

RunCam Feed Camera - IMU Motion Data Guide

The Feed Camera features a built-in IMU sensor that records device motion data together with RGB video, including:

- Gyroscope data (angular velocity)
- Accelerometer data
- Timestamp information

By capturing visual and motion data together, the Feed Camera provides additional data support for applications such as behavior analysis, data annotation, and motion analysis.

IMU Data Access

The device supports two methods for accessing IMU data.

1. Independent .gcsv File

The device can generate a separate **.gcsv** file containing the raw IMU data.

Data format:

timestamp, gx, gy, gz, ax, ay, az



The data includes:

- Timestamp
- Gyroscope data on the X/Y/Z axes
- Accelerometer data on the X/Y/Z axes

2. IMU Data Embedded in MP4 Metadata

IMU data can also be embedded directly in the MP4 metadata, allowing video and motion data to be stored within the same file for easier downstream processing.

Data location and format:

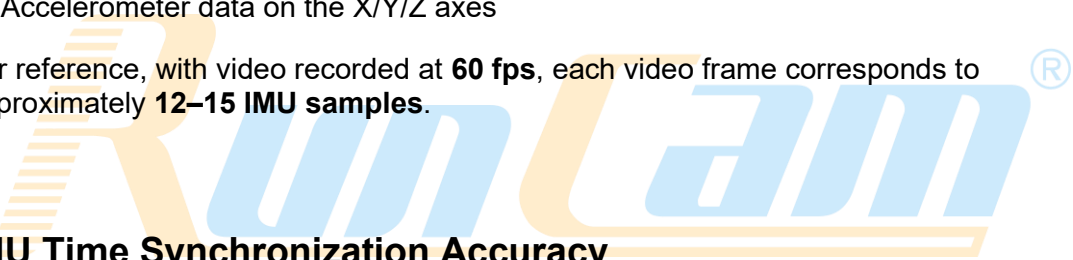
- Metadata name: ShenShuMetaData
- Data format: Gyroflow Protobuf

Data extraction workflow:

MP4 file → Read metadata → Parse Gyroflow Protobuf → Extract IMU data

Each IMU sample contains:

- Timestamp
- Gyroscope data on the X/Y/Z axes
- Accelerometer data on the X/Y/Z axes

For reference, with video recorded at **60 fps**, each video frame corresponds to approximately **12–15 IMU samples**.

IMU Time Synchronization Accuracy

The Feed Camera uses a **software-based time synchronization mechanism** to synchronize IMU timing with RGB video timing, maintaining temporal consistency between the two data streams.

- **Time synchronization error:** ≤ 0.1 ms
- **Long-duration recording stability:** approximately 0.07 ms accumulated timing error over 5 minutes

The current synchronization performance supports applications including:

- Electronic video stabilization
- Gyroflow post-processing stabilization
- Motion trajectory analysis