OKI
Open up your dreams

GigE VISION®

Xilinx FPGA
GigE Vision Solution

GEN‹i›CAM

Xilinx Tri-Mode EMAC supported

High-speed, highly reliable image transmission by GigE Vision® Protocol achieved on FPGA Single Chip, with GigE Vision Protocol stack implemented within Xilinx FPGA.

Features

- **Ethernet image real-time capturing by GigE Vision protocol**
- **Image data transmission making maximum use of Gigabit Ethernet bandwidth**
- **GigE Vision feature implemented on FPGA allows packetizing/transmission of data from various sensors/cameras in GigE Vision compliant packet.**
- **Officially tested and certified by AIA (Automated Imaging Association) as GigE Vision compliant solution.**

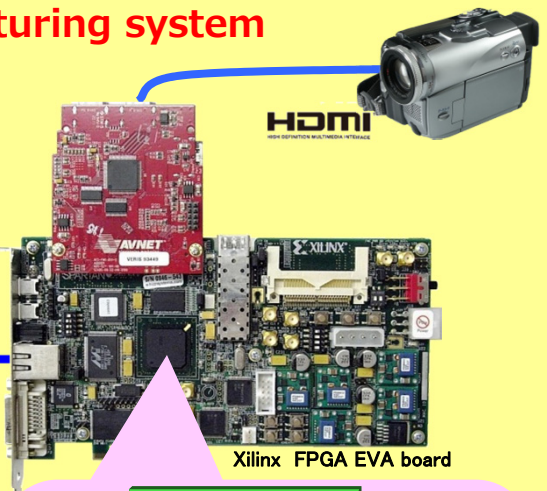### Design suite required for image capturing system available as a platform

1280x720 60fps
Real-time capture

GEN‹i›CAM
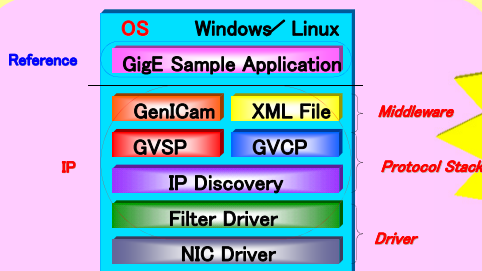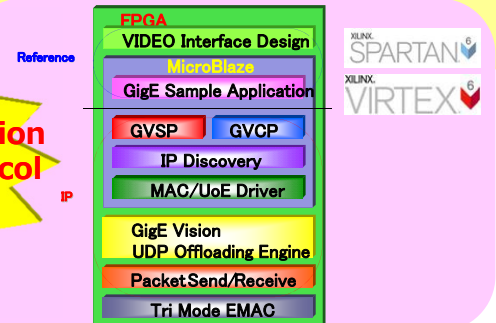
GigE VISION®

HDMI

Windows PC

Category 5 compliant
universal LAN cable
(up to 100m w/o junction)

Xilinx FPGA EVA board

Raw image data conversion/transmission into GigE Vision protocol packet

Reference

OS   Windows∕Linux
GigE Sample Application

GenICam	XML File	*Middleware*
GVSP	GVCP	*Protocol Stack*
IP Discovery	
Filter Driver	*Driver*
NIC Driver	

IP

Reference

FPGA
VIDEO Interface Design
MicroBlaze
GigE Sample Application
GVSP	GVCP
IP Discovery
MAC/UoE Driver
GigE Vision UDP Offloading Engine
Packet Send/Receive
Tri Mode EMAC

SPARTAN-6
VIRTEX-6

IP

GigE Vision protocol control processed within FPGA (Micro Blaze™). Hardware engine (ToE) + GigE Vision stack achieve high speed image transmission
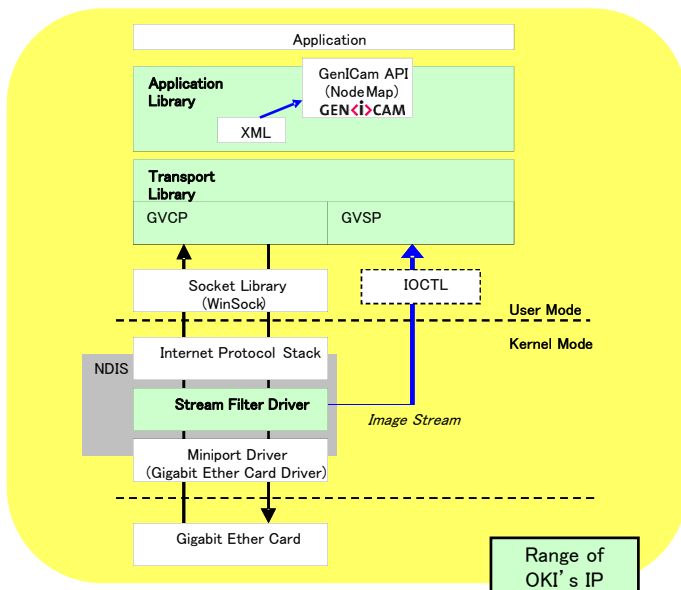
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HW/SH Configuration of GigE Vision Solution

Hardware Configuration

DDR3 SDRAM I/F

FPGA
- Gigabit EMAC
- HW-IP (GV-UOE)
  - Outgoing packet control
  - GVSP Packet Generation
  - GVCP Packet Generation
  - Other Packet Generation
  - Receiving packet control
  - GVCP Packet Receiving
  - Other Packet Receiving
- Image Data Read Control
- Image Data Write Control
- Image Processing
- DDR3 Controller
- System
- Micro Blaze
  - User Application
  - SW IP
    - GigE Vision protocol stack
    - MAC Driver
    - GV-UOE Driver
- UART Controller
- Memory Controller

Gigabit Ethernet PHY I/F
GMII PHY I/F
Xilinx Tri-Mode EMAC IP
Image Data Input I/F
UART I/F
Flash Memory I/F

Stream Packet
Control Packet

➢ For EMAC, Xilinx Tri Mode Ethernet MAC is used to control data link layer

➢ OKI's original "GigE Vision UDP Offloading Engine" achieves high speed transmission of GigE Vision protocol packet

➢ GigE Vision Protocol Stack, MAC Driver and GV-UOE Driver are implemented on MicroBlize, and GigE vision Protocol is processed within FPGA

➢ Development environment : Xilinx ISE and EDK

Software Configuration

- Application
- Application Library
  - GenICam API (NodeMap) GEN<i>CAM
  - XML
- Transport Library
  - GVCP
  - GVSP
- Socket Library (WinSock)
- IOCTL
- User Mode
- Kernel Mode
- NDIS
- Internet Protocol Stack
- Stream Filter Driver
- Image Stream
- Miniport Driver (Gigabit Ether Card Driver)
- Gigabit Ether Card

Range of OKI's IP

➢ Streaming Filter Driver quickly extracts the image stream out of camera data, enhancing stream reception rate

➢ Extracted image stream is directly transferred to library without putting through Internet Protocol, substantially reducing CPU load

➢ Stream Filter Driver works as a Filter Driver for network driver stack, allowing use of various Gigabit EtherCards in the market

➢ Camera control is via GenICam API (Node Map), interpreting Camera Description File (XML)

➢ Windows 7(64/32bit) and Windows XP (64/32bit) supported

➢ Application development environment: Microsoft Visual Studio 2008

GigE Vision Solution contains:

·Full development environment required for FPGA designing; IP + Reference Design + ISE/EDK Project with manuals
·Development environment required for PC application; Filter Driver + GigE Vision Protocol Stack +GenICam library and manuals

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