Tof Commands

This is based on slides from Sydney, Dec 2022, Achim's input, and, hopefully, a good dose of common sense.

Implementation

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
```

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
- Calibration : 50 - 59
- Tof SW related : 60 - 69

The commands follow Sydney's list, Achim's list, and additions (Pad stands for padding, first user commands and then nerd commands):

TofCommandCode	Command	Frequency	Data
0	Unknown command	Deal with unrecognised command or corrupted commands	Pad:u32
1	Ping command	Ping tof components to check whether they are online	Pad:u16, ComponentType:u8, ComponentID:u8
2	Monitor command	Request status of a specific tof component	Pad:u16, ComponentType:u8, ComponentID:u8
10	Power on/off/cycle command	< 5/day Command to power on/off/cycle MTB, RBs (only reboot), LTBs, Preamps. RATs are managed by flight cpu	Pad:u8, TofComponent:u8, ComponentID:u8, Status:u8
21	Set LTB Threshold command	< 3/day Command to set a threshold level on LTBs (to TOF -> to RBs)	LTB_ID:u8, Threshold_name:u8, Level:u16
22	Set MTB Config command	< 3/day? Command to set MTB trigger config (to TOF -> to MTB)	Pad:u16, TriggerConfig:u16
28	Set preamp bias command	< 3/day Command to set a preamp bias on preamps (to TOF -> to RBs)	Pad:u8, Preamp_ID:u8, Preamp_level:u16
30	Stop data-taking run command	<10/day? Command to stop taking regular data (to TOF -> to RBs)	Pad:u32

TofCommandCode	Command	Frequency	Data
31	Start data-taking run command	<10/day? Command to take regular data (to TOF -> to RBs)	Pad:u8, RunType:u8, E:u8, Time:u8
32	Start validation run command	<10/day? Command to take a small amount of data on an RB or every RB (E events)	Pad:u16, E:u8, RB:u8
33	Get full waveforms (360*E, after 32) command	Command to take raw data from RBs	Pad:u32
50	No input Calibration command	Command to take data without input @ 100 Hz in self trigger (E = 1000 default) for an RB or every RB	Pad:u16, RB:u8, Extra:u8
51	Voltage Calibration command	Command to take data with fixed voltage @ 100 Hz in self trigger (E = 1000 default) for an RB or every RB (it includes 50)	VoltageLevel:u16, RB:u8, Extra:u8
52	Timing Calibration command	Command to take data with poisson self trigger (E = 5000 default) for an RB or every RB (it includes 50/51)	VoltageLevel:u16, RB:u8, Extra:u8
53	Default Calibration command	Command to perform the default calibration step and calibrate RBs (it includes 50/51/52)	VoltageLevel:u16, RB:u8, Extra:u8

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

Nerd commands, related to TOF SW:

TofCommandCode	Command	Frequency	Data
23	Set RB data buffer size command	Command to set RB data buffer size (to TOF -> to RBs)	Pad:u8, RB:u8, Size:u16
24	Enable/disable trigger mode forced command	Command to enable/disable trigger mode forced (to TOF -> to RBs)	Pad:u16, RB:u8, Status:u8
25	Enable/disable trigger mode forced for MTB command	Command to enable/disable trigger mode forced for MTB (to TOF -> to RBs)	Pad:u16, Pad:u8, Status:u8
44	Unspool event cache command	Command to unspool event cache if something bad happens	Pad:u32
60	Restart systemd command	Command to restart systemd if some mischievous stuff happens	Pad:u32