United States Patent [19]

Shu et al.

[54] **IMPROVED HYPERCUBE TOPOLOGY FOR MULTIPROCESSOR COMPUTER SYSTEMS**

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[21] Appl. No.: **655,258**

[22] Filed: **Feb. 13, 1991**

Related U.S. Application Data

[63] Continuation of Ser. No. 85,980, Aug. 14, 1987, abandoned.

[51] Int. Cl.^{5} **G06F 13/00**
[52] U.S. Cl. **395/800**; 364/DIG. 1; 364/DIG. 2; 364/931; 364/931.4; 364/931.41; 364/229
[58] Field of Search .... 364/200, 900; 395/DIG. 1, DIG. 2, 800, 700, 325

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[57] ABSTRACT

A hypercube system which has been modified by adding additional communication links between the most distant nodes of a classic hypercube topology is described herein. This improvement in a hypercube topology is termed as a Modified Hypercube topology. Such a topology contains extra links which connects a node to another node in the topology which requires the greatest number of nodal hops over the shortest path. Also stated another way, that node having the greatest number of singly traversed or hopped nodes along the shortest path from an originating node to that node makes that node the most distant processor node. If hamming were to be implemented in the system, there is added an extra link between two nodes having the greatest hamming distance. Such a system makes a technological trade off to reduce the diameter of a classic hypercube at the cost of incrementally increasing the number of I/O ports at each node. This trade off has been recognized in the industry as advantageous since a great gain in performance is achieved n exchange for an incremental impact to the hardware. Clearly the performance advantages of the present invention grows as the number of nodes in the hypercube grows and the maximum distance between nodes increases.

14 Claims, 6 Drawing Sheets
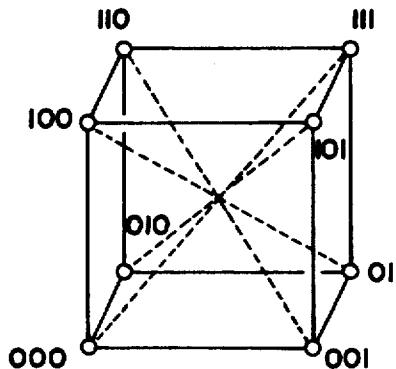
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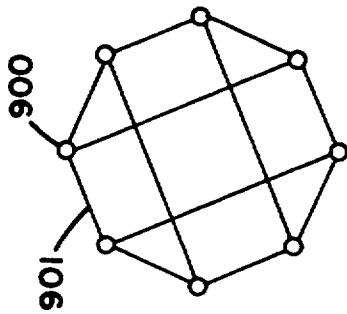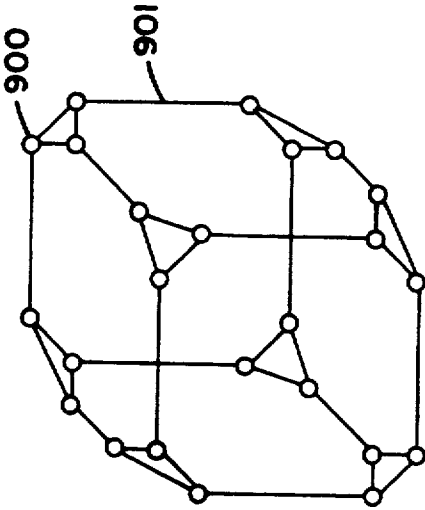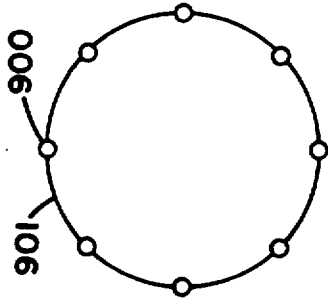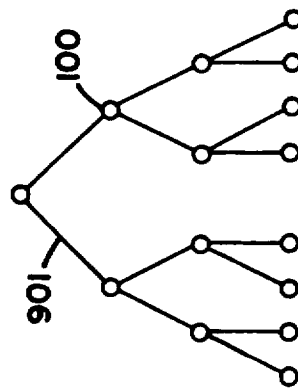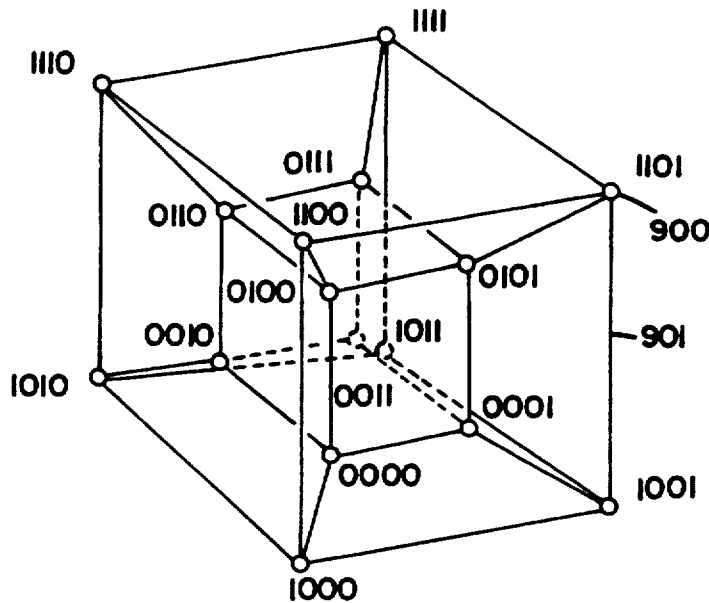
(PRIOR ART)

FIG. IA

FIG. IB

FIG. IC

FIG. ID

FIG. IE

FIG. IF

(PRIOR ART)

Vertex (Node)

Edge

FIG. 2 A

FIG. 2 B

FIG. 2 C
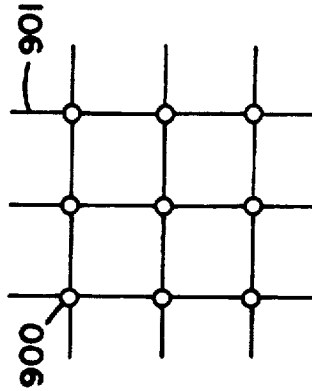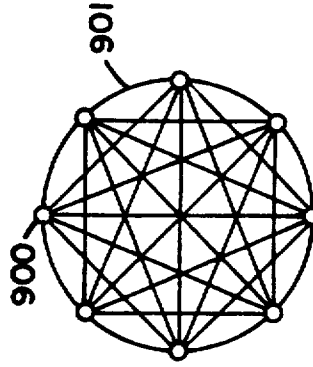
FIG. 2 D

FIG. 3

FIG. 4

DOCKET ALARM
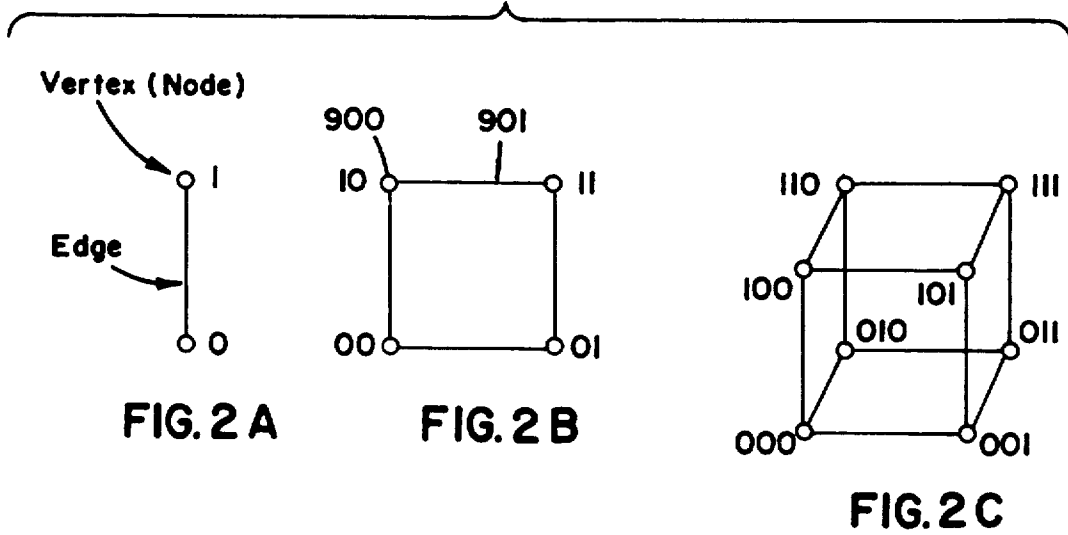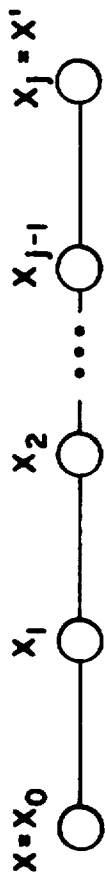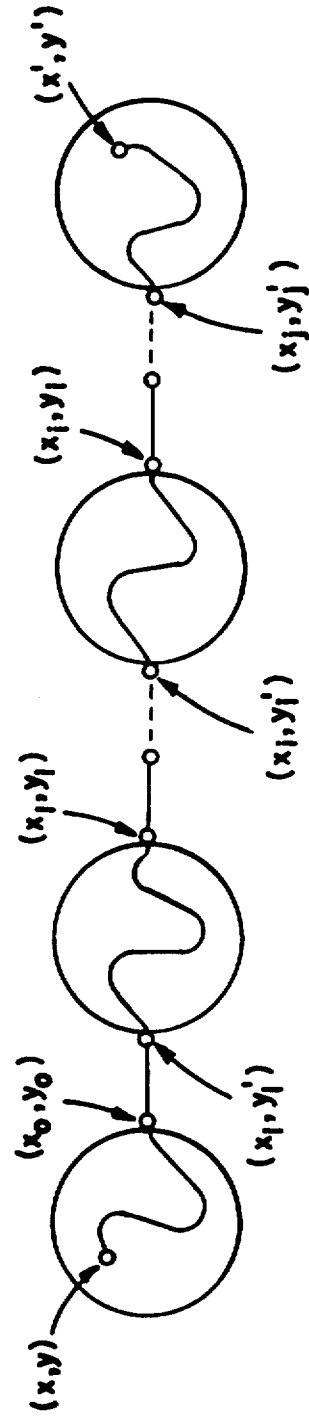
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