DESIGN OF CONTROL SYSTEM OF THE RIKEN SSC

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Abstract

The computer control system of the RIKEN SSC is designed. It consists of a computer network and CAMAC serial loops. Micro computers are used for the interface between devices and CAMAC system.

1. Introduction

RIKEN SSC system consists of two injectors (linac and AVF cyclotron) and a separated-sector cyclotron. A large number of devices are distributed around them. There are thousands of parameters. Complicated control sequences are neccesary to operate this accelerator system. For these reasons a computer control system is introduced.

2. Computer System

Figure 1 shows the configuration of the computer system. A network is formed by five mini-computers. For the control of three accelerators, three computers are used. Because each injector is also used for the experiments independently of the SSC, and because the linac is installed in different building, it is convenient to use independent computers and operator consoles. In cases of independent operation, start up, and maintenance, these consoles are used. In the operation as the injectors for the SSC, these accelerators are controled at the central console connected to a console computer. Another computer is used for the program development and to store the data base of the control system. This computer is linked to a central computer by modems.

3. Interface System

CAMAC system is used for the interface because of flexibility and expandability. Most of CAMAC crates are installed in power supply rooms, and the distance between these rooms and computer is very long. These CAMAC crates are connected by a serial CAMAC loop by using optical fiber cables. In order to decrease the number of crates and signal cables, a new CAMAC module which includes a micro processor is developed. The configuration of the module is shown in Fig. 2. The communication interface module (CIM) is a CAMAC module and connected to CAMAC data way. The device interface module (DIM) is installed near the controled devices. To one CIM, 16 DIMs can be connected and data are transfered through serial lines of optical fiber cables. One DIM can control several devices. CIM has random acceses memory (RAM). It reads the data from DIM at predetermined time intervals and stores them. In the failure of devices, the mini-computer reads out the contents of RAM for trouble shooting. The DIM consists of CPU, RAM, ROM, and S/D converter. It can include ADC, DAC, status I/O, and other CPU as options.

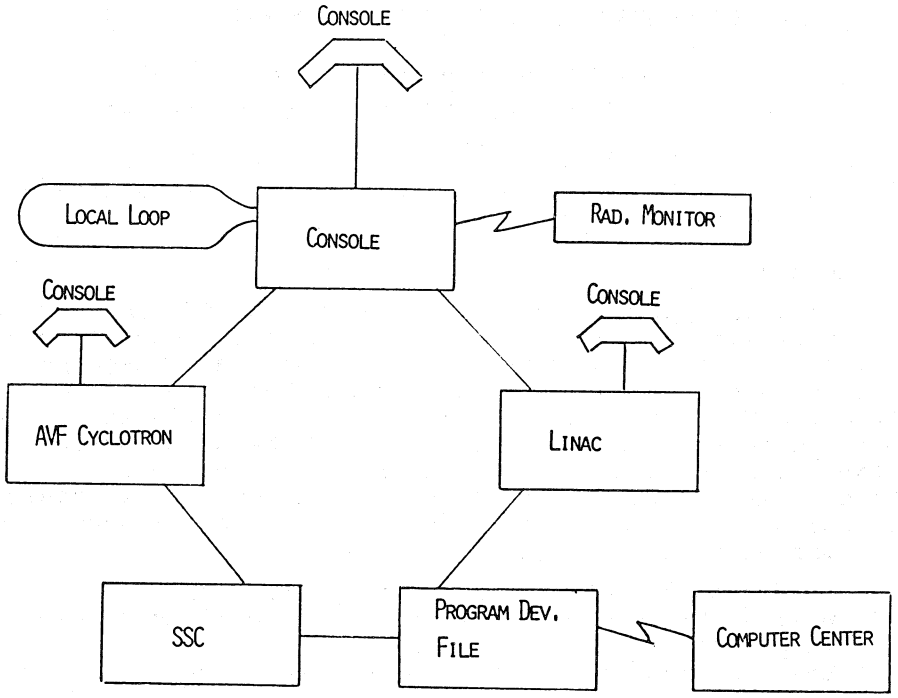

Fig. 1 Configuration of computer system

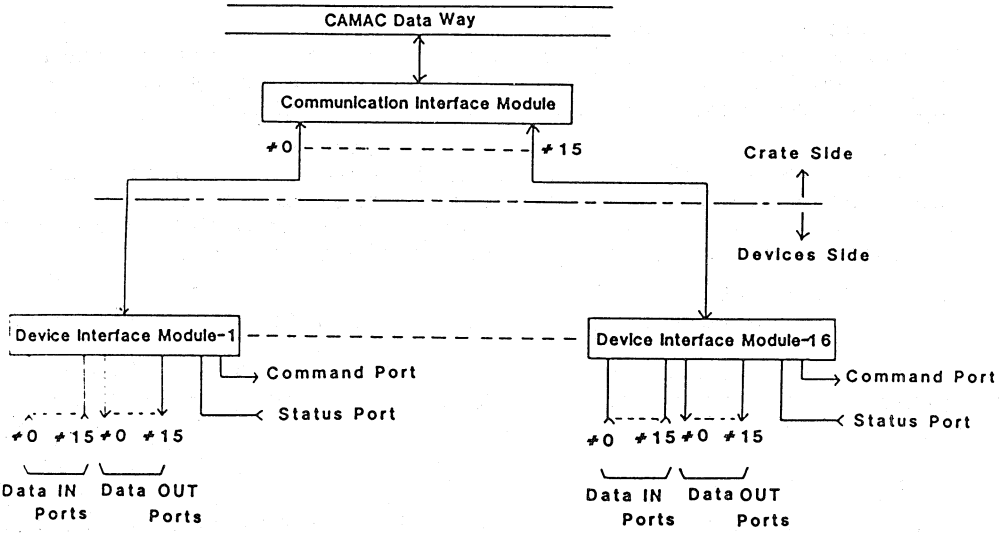

Fig. 2 Configuration of interface system