Tof Commands

this is based on slides from Sydney, Dec 2022

Implementation

obviously, this is subject to change

Each command has a TofCommandCode (u8) and a data field (u32).

Commands will be filled in a TofCommand with a fixed size of 9 bytes (2 (head) + 1 (cmd) + 4 (data) + 2 (foot)) and the following structure:

```
HEAD            : u16 = 0xAAAA
TofCommandCode  : u8
data            : u32
TAIL            : u16 = 0x5555
```

This does not follow exactly Sydney's proposal, but has some advantages:

- The CommandClass is 1 byte shorter
- Each CommandPacket has the same (fixed) size
- A 32 bit data field can accomodate the event id, which is needed for the event query.

The CommandClass is a number (u8) so at max 255 different commands are available. We divide the CommandClass in several subgroups. Currently, a large number of the command space is reserved.

- <Reserved> : 0-9
- <Reserved> : 100 - 199
- <Reserved> : 200 - 255
- Power : 10 - 19
- Config : 20 - 29
- Run : 30 - 39
- Request : 40 - 49
- Calibration : 50 - 59

The commands follow Sydney's list (Pad stands for padding):

TofCommandCode	Command	Frequency	Data
10,11,12	Power on/off to PBs + RBs + LTBs + preamps (all at once) or MT	< 5/day Command to power on/off PDU channels (to PDU)	Pad:u16+u8, PDU:u8
10,11,12	Power on/off to LTB or preamp	< 2/day Command to power on/off various components (to TOF -> to RB)	Pad:u16+u8, RB:u8

TofCommandCode	Command	Frequency	Data
20	RBsetup ? Command to run rbsetup on a particular RB or all (to TOF -> to RBs) Comment: prolly not needed anymore?		Pad:u16+u8, RB:u8
21	Set Thresholds	< 3/day Command to set a threshold level on all LTBs (to TOF -> to RBs)	Pad:u8, Threshold:u8, Level:u16
22	Set MT Config 1/run	<10/day? Command to set MT trigger config (to TOF -> to MT)	Pad:u16, TriggerConfig:u16
32	Start Validation Run 1/run	<10/day? Command to take a small amount of data on an RB or all (E events)	Pad:u16, E:u8, RB:u8
41	Get full waveforms (360*E, after 32) (from TOF)	?	Pad:u32
31	Start Data-Taking Run 1/run	<10/day? Command to take regular data (to TOF -> to RBs)	Pad:u8, RunType:u8, E:u8, Time:u8
42	Get reduced data packet (from Flight computer)	?	Pad:u32
30	Stop Run < 1/run	< 10/day Command to stop a run (to TOF -> to RBs)	Pad:u32
50	No input Calibration for an RB or all	???	Pad:u16, RB:u8, Extra:u8
51	Voltage Calibration for an RB or all	Runs 1/day Command to take 2 voltage calibration runs (to TOF -> to RBs) 12 B	VoltageLevel:u16, RB:u8, Extra:u8
52	Timing Calibration for an RB or all	Run 1/day Command to take a timing calibration run (to TOF -> to RBs) 8 B	VoltageLevel:u16, RB:u8, Extra:u8
53	Full Calibration for an RB or all	???	VoltageLevel:u16, RB:u8, Extra:u8

TofCommandCode	Command	Frequency	Data
54	Create New Calibration File for an RB or all	Comment: does this really make sense? Whats the point of having a command that creates a file? Shouldnt it be integrated w/ smth else?	Pad:u8, VoltageLevel: u16, RB:u8

Note: when "all" is needed it will be rendered as all ones.

Further commands (Achim)

CommandCode	Command	*Comment*	Data
12	PowerCycle	Combines 10 + 11	Refer to single cmds
43	RequestMoni	Request monitoring/housekeeping data	Pad:u32

Render the flowcharts for documentation

This uses mermaid to render the flowcharts, generating images can be done via mermaid-cli. Install with
`npm install -g @mermaid-js/mermaid-cli`

and then use it e.g. like this: `mmdc -i input.mmd -o output.png -t dark -b transparent`