

## COMPUTER CONTROL SYSTEM FOR PHOTON FACTORY AT KEK

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Introduction

In the Photon Factory, the accelerator control and on-line data processing will be performed by constructing a new architecture of information processing system. A computer network, CAMAC modules, software modules, and an interpretive language are provided as basic software/hardware tools in the system.

Some descriptions of the system follow.

Computer network

The computers in the Photon Factory are distributed both in function and space. Each computer assigned to a certain work unit executes particular programs for its corresponding equipment. All of the computers are linked to a specially designed network (Fig. 1). The network consists of CAMAC driver-receiver modules and byte-serial bit parallel dataways. Any computer can communicate with any other member in the network. The computers in cooperation with each other perform the overall operation of the accelerator by exchanging information through the network.

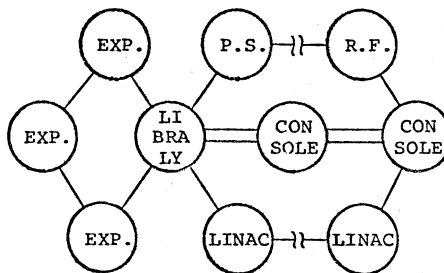


Fig. 1 Schematic diagram of the network

Hardware structure

The CAMAC specifications are applied to most of electric modules, such as computer I/O devices, accelerator control instruments, and electronics for the on-line experiments. The introduction of CAMAC to all parts of the Photon Factory is profitable for efficient construction and maintenance of the information processing system in the following aspects:

- 1) simplification of the interfacing of instruments,
- 2) flexibility of hardware assembly,
- 3) compatibility of software,
- 4) availability of commercial products, and
- 5) possibility of independent development of equipment and computer system.

The design of standard hardware is in progress.

Software structure

The software system has a hierarchy structure (Fig. 2). The elementary module is "CAMAC handler" which executes the CAMAC functions and gets status data from the CAMAC crate. The modules in the next stage are "CAMAC drivers" corresponding to individual CAMAC hardwares, e.g. ADC, DAC, and I/O register. In the next higher stage, a software module which is a fundamental unit servicing for application users, drives a specific instrument by referring to necessary "CAMAC drivers". All of the application programs can be written by CALLing those software modules.

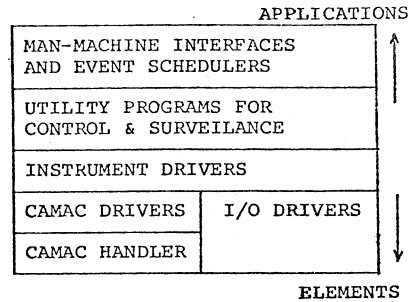


Fig. 2 Software structure

Interpretive language

Following the CERN SPS example, an interpretive language is used for writing the accelerator control programs. The interpretive language is required by the following reasons:

- 1) the variety and complexity of the accelerator system requires a large number of programs, and
- 2) the programs are written not only by experienced programmers but also by engineers and accelerator physicists.

The choice of the interpretive language makes it easy-to-learn and suits with try-and-error development of the programs. The language includes specially designed commands for the exchange of information and the synchronization between the computers.