

I claim:

1. An integrated audio/video decoder comprising:
 ~~a first~~^{an} internal memory;
 means for alternately writing a block of
5 audio data to the ~~first~~^{internal} memory then writing a
block of video data to the ~~first~~^{internal} memory; and
 a signal processing unit which alternately
decodes audio data from the ~~first~~^{internal} memory then
decodes video data from the ~~first~~^{internal} memory.
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2. The decoder of claim 1, wherein the signal
processing unit further comprises:
 a multiplier which multiplies IDCT
coefficients and dequantization coefficients
15 during video decoding and multiplies components of
quantized sample vectors and dequantization
coefficients during audio decoding; and
 a butterfly unit which determines sums and
differences of IDCT coefficients for an inverse
20 discrete cosine transformation during video
decoding and determines sums and differences of
components of a frequency-domain sample vector
during audio decoding.
- 25 3. A method for decoding an MPEG audio data
frame, comprising the steps of:
 decoding subband data from an audio data
frame to generate a first vector, the first vector
having components which represent frequency-domain
30 components of a sound sample;
 combining two or more components of the first
vector, using a butterfly unit;
 determining a product of the combination and
a matrixing coefficient, using a multiplier;
35 accumulating the product into a memory
location; and

header or side information of the first data frame.

5 25. The method of claim 22, wherein the step of changing the data stream further comprises replacing the bit combination with similar data derived from one or more previous audio data frames.

10 26. The method of claim 20, further comprising:
writing a 1 into a value in a shift register when the error signal is asserted; and
shifting the value in the shift register periodically, wherein
15 asserting the flag signal further comprises asserting the flag signal when the value in the shift register is not zero.

20 27. The method of claim 26, further comprising writing the changed data stream into a buffer, wherein shifting the value further comprises shifting the value at a rate such that a non-zero bit remains in the shift for a time greater than or equal to a time that an error code remains in the buffer.

Add new claims 28-33.

MPEG AUDIO/VIDEO DECODER

ABSTRACT OF THE DISCLOSURE

An MPEG audio/video decoder has resources which are time division multiplexed between decoding video and audio data. For audio decoding, a degrouping circuit degroups a subband code by performing two divisions in three clock cycles, the time required to write three degrouped components to memory. A butterfly unit combines components of a frequency-domain vector to reduce the number of multiplies required to transform to the time domain, and the butterfly operations are interwoven with audio filtering to increase parallel utilization of a multiplier, the butterfly unit, and memory. In response to a source of an MPEG audio data indicating an error, the decoder replaces errant data with a code and enables error handling circuits. The code is a valid bit combination rarely found in MPEG audio data. The enabled error handling circuits later replace the code with reconstructed data.

Figure 1