



WIZnet

Case Study - DVR

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WIZnet Inc

1. What is DVR?
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1. What is DVR?

What is DVR?

DVR (Digital Video Recorder) is security device to convert analog video data of CCTV into digital and record it to HDD.

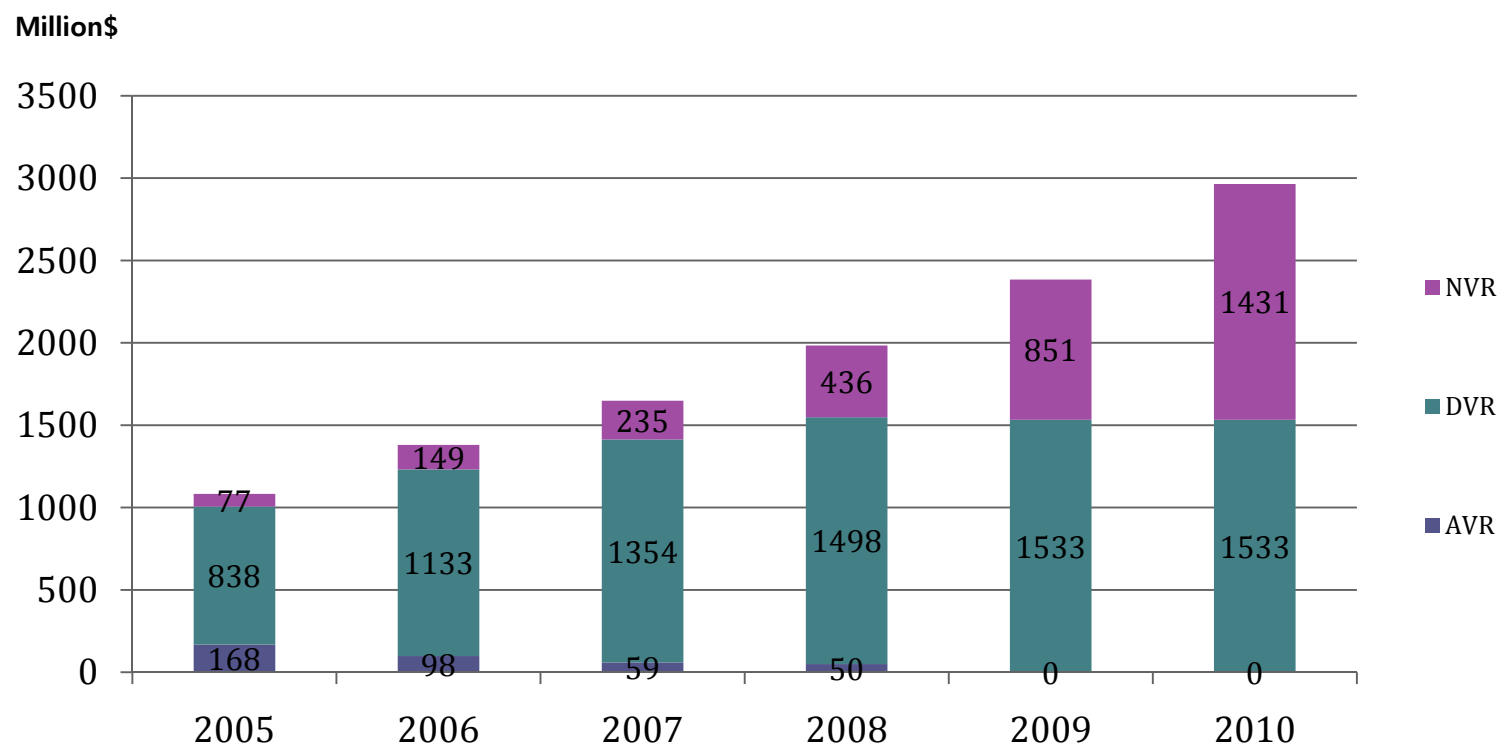
Main Features of DVR

- **High Stability & Reliability** is required as main security device
- **Short Life Cycle** DVR technology and new products are quickly developed
- **From Security to Non-Security** : Business chances are extended to home, education, mobile etc
- **Core Device of Security System** : DVR leads the demands of other devices such as CCTV, Monitor, Alarm , PT Z Controller
- **Network is basic function of DVR**





2. DVR World Market Size & Prospects



AVR (Analog Video Recorder / VCR) : will disappear from 2009

DVR (Digital Video Recorder) : (2005) 896million \$ => (2010) 1,533million\$ (Yearly Growth Rate : 14.4%)

NVR (Network Video Recorder) : (2005) 77million\$ => (2010) 1,431million \$ (Yearly Growth Rate ; 107.6%)



3. DVR Market Trend & Opportunity Seeking

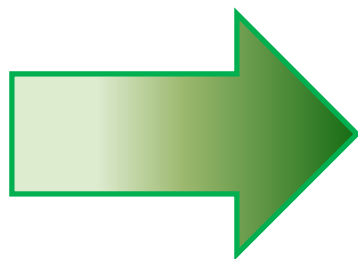
1) Growth of CAR DVR

Growth of CAR DVR

- The requirement for Car DVR is increasing for prevention of crime and safety of traffic
- Legislation of automotive mobile black box installation in Europe and US => Demand for CAR DVR will increase (Europe : from 2010 US : from 2011)

New Opportunity Seeking at the CAR DVR with WIZ600Wi

- Car DVR also needs network function for Data Back-up & Remote Monitoring
 - Wireless solution is more appropriate rather than wired networking solution in CAR DVR
 - Existing wireless modules (SDIO, Mini-PCI, USB interfaced client modules) : Needs High-performing MCU, Porting of S/W TCP/IP, Development Complexity
- => System Quality can be lowered.



WIZ600Wi

Easily & Quickly Applied to Existing System
Independent of Host MCU
Not Need to Port Software TCP/IP



3. DVR Market Trend & Opportunity Seeking

2) Technology

Developing to Intelligent DVR

- More intelligent functions are included in DVR
(loss detection, face recognition, motion tracking and so on)
- For Providing Image Information without Manual Operation

⇒ **System is getting heavier & MCU needs to perform more tasks**



EX) Intelligent DVR – Motion Tracking

Image Compression Technology

- Changing from MPEG 4 to H.264
- Expecting H.264 products will mainly occupy the market in near future

⇒ **H.264 technology is still processed by software occupying most of the MCU cycle**



i-Offload Platform W5100 & W5300

Reducing MCU Burden for Network
MCU can concentrate on main jobs
Upgrading System Performance

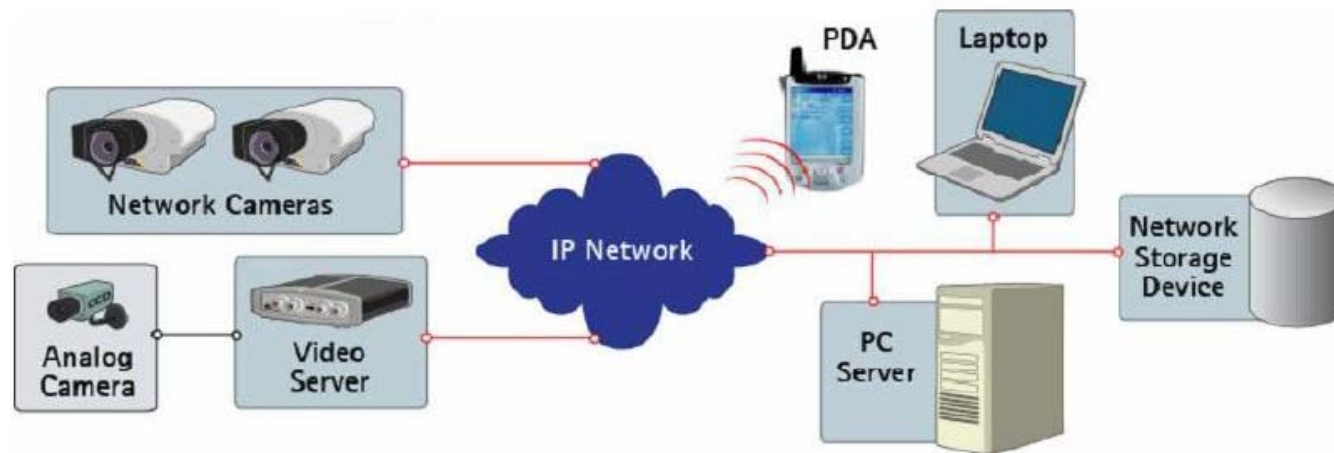


2. DVR Market Trend & Opportunity Seeking

3) IP Surveillance System

Development of IP Based Surveillance System

- What is IP Surveillance ? All video surveillance systems are integrated into Ethernet base (Video Monitoring, Recording, Transmission are processed through Ethernet)
- Merits : Easy -Expansion of System, Cost Saving, Flexibly Remote Monitoring, Integrated Monitoring and Management System through Ethernet Infra
- NVR (Network Video Recorder) will lead the development of IP surveillance system



System Configuration of IP Surveillance System

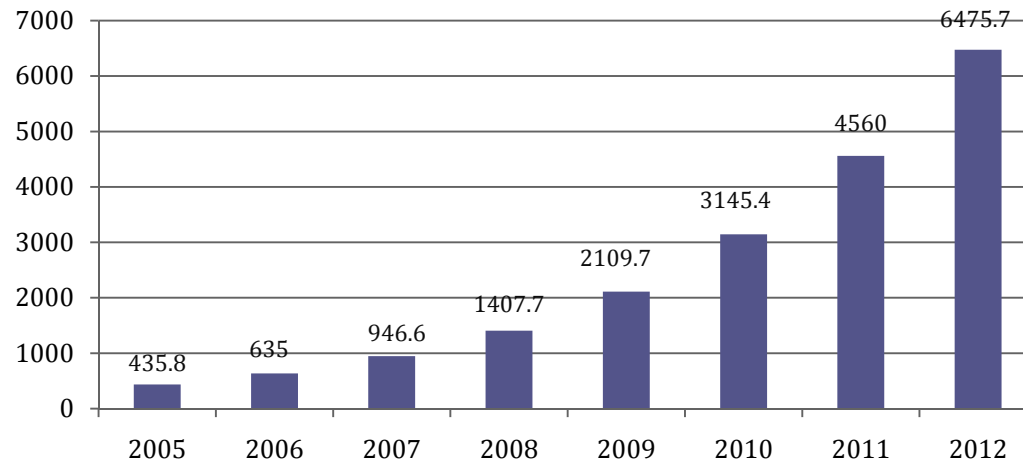


2. DVR Market Trend & Opportunity Seeking

3) IP Surveillance System

Million\$

IP Surveillance World Market Trend



IP Surveillance World Market Size

- 2005 : 435.8million \$
- 2012 : 6,475.7million\$
- Yearly Growth Rate : 47%

Focusing on NVR's Development

- NVR will be the Core Device in the IP Surveillance System
 - Most of main customers in Korea already started to develop NVR
 - Main Issue of NVR : Network Performance by processing various functions
- => W5300 is the Best Solution - Argus, ITX, Nadatel, & Casti are applying W5300 to upgrade network performance



3. Case Study - A Company in Korea

1) System Introduction

Main Functions with WIZnet Solution in DVR of A Company

- ▶ Monitoring live view
- ▶ Viewing recorded data
- ▶ Controlling PTZ
- ▶ Internet Backup

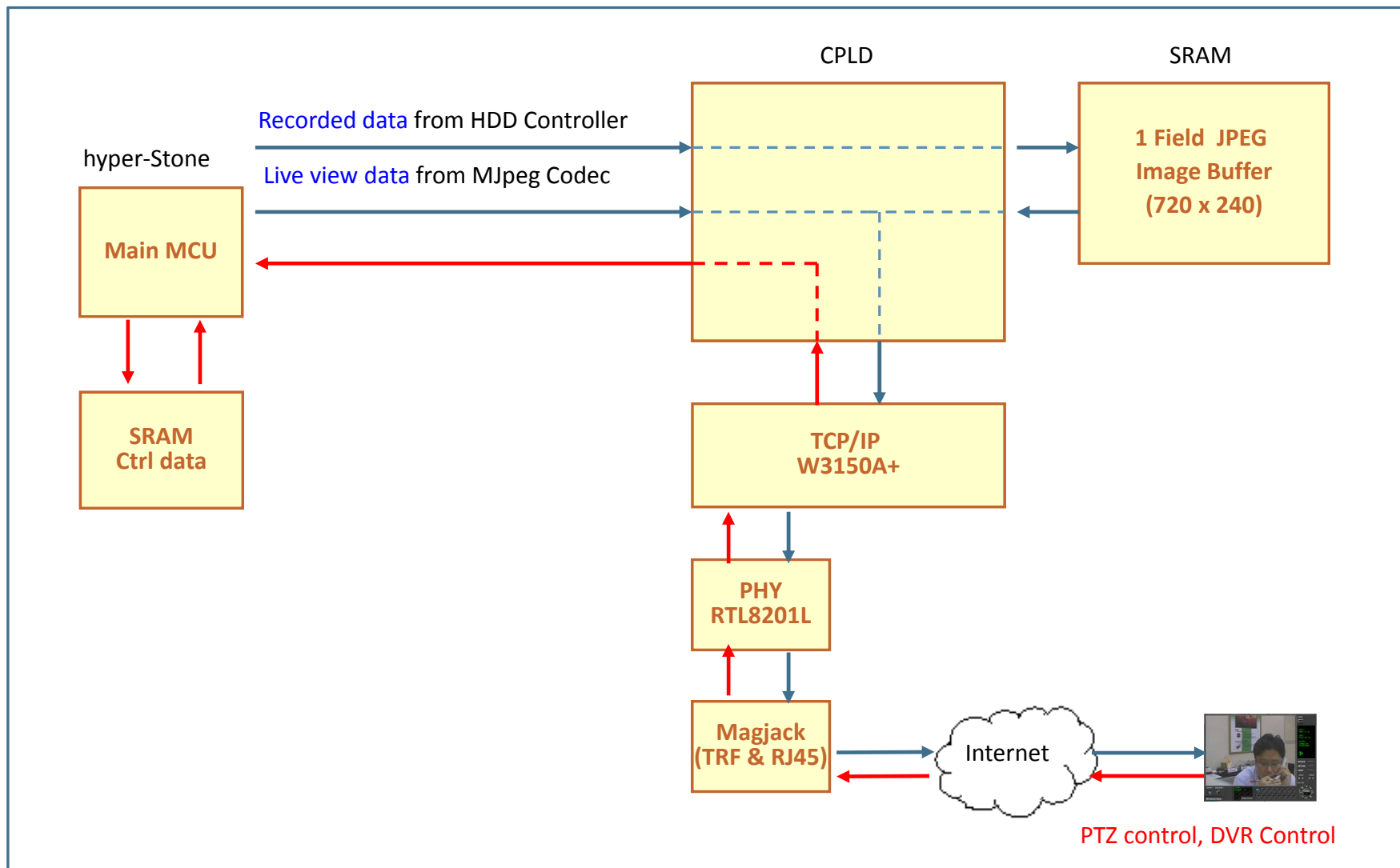
System Implementation

- ▶ MCU + CPLD + W3150A+ (no direct connection between MCU and W3150A+)
 - MCU : 1. Control W3150A+ through CPLD
 - 2. Receive data from W3150A+
 - 3. Send other data except JPEG Image to W3150A+
 - CPLD : 1. Interface W3150A+ and give an indirect path between MCU and W3150A+
 - 2. Store JPEG Image into SRAM and send it to W3150A+
 - W3150A+ : 1. Process TCP/IP Protocol
 - 2. Send or receive data between CPLD and Internet



3. Case Study - A Company in Korea

2) System Block Diagram – Ethernet Part





3. Case Study - A Company in Korea

3) Network Operation

Send Data (from DVR to Remote Viewer)

- ▶ MJPEG data
 1. JPEG Image arrives at CPLD from MJPEG CODEC or HDD Controller.
 2. CPLD saves Jpeg Image into SRAM and copies it to TX Buffer of W3150A+ and then notify MCU.
 3. MCU gives “send command” to W3150A+ through CPLD.
 4. W3150A+ sends data to the Internet.
- ▶ Other data
 1. MCU copies data to TX Buffer of W3150A+ and gives “send command” to W3150A+ through CPLD.
 2. W3150A+ sends data to the Internet.

Receive Data (from Remote Viewer to DVR)

- ▶ PTZ control, DVR control
 1. Data arrives at RX Buffer of W3150A+ from the internet.
 2. W3150A+ sends the data to MCU through CPLD.
 3. MCU saves the data into SRAM and analyzes data.
 4. MCU executes a sequence of jobs according to the result of analysis.



3. Case Study - **A** Company in Korea

4) WHY WIZnet is selected?

They tried to implement network function by using S/W TCP/IP

Developed DVR System by using ARM 7 & Embedded Linux

⇒ **Caused raise of total system cost by 10%**

⇒ **Caused instability by using Linux OS : system-down occurs almost every 3 days**

In order to solve this problem, they changed the design with W3150A+, and,,,

⇒ **Can reduce total system cost by using 8bit low-end MCU**

⇒ **Can produce high network performance**

⇒ **Can easily implement TCP/IP even at the Non-OS based system**

⇒ **Can guarantee system stability by using hardware TCP/IP solution**

WIZnet, the most Stable & Reliable Networking Solution

for all Embedded Systems !!!

* Source by "Embedded Internet Technology Trend" - Embedded World (Korean monthly journal), Nov. 2005



Thank You

www.WIZnet.co.kr

www.eWIZnet.com

www.WIZwiki.net