

Readout Performance Research

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Readout Performance

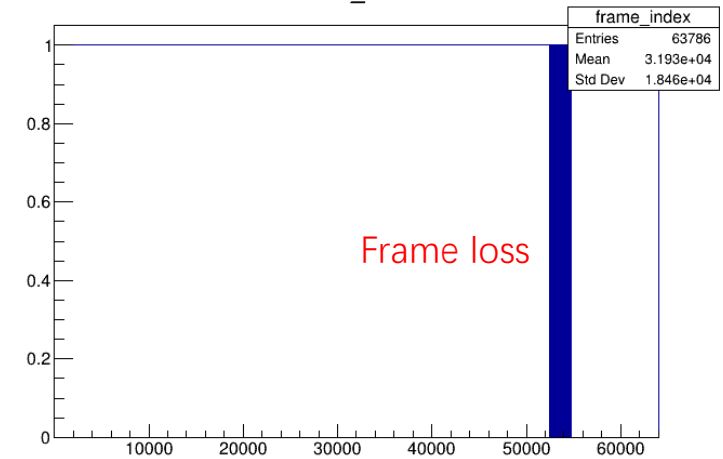
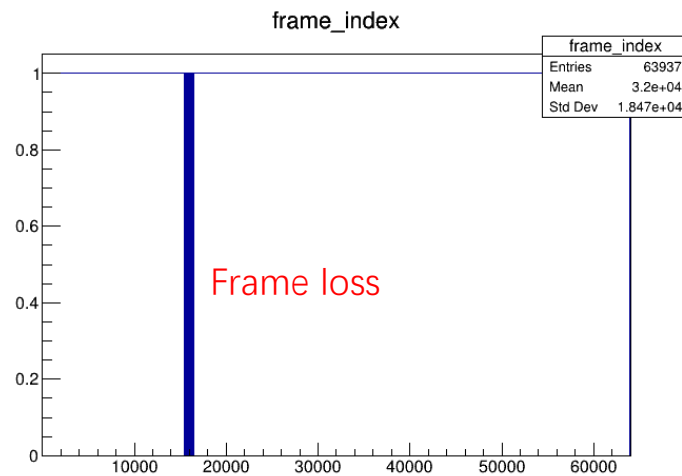
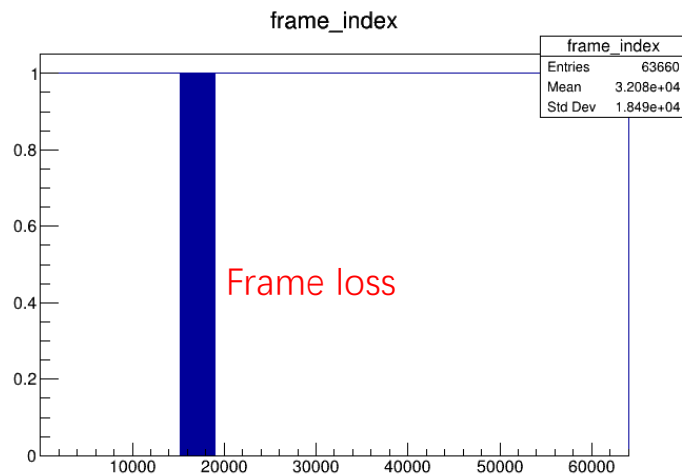
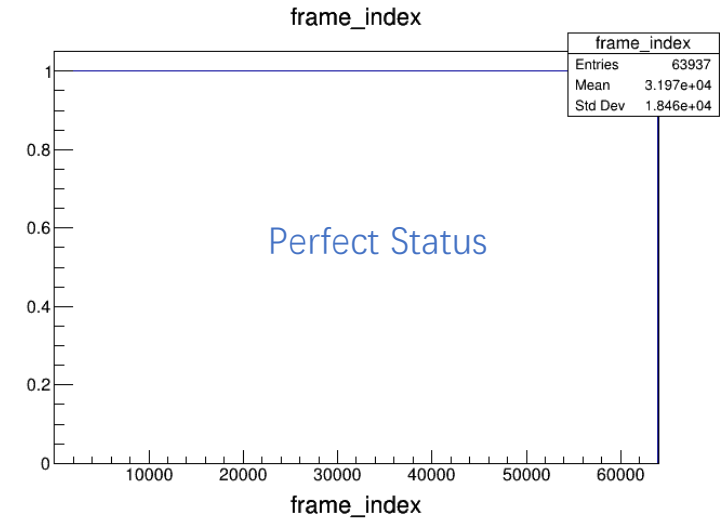
- Data loss may still occur during **long-term** operation.

Test setup:

Data num per row: 4/48

Frame number set: 64000

The performance is already improved by changing IPbus-Firmware settings, larger rx and tx buffer, more buffer numbers.



Jumbo Frame

- It looks like something **choked** on the PC side...
 - CPU caches?
- So try to use the **Jumbo Frame** to improve transmission quality.
 - MTU: 1500 bytes -> 9000 bytes (Linux)
 - FPGA:
 - BUFWIDTH changed, from 4 to 6
 - ADDRWIDTH changed, from 11 to 13
 - Because of this, the transfer speed drop down: 0.75Gbps -> 0.5Gbps (Same as official doc)
 - OS:
 - Set NIC MTU from 1500 to 9000
 - `sudo ip link set eth0 mtu 9000`
 - uHAL(Software): the software will do **fragment** things, the maximum data size in each UDP package we can get is still 1400 bytes.
 - **NOT** find the key yet, crated an issue on the ipbus-software github page.
 - <https://github.com/ipbus/ipbus-software/issues/221>

Backup

The screenshot shows the resource usage tool interface. On the left, a tree view shows the hierarchy of resources: Memory > Block RAM Tile (93%) > RAMB18 (1%) > RAMB18E1 only; RAMB36/FIFO (92%) > RAMB36E1 only; DSP; IO and GT Specific > IBUFDS (<1%); and IDFI AYF2/IDFI AYF2 FINFDFI AY (?). The 'Block RAM Tile (93%)' item is highlighted. On the right, a table provides a detailed breakdown of the 'JadePix3_Readout' component's resource usage.

Name	Used
▼ N JadePix3_Readout	412
> I ipbus_infra (ipbus_gmii_infra)	260
> I ipbus_payload (ipbus_payload)	116
> IE u_ila_0 (u_ila_0)	20
> I jadepix_ctrl_wrapper (jadepix_ctrl_wrapper)	12
> IE u_ila_1 (u_ila_1)	2.500
> I jadepix_read_data (jadepix_read_data)	1.500
📁 Leaf Cells (1)	1

The costs of Block ram