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OBELIX/CA/89/01

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FIRST TEST OF THE TOF DAQ SYSTEM AND TOF ON-LINE SOFTWARE

We put in operation for the TOF test a system with **the standard configuration (hardware and software) foreseen for the subdetectors local monitoring and independent tests**. The system, based on MODEL for the VAX side, uses a dedicated CPU with the CAMAC readout code running under OS9. The data are transferred from the CES CBD-8210 Camac Branch Driver to the CPU memory through the VME bus. The VME-VAX communication relays on the Ethernet channel. A test of a complete working system has been performed taking data from 6 TOF scintillators equipped with 24 FERA channels giving pulse height and time information. The TOF Format and Decoding software has been employed to decode TOF information. The histograms were analyzed with the Histogram Presenter system .

Introduction

The Obelix on-line architecture is devised to enable a centralized data acquisition as well independent data taking for each detector.

The MODEL software is the on-line system resident in the VAX 6210 and in the Vaxstations. It has been implemented in this distributed environment in such a way that the above requirements can be satisfied.

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In the TEST described we used the basic setup for one detector independent acquisition. At the same time we tested the simplest case (the central VAX + 1 Vaxstation) of the integrated system.

The VME System

The VIP card, developed by the ALEPH experiment, has been employed. This card features a Motorola 68010 cpu and a LANCE Ethernet interface on a single board VME module. The OS9 kernel system is resident in a eprom of the same module. The program development and code loading is accomplished by means of the OS9 Network Disk Server, developed by the Aleph group [1] . It has been employed to provide the OS9 microprocessor resident system with the necessary storage media (virtual disks on the Vax) . The CAMAC readout program has been developed in Real Time Fortran using a high-speed but non completely standard way to do CAMAC cycles, [2]. The standard CAMAC ESONE library (implemented under OS9 by the OPAL group [3]) was used in the initialization program.

The VME-VAX Communication

Commands from Vax to OS9, events and status flags from OS9 to VMS, are transferred using the Aleph Subroutine Library for the Vax Ethernet Interface [4]

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The Vax System

The on-line software developed on the Vax is based on MODEL. MODEL is a set of independent packages which have been integrated to suit our needs. To build our systems we used the Model Buffer Manager [5], the Model Human Interface [6], the Model Process Control [7], the Monitor Process Frame [8], the Model Recording System, the Occurrence Signaling Package [9]. A Producer which handles the Vax-OS9 communication, events readout and injection in the Model Buffer Manager has been developed. For the test we used the Vax 6210 and a Vaxstation 2000. The Producer and the monitoring processes ran on the Vax. We used the Model Process Control to control the Vax processes from the Vaxstation. In this way we tested the use of our on-line system in a multi-computer environment (as will be our final configuration). The TOF Format and Decoding software (described in reference [10]) has been employed to decode TOF information. We used the Histogram Presenter system to examine the histograms [11]. A schematic view of our system is shown in fig. 1 .

The Test System

We took data from 6 TOF scintillators mounted on the apparatus. Each scintillator is equipped with 2 PhotoMultipliers (PM) . We have 2 Fera channels (giving pulse height and time information) for each PM. The event size was 24 words. We tested the scintillators with cosmic rays asking for a signal on a scintillator (from both PM) from the OR of the six barrels. The measured event rate was around 25 events per second. The maximum readout and ethernet transfer rate (without any other data processing) is around 50 events per second, equivalent to about 1 millisecond per word. The acquisition rate from CAMAC modules to the VIP memory , although not optimized) is roughly 5 microseconds per word. This means that the ethernet VAX-VME communication is the main responsible of the acquisition rate. The transfer rate of 2.5 kbytes/sec is enough to satisfy the event rate foreseen for the local monitoring. Nevertheless an increased packet size (buffering in the VME) will enable us to increment the transfer rate by a factor 25-30 (about 50-60 kbytes/sec)

Conclusions

Several parts are not yet in a definitive form and data transfer has to be optimized. Nevertheless we want to stress that a complete system is now in operation and has been used to test a part of the apparatus. Another major point is that this system has the same configuration (hardware and software) foreseen for the subdetectors computers. Moreover the Model software implemented will be used also for the global on-line system in the complete configuration.

References

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[4] T. Charity "A subroutine Library for the Vax Ethernet Interface" Aleph note March 1,1988

[5] P. Van de Vyvre "The Model Buffer Manager Users's Guide" DD//OC/OS January 1988

[6] G. Mornacchi " Model Human Interface Users's Guide " DD//OC/OS August 1988

[7] J.P. Matheys " MODEL Process Control Users's Manual " DD//OC/OS June 1988

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[10] A. Masoni, G. Puddu "OBELIX TOF Format and Decoding Software" Obelix Internal Note OX/CA/88/05

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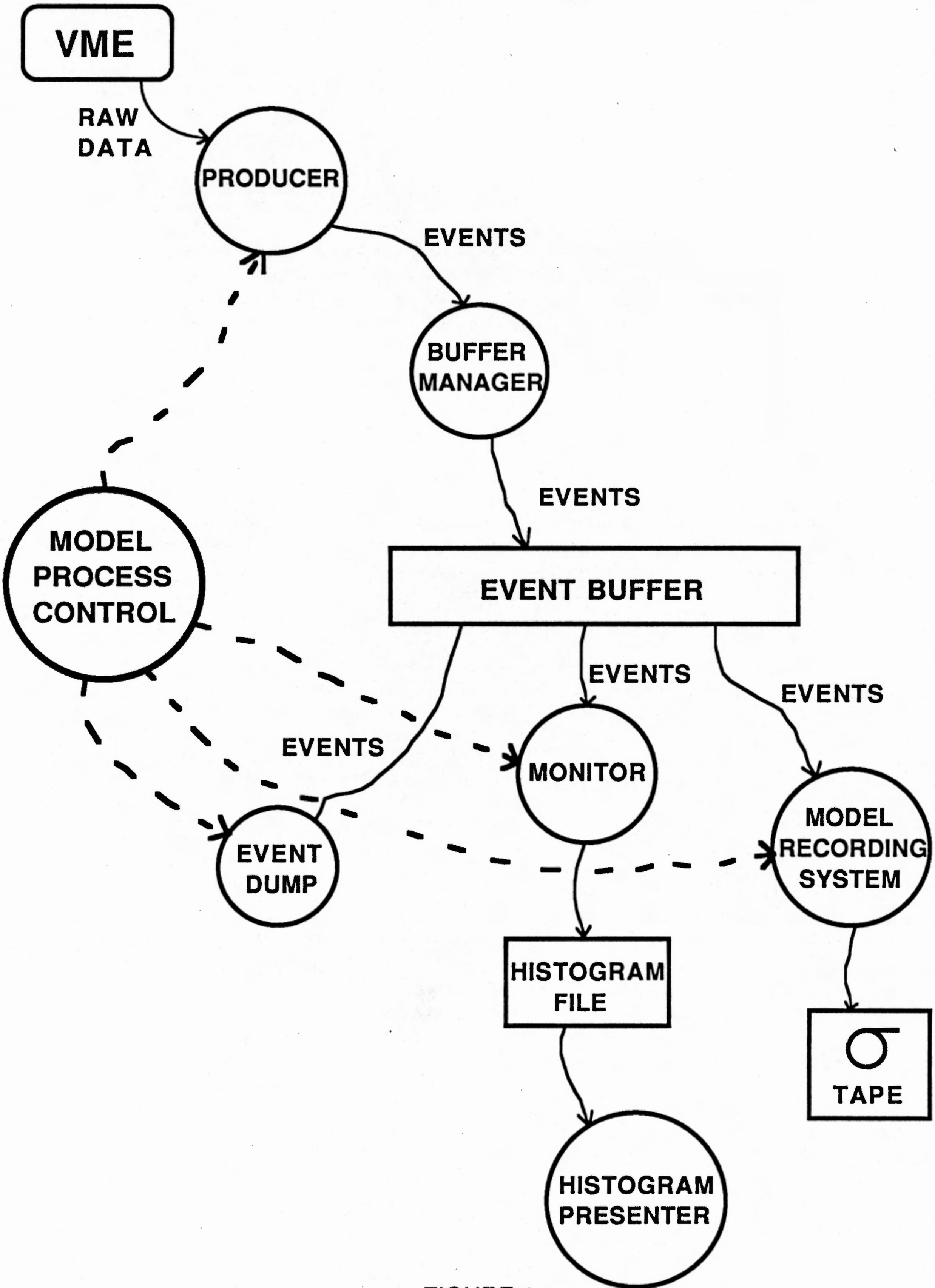

FIGURE 1
VAX ON-LINE SYSTEM