# Commands for MPX3 server communication

(Based on MPX3GUI commit: f800626)

## Changes

v1.0.0, 20181112, original version

## Testing

Testing can be done on the server computer with the command:

nc localhost 6351

## List of commands

The commands are based on the existing communication protocol to the Merlin Detector (MPX3) developed at DLS. Each command can be of type CMD, SET, GET, has a header with length information and a keyword and can also have arguments following the keyword.

In the over below a list of all possible commands are given including examples that can be copied for test purposes.

The first 14 characters of a command are used for the header:

1 2 3 4

XXXXXXXXXXXXXX1234567890123456789012345678901234567890

## CMD commands

**STARTACQUISITION**

MPX,0000000021,CMD,STARTACQUISITION

**STOPACQUISITION**

MPX,0000000020,CMD,STOPACQUISITION

**RESETSLOPESANDOFFSETS**

Reset energy (keV) to chip setting calibration (DAC unit).

MPX,0000000026,CMD,RESETSLOPESANDOFFSETS

**THSCAN**

**s**tarts and stops the THSCAN

MPX,0000000011,CMD,THSCAN

MPX,0000000021,CMD,STOPEQUALIZATION

## Get/set parameter commands

**SOFTWAREVERSION**

MPX,0000000020,GET,SOFTWAREVERSION

**CONFIGFILE**

Open a configuration file (.json) for the acquisition and chip settings

MPX,0000000071,SET,CONFIGFILE,/home/asi/TestData/51000108/20181025-eq-spm/config.json

MPX,0000000015,GET,CONFIGFILE

**EQUALIZATIONFILE**

Upload pixel configuration to the detector based on the equalization files from the given server directory

MPX,0000000065,SET,EQUALIZATIONFILE,/home/asi/TestData/51000108/20181025-eq-spm

MPX,0000000021,GET,EQUALIZATIONFILE

**SAVECONFIGS**

Save acquisition and chip settings

MPX,0000000072,SET,SAVECONFIGS,/home/asi/TestData/51000108/eq-tmp-remove-tst/mpx3.json

**COLOURMODE**

Not used for fine pitch assemblies

0=off, 1 is on

MPX,0000000017,SET,COLOURMODE,0

MPX,0000000015,GET,COLOURMODE

**CHARGESUMMING**

Requires both counters, relevant threshold is thh (thl1)

0=off, 1 is on

MPX,0000000020,SET,CHARGESUMMING,1

MPX,0000000018,GET,CHARGESUMMING

**GAIN**

(0,1,2,3) corresponds to super low, low, high, super high

MPX,0000000011,SET,GAIN,1

MPX,0000000009,GET,GAIN

**CONTINUOUSRW**

0=off/SRW, 1 is on/CRW

MPX,0000000019,SET,CONTINUOUSRW,1

MPX,0000000017,GET,CONTINUOUSRW

**ENABLECOUNTER1**

This is for acquiring with two thresholds and for CSM (in SRW).

MPX,0000000021,SET,ENABLECOUNTER1,1

MPX,0000000019,GET,ENABLECOUNTER1

**COUNTERDEPTH**

1,6,12,24 for SRW

1,6,12 for CRW

MPX,0000000020,SET,COUNTERDEPTH,12

MPX,0000000017,GET,COUNTERDEPTH

**ACQUISITIONTIME**

frame acquisition time, shutter open time SRW (in ms)

MPX,0000000025,SET,ACQUISITIONTIME,1000

MPX,0000000020,GET,ACQUISITIONTIME

**ACQUISTIONPERIOD**

full acquisition period, shutter open and close tine in SRW, frame time in CRW (in ms)

MPX,0000000027,SET,ACQUISITIONPERIOD,1002

MPX,0000000022,GET,ACQUISITIONPERIOD

**NUMFRAMESTOACQUIRE**

MPX,0000000027,SET,NUMFRAMESTOACQUIRE,100

MPX,0000000023,GET,NUMFRAMESTOACQUIRE

**TRIGGERMODE**

Trigger modes to control the shutter by software or external trigger:

0 = auto, 1 = postive ext, 2 =negative ext, 3 = positive ext timer, 4 = negative ext timer, 5 = positive ext counter

MPX,0000000018,SET,TRIGGERMODE,0

MPX,0000000016,GET,TRIGGERMODE

**INHIBITSHUTTER**

Allows inhibit shutter trigger signal to temporary stop counting within an acquisition

0 = off, 1=on

MPX,0000000021,SET,INHIBITSHUTTER,0

MPX,0000000019,GET,INHIBITSHUTTER

**CHIPTEMPERATURE, FPGATEMPERATURE, BOARDTEMPERATURE, HUMIDITY**

get the humidity (%) and temperatures (deg C)

MPX,0000000020,GET,CHIPTEMPERATURE

MPX,0000000020,GET,FPGATEMPERATURE

MPX,0000000021,GET,BOARDTEMPERATURE

MPX,0000000013,GET,HUMIDITY

**THRESHOLD0-7**

set thl in keV for fine pitch assembly only th0 and th1 are relevant,

requires SLOPE and OFFSET parameters to be set first based on a threshold calibration

MPX,0000000018,SET,THRESHOLD0,10

MPX,0000000018,SET,THRESHOLD1,10

MPX,0000000018,SET,THRESHOLD2,10

MPX,0000000018,SET,THRESHOLD3,10

MPX,0000000018,SET,THRESHOLD4,10

MPX,0000000018,SET,THRESHOLD5,10

MPX,0000000018,SET,THRESHOLD6,10

MPX,0000000018,SET,THRESHOLD7,10

MPX,0000000015,GET,THRESHOLD0

MPX,0000000015,GET,THRESHOLD1

MPX,0000000015,GET,THRESHOLD2

MPX,0000000015,GET,THRESHOLD3

MPX,0000000015,GET,THRESHOLD4

MPX,0000000015,GET,THRESHOLD5

MPX,0000000015,GET,THRESHOLD6

MPX,0000000015,GET,THRESHOLD7

**THRESHOLD0-7CHIP**

set thresholds in dac units (from 0 to 511) per chip

MPX,0000000031,SET,THRESHOLD0CHIP,0,42.000000

MPX,0000000032,SET,THRESHOLD1CHIP,0,044.000000

MPX,0000000031,SET,THRESHOLD0CHIP,1,42.000000

MPX,0000000032,SET,THRESHOLD1CHIP,1,044.000000

MPX,0000000031,SET,THRESHOLD0CHIP,2,42.000000

MPX,0000000032,SET,THRESHOLD1CHIP,2,044.000000

MPX,0000000031,SET,THRESHOLD0CHIP,3,42.000000

MPX,0000000032,SET,THRESHOLD1CHIP,3,044.000000

MPX,0000000021,GET,THRESHOLD0CHIP,0

MPX,0000000021,GET,THRESHOLD0CHIP,1

MPX,0000000021,GET,THRESHOLD0CHIP,2

MPX,0000000021,GET,THRESHOLD0CHIP,3

MPX,0000000021,GET,THRESHOLD1CHIP,0

MPX,0000000021,GET,THRESHOLD2CHIP,0

MPX,0000000021,GET,THRESHOLD3CHIP,0

MPX,0000000021,GET,THRESHOLD4CHIP,0

MPX,0000000021,GET,THRESHOLD5CHIP,0

MPX,0000000021,GET,THRESHOLD6CHIP,0

MPX,0000000021,GET,THRESHOLD7CHIP,0

**SLOPE, OFFSET**

for example for chip 0: TH 50 = 10 keV , TH 90 = 10 keV:

MPX,0000000017,SET,SLOPE,0,0.25

MPX,0000000018,SET,OFFSET,0,-2.5

get slope and offset for chip 1

MPX,0000000012,GET,SLOPE,1

MPX,0000000013,GET,OFFSET,1

**DOEQUALIZATION**

Perform noise edge pixel to pixel equalization, expert function, the folder should exist

MPX,0000000038,SET,DOEQUALIZATION,/home/asi/TestData

**MASKPIXEL, UNMASKPIXEL**

(Un)Mask pixel (x,y)

MPX,0000000022,SET,MASKPIXEL,194,255

MPX,0000000024,SET,UNMASKPIXEL,194,255

**FILEDIRECTORY**

Read back and set the server file directory

MPX,0000000018,GET,FILEDIRECTORY

MPX,0000000045,SET,FILEDIRECTORY,/home/asi/projects/mpx3gui

**FILEENABLE**

Enable file saving

MPX,0000000017,SET,FILEENABLE,1

**THSCAN, THSTART, THSTOP, THSTEP, THFRAMES, THPATH**

Commands to perform threshold scanning.

MPX,0000000013,SET,THSCAN,0

MPX,0000000011,GET,THSCAN

MPX,0000000015,SET,THSTART,40

MPX,0000000012,GET,THSTART

MPX,0000000014,SET,THSTOP,80

MPX,0000000011,GET,THSTOP

MPX,0000000013,SET,THSTEP,1

MPX,0000000011,GET,THSTEP

MPX,0000000015,SET,THFRAMES,1

MPX,0000000013,GET,THFRAMES

MPX,0000000038,SET,THPATH,/home/asi/projects/mpx3gui

MPX,0000000011,GET,THPATH

**SERVERSTATUS**

MPX,0000000017,GET,SERVERSTATUS

returns:

MPX,0000000021,GET,SERVERSTATUS,0,0 If server is free.

MPX,0000000023,GET,SERVERSTATUS,101,0 server is busy with taking data

MPX,0000000023,GET,SERVERSTATUS,102,0 Server is busy with equalization

MPX,0000000023,GET,SERVERSTATUS,103,0 Server is busy with DAC scanning

MPX,0000000023,GET,SERVERSTATUS,104,0 Server is busy with threshold scanning

## Not implemented

Commands below are defined but not implemented in the MPX3 server

MPX,0000000023,SET,OPERATINGENERGY,10

MPX,0000000020,GET,OPERATINGENERGY

MPX,0000000015,SET,PROFILES,0

MPX,0000000013,GET,PROFILES

## Camera busy example

## asi@cube1:~/dexter/mpx3gui$ nc localhost 6351

Camera is not busy:

MPX,0000000017,GET,SERVERSTATUS  
MPX,0000000021,GET,SERVERSTATUS,0,0

Camera is taking data”

MPX,0000000017,GET,SERVERSTATUS

MPX,0000000023,GET,SERVERSTATUS,101,0

Camera is taking data and server returns an error code:

MPX,0000000015,GET,THRESHOLD0

MPX,0000000020,GET,THRESHOLD0,,101