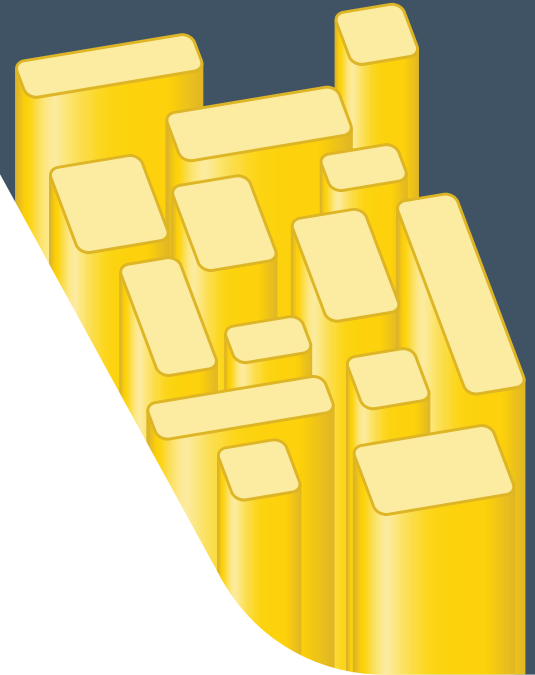


Atomic Rules TK242

Packet Capture and Replay



TK242 from Atomic Rules is a bitstream that provides lossless packet capture for up to four 100GbE streams – out-of-the-box with no FPGA programming required. The TK242 IP runs on BittWare cards with Altera® Agilex™ FPGAs. Sustaining PCIe Gen5 x16 throughput over 400 Gb/s from Ethernet to user space host memory, TK242 provides a runtime programmable 400 Gb/s RSS filter, 6-tuple, 64K entry flow-table and queue routing. All formatting – including PCAP generation – is done in hardware, offloading that function from the host CPU. High-performance timing capability includes nanosecond-resolution packet head timestamping for fusing up to four 100GbE streams into a single time-monotonic ordered stream.

Up to
400 Gb/s RSS Filter
PCIe Gen5 x16

Nanosecond timestamps

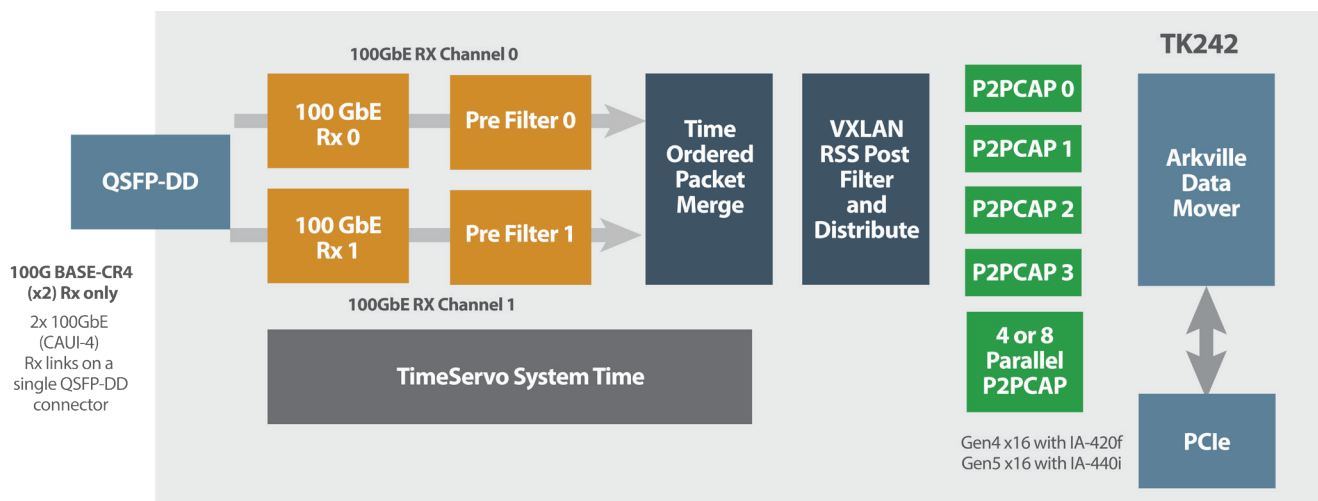
Lossless Capture



BittWare offers TeraBox integrated servers perfect for building high-density capture solutions

Features

- Lossless packet capture of up to four 100 GbE streams
- Nanosecond timestamps with time-ordered merge
- Generation of multiple PCAP files in hardware
- Exceptionally low host CPU core burden
- Open-source C host example design gets you started quickly



TK242

400G Packet Capture

Detailed Feature List

Overall

- Lossless, protocol-agnostic, simultaneous ingest of up to four 100G 100GBASE-CR4 sources
- Nanosecond resolution packet head timestamping on both ingress ports
- Online, in-flight fusing of both ports into a single time-monotonic ordered stream
- Runtime programmable 200 Gb/s RSS filter, 6-tuple, 64K entry flow-table, queue routing
- Online, in-flight generation in hardware of multiple, parallel PCAP format byte streams
- PCIe Gen5 x16 sustained throughput over 400 Gb/s from Ethernet to user space host memory
- Exceptionally low host CPU utilization - all formatting, including PCAP generation, in hardware

Up to Four 100 GbE Inputs

- Each QSFP-DD provides two 100G CAUI-4 Rx
- Each of the two parallel input channels has:
 - 100 GbE PHY/PCS/MAC with RX head timestamps
 - Atomic Rules MTAU Layer-2 pre filter
 - Rich per-port Rx statistics
 - TimeServo system timer
 - Nanosecond resolution time
 - Time ordered packet merge of both streams
 - Single 200 Gbps / 300 Mpps output stream

RSS and Distribute

- Line rate 200 Gbps / 300 Mpps RSS 6-tuple hashing
 - Software programmable polynomial
 - Default Microsoft Toeplitz weights
- 64K Entry flow redirection table
 - Each entry identifies a unique PCAP flow direction or identifies a flow to be discarded
 - Use cases include:
 - Send everything allowed to a single PCAP flow
 - RSS spread allowed incoming packets among the multiple PCAP flows
 - Forward only specific matches to host for lawful intercept
- Multiple Parallel H/W PCAP generators (P2PCAP)
 - Nanosecond per-packet headers added
 - Each supports the full 200 Gbps / 300 Mpps flow

Use Cases

There are many ways to leverage TK242 for your own solution. Here are a few of them:

Use it as-is: an out-of-the-box, plug-and-go packet capture solution.

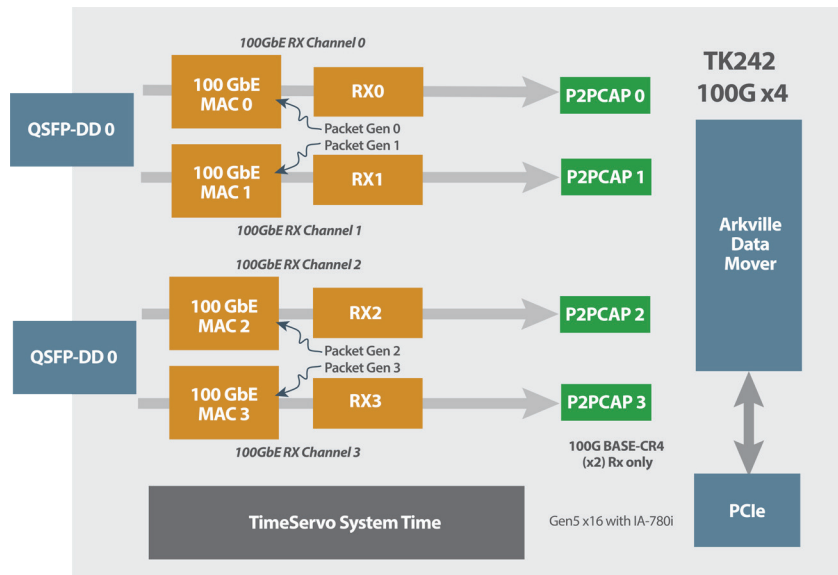
Add the FPGA board, the host, plug in, and capture packets using the Atomic Rules supplied example design. The design is limited to what is demonstrated.

Point your host application code at the in-memory hugepages filled with PCAP formatted byte streams.

The example design is your starting point. Add other capabilities before, during, and after packet capture. Most features are programmed through the DPDK.org standard API.

Modify the example design to provide other functionality.

For example, each P2PCAP flow could become its own libpcap stream, feeding its own host core.



Compatible FPGA Cards and TK242 Variants

- [IA-780i](#)
- [IA-440i](#)
- [IA-420f](#)



FPGA Card	IA-420f		IA-440i		IA-780i	
Variant	10G x2	100G x2	100G x2	200G x1	100G x2	100G x4
QSFP-DD Signaling	10G NRZ on lanes 1 and 2 of the 8 lanes	100GBASE-CR4 x2 on a single QSFP-DD	100GBASE-CR4 x2 on a single QSFP-DD	200BASE-CR4 as 4 lanes of 56G PAM4	100GBASE-CR4 x2 on a single QSFP-DD	100GBASE-CR4 x2 on each of 2 QSFP-DDs
PCIe	Gen4 x16		Gen 5 x16			
RSS	Yes					No
P2PCAP Engines	4		8			4
Paced Replay	Yes					No

To learn more, visit www.BittWare.com

v3 | last revised 2024.11.18

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