CONTROL SYSTEMS FOR TECHNOLOGICAL LINACS

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Abstract

Recently the technological linear electron accelerators such as: LU-10, KYT, LIK, EPOS with the energy up to 8 and 30 MeV and the pulse current up to 1A have been developed and put into operation in the Scientific Research Complex (SRC) "Accelerator" of the National Science Center, Kharkov Institute of Physics and Technology (KIPT). These linacs equipped with control systems which allows to control electrons energy on the exit of the linacs.

1 CONTROL SYSTEMS

The special control system [2] has also been developed for controlling the electron beam current [3], energy [4] and position as well as the control of parameters and defense of the accelerating and scanning systems from the damage caused by the beam; blocking of the modulator and klystron amplifier in the case of the intolerable operation regimes; current control in the magnetic system; regulation of the phase and power of the HF signals in the injecting system; the radiation dose control and control of the target devices. The program & technical complex consists of PC equipped with CAMAC crate (fig.1) or measuring channels in PC standard (fig.2), multiplexer (MP), synchronization unit (S), microprocessor-operated complexes (MC) to monitor the klystron amplifier operation, the thermostating system (t°C), the target equipment (TE), and control units of magnet power supplies (MPS).

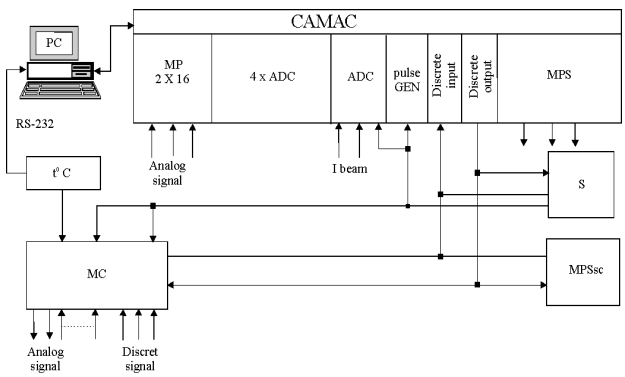

Fig. 1. Functional scheme of the KYT accelerator control system

The measuring devices provide receiving the signal from the analog to digital converters (ADC) probes with the 50 or 100 nsec discreteness by two (fig.3) or four (fig.4) commutating channels simultaneously. The CSL software packet allows the control system to operate in both automatic and manual regimes. The information of the accelerator systems state and the beam parameters is displayed on the local unit terminals and on the color graphics display (D) in the form of the triple-screen control panel. The operator can monitor the work of the accelerator from the PC keyboard and from the local control panels (CP).

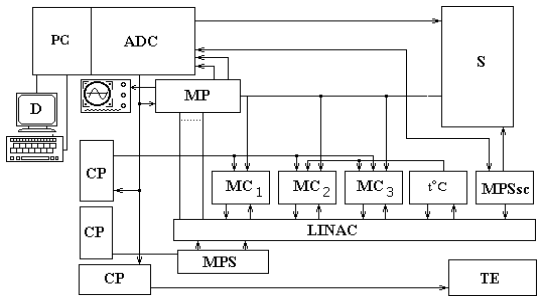

Fig. 2. Functional scheme of the EPOS accelerator control system

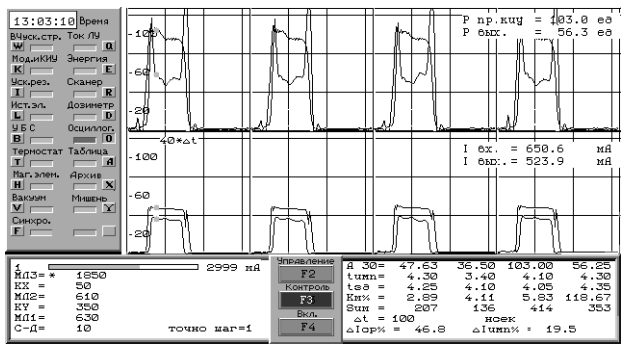

Fig.3. Videogram of the KYT accelerator operator's interface when monitoring the magnet elements power supplies.

Each from the basic accelerator systems in CSL has the corresponding overlay unit, which is called by the main

monitor program. These program units can provide the momentary or repeated control of system parameters or give operating commands. Simultaneously the parameters of several systems can be controlled and only one of them regulated. CSL packet is written in C- language.

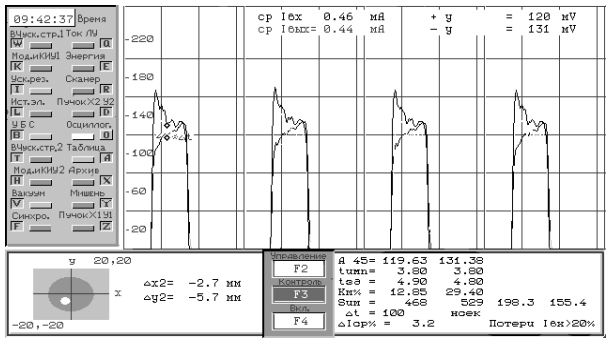

Fig.4. Videogram of the EPOS accelerator operator's interface when controlling the electron beam position.

2 CURRENT STATUS AND PROSPECTS

In the present time various versions of the described system work at four acceleration complexes and other two complexes KYT-2, which are manufactured now, will be supplied with such systems.

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