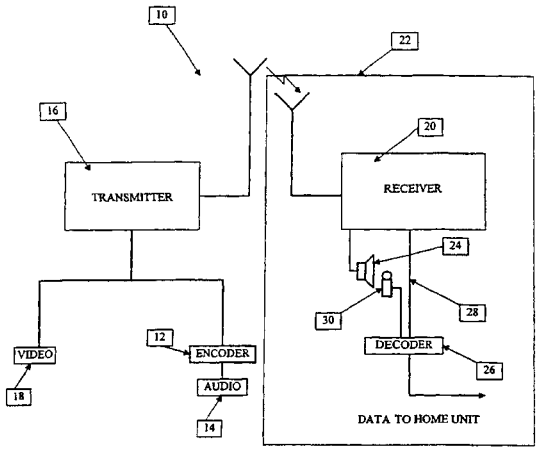
(54) Title: SYSTEM AND METHOD FOR ADDING AN INAUDIBLE CODE TO AN AUDIO SIGNAL AND METHOD AND APPARATUS FOR READING A CODE SIGNAL FROM AN AUDIO SIGNAL




(57) Abstract: An encoder includes a sampler that samples an audio signal and that generates from the samples a plurality of short blocks of sampled audio. Each of the short blocks has a duration less than a minimum audibly perceivable signal delay. A processor combines the plurality of short blocks into a long block. The long block is transformed into a frequency domain signal having a plurality of independently modulatable frequency indices. The frequency difference between adjacent indices is determined by the minimum duration and the sampling rate of the sampler. A neighborhood of frequency indices is selected so that the frequency difference between a lowest index and a highest index within the neighborhood is less than a predetermined value. Two or more of the indices are modulated in the neighborhood so as to make a selected one of the indices an extremum while keeping the total energy of the neighborhood constant. A plurality of frequency bands are so coded. A decoder decides that a bit or bits have been received if, in a majority of the frequency bands, the decoder detects a modulated index.

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