Slow Control to DAQ communication protocol (FERMILAB) V8

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Changes: Table 1, item 7

The whole communication is, because of different systems (big/little endian), doing in STRINGs.

Table 1 shows the available command structure. All other tables are describing the back coming values.

	command	prefix 1	prefix 2	comment	comment
1.)	run			not used	send UNIX sec back (up to now)
2.)	reset			not used	only a "#" is send back
3.)	control			getting actual stage position	stage position (table 1) is send back, after all movement has been stopped
4.)	position	x pos	y pos	x and y position [mm/10]	actual position, after stage stops [mm/10]
5.)	readout			Not defined	Not defined
6.)	readout	mod	1 .. 38	get data for module 1 to 38	sending parameters for module 1 to 38
7.)	readout	CERN || FNAL || FERMILAB	getNewBeamData || data	beam parameters	sending parameters of FNAL beam

Table 1

1.) **run**

not defined up to now
send by DAQ: run#
receive: <UNIX seconds>#

examples:
send: *run#*
receive: *1147349593#*

2.) **reset**

not defined up to now
send by DAQ: reset#
receive: #

examples:
send: *"reset#"*
receive: *"#"*

3.) **control**

ask for the actual stage position. A result is coming back when stage is not moving
send by DAQ: control#
receive: <timestamp in UNIX sec> <x position of stage [mm/10]> <y position of stage [mm/10]> #

examples: *the actual position shall be displayed (x=123.5mm and y=60.8mm)*
send: *"control#"*
receive: *"1147349593 1235 608#"*

4.) **position**

force the stage to go to a specific position and wait until it reaches the position.

send by DAQ: position <x pos [mm/10]> <y pos [mm/10]>#
receive: <timestamp in UNIX sec> <x position of stage [mm/10]> <y position of stage [mm/10]> #

examples: *the stage has to move to x=123.5mm and y=60.8mm*
send: *"position 1235 608#"*
receive: *"1147349593 1235 608#"*

5.) **readout**

not defined

6.) readout mod 1..38

the actual status of modules 1 to 38 shall send from SC to DAQ
send by DAQ readout mod <1 to 38>#
receive <timestamp> <module no> <data 3> … <data 39>#

see *Table 2, Modules*

7.) **readout FERMILAB <command>**

getting data of FERMILAB beam

The beam data is getting out of the FERMILAB database. This connection take some time (1-3 seconds) from the FERMILAB side. Hence we are starting at first a request for downloading data of the relevant Mtest beam, and after this a special request can start for getting the actual data.

If an error occurs the value 999999 will appear in the problematic field.

Do the following command only at the time you want to get new data of the Fermilab database.
send by DAQ: readout FERMILAB getNewBeamData#
receive: OK#

After that, you're be able to ask for special data:
send by DAQ: readout FERMILAB data#
receive: <timestampSC> <data 1> … <data 33># (depending on number of entries in db)

example:

send	**receive**
readout FNAL getNewBeamData#	OK#
readout CERN data#	<timestampSC> and 33 values#

See table 3 for possible values

Data	Comment	unit
1	timestamp	UNIX sec
2	module No	1 .. 38
3	CMB temp 1	°C
4	CMB temp 2	°C
5	CMB temp 3	°C
6	CMB temp 4	°C
7	CMB temp 5	°C
8	CMB temp lower	°C
9	CMB temp upper	°C
10	CMB V_calib_at_U041	V
11	CMB power 12V	V
12	CMB REF_1.235V	V
13	CMB VLD_upper_CMB	V

14	CMB VLB upper	V
15	CMB VLB upper	V
16	CMB VLD for LED	V
17	CMB 10V bias	V
18	CMB W calib at U051	V
19	CMB LED settings	0 .. 65535 (int)
20	CMB width	0 .. 255 (int)
21	CMB height	0 .. 255 (int)
22	CMB 12V extern	V
23	CMB 12V current extern	A
24	HBAB temp top 1	°C
25	HBAB temp top 2	°C
26	HBAB temp bot 1	°C
27	HBAB temp bot 2	°C
28	HBAB HV Volt top	V
29	HBAB HV Volt bot	V
30	HBAB HV Cur top	A
31	HBAB HV Cur bot	A
32	HBAB LV Volt top	V
33	HBAB LV Volt bot	V
34	HBAB LV Cur top	A
35	HBAB LV Cur bot	A
36	HBAB LVn Volt top	V
37	HBAB LVn Volt top	V
38	HBAB LVn Cur top	A
39	HBAB LVn Cur bot	A

Table 2, Modules

Beam flux measurements:		
1	I:BEAM	Amount of beam in Main Injector
2	S:F1SEM	Beam halfway down the Switchyard line
3	F:MW1SEM	Beam at west split
4	F:MT4SEM	Beam at downstream target
Magnet settings for MTest line:		
5	F:MT3W	Main west bend magnet
6	F:MT4W	Target bend magnet
7	F:MT4WL	Low current for above
8	F:MT5E	Last east bend magnet string
9	F:MT5EL	Low current for above
10	F:MT5Q1	MT5 quadrupole 1
11	F:MT5Q1L	Low current for above
12	F:MT5Q2	MT5 quadrupole 2
13	F:MT5Q2L	Low current for above
14	F:MT5VT1	MT5 vertical trim 1
15	F:MT5VT2	MT5 vertical trim 2
16	F:MT5HT2	MT5 horizontal trim
Target and collimator settings for secondary beam:		
17	F:MW1TGT	Upstream target position
18	F:MT4TGT	Downstream target position
19	F:MT4CV1	First vertical collimator

20	F:MT4CH1	First horizontal collimator
21	F:MT4PB	Lead sheet position
22	F:MT4CH2	Second horizontal collimator
23	F:MT4CV2	Second vertical collimator
24	F:MT6AB1	Muon absorber half 1
25	F:MT6AB2	Muon absorber half 2
Devices related to pinhole collimator posiition for 120 GeV data:		
26	F:MT3PUH	upstream horizontal
27	F:MT3PDH	downstream horizontal
28	F:MT3PUV	upstream vertical
29	F:MT3PDV	downstream vertical
Scaler counts for beam signals		
30	F:MT6SC1	First TOF counter
31	F:MT6SC2	Second TOF counter
32	F:MTSCL1	User scalers
33	F:MTSCL2	User scalers
34	F:MTSCL3	User scalers
35	F:MTSCL4	User scalers
36	F:MTSCL5	User scalers
37	F:MTSCL6	User scalers
38	F:MTSCL7	User scalers
39	F:MTSCL8	User scalers
40	F:MT5CC	Threshold Cerenkov counter

Table 3:

FERMILAB beam parameters