

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

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(54) **QUALITY OF SERVICE CONTROL MECHANISM AND APPARATUS**

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(\* ) Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

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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(52) **U.S. Cl.** ..... **370/401; 370/400**

(58) **Field of Search** ..... 370/395, 400, 370/401, 412, 420, 421, 428, 429, 396, 397, 407, 410

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*Primary Examiner*—Douglas W. Olms

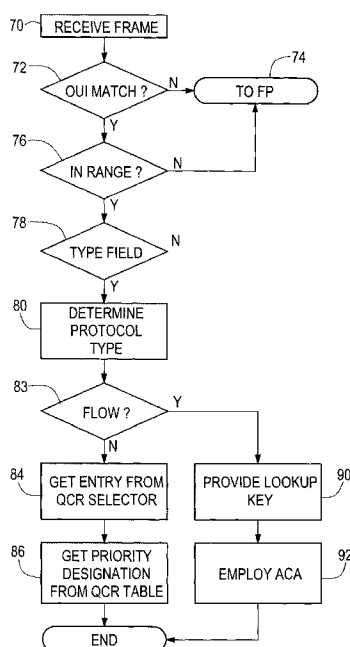
*Assistant Examiner*—Ricardo M. Pizarro

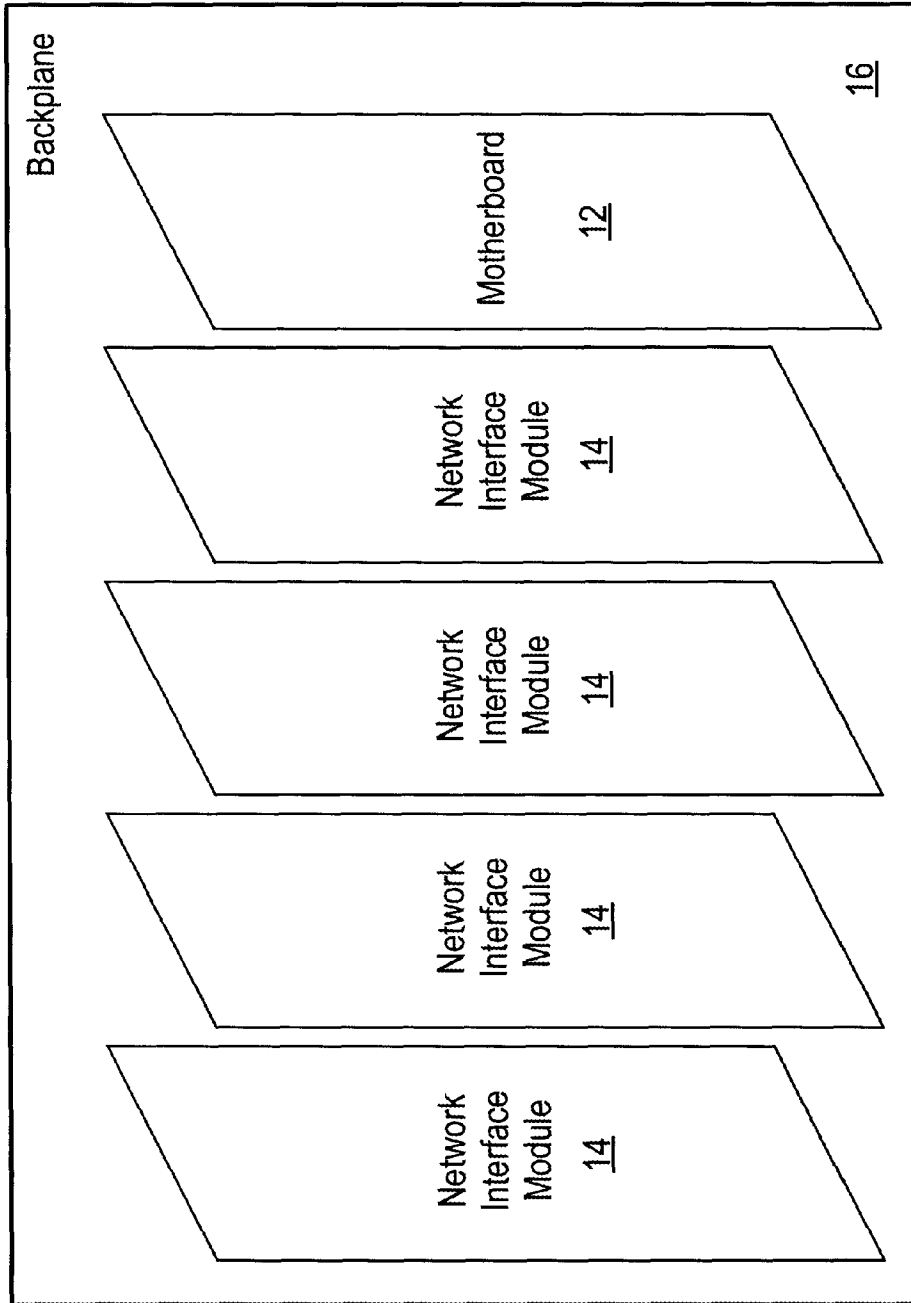
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(57) **ABSTRACT**

Quality of Service (“QoS”) variables for predetermined protocol Type data units are stored in a cache memory. For data units that are associated with a flow, thirteen bytes selected out of the Internet Protocol (“IP”) header are employed as at least a portion of a key to perform a cache lookup to obtain at least one Quality of Service variable from the cache. Both routing and QoS information may be stored in the cache for retrieval upon a single lookup operation.

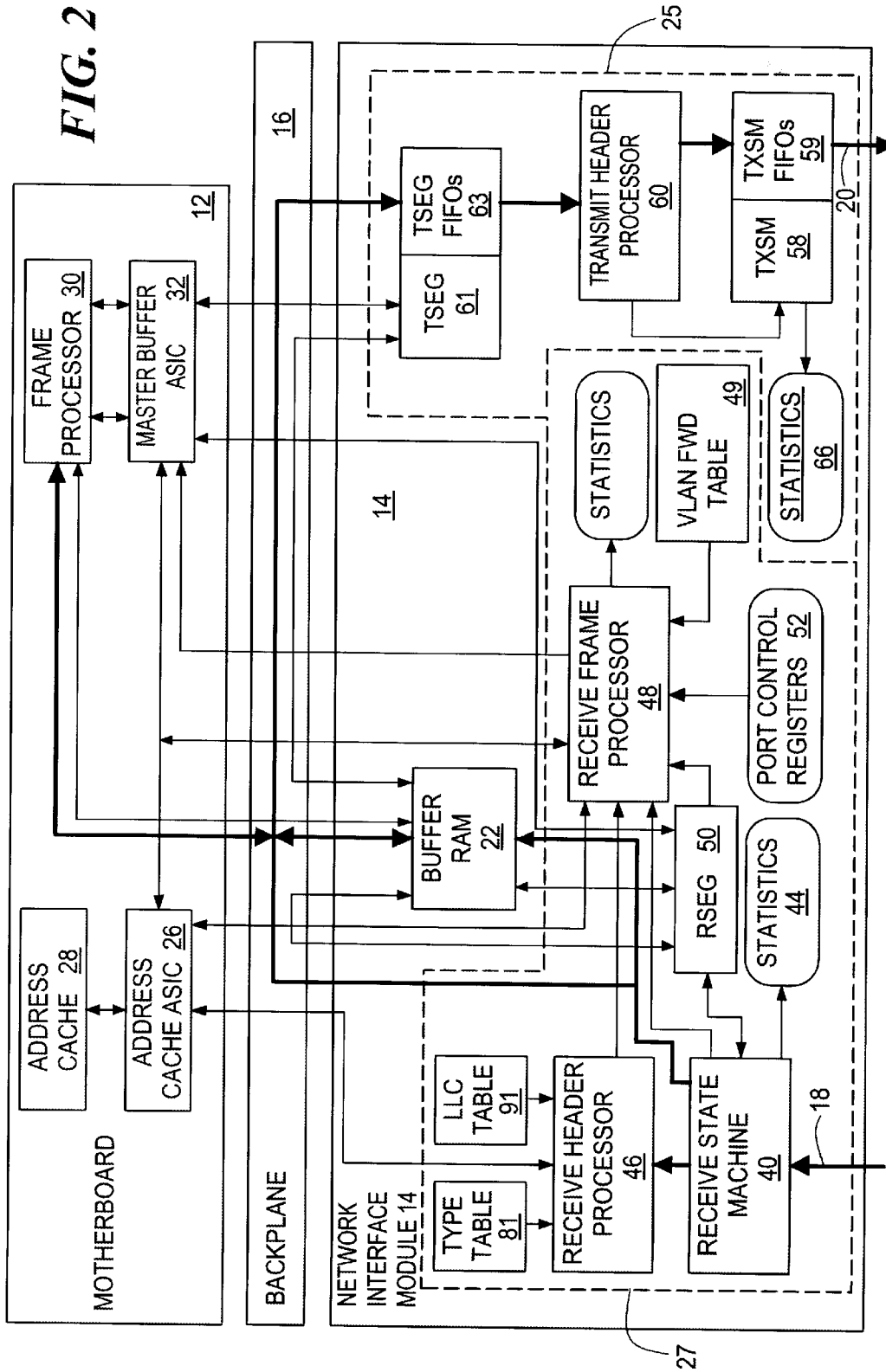
**24 Claims, 4 Drawing Sheets**





**FIG. 1**

FIG. 2



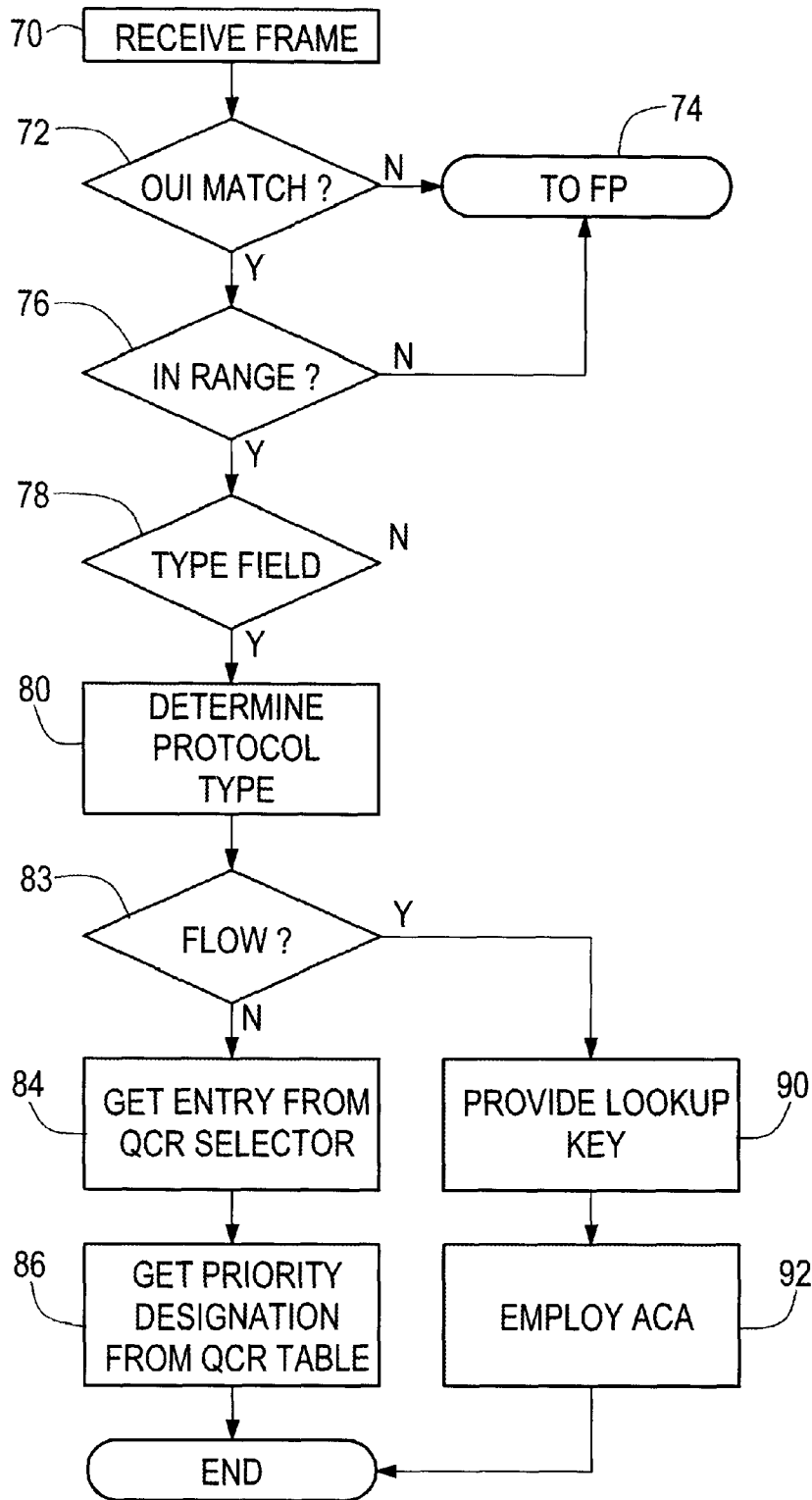


FIG. 3

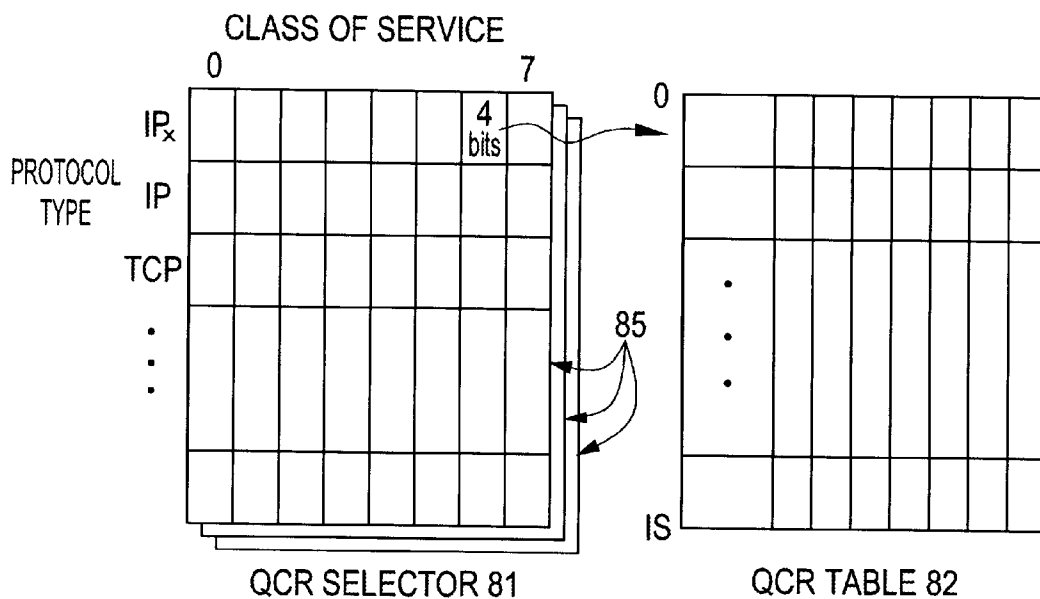


FIG. 4

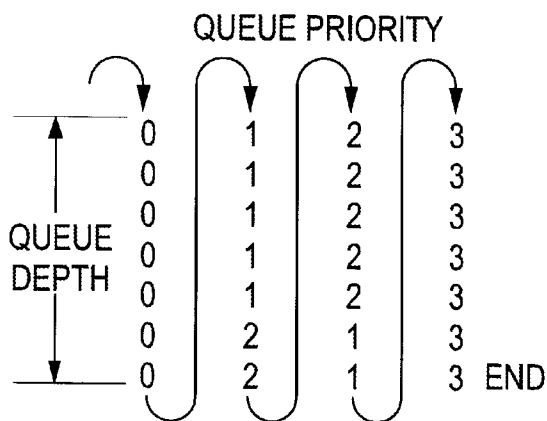


FIG. 5

FIG. 6

```

0 1 2 3
1 2 3 0
2 3 0 1
3 0 1 2 END
    
```

FIG. 7

```

0 1 2 3
1 0 2 3
0 1 2 3
2 0 1 3
0 1 2 3
1 0 2 3
0 1 2 3
3 0 1 2
0 1 2 3
1 0 2 3
0 1 2 3
2 0 1 3
0 1 2 3
1 0 2 3
0 1 2 3 END
    
```

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