CONTROL SYSTEM FOR MAGNET POWER SUPPLIES FOR NOVOSIBIRSK FREE ELECTRON LASER

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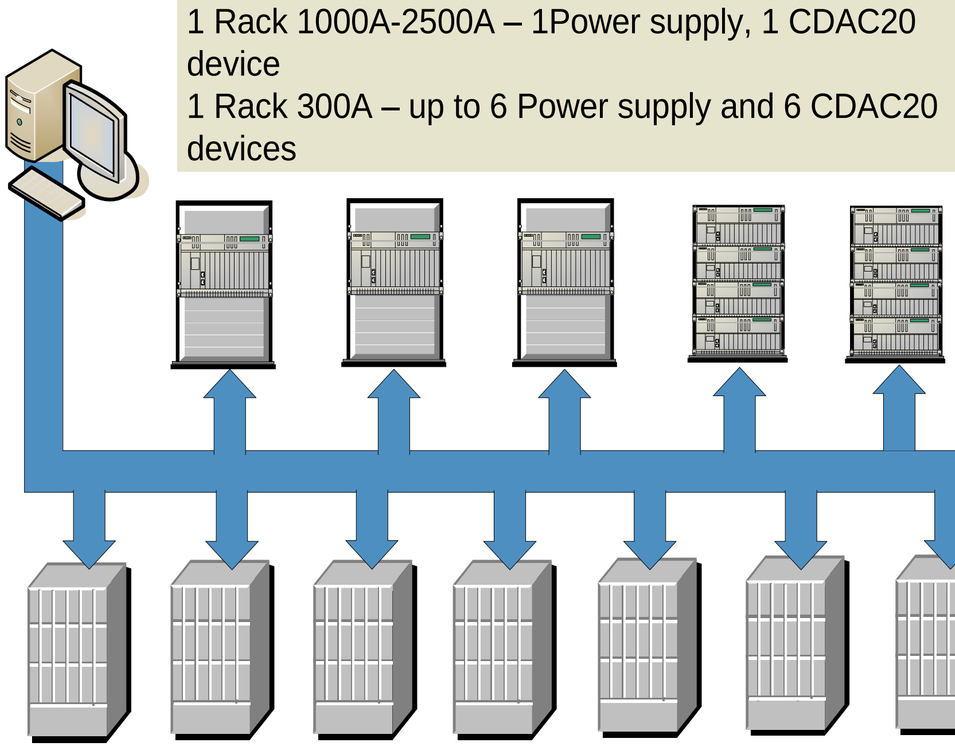
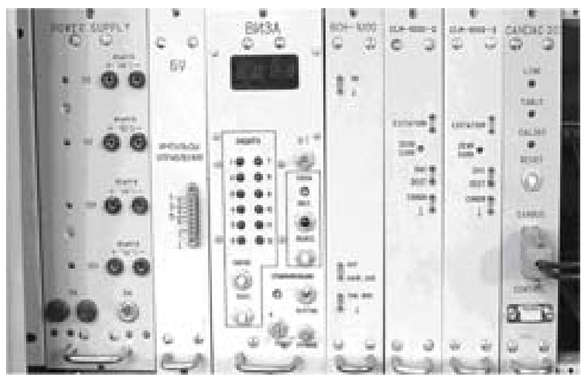
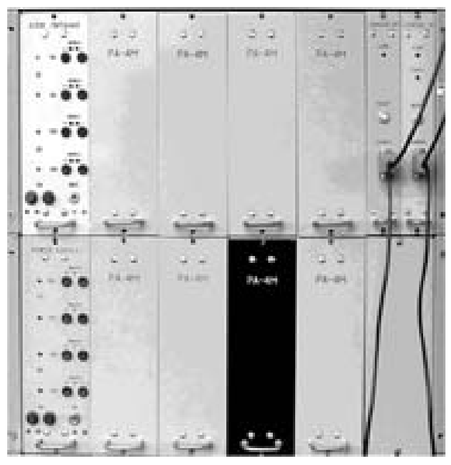
The connection of control devices with power supplies







The control devices used:

1. CANDAC16 - 16-channel DAC. Controls up to 16 low-current(3-17A) power supplies.
2. CANADC40 - 40-channel ADC. Measured output voltages form up to 16 low-current(3-17A) power supplies.
3. CDAC20 – 1-channel DAC and 5-channel ADC. Completely controls one high-current(300A-2500A) power supply.

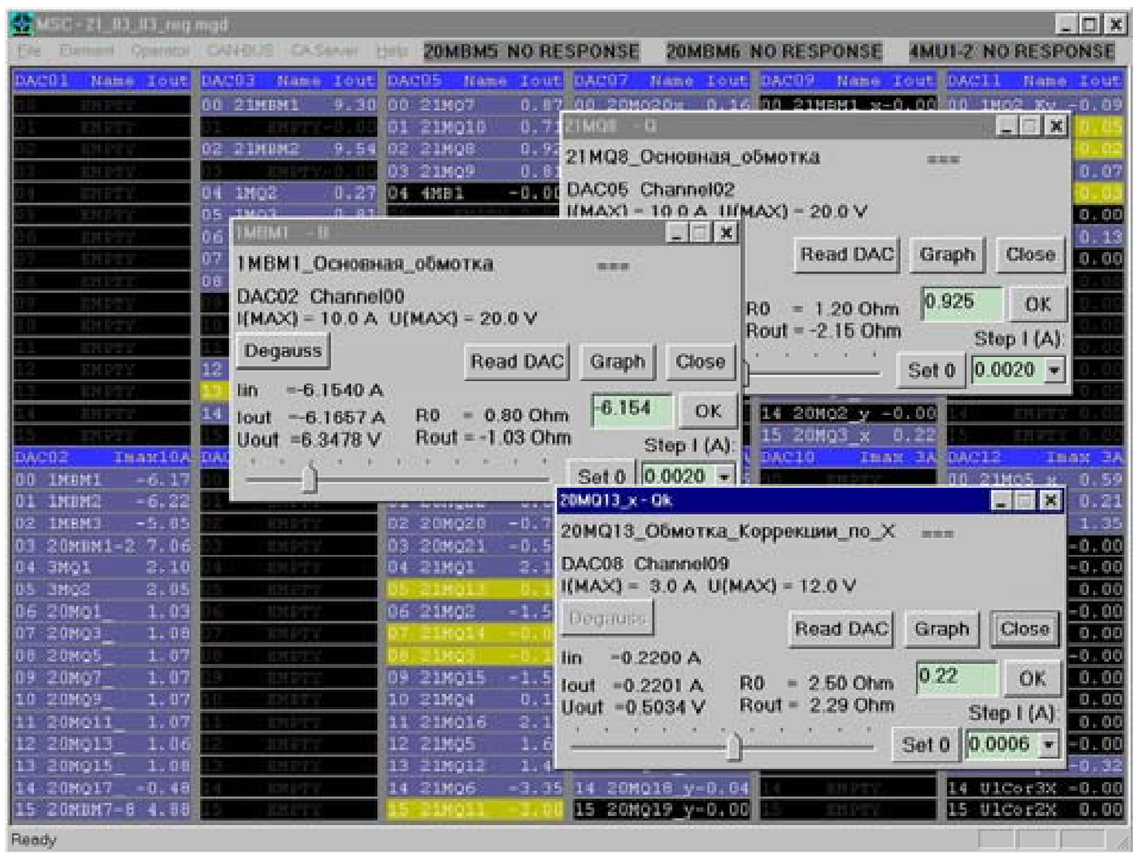
Parameter	Candac16	Canadc40	Cdac20
DAC resolution	16 bits	-	21 bits
DAC accuracy	0.05%	-	0.005%
DAC channels	16	-	1
ADC resolution	-	23 bits	23 bits
ADC accuracy	-	0.03%	0.003%
ADC channels	-	40	5
Scale (input/output)	10 V	10 V	10 V
Qty of devices used in the 1st FEL stage	10	10	3
Qty of devices used in the 2nd FEL stage	24	24	7
Qty of devices used in the 3rd FEL stage	24	24	12

The main operation modes:

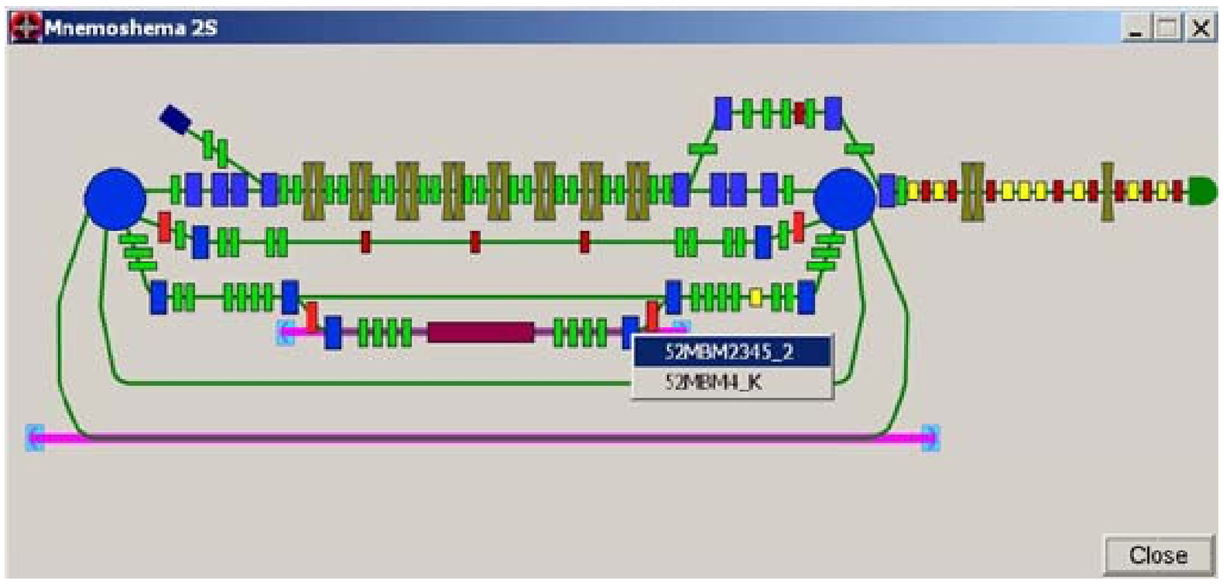
1. Multi-channel mode. All ADC are continuously measuring all required channels and transmitting measured data to control PC. In this operation mode all power supplies are processed.
2. Single channel mode. One of ADC (CANADC40 or CDAC20) starting continuous measurement of channel, connected to output of interesting power supply. This operation mode is used to diagnosing of power supplies (detecting current ripples, studying time stability...)

CONTROL SOFTWARE

1. The main window of application. The power supplies are represented as colored bars. The color of the bar and its content informs about state of current power supply. For modifying the current in power supply, the individual dialog window is opened.



2. The mnemonic scheme of the microtron-recuperator. All elements of magnetic system are depict as colored rectangle. The element of different types (corrector, quadrupole,bending magnet) have different color and the size. Clicking by mouse cursor on the rectangle, individual dialog window, corresponding to power supply, controlling this element, is opened.



3. Diagnosing of power supply current ripples window. The application runs the cycle of single-channel measurements of all channels of all ADCs, measuring the output current of power supplies. Measured current waveform is processed - maximum deviation and root-mean-square deviation of current is calculated. Obtained values are represented in window as colored vertical bars.