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Lawler et al.

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[54] **HIGH SPEED CACHE MANAGEMENT UNIT FOR USE IN A BRIDGE/ROUTER**

5,802,278 9/1998 Isfeld et al. 395/200.79

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[57] ABSTRACT

A method and cache management for a bridge or bridge/router providing high-speed, flexible address cache management. The unit maintains a network address cache and an age table, searches the cache for layer 2 and layer 3 addresses from received frame headers, and returns address search results. The unit includes an interface permitting processor manipulation of the cache and age table, and supports a 4-way set associative cache to store the network addresses. A plurality of functions implemented in hardware enables software manipulation of the associated cache. Four cache operating modes are selectable. The unit can identify and select destination ports within a Load Balanced Port Group for frame forwarding. The unit utilizes Virtual LAN identification in conjunction with a MAC address for lookup in the cache. A cyclic redundancy code for each address to be looked up in the cache is used as an index into the cache. If a cache thrash rate exceeds a predetermined threshold, CRC table values can be rewritten. Four time-sliced cache lookup units are provided, each consisting of a cache lookup controller for comparing a received network address to an address retrieved from an identified cache set.

[73] Assignee: **3Com Corporation**, Santa Clara, Calif.

[21] Appl. No.: **08/927,336**

[22] Filed: **Sep. 11, 1997**

[51] Int. Cl.⁶ **H03M 13/00**

[52] U.S. Cl. **714/758; 370/392; 370/401**

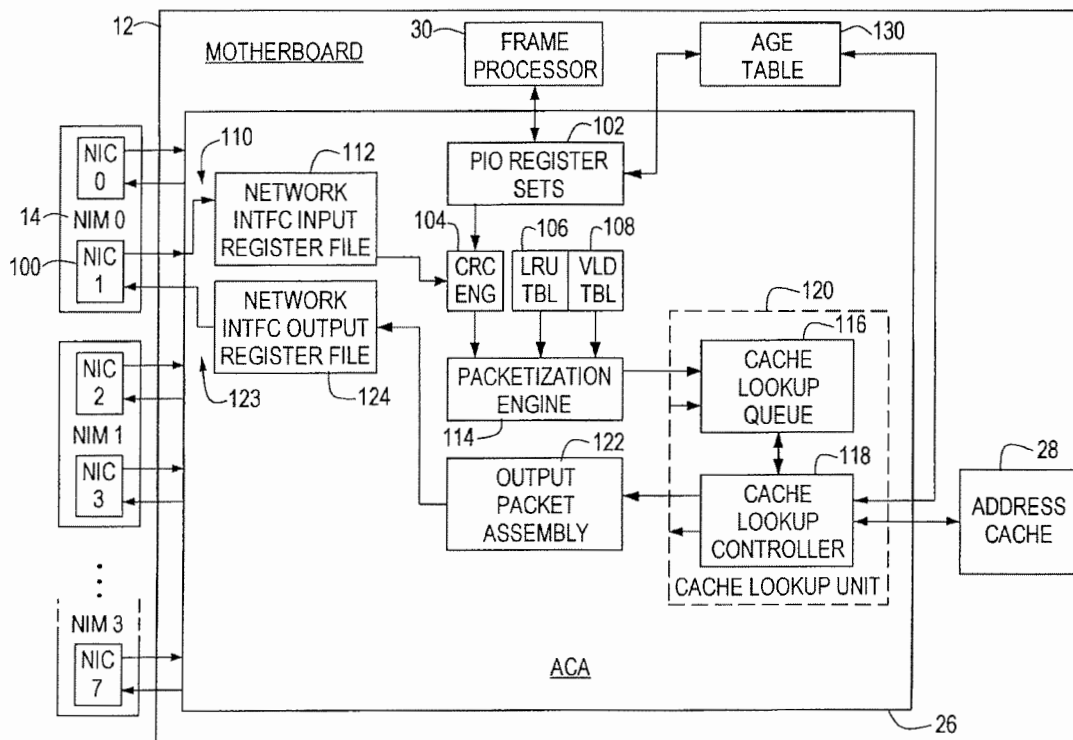
[58] Field of Search **371/37.07, 37.7; 370/232, 253, 392, 401, 402, 466; 395/286, 185.02**

[56] References Cited

U.S. PATENT DOCUMENTS

5,469,555	11/1995	Ghosh et al.	711/133
5,598,541	1/1997	Malladi	395/286
5,640,399	6/1997	Rostoker et al.	370/232
5,708,659	1/1998	Rostoker et al.	370/392
5,742,792	4/1998	Yanai et al.	711/162

26 Claims, 14 Drawing Sheets



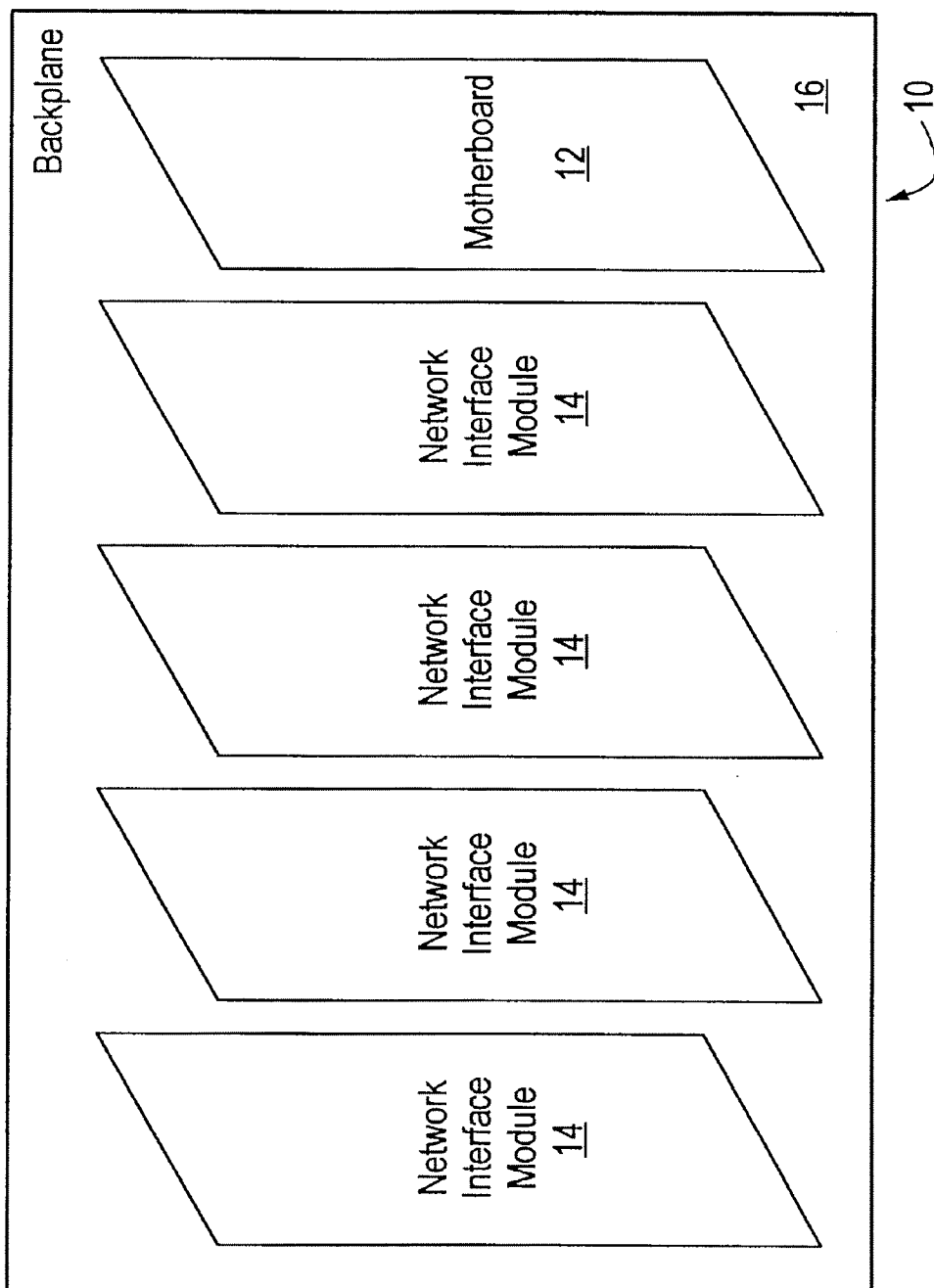
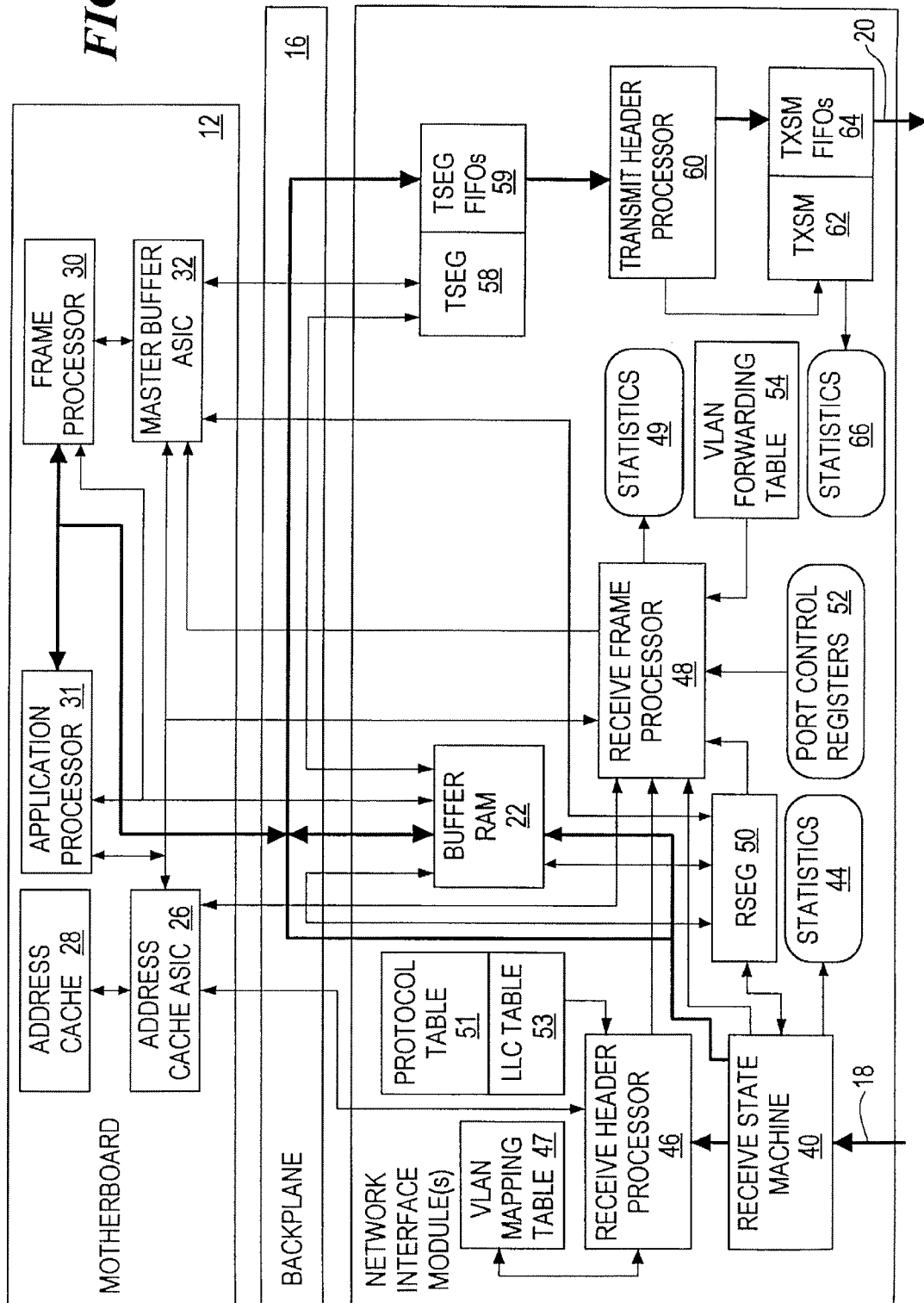


FIG. 1

FIG. 2



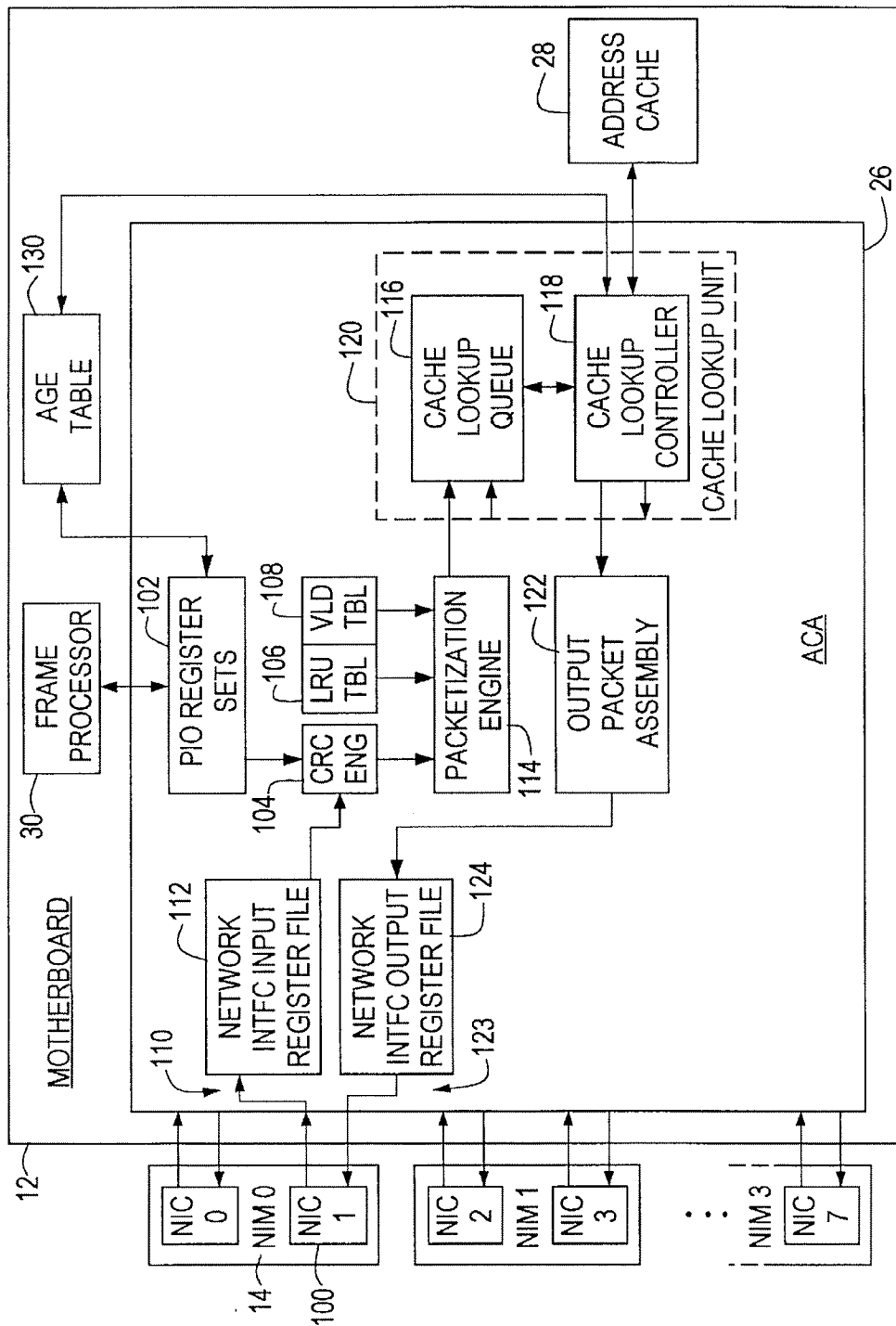


FIG. 3

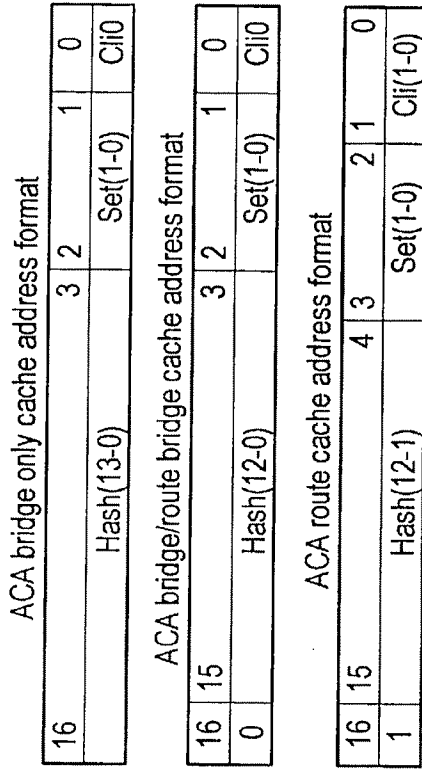
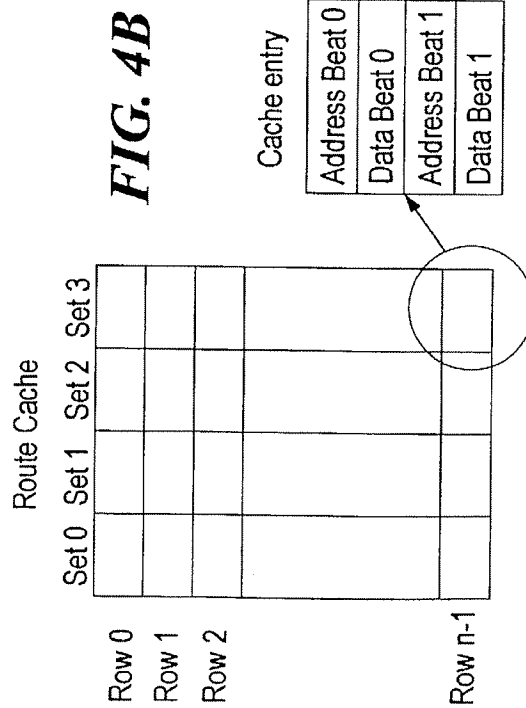
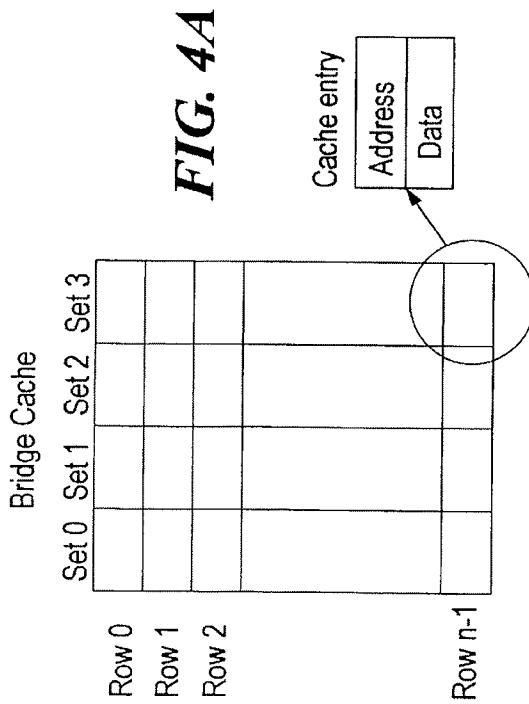


FIG. 5

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