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LNF-85/66(NT)  
24 Dicembre 1985

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VME - ETHERNET INTERCONNECTION**

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**ABSTRACT**

A VME board to interconnect a VMEbus and an Ethernet local area network was designed. Software developed for this system includes echo programs, fast data transfer programs, and file transfer programs implementing ISO FTAM model.

**1. - INTRODUCTION**

Ethernet is a well known high speed local area network (10 Mbit/sec). It allows intelligent stations on the network to communicate and to share its full resources.

The VMEbus is an asynchronous bus, non multiplexed, with high transfer speed and supporting multiprocessor systems. The VME standard was developed by the 68000 manufacturing industries, and the bus is widely supported.

A link between a VMEbus and an Ethernet local area network has been implemented. The software developed allows interconnection between a VME CPU board and any host with a DEQNA or DEUNA port (for example MicroVAX or VAX computers).

## 2. - HARDWARE INTERCONNECTION

Two boards, the Interlan, Inc. NM10A and the FVNM10 interface developed by the authors, constitute the hardware interconnection between the VMEbus and Ethernet. NM10A is an intelligent Ethernet controller: it interfaces an Ethernet network to any host (for example our VME board). It has five internal registers. FVNM10 is a VME board that allows to adapt NM10A to VMEbus. It is selected when the CPU is addressing the location \$FFF40X, where X is an hexadecimal odd number between 1 and F. Each X value selects a different FVNM10A function:

- VME writes NM10A command register
- VME reads NM10A receive-data register
- VME writes NM10A transmit-data register
- VME tests control-bits
- VME reads NM10A status register
- VME instructs FVNM10 to request an interrupt on VMEbus when there are valid data in the status register or in the receive-data register

## 3. - SOFTWARE INTERCONNECTION

The following software for managing the interconnection has been developed:

1. echo programs: VME sends packets to MicroVAX 1 and waits echo packets from it and vice versa. These programs are useful to test the hardware connection;
2. fast data transfer programs: a simple communication protocol for fast data transfer. The maximum rate measured was 1 megabit per second (when other three DECnet nodes were active);
3. programs implementing ISO FTAM (File Transfer, Access and Management) protocol. It was chosen to implement only the FTAM mandatory part (connection between application processes and its release or abort; selection and deselection of a file; open and close files; data transfer; cancel a data transfer) plus create and delete files. It is interesting to implement FTAM but the protocol overhead is heavy: we have an ISO standard but low data rate connection.

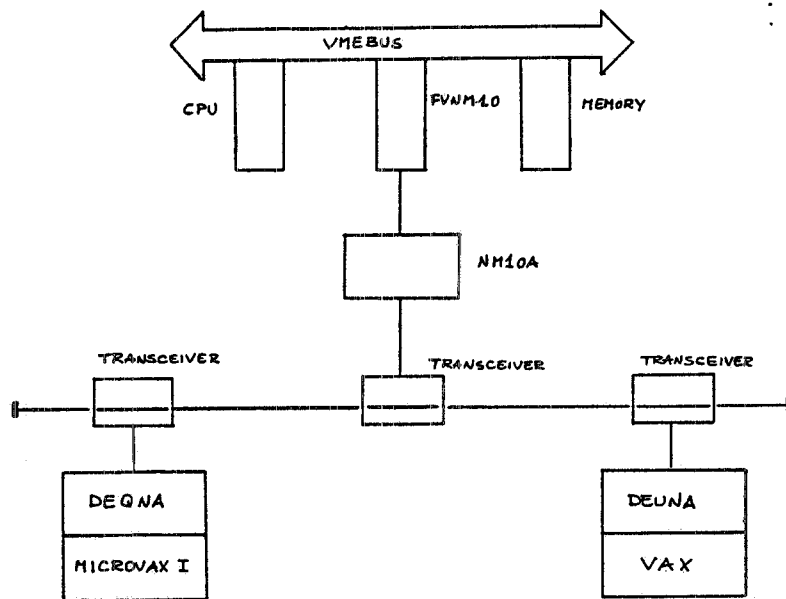


Figure is a schematic diagram of the set up used.

#### 4. - FUTURE DEVELOPMENT

An intelligent Ethernet controller produced by Motorola and called MVME 330 shall be used: it is a VME board and will substitute the FVNM10 plus NM10A. It will, probably, improve the data rate.

We thank the LNF Photographic Laboratory which designed and produced the P.C. board.