

ABSTRACT

A HYBRID PACKET-SWITCHED NETWORK FOR
DATA FLOW

By

Paul Collier Smith

December 1982

This paper presents the results of an investigation on hybrid packet switched networks for data flow communications.

First, data flow communication network requirements are reviewed and discussed.

Next, a topology based on a clustered cubic switch network connected to a 16 pair dual bus network is presented. The topology has the property of requiring only two intermediate stopovers for connecting 160 nodes.

A tiered protocol based on physical, link and packet layer divisions is then generated. Physical connections are TTL. Link access is chain-enabled. Packets contain destination, source, control and information fields.

Design of a switch suitable for implementation in Very High Speed Integrated Circuitry (VHSIC) is developed. Gate count and I/O pin count estimates are given.

The design performance is analyzed in terms of overall throughput, message delay and network efficiency. Throughput of 128 million packets per second at maximum locality is achieved.

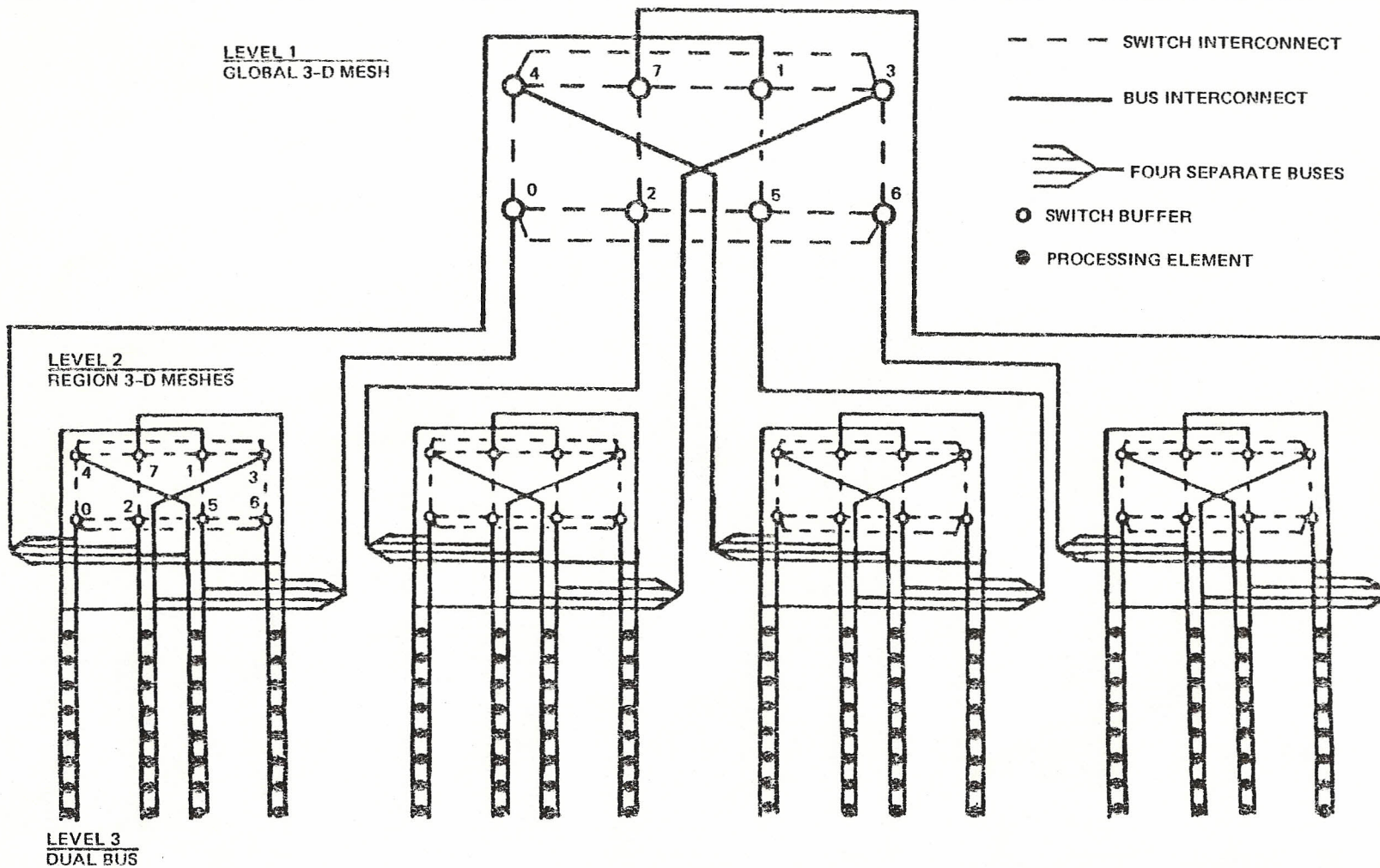


Figure 2.5. Hybrid Switch/Bus Topology

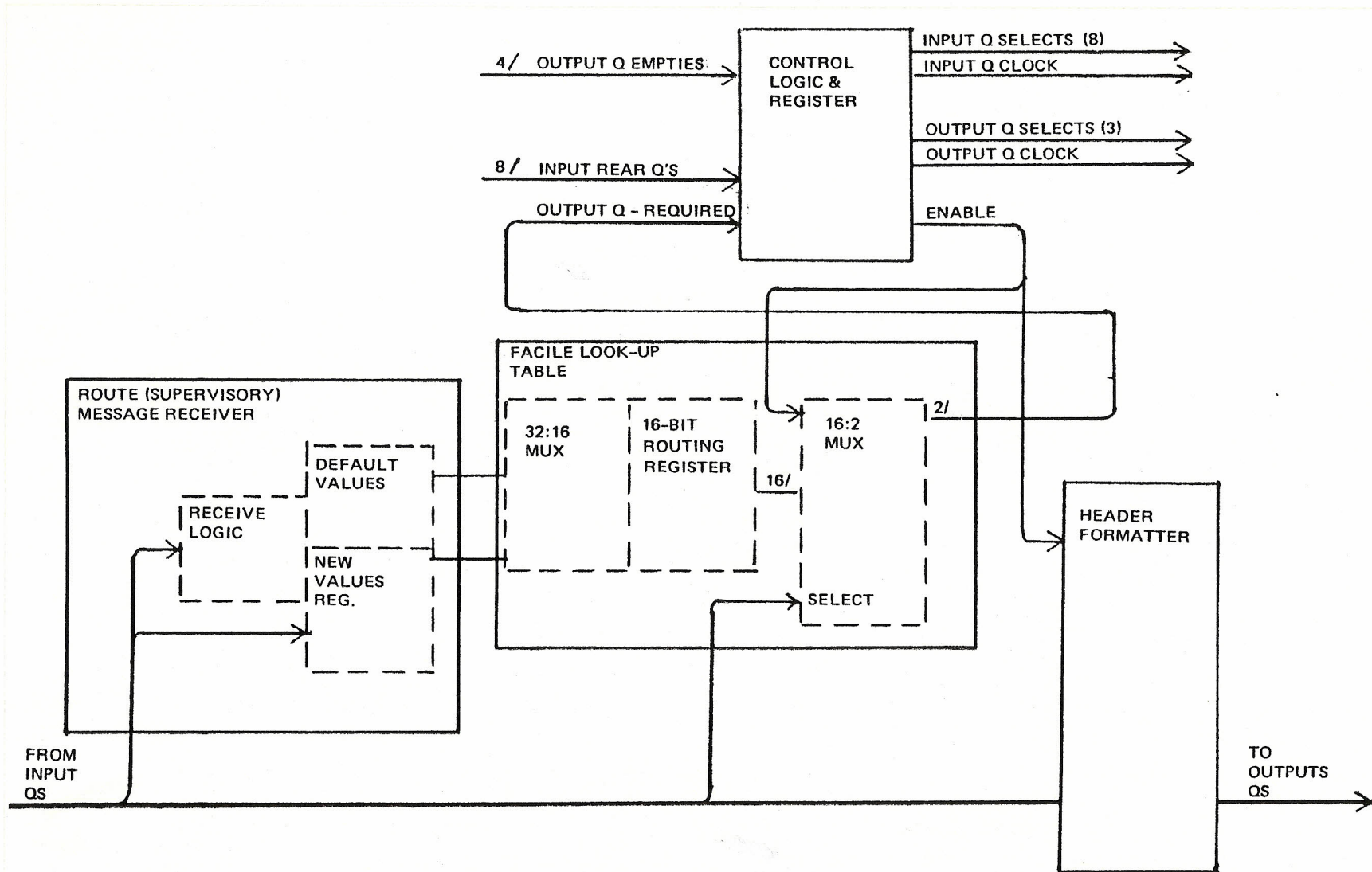


Figure 4.19. Output Server Controller

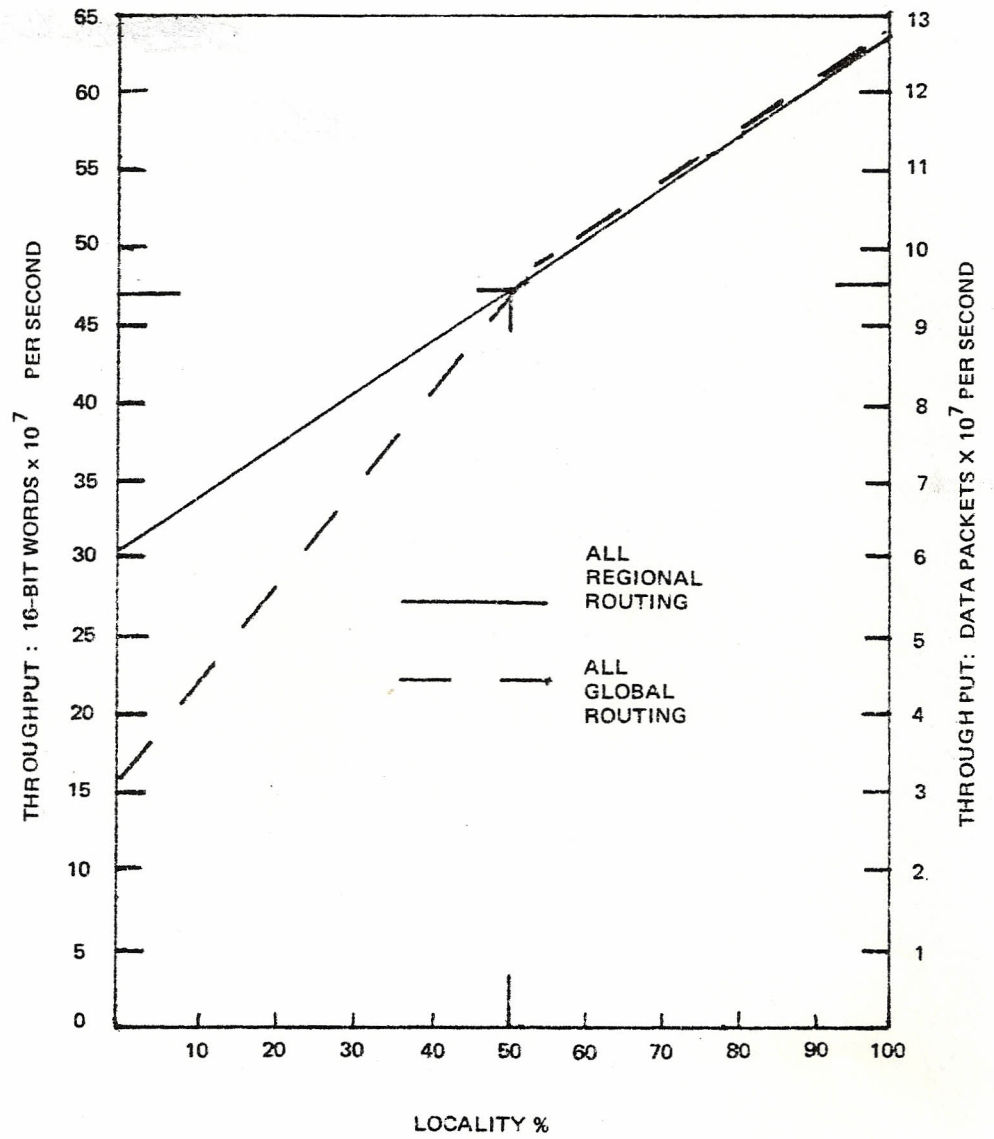


Figure 5.2. Throughput Versus Locality, 20 Mhz Clock