

FIBRE Fabry-Perot operation principles - February 2001

FP_control.vi configures and controls the FIBRE Fabry-Perot. The front panel of this VI gives access to all commands and software parameters that can be configured by the instrument team. The VI can also receive these commands via TCP/IP.

In addition, the front panel allows the configuration of Fabry-Perot hardware dependent parameters (ranges, sync signals) and file path for the configuration files.

Computer dependent parameters (interface board types, TTL interface timing) are set as default values into the global variable FP_global.vi, communication dependent parameters are set as default values into the global variable FP_Com_global.vi.

Operating the Fabry-Perot consists in :

1- Setting parameters for the segment

2- Issuing a start command : the FP motion will start at a subsequent falling edge of the FPNEXT bit. FPM status bit is set to 1 when scan begins and will be reset to 0 a few tens of ms after the last command of the segment is sent. A "sync out" TTL pulse is generated by the computer in sync with the FPNEXT bit or by an internal clock (SYNC int mode).

FP_acquisition.vi is in charge of the acquisition of the analog status generated by the FP control electronics, 3 motor currents and 3 motor errors. The digitized signals are visualized on the VI front panel and can be sent via TCP/IP to a client. Under LabView, FP_acquisition.vi can be configured as a client (remote mode on the front panel). FP_acquisition can be set to write the digitised data in a file (next version).

TCP/IP Command scheme

Commands are sent through TCP/IP, mac_address, TCP port command_port (2055 default).

Mac is set to listener mode, waiting for connection on port command_port.

When a connection is made, Mac issues a TCP read command (4 bytes read) to get num_bytes_read to read, followed by a second TCP read command (num_bytes_read bytes read).

Mac processes the command and issues a TCP write command (4 bytes written) to send num_bytes_write to write, followed by a second TCP write command (num_bytes_write written).

The connection is closed and Mac set back to listener mode.

Fabry-Perot startup

On G3 connected to FP control electronics :

A- Launch FP_control.vi (1st Feb 2001 version is V0.42)

B- Launch FP_acquisition.vi in local mode. TCP port used is status_port (2056 default)

Remote control via Labview

On remote computer :

A- Send command with Send_command vi (included in TCP_IP_commands.llb)

B- Launch FP_acquisition.vi in remote mode

Header format - February 2001

Item 1 to 9 are padded with spaces to 79 bytes and followed by <CR>

Items 10 and above are in binary representation (representation column)

SGL = real*4

DBL = real*8

| | HEADER | bytes | total | representation | Comments |
|----|--|-------|-------------|----------------|---|
| 1 | Header version | 80 | 80 | ASCII | FIBRE HEADER VERSION 0.5 |
| 2 | Comment | 80 | 160 | ASCII | |
| 3 | Date | 80 | 240 | ASCII | YYYYMMDD_HHMMSS |
| 4 | Parallelism table file name | 80 | 320 | ASCII | |
| 5 | Parallelism table file path | 80 | 400 | ASCII | truncated to 80 characters |
| 6 | Wavelength calibration table file name | 80 | 480 | ASCII | |
| 7 | Wavelength calibration table file path | 80 | 560 | ASCII | truncated to 80 characters |
| 8 | reserved | 80 | 640 | ASCII | |
| 9 | reserved | 80 | 720 | ASCII | |
| 10 | Wavelength_Min | 4 | 724 | SGL | |
| 11 | Wavelength_Max | 4 | 728 | SGL | |
| 12 | Command_Start | 2 | 730 | I16 | Initial command on Motor 1 (0-4095) |
| 13 | Command_Step | 2 | 732 | I16 | Command step increment on Motor 1 |
| 14 | Chops_per_Int | 2 | 734 | I16 | Number of chop cycles for each integration (FP step) |
| 15 | Int_per_Seg | 2 | 736 | I16 | Number of integrations (FP steps) during segment |
| 16 | Whole_Scan | 1 | 737 | I8 | N=1 for TRUE and N=0 for FALSE |
| 17 | Ramp | 1 | 738 | I8 | N=0 not Ramp, N=1 for UP and N=2 for DOWN |
| 18 | Triangle | 2 | 740 | I16 | N=0 not Triangle, N#0 for Number_of_Triangles |
| 19 | Still | 2 | 742 | I16 | N=0 not Still, N=1 for Still mode |
| 20 | Calibration_law parameters | 80 | 822 | 10DBL | Calibration law parameters in the order p0...p9 $e(\mu\text{m})=p_0+p_1*c+p_2*c^2+p_3*c^3+p_4*c^4$ $c(\text{count/motor1})=p_5+p_6*e+p_7*e^2+p_8*e^3+p_9*e^4$ |
| 21 | Commands_per_Seg | 4 | 826 | I32 | Commands_per_Seg=Int_per_Seg*Chops_per_Int+1. Last command of the segment is redunded to wait for last chop cycle end. FPM status bit is set to 1 when scan begins and will be reset to 0 a few tens of ms after the last command of the segment |
| 22 | Offset motor 2 | 2 | 828 | I16 | Offset applied to motor 2 command read in parallelism table. Offset is taken into account in Command table |
| 23 | Offset motor 3 | 2 | 830 | I16 | Offset applied to motor 2 command read in parallelism table. Offset is taken into account in Command table |
| 24 | Command table | 6N | 830 + 6N | 3N I2 | N = Commands_per_Seg Array of commands sent to FP electronics. 2 bytes per motor for 3 motors per command. |

FIBRE Fabry Perot commands - February 2001

General syntax : **command** [parameter1] [parameter2]

Delimiter is space.

A string is returned, beginning with **ok** or **warning**, padded to 10 bytes with spaces, followed by the segment_length (number of chop cycles for the segment) in integer I5 format padded with spaces to 10 bytes, followed by a stream of bytes depending on **command** (ascii formatted values or strings separated by comas, or otherwise specified in table). Else, **error** is returned followed by an error message

ok : command and parameters are within range

warning : parameters are out of range, and were coerced in-range

error : command is unrecognized or out of context

* = command not implemented or implemented in part in version 0.42