Intelligent SoC Robot War 2017

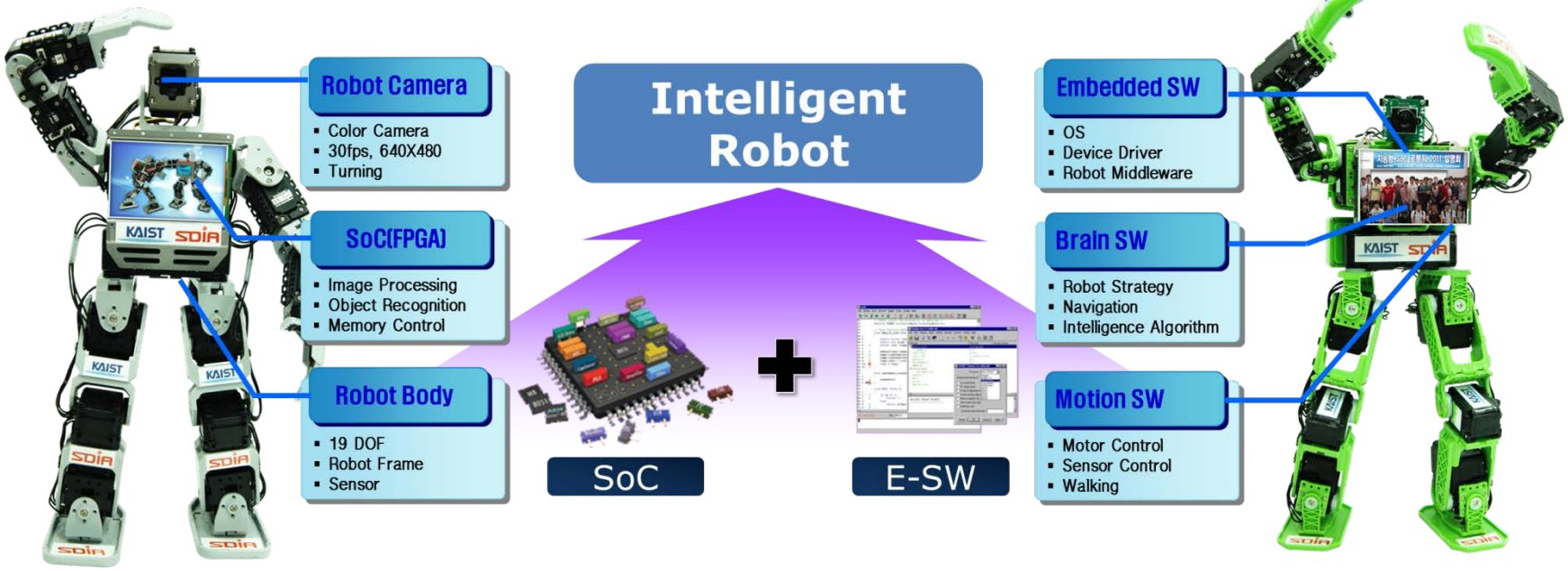
System Design Innovation & Application Research Center

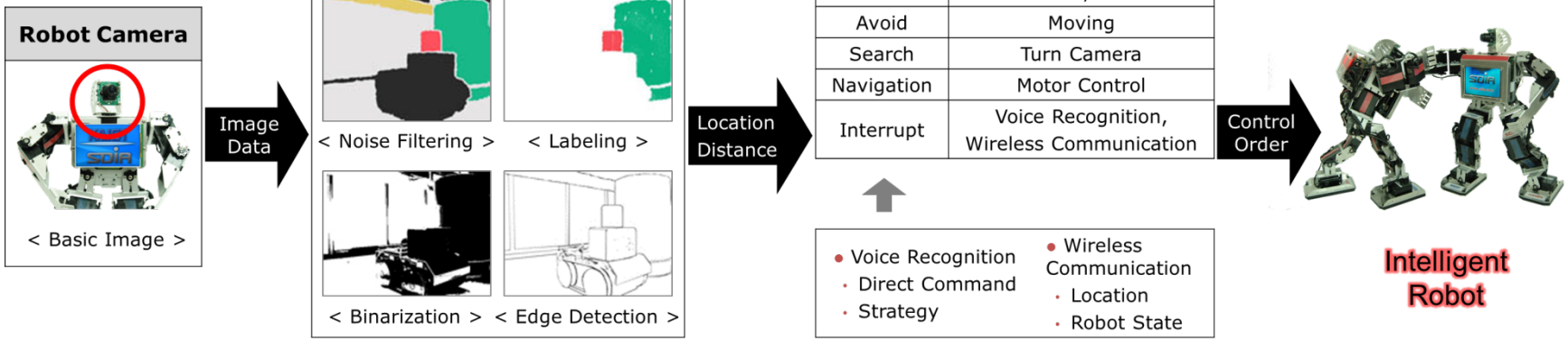
I. Intelligent SoC Robot Algorithm
II. SoC
III. Brain Board
IV. Image Processing
V. Embedded OS
VI. SoC Robot SW
VII. SoC Robot

Intelligent SoC Robot System

Excellence in Intelligent Robot, Wearable Computer, and Bio/Health!

ROBOTWAR
Intelligent SoC Robot War





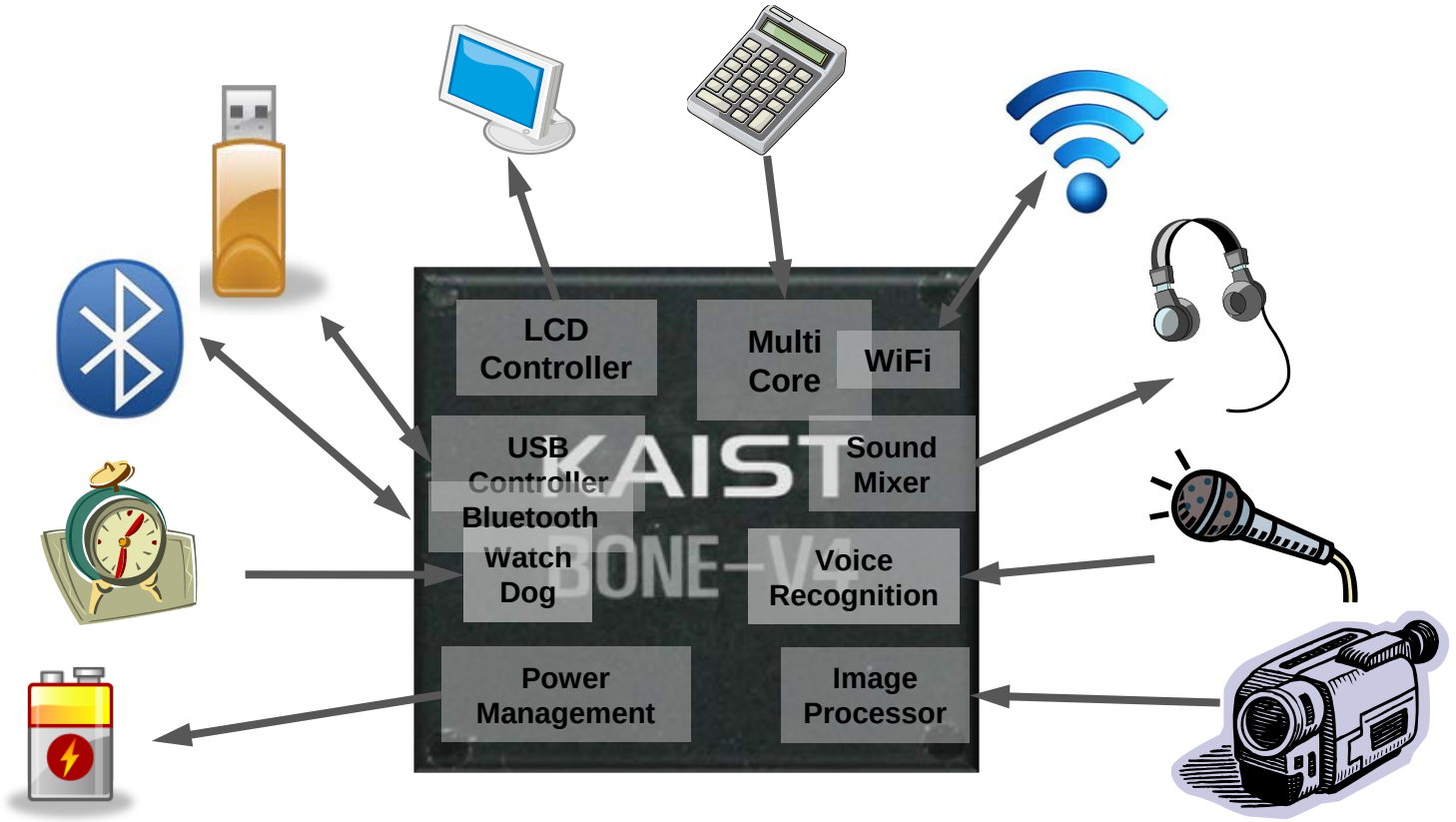
Excellence in Intelligent Robot, Wearable Computer, and Bio/Health!

SoC (System On Chip)

단일 칩 시스템(SoC)는 하나의 집적회로에 집적된 컴퓨터나 전자 시스템 부품을 말함.

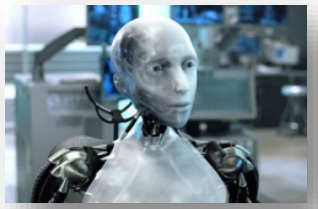
디지털신호, 알라로그 신호, 혼성 신호와 RF 기능 등이 단일 칩에 구현

임베디드 시스템 영역에서 주로 사용



Excellence in Intelligent Robot, Wearable Computer, and Bio/Health!

Real-time Object Recognition Applications



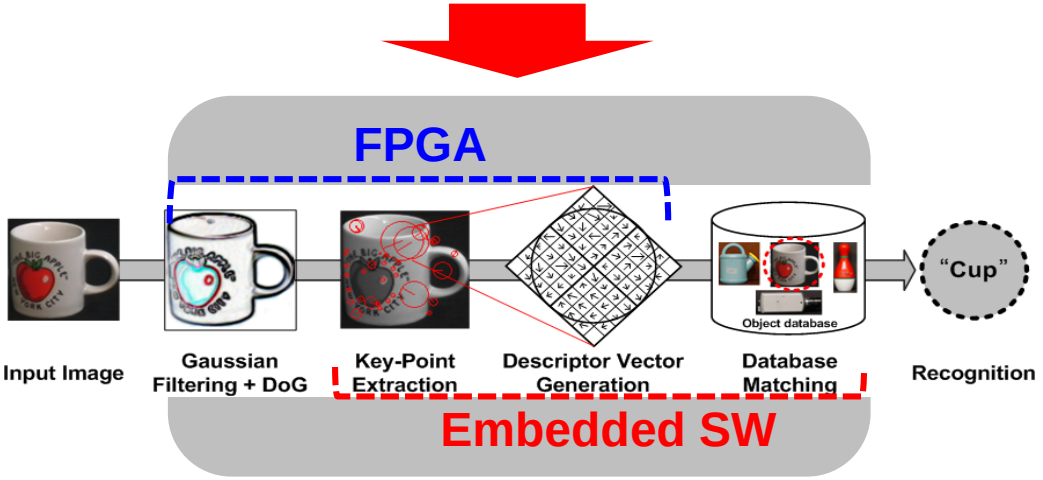
Mobile Robot Vision

Smart Phone

Surveillance System

Smart Car Vision

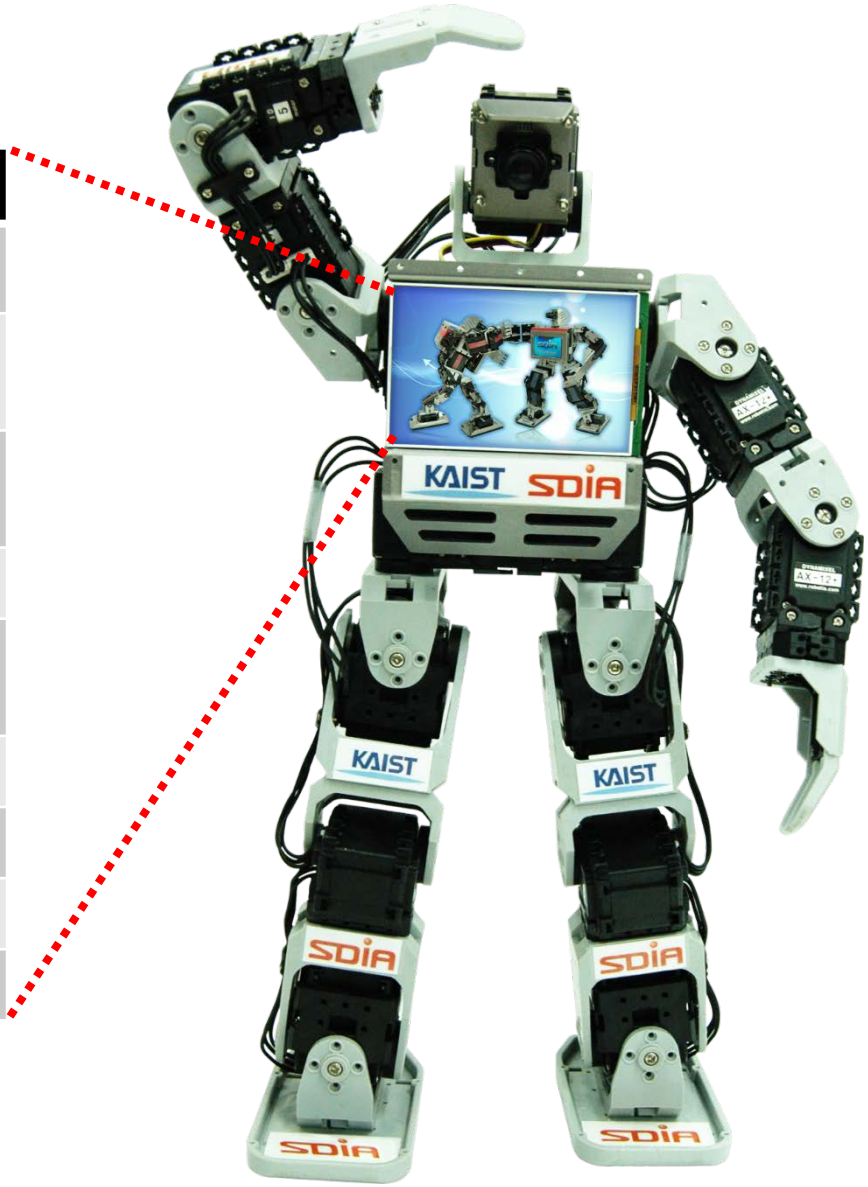
- 지능형 비전시스템에서의 핵심 기술
- 많은 양의 이미지 데이터 처리 및 복잡한 연산이 요구
- 실시간 처리/인식에 어려움이 발생



FPGA + Embedded SW, Object Recognition Process

Excellence in Intelligent Robot, Wearable Computer, and Bio/Health!

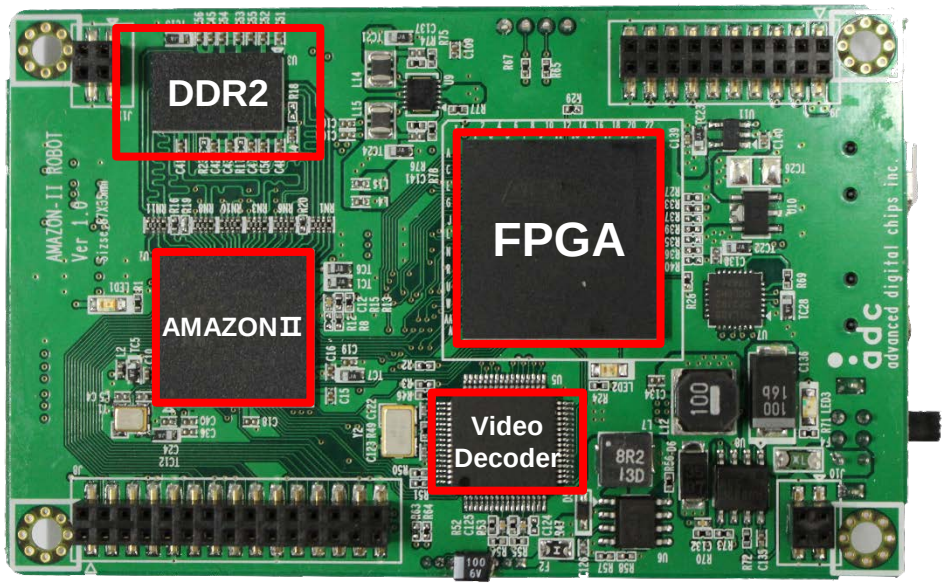
Item	Specification
MCU	ADChips Amazon Ⅱ (EISC CPU) 160MHz
Memory	DDR2 - 128MB NAND Flash - 64MB
FPGA	Altera Cyclone – EP4CE75 Altera EPCS64
Video Decoder	SAA7111A
UART	1 Port USB to Serial – PC 1 Port TTL Level – Robot
USB	1 Port – Mini USB
Camera Input	2 Port – 3Pins
Display	3.5Inch TFT-LCD (320 X 480)
Size	88mm X 55mm



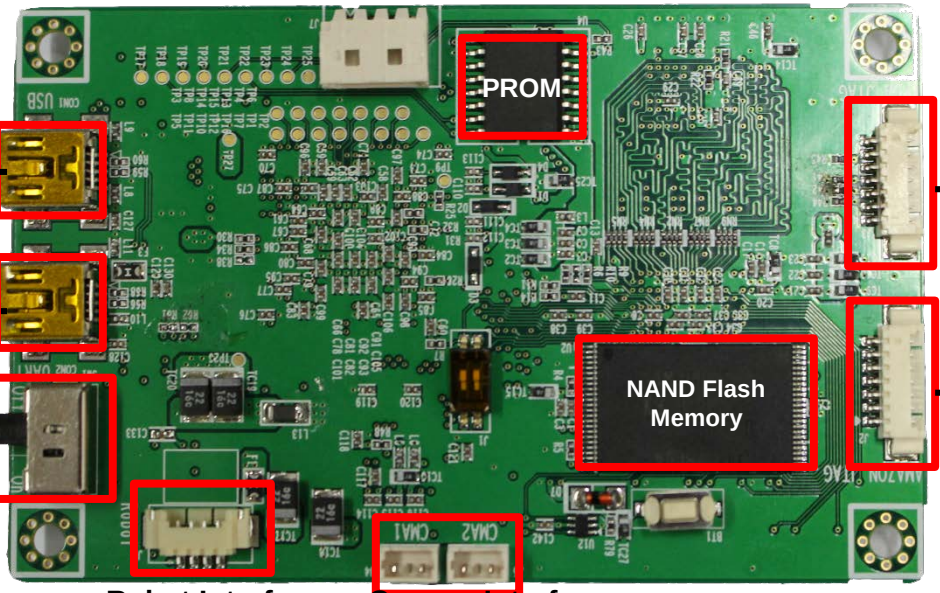
Brain Board (Main Board)

Excellence in Intelligent Robot, Wearable Computer, and Bio/Health!

Top



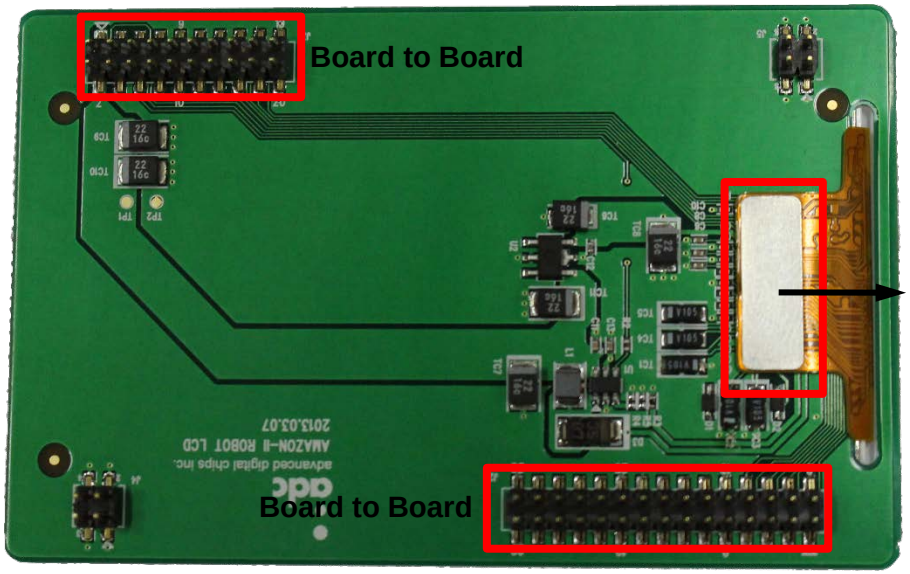
Bottom



Excellence in Intelligent Robot, Wearable Computer, and Bio/Health!

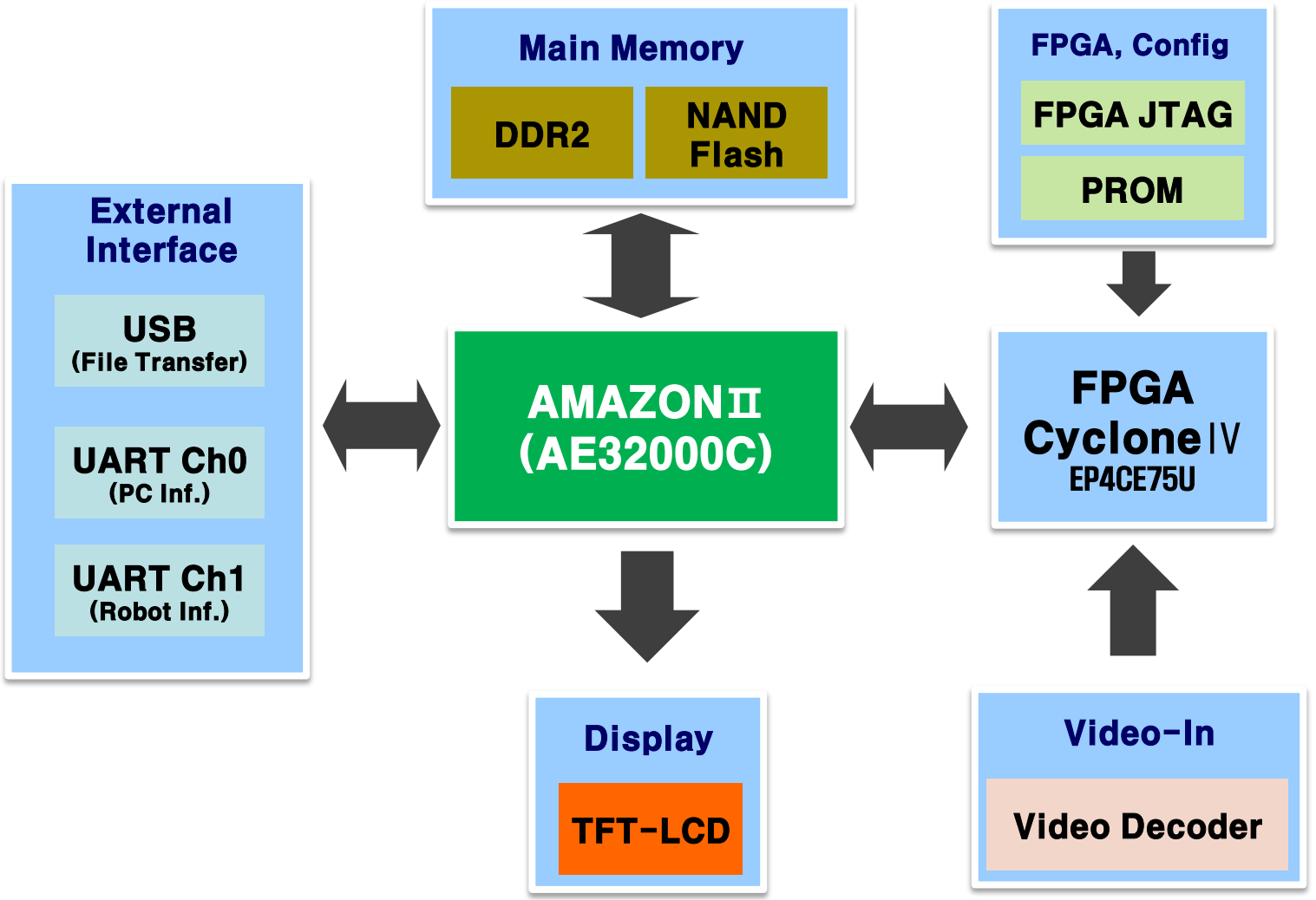
Top

Bottom



Brain Board Block Diagram

Excellence in Intelligent Robot, Wearable Computer, and Bio/Health!

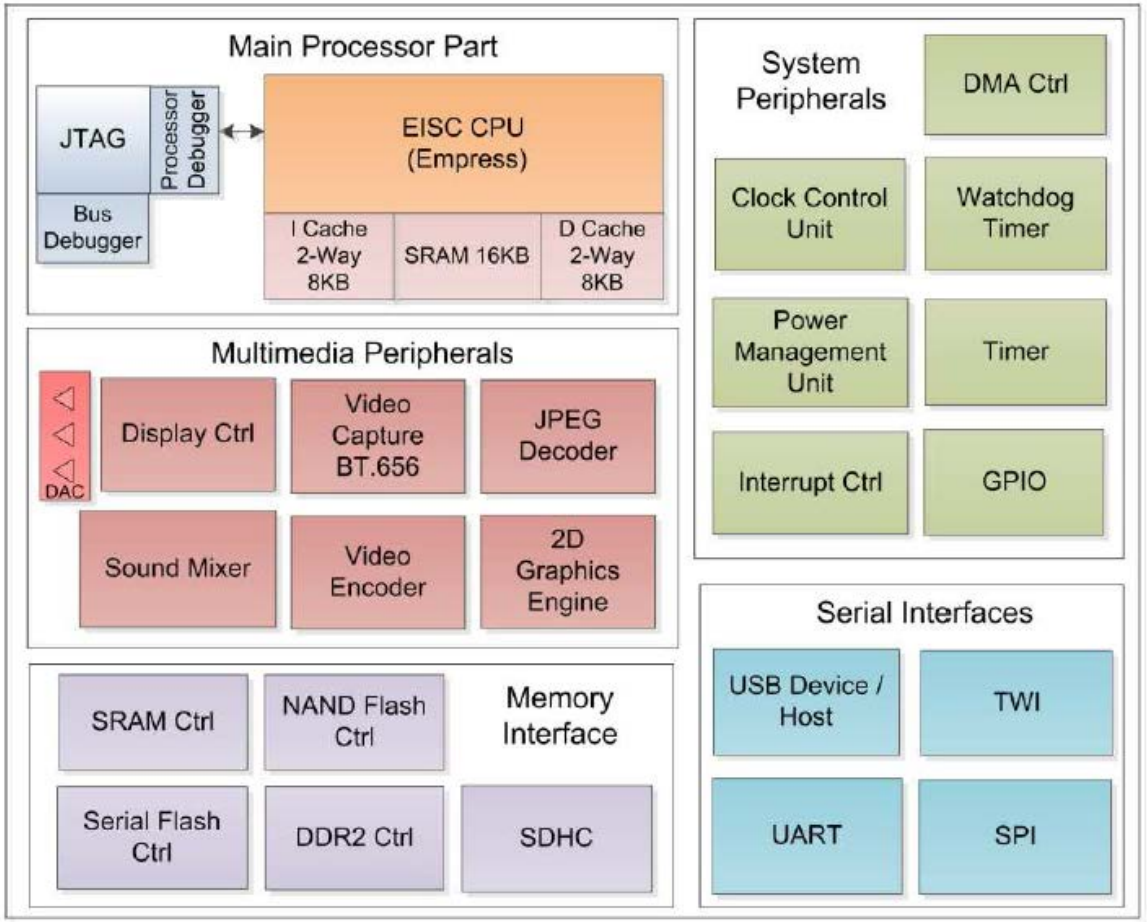


EISC "Extendable Instruction Set Computing"

국내 순수기술로 개발된 **Embedded Processor (에이디칩스)**

CISC와 RISC의 단점을 보완

http://www.adc.co.kr



FPGA "Field-Programmable Gate Array"

프로그래머블 논리요소와 프로그래밍 가능 내부선이 포함된 반도체 소자

ASIC 보다 느리고, 복잡한 설계에 적용할 수 없고, 소비전력이 큼

개발시간이 짧고, 오류에 대한 재 수정이 가능, 초기 개발비가 저렴

HDL (Hardware Description Language)

- 전자회로를 정밀하게 기술하는 데 사용하는 컴퓨터 언어
- 소프트웨어 프로그래밍 언어와 달리 하드웨어의 주요특징인 시간과, 동시성의 표현 가능
- ABEL, AHDL, MyHDL, SystemC, VHDL, Verilog

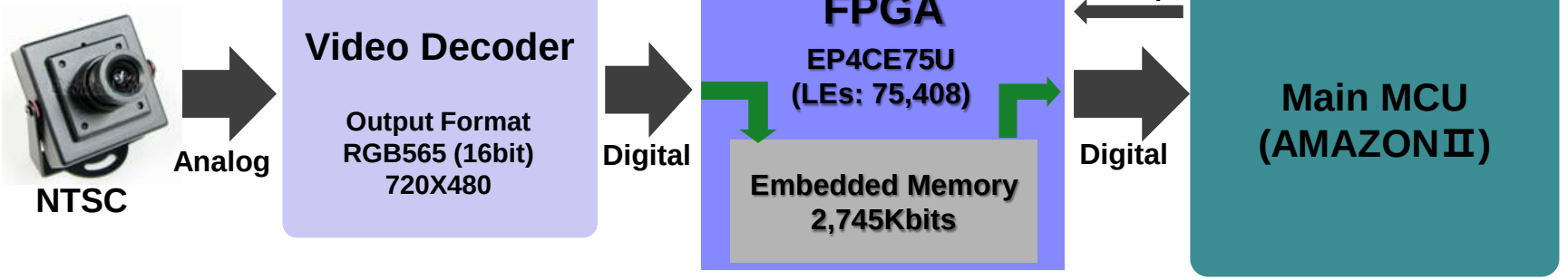
VHDL

- □| (Department of Defense)
- 1993 (IEEE 1164)
-

Verilog

- Gateway Design Automation
- 1985
- C

Excellence in Intelligent Robot, Wearable Computer, and Bio/Health!



Camera

- CCD Color Camera
- 30 frame/sec

FPGA

- Video Decoder로부터 Image Data 입력
- 영상 처리/인식
- Main MCU 요청에 의한 Image 전달

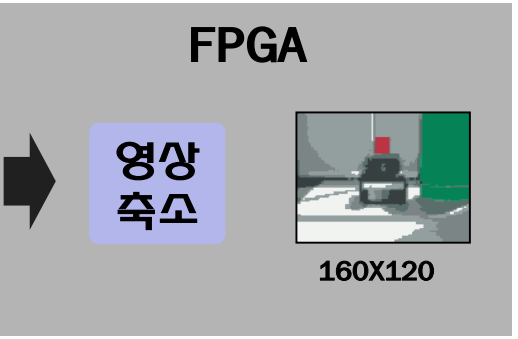
Video Decoder

- Analog 영상을 디코딩
- 720X480, RGB565 출력
- 30 frame/sec

Main MCU

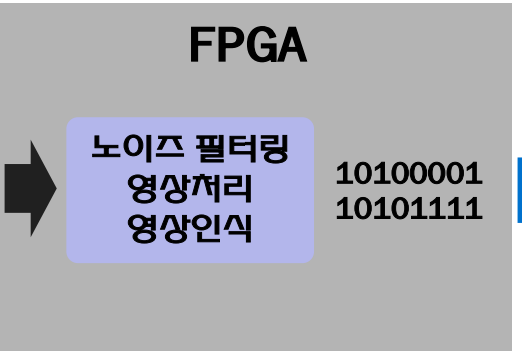
- Robot Strategy
- Decision
- Robot Motion SW

Excellence in Intelligent Robot, Wearable Computer, and Bio/Health!



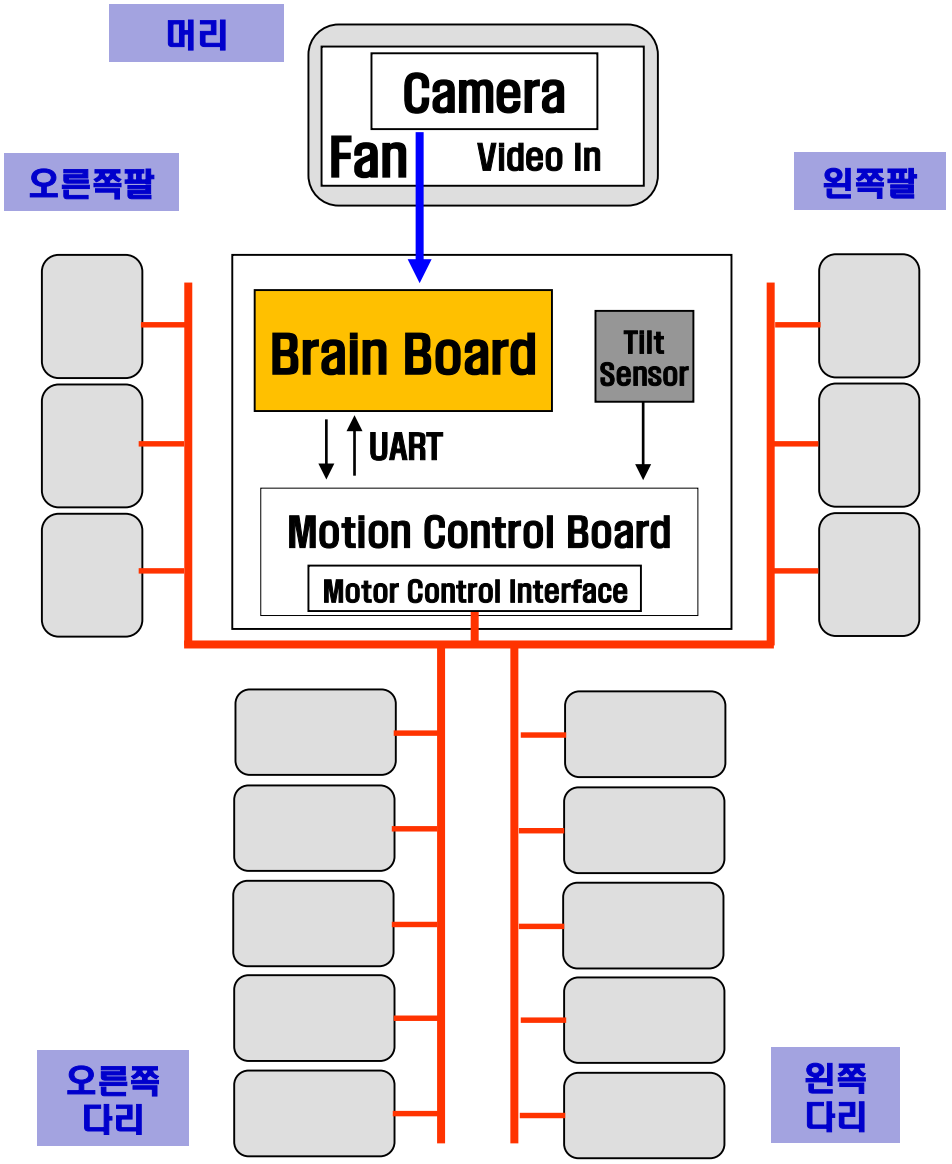
160X120X16bit

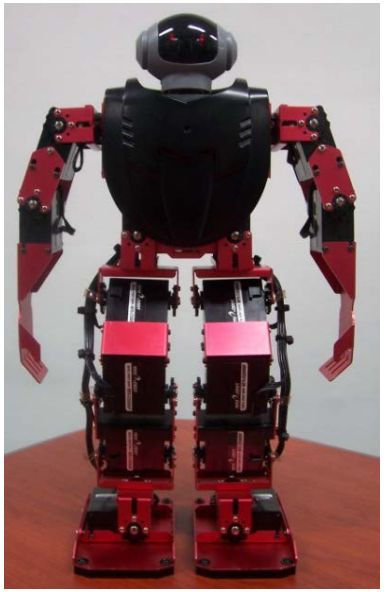
10 fps



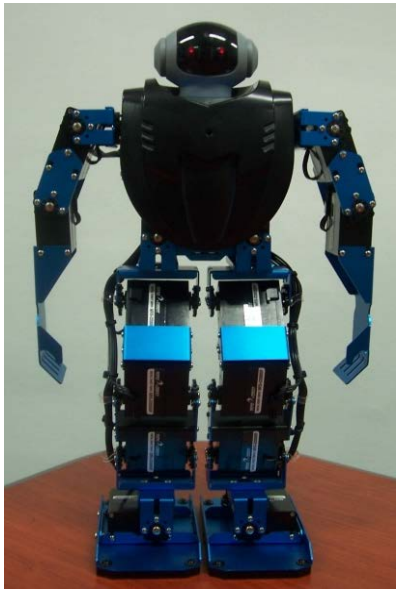
16bit

25 fps

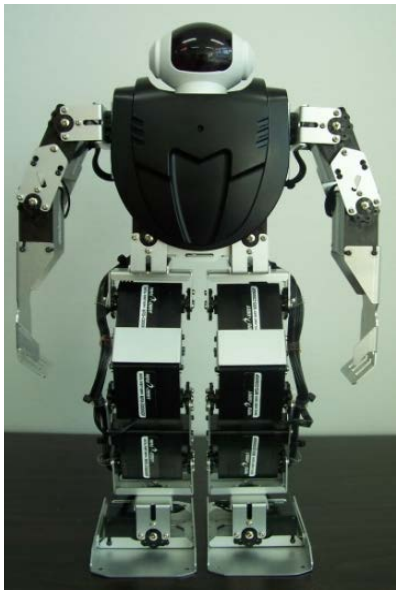




<메탈파이터-레드>



<메탈파이터-블루>



<메탈파이터-실버>

로봇명: (, , ,)
: MRS-D2009SP x 17ea
: 310x180x90mm
: 1.2kg
Controller: MR-C3024
: NiMH 1000mA
Motion SW:

<로보티즈-프리미엄>

로봇명: 티
: x 19ea(A type)
: 397mm
: 1.7kg
Controller: CM-510
: , 1000mA
Motion SW:

<로보티즈-GP>

: 티 GP
: x 17ea
: 346mm
: 1.6kg
Controller: CM-510
: , 1000mA
Motion SW:

로봇명: HOVIS Lite

제어모터: DRS-0101 X 19ea

크기: 348 X 175 X 112 (mm)

중량: 1.45Kg

Motor Controller: ATmega128

Battery: 7.4V 3,000mA Li-Po

Excellence in Intelligent Robot, Wearable Computer, and Bio/Health!

로봇명: 로보티즈 프리미엄키트

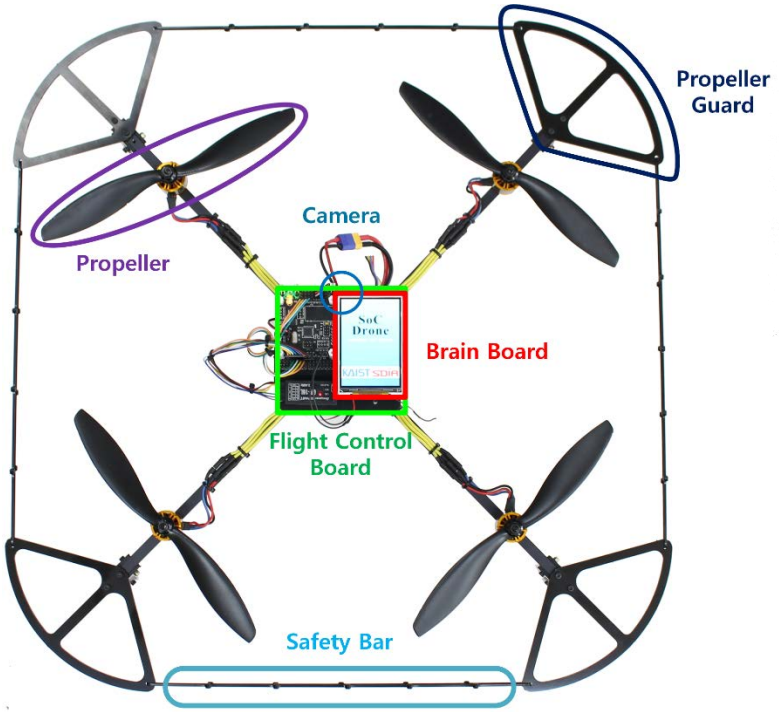
제어모터: 다이나믹셀 x 19ea

키: 397mm

중량: 17Kg

Motor Controller: CM-530

Battery: 리튬폴리머, 1000mA



인터보드: SoC Drone

Motor: 1000KV

Battery: LIPO, 2200mA – 3Cell

초음파 자율고도 유지 시스템

Size:620 x 620 x 182(mm)