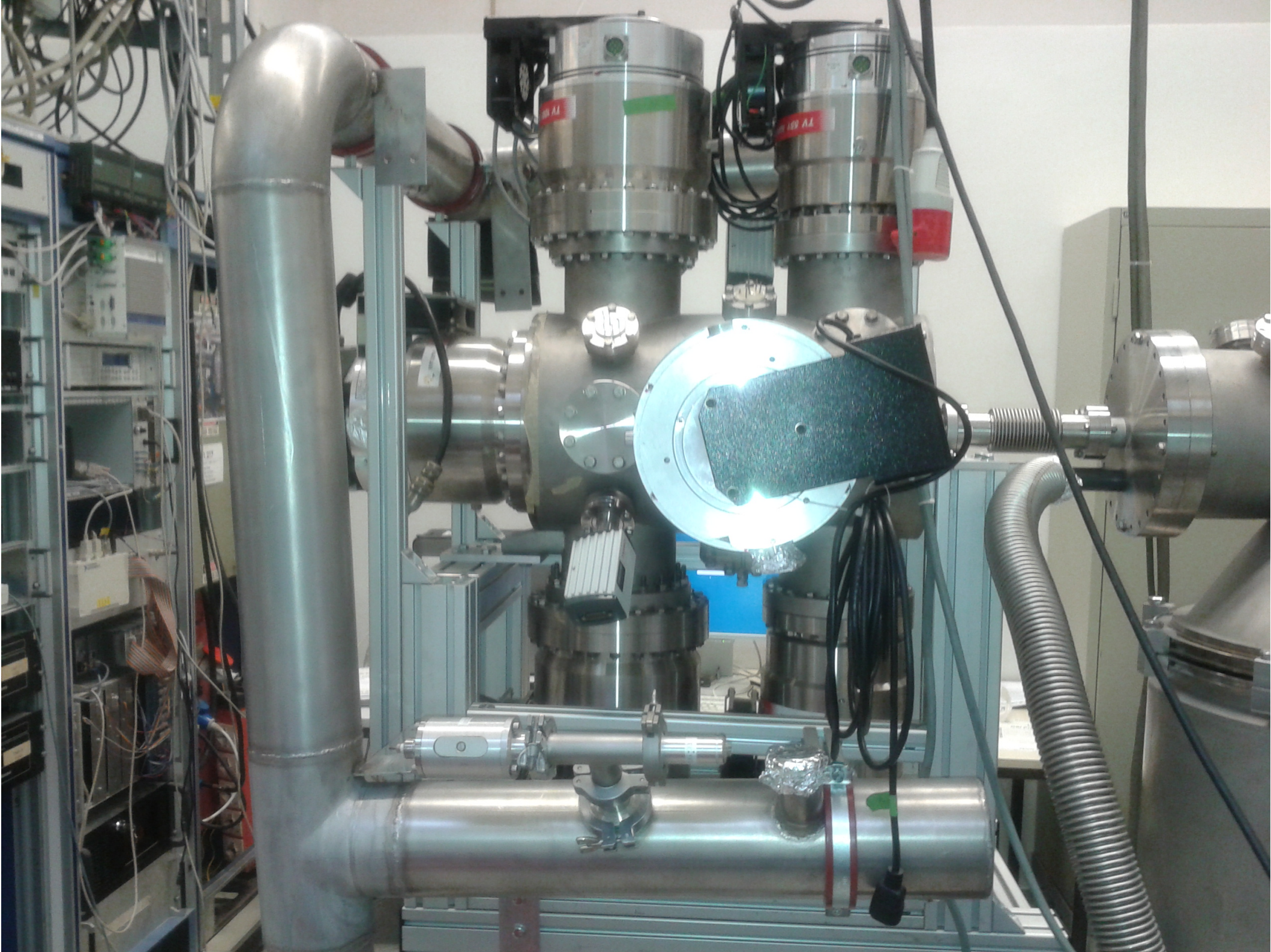


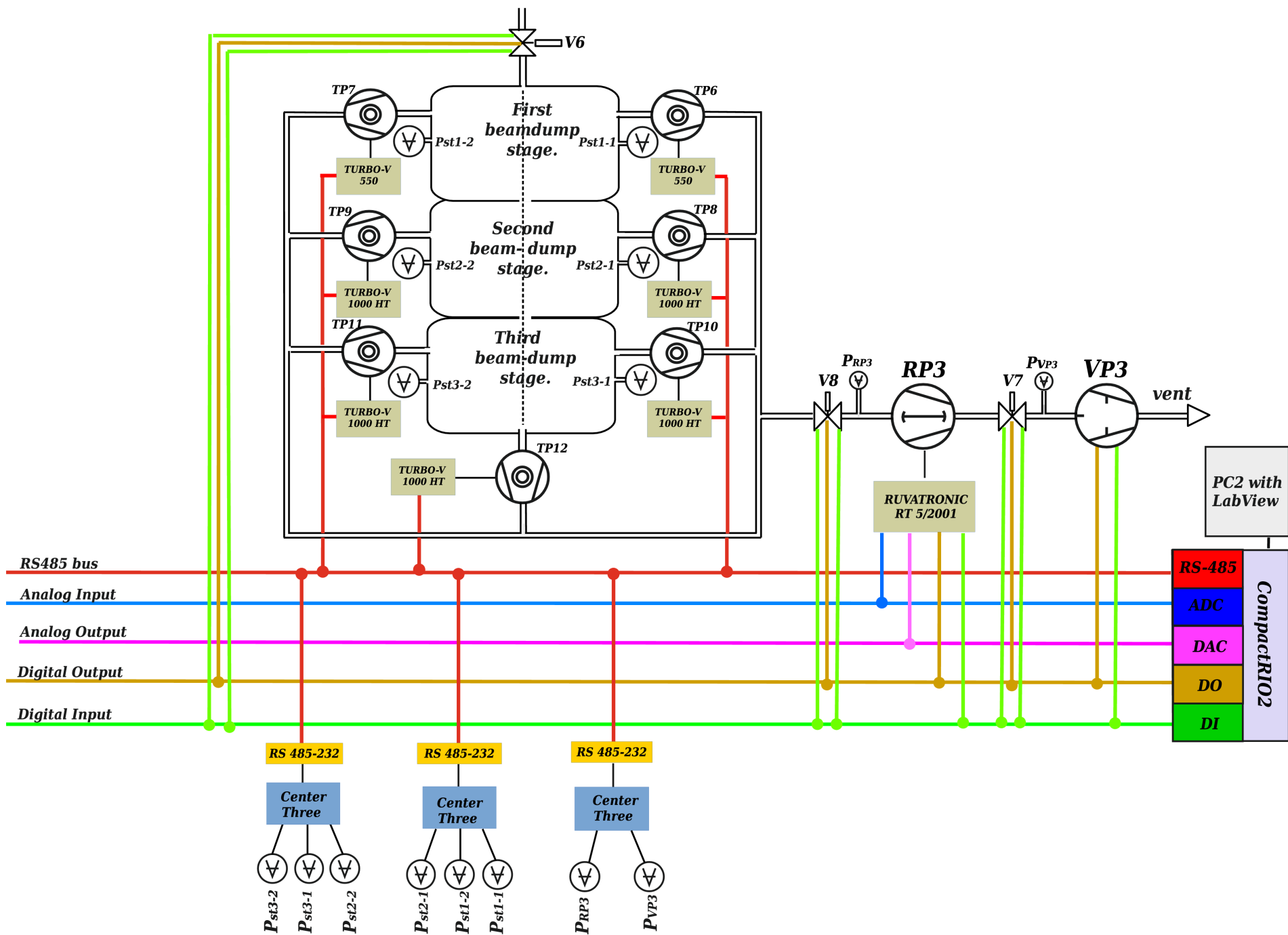
*A. Trzciński*

*National Centre for Nuclear Research  
Warsaw*

***LabVIEW instrumentation  
for the PANDA Cluster-Jet Target***







# ***The Slow-Control for the Cluster-Jet Target***

***National Instruments based hardware consisting of:***

***CompactRIO-9074 equipped with modules:***

***Serial RS-485 ,RS-232***

***Digital Input & Output***

***ADC & DAC***

***Controlled elements:***

***turbomolecular pumps, vacuum gauges, valves,  
root & fore pumps***

***Data transmission: serial binary, digital output***

***Programming language: LabVIEW 2013***

***Performed test:***

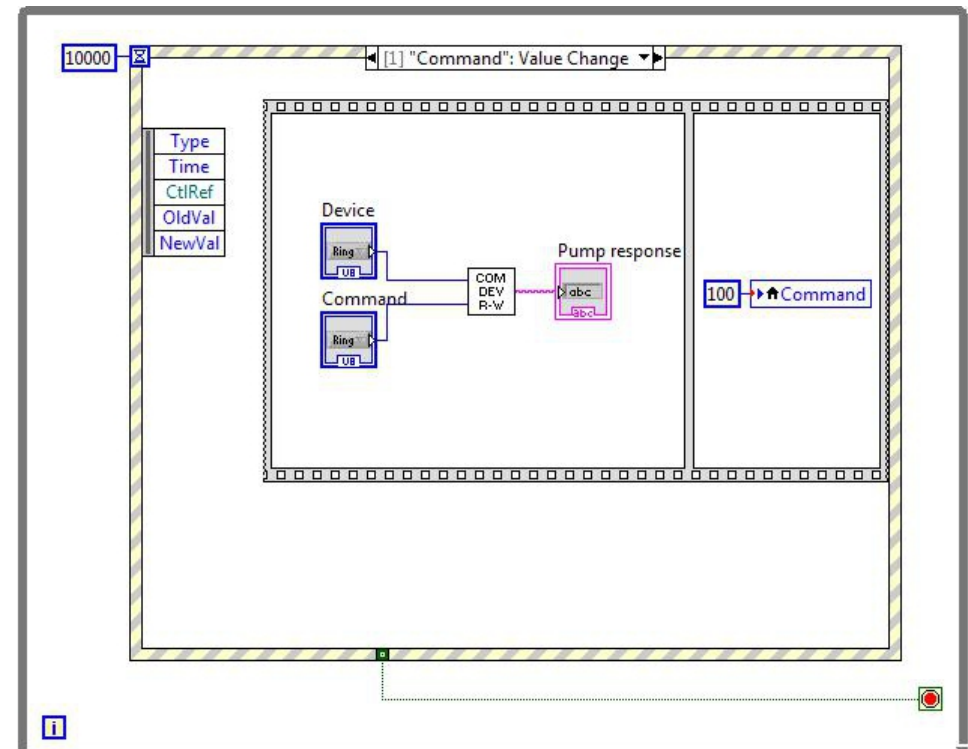
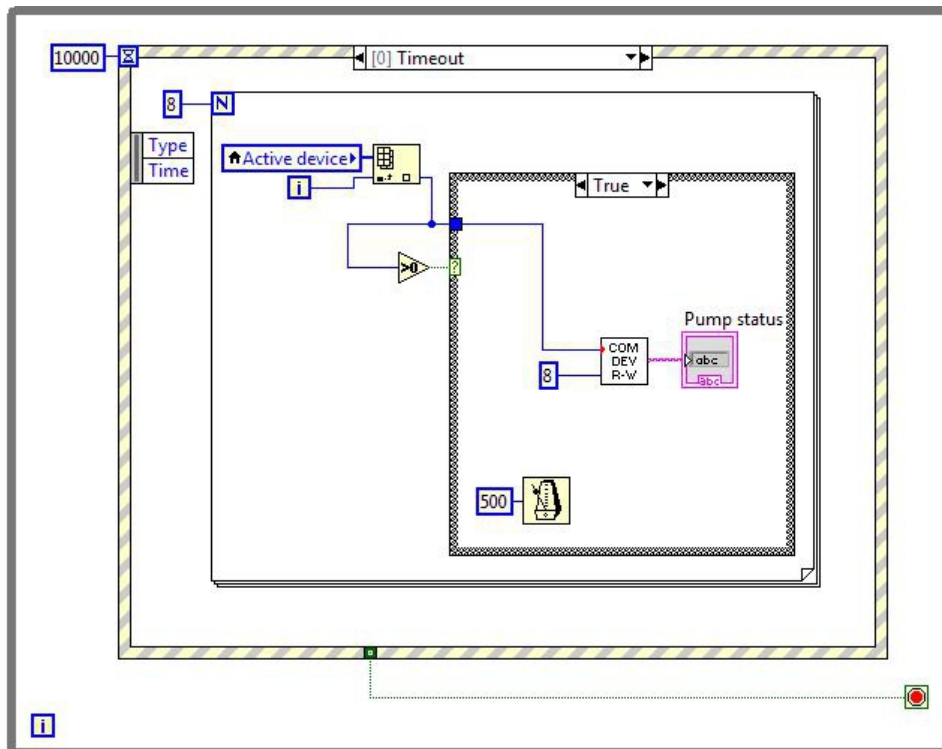
***Test Jet-target at GSI***

***software emulator of the hardware***

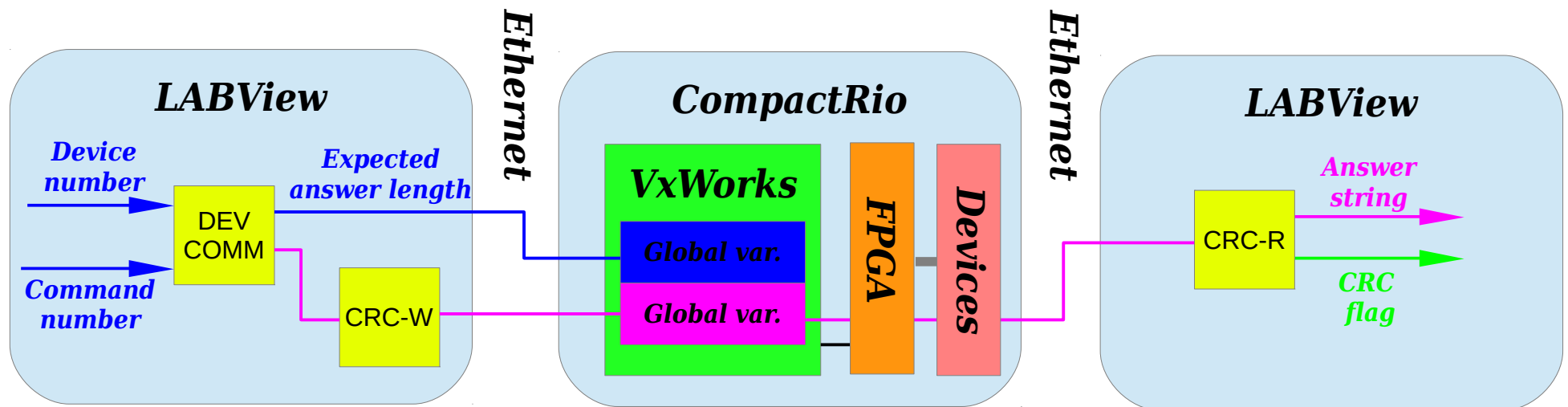
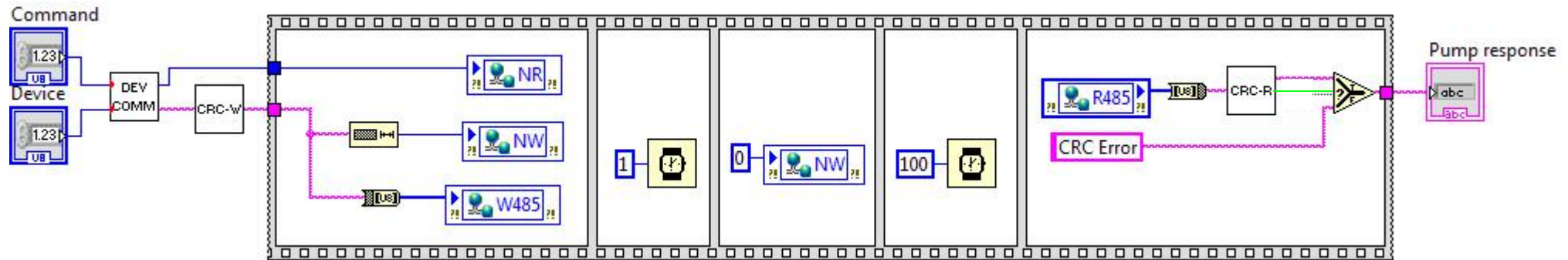
***Software status: working***

## *Idea of the program*

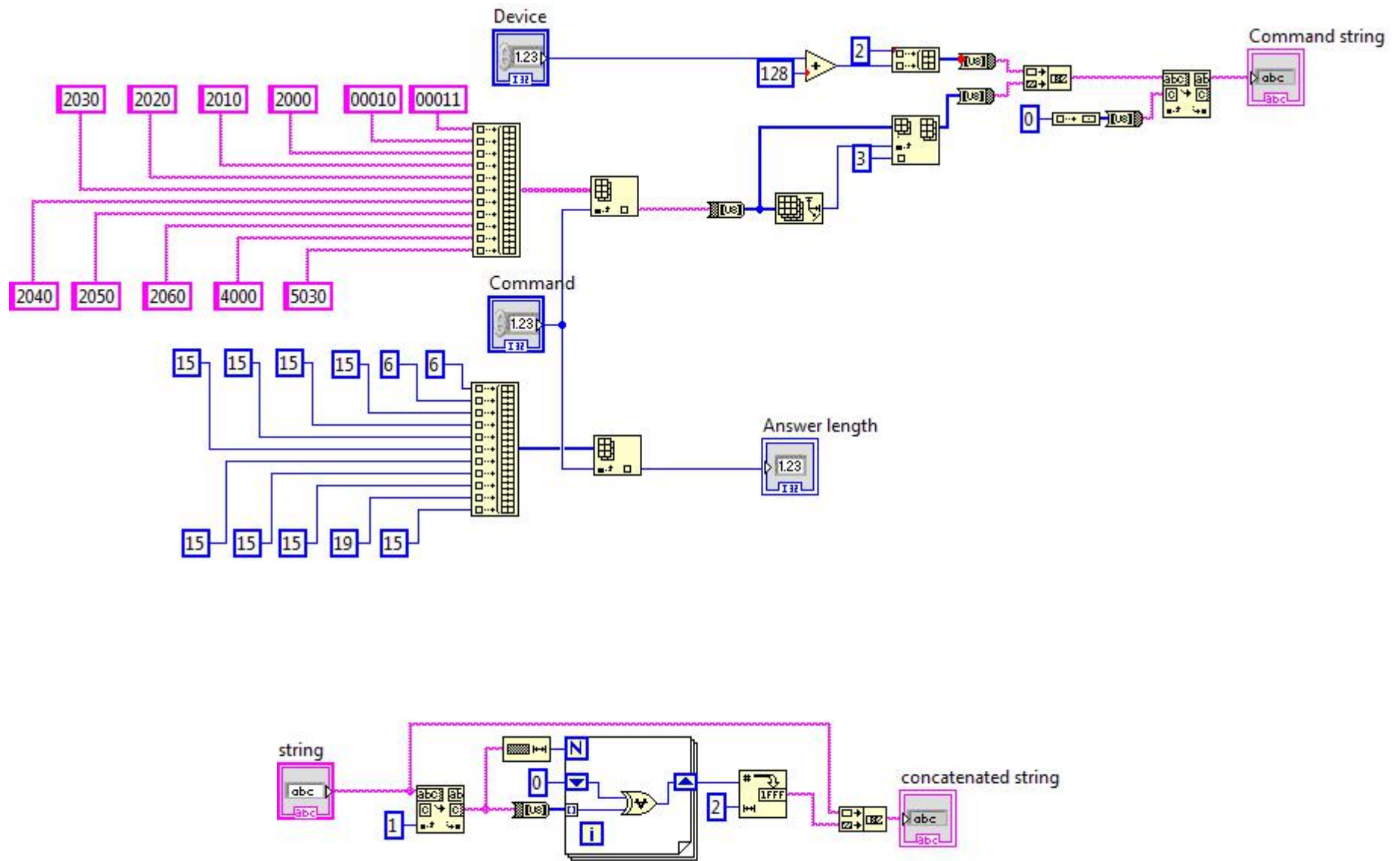
Device	Pump 4	Pump status	OK
Command	TEMPERATURE	Pump response	27
<div>stop</div> <div>STOP</div>			



# *Schematic view of the program flow diagram*



# Details of the basic modules



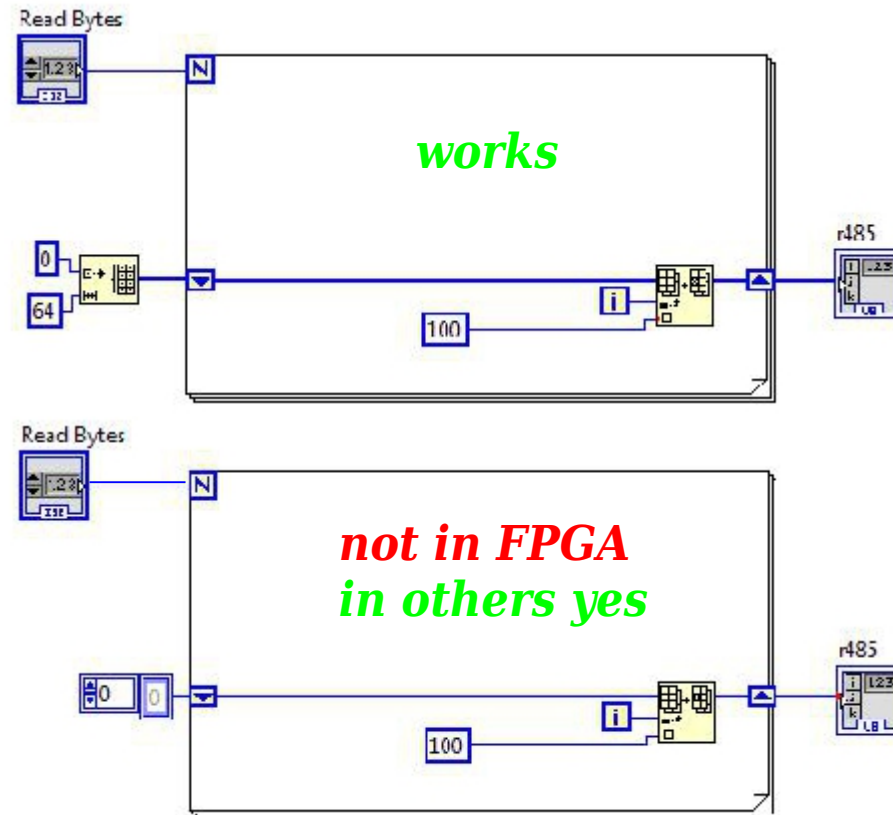
## ***Known problems***

- insufficient speed - losing and mixing sequences of data***
- problems with unterminated binary data transfer property nodes return incorrect number of bytes***
- complicated programming***
- numerous bugs***

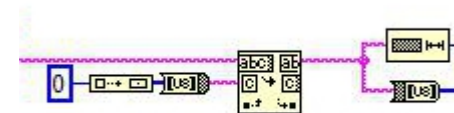


# Bug examples

***Filling of constant size array  
in FPGA***

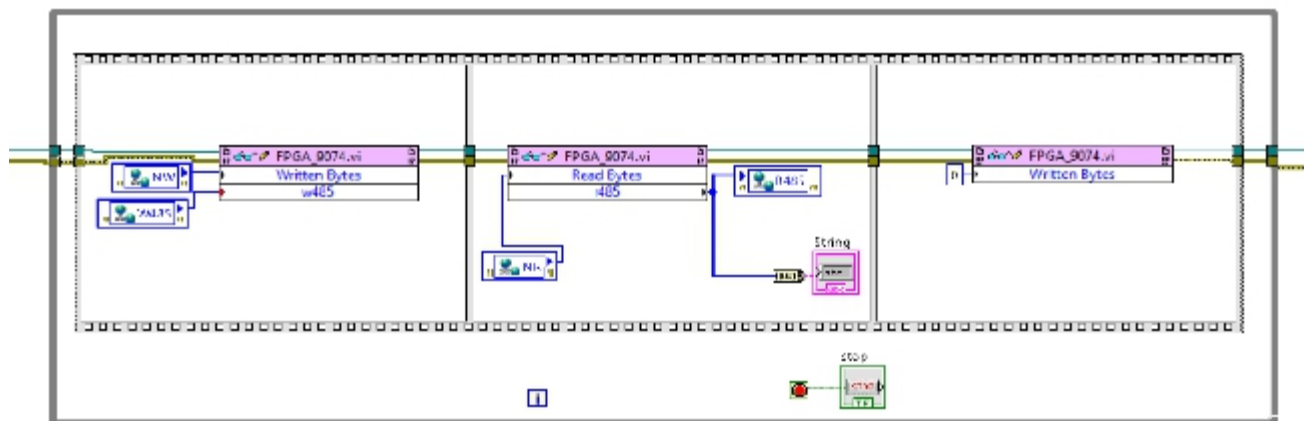
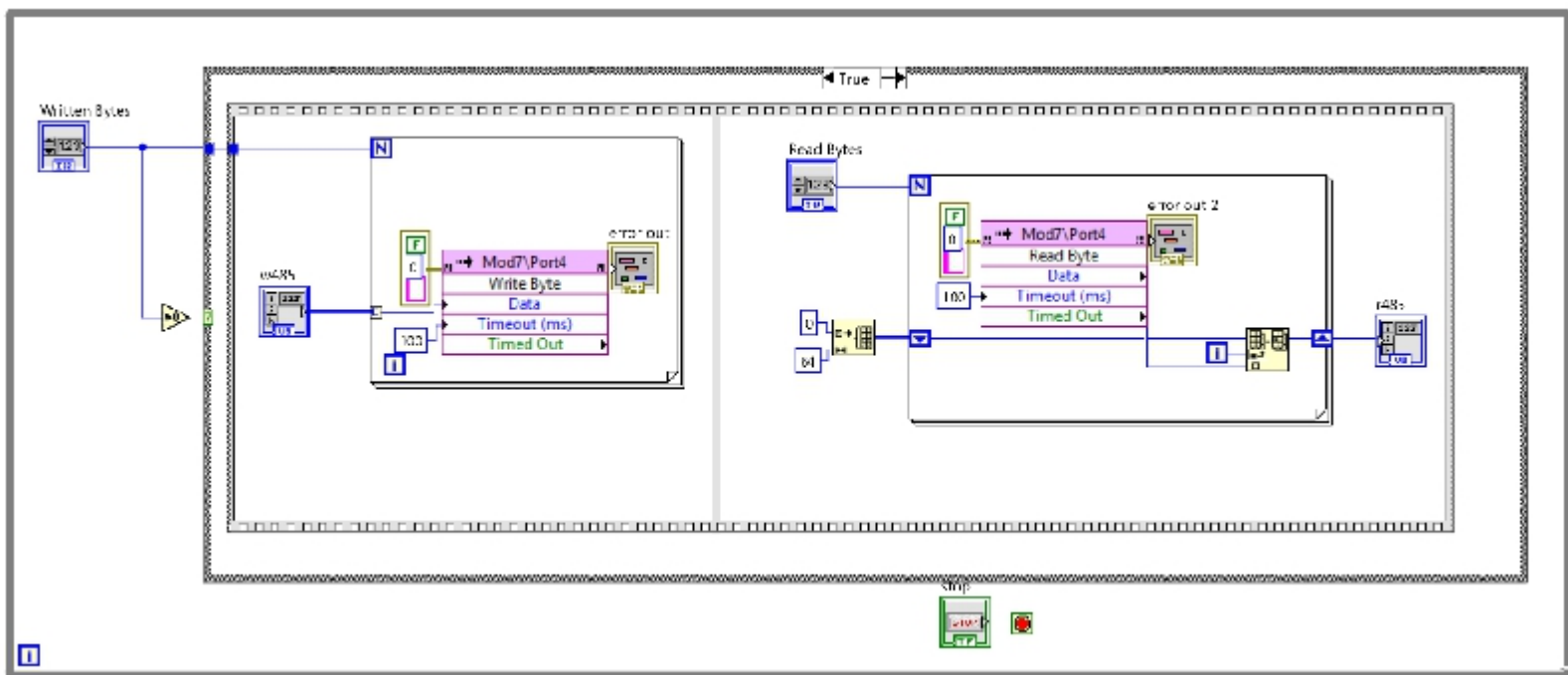


***Incorrect measurement of string length  
length = array size even when string  
is filled with zeros. Special construction  
must be used to bypass the problem***

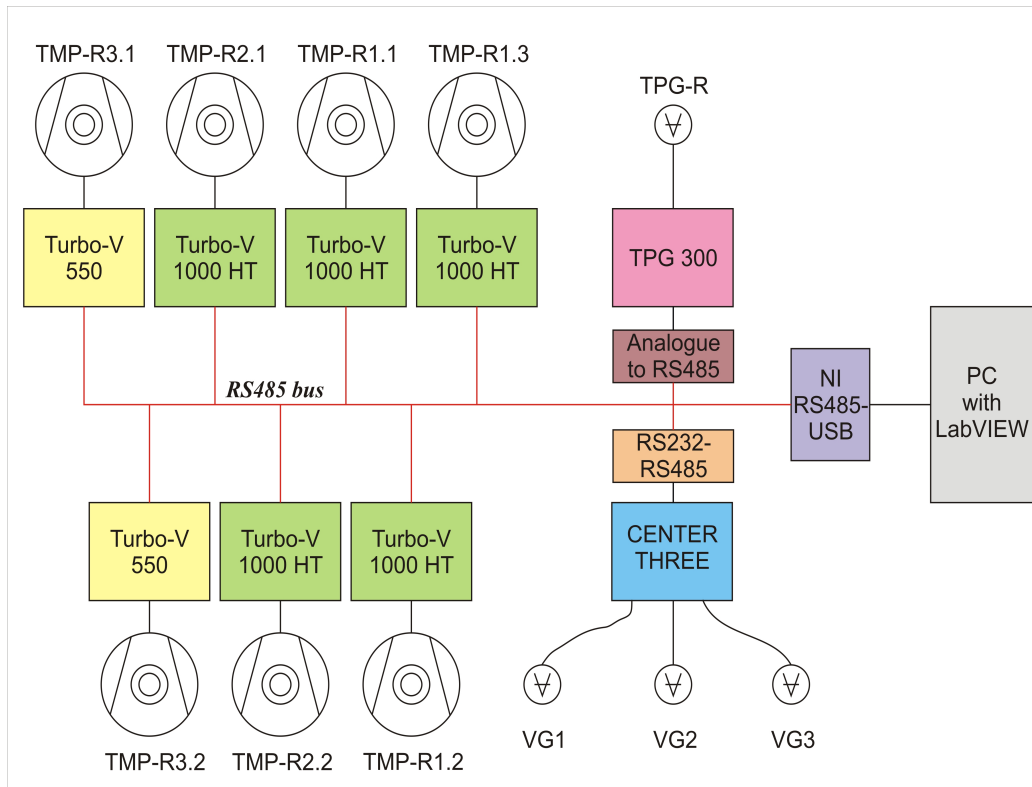


## ***TO DO***

- *incorporating to the program CenterThree devices*
- *substituting network shared variables by separate network task directly transferring data to VxWorks (cRIO)*
- *attempt to use of EPICS*



# ***RS-485 bus controlled and communication elements***



## **TMP controllers**

***TV 1001 - Turbo-V 1000 HT***

***TV 551 - Turbo-V 550 HT***

***communicate via the RS-485***

## **VG1 - VG3 vacuum gauges**

***Leybold CenterThree which***

***communicates via RS-232***

***RS232↔RS485 addressable***

***converter is needed***

# *Schematic view of the program flow diagram*

