10G-Based Ethernet Data Exchange Kit

Based on User Datagram Protocol (UDP/IP), 10GEDEK implements a full 10G data transfer solution. With our IP, connect your FPGA (or ASIC) to a PC, control it using a simple register interface over Ethernet and stream data in both directions at 10Gb/s at the same time !

A bit of history...

20 years ago, we invented at ALSE the concept of **processor-less Ethernet communication** with our 1G Ethernet IP : **GEDEK**.
It was a big success, enabling a lot of applications on small and cheap FPGAs with unbeatable transfer performance. When 10G Ethernet became popular and cheap, it was a natural evolution of GEDEK to support 10G Ethernet standard : 10GEDEK was born.

Fast, Small, Easy to use

Our compact IP (see table on the right) reaches the maximum theoretical data-rate. It is highly configurable and adaptable to your environment. Note that, on Agilex 5 FPGAs (eg), we use the MAC hard IP from the transceivers for further reducing the IP footprint. And 10GEDEK can be integrated in your application in just a few hours !

For all FPGAs

...that offer at least a 10G transceiver. As soon as a new family becomes available, we port our 10GEDEK IP to this family.
To date we support Altera (/Intel), AMD(/Xilinx), Lattice and MicroSemi.

An FPGA IP... but not only

Our IP comes with an **API**, available on both Windows and Linux, which implements simple and efficient communication functions to access the remote device through PC sockets. A Python wrapper is available as well ! The UDP frame format is fully documented, so you could use your own API or application if you prefer.

Three different interfaces for specific purposes

10GEDEK offers three interfaces for different purposes :

- ✔ a **Register Interface** (32 bits Memory Mapped) : Read and Write the FPGA registers from your PC software.
- ✔ **User Data Transfer** RX and TX stream interfaces (64 bits Streaming) : send and receive the maximum 10GB/s data at the same time through this couple of very simple streaming interfaces.
- ✔ an **optional 'Raw' Port** (64 bits Streaming) : streaming raw data from and to the MAC, allowing you to implement your own custom protocols (DHCP or TCP for example), while relying on 10GEDEK to handle transparently the UDP traffic in parallel.

Adaptable to your design

Every interface can be enabled or disabled depending on your needs.

Affordable

Like all our IPs, 10GEDEK is affordable and available under various licenses (which depend on the FPGA vendor), from prototype encrypted RTL to full source code license. And no (zero) royalty.

Tempted ?

Contact ALSE ! (info@alse-fr.com)

Technical Characteristics

Ethernet Protocols

- ✔ UDP (streaming)
- ✔ ICMP (ping)
- ✔ ARP (infrastructure)
- ✔ And all others (Raw Port option)

Data Speed

Maximum theoretical 10Gb/s reached, 100% guaranteed, with no loss.

Device and family supported

Any FPGA or ASIC featuring 10 Gbit/s transceiver(s).

Reference Designs available

- ✔ Agilex 5 Premium Development Kit
- ✔ Agilex 5 AXE5-Eagle Development Kit
- ✔ Cyclone 10 GX dev kit
- ✔ Polarfire MPF300 Evaluation Kit
- ✔ Virtex 7 Development Kit
- ✔ Kintex 7 STLV7325
- ✔ CertusPro-Nx Versa board
- ✔ And many others : contact ALSE !

Compact IP – Resources

Device	Logic Elements	Memory
AG05	2000-3000 ALMs	15-30 M20Ks
C10GX	4000-5000 ALMs	15-30 M20Ks
MPF300	6000-9000 4LUTs	10-16 LSRAMs
VC707	4000-6000 LUTs	10-18 RAMs
LFCPNX	6000-8000 LUT4s	20-35 EBRs

Highly Configurable & Versatile

- ✔ Interfaces activation/deactivation
- ✔ Broadcast/Multicast support
- ✔ UDP port management
- ✔ FPGA optional Hard IP usage
- ✔ Secure data transfer protocol, FPGA Remote Update and many more features not discussed here