

# Controller Log Packet Format

June 2023

## Background

The controller logs the data it acquires on the SD card in a file that is made of a sequence of packets whose envelope conforms to the Serial Packet protocol. This document outlines the format of the payload data within those log packets.

**Design decision #1:** Time resolution for log events is 1ms.

**Design decision #2:** To simplify local buffering in the controller's modules, the order of log data point timestamps is not necessarily monotonic. It's expected that a batch post processor on the host will extract the data points and will export them in order.

## Overall packet structure

The log packets are encoded as Serial Packets protocol packets of type LOG (packet type 3). These packets do not contain metadata such as endpoint id but only payload data.

### Packet Data:

- *Header*
- *Group 1*
- *...*
- *Group N*

### Header:

- **UINT8: Packet format version.** As of June 2023, the only valid version is 1.
- **UINT32 : Packet base time in milliseconds.** This is a device time in milliseconds that is the base timestamp of this packet. These values wrap around after 50 days of device operations, and it's responsibility of the reader to handle this wraparound gracefully. Typically is typically the time of the earliest event in the packet (time-wise, not by order within the packet), it's not guaranteed.

### Group i

- **UINT8: Group id.**
- **Group data.** The interpretation of this data depends on the group id.

## Load Cell Data Group

This group contains a sequence of reading from a single load cell channel that were done in a fixed

interval and its content is

- **UINT8: Group id**, with the bit structure *000001nn* where *nn* is the channel load cell id 0..3.

Group ID (decimal)	Load cell channel
4	0
5	1
6	2
7	3

- **UINT8: Group relative start time in milliseconds.** This is a relative time offset from the start time of the packet to the time of the first load cell value in the group.
- **UINT8: Step interval.** This is the time in milliseconds between two consecutive values in the group.
- **UINT8: Number of values in the group.**
- **[INT24]: N load cell raw ADC values.**