INTERFACE OF THE CAMAC VDB - CONTROLLERS FOR THE FOBOS DATA ACQUISITION SYSTEM IN THE PCI STANDART

Yu.B. Semenov, V.E. Zhuchko, D.V. Kamanin

The data acquisition system of the FOBOS setup is based on computers and computer-controlled technique in different standards. The electronics of the gas-detectors occupies ten CAMAC crates housing the special digitising electronics (8 crates) and the control logic together with some service modules (2 crates). Splitter and delay boxes and CIS-electronics (4 crates), and FASTBUS mini-crate are used for the photo multiplier read-out of the scintillator shell and the forward array. A detailed description of the data acquisition system is given in Ref.[1)] and in Refs. therein. Almost all CAMAC-crates and the FASTBUS-crate are connected with main VME crate by means of the parallel VSB Differential Bus Extension (VDB). The VDB is well suited for multi-crate systems where different bus standards have to be controlled. The CAMAC-to-VSB interface is a single-width CAMAC crate controller STR 610/CBV driven from the VME Subsystem Bus (VSB) via the VSB Differential Cable. The specification of the CBV is similar to the CAMAC crate controller of type A_1. It maps a portion of the VSB address space to the CAMAC (C, N, A, F) and generates single CAMAC cycles from each proper VSB cycle.

After a LAM demand has been recognized, the VME processor reads the coincidence pattern register first and then the conversion results of the TDCs and BDPs which had fired. Subsequently, the QDCs of the scintillator shell and the forward array are serviced. A single-board EUROCOM-6 VME computer with a 68030 CPU builds the event data blocks. A valid event is characterized, on average, by 20-30 parameters which are stored within ~ 2.5 ms.

The FASTBUS mini-crate contains a 68030-processor board (CERN Host Interface, CHI), an VSB I/O-Port, a LAN Ethernet module and six 96-channel QDCs. The VSB I/O-port provides an efficient interface between the CHI and the VME where the CHI is operating in the VDB-slave mode. The CHI data memory is directly mapped into the local VSB address space, and the EUROCOM-6 processor module is treated in the same manner as any local memory.

The VME sends the data blocks via LAN to a SUN SPARC-station 10 which records them to the mass storage memory event-by-event. The maximum data rate with respect to the gas-detector part of FOBOS is about 200 kbyte/s. Due to the conversion time of the FASTBUS QDCs (1 ms) rates of 50-100 kbyte/s are typical for the whole spectrometer. Therefore, the maximum permitted counting rate becomes 500-1000 events per second. It is mostly restricted the rate of random coincidences etc.

The VME and the CHI are operating under the Microware real-time operating system OS-9 (professional). All time-critical tasks are moved to the module processors. The data acquisition control program runs on the SUN. Quasi-on-line monitoring of the recorded data is performed using several PC AT as well as X-terminals and the ATHENE data analysis software, which via LAN organizes a direct access to the data just written to the disk memory of the SUN.

The new interface PCI card for the computers of a type x386 is developed which allows to build up the data acquisition system on the base of the modern PC. This card is based on the programming logic microchip ALTERA type EP1K50QC208-3 of the ACEX series. The application of the fast PC-workstation instead of the complex VME-SUN will accelerate processing of the events significantly. Moreover, it facilitates the systematical upgrade of the system and application of available software solutions[2)].

REFERENCES

1) H.-G. Ortlepp et al. NIM A 403 (1998) 65
2) V.E. Zhuchko et al. Contribution to this report

Heavy Ion Physics, FLNR JINR Scientific Report 1999-2000, Dubna 2001, p. 196.