

(12) **United States Patent**
Miller et al.

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- (54) **APPARATUS AND METHOD TO DIGITALLY COMPRESS VIDEO SIGNALS**
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- (*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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- (22) Filed: **Jul. 15, 1999**

Related U.S. Application Data

- (62) Division of application No. 08/060,613, filed on May 12, 1993.
- (51) **Int. Cl.⁷** **H04N 7/12**
- (52) **U.S. Cl.** **375/240.12**
- (58) **Field of Search** 348/409; 358/403; 375/240, 240.23, 240.12

(56) **References Cited**

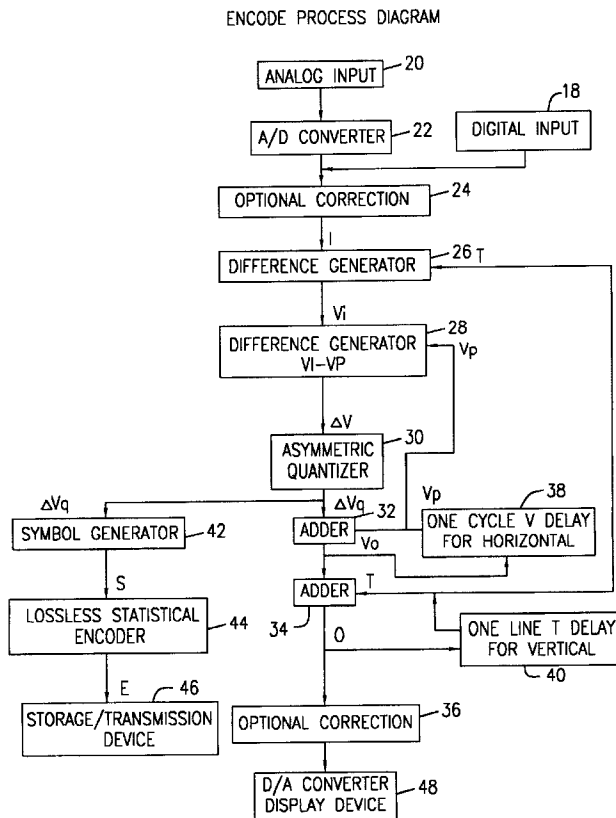
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(57) **ABSTRACT**

A method and apparatus is disclosed for digitally compressing video signals. The method and apparatus provides a system which generates values related to the differences between respective pixel locations in an x, y pixel display. The differences generated between proximate pixel locations are used to generate various delta values which are encoded in an asymmetric fashion. The asymmetric coding eliminates artifacts in the displayed image, and the delta encoding is performed in both a horizontal and vertical direction. Errors due to the compression process are distributed randomly in both horizontal and vertical directions, approximating the effect of analog media such as video and especially film.

2 Claims, 7 Drawing Sheets



PRE-ENCODE PROCESS DIAGRAM

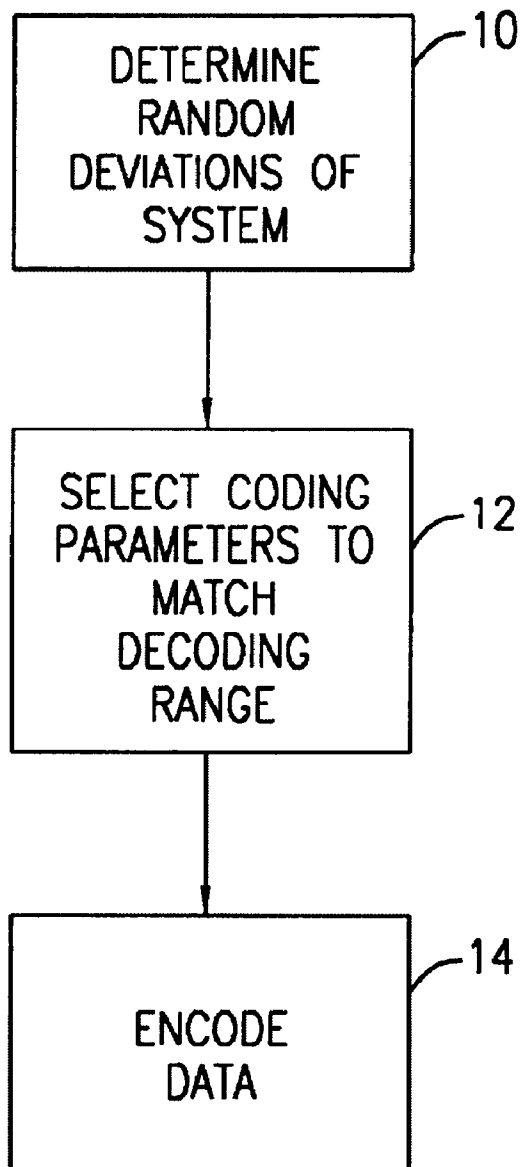


FIG. 1

ENCODE PROCESS DIAGRAM

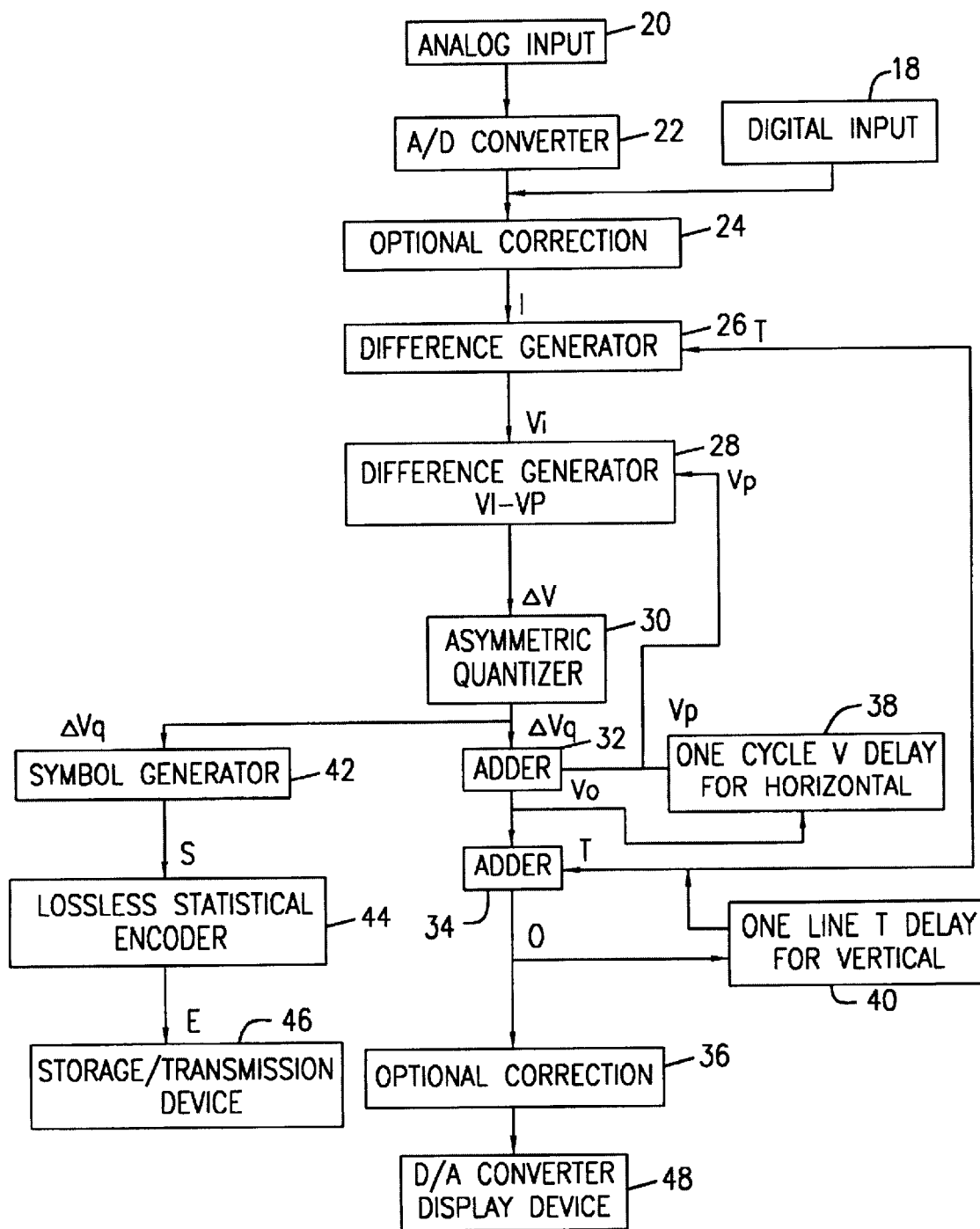


FIG. 2

DECODE PROCESS DIAGRAM

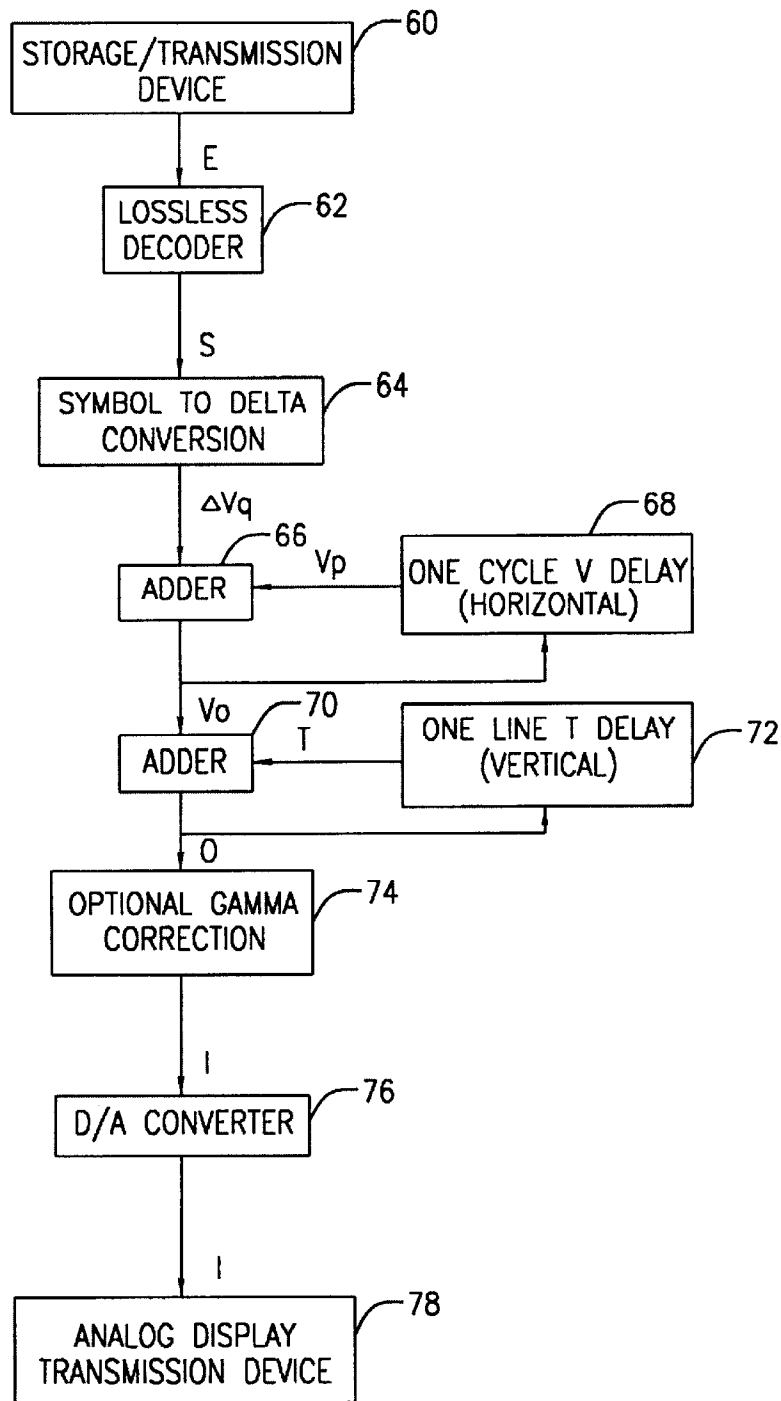


FIG. 3

I INPUT PIXEL (CORRECTED)
T TOP PIXEL (DECODED)
O OUTPUT PIXEL (DECODED)
 V_p PREVIOUS VERTICAL DIFFERENCE
 V_i NEW VERTICAL DIFFERENCE (INPUT)
 V_o VERTICAL DIFFERENCE
 ΔV_o DELTA BETWEEN V_p AND V_i
 ΔV_q QUANTIZED DELTA
S CODED SYMBOL
E LOSSLESS-ENCODED BITSTREAM

FIG. 3A

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