

IT Convergence Solution

# 회사 소개

[주] 에이아이텍

# Contents

**1** Introduction

**2** History

**3** Organization

**4** Products

# Introduction

## Core Technology

Embedded system H/W design, FPGA design

Embedded S/W technology (firmware & embedded OS)

Industrial instrumentation & monitoring technology

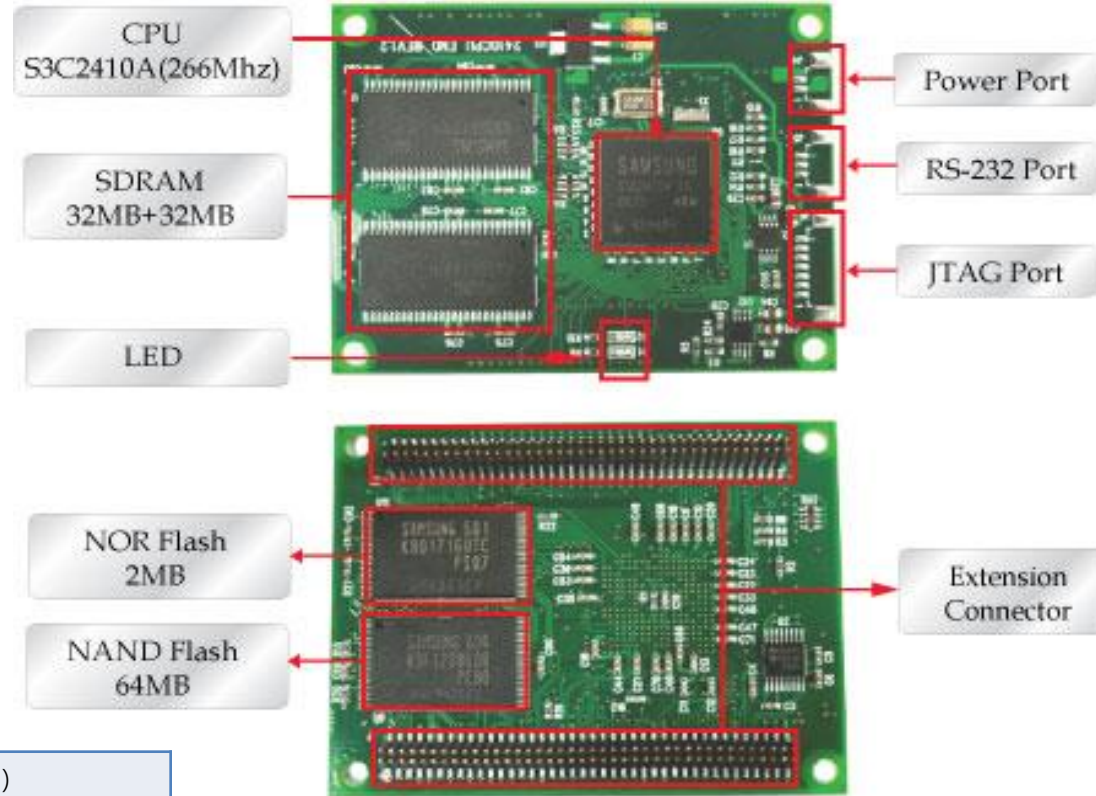
motor controller & sensor signal processing technology

mobile display testing technology

# **Embedded Development Solution**

# Embedded Development Solution

## AI-2410CPU (ARM 기반 MCU Module)



AI-2410CPU Board 구성

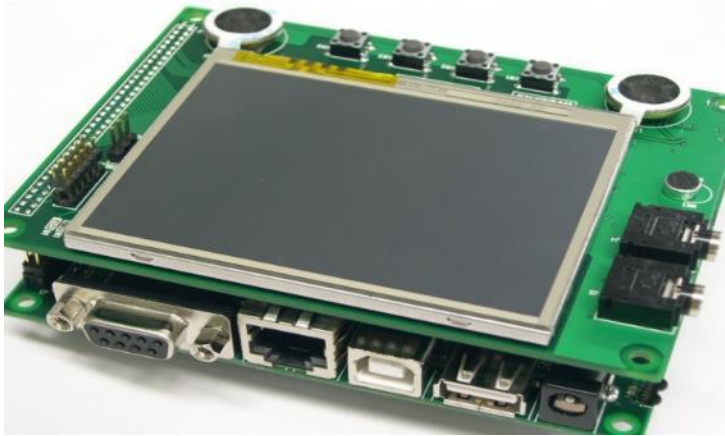
### ■ Specification

SIZE	Small Form Factor (100mm x 84mm x 30 mm)
CPU	S3C2410A(ARM920T) 266MHz
MEMORY	2MB NOR , 64MB NAND, 64MB(32MB x 2) SDRAM
I/O	Power(2Pin), Serial(3Pin), JTAG(7Pin),External I/O(160 Pin)
UART	MULTICHANNEL RS-232 2ch



# Embedded Development Solution

## AI-2410AVK (based ARM process)



### ■ Specification

SIZE	Small Form Factor (100mm x 84mm x 30 mm)
CPU	S3C2410A(ARM920T) 266MHz
MEMORY	2MB NOR , 64MB NAND, 64MB(32MB x 2) SDRAM
I/O	Power(2Pin), Serial(3Pin), JTAG(7Pin),External I/O(160 Pin)
UART	MULTICHANNEL RS-232 2ch, IRDA 1ch
ADC	10bit SAR, 8ch
LAN	CIRRUS LOGIC 10BASE-T(wire), SD Type(wireless)
USB	HOST 1ch, DEVICE 1ch Support
Disk	CF/SD/MMC Card, HDD Support

### Target Applications

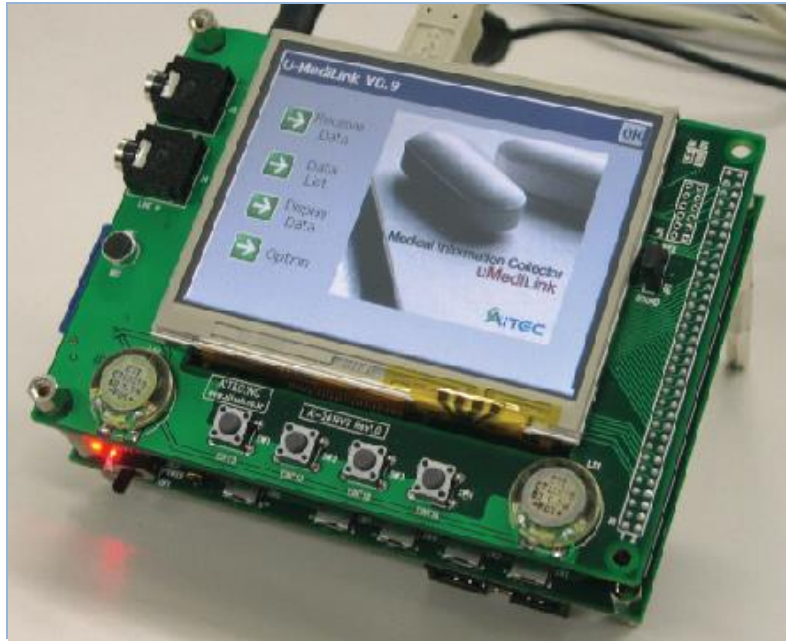
- Factory/Home automation system
- Platform for measurement system
- Robot main controller
- Sensor signal processing system
- Handheld PC



ex. Wince Application

# Embedded Development Solution

## Medical data management system (wireless medical information)



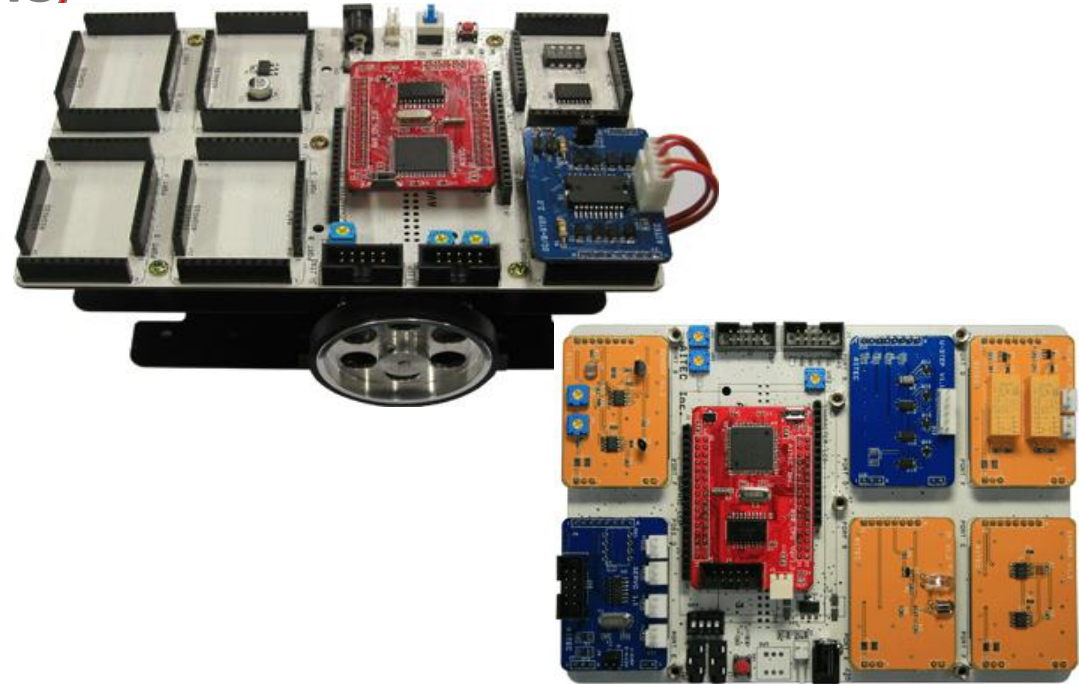
ex. sending blood pressure data using wireless



Total System Flow

# Embedded Development Solution

## AVR Control System KIT (AVR-MTS)



### ■ Specification

CPU	ATmega128-16AU (64 pin TQFP Type), 16MHz Clock
ETC	External 32KByte SRAM, Extension Connector : 32 pin x 2 with port and bus interface

### Target Applications

- Embedded system education
- Operation of the various control module
- Robot education environment based on AVR



# Embedded Development Solution

## AVR Control System KIT (AVR-MTS)



STEP motor



Servo motor



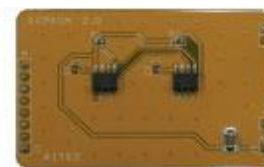
DC motor



MCU module



DC/B-STEP motor module



EEPROM module



Frame body 상, 하



DC/STEP motor용 휠



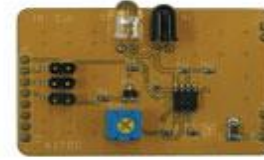
DC motor 연결판



FND module



U-STEP module



IR module



렌치 볼트



볼캐스터



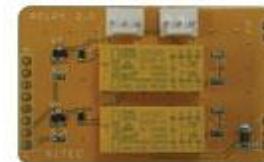
육각렌치, 드라이버



Key matrix module



LED module



Relay module



RS-232 Cable



ISP Dongle Cable



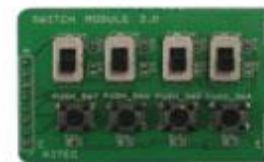
7.5V 2A Adapter



Sensor module



Servo motor module



Switch module



CD(교육자료 및 Firmware)



Character LCD module

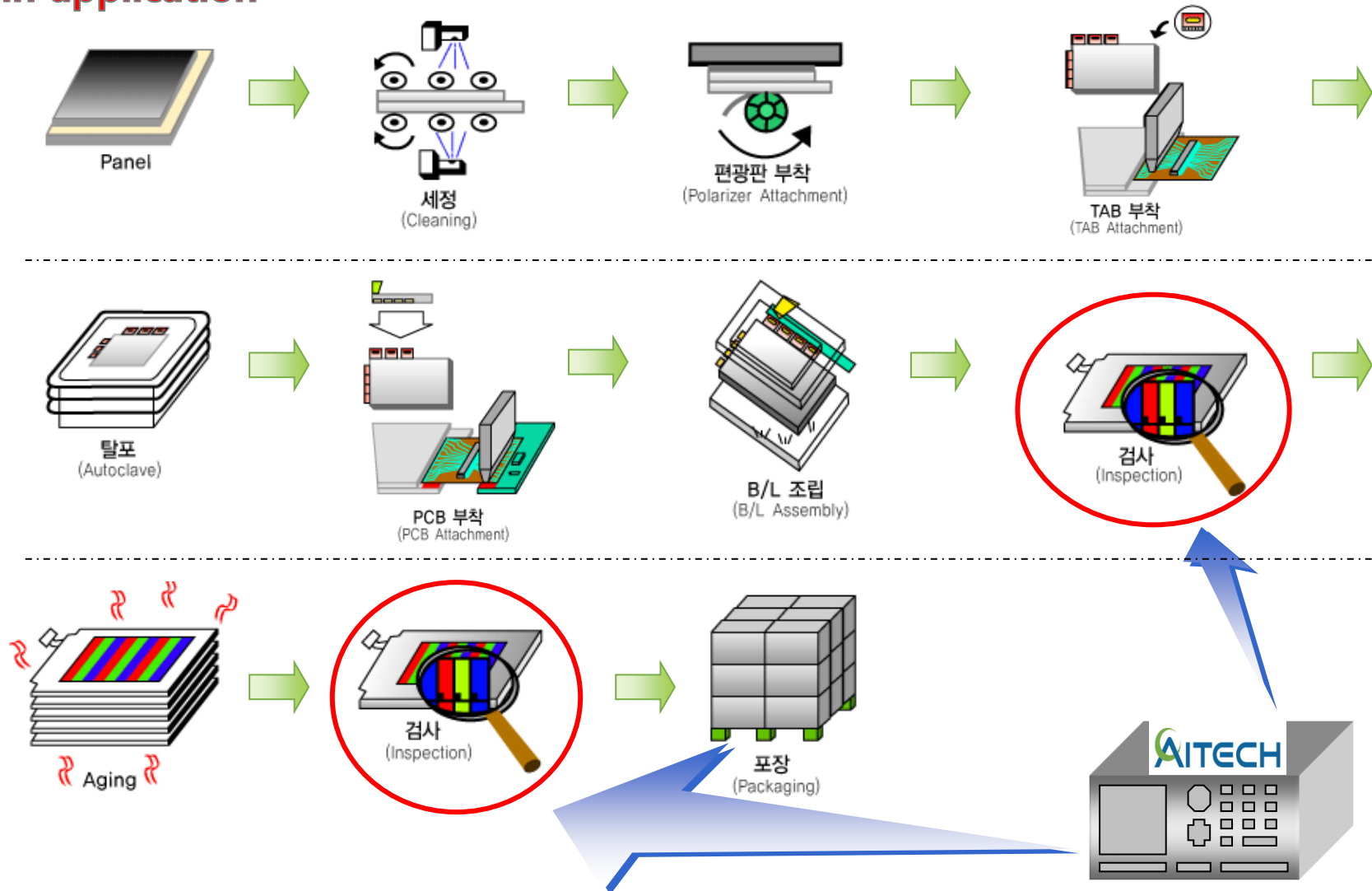


Graphic LCD module

# **LCD Module Control System**

# LCD Module Control System

## main application



# LCD Module Control System



system architecture

## ■ Specification

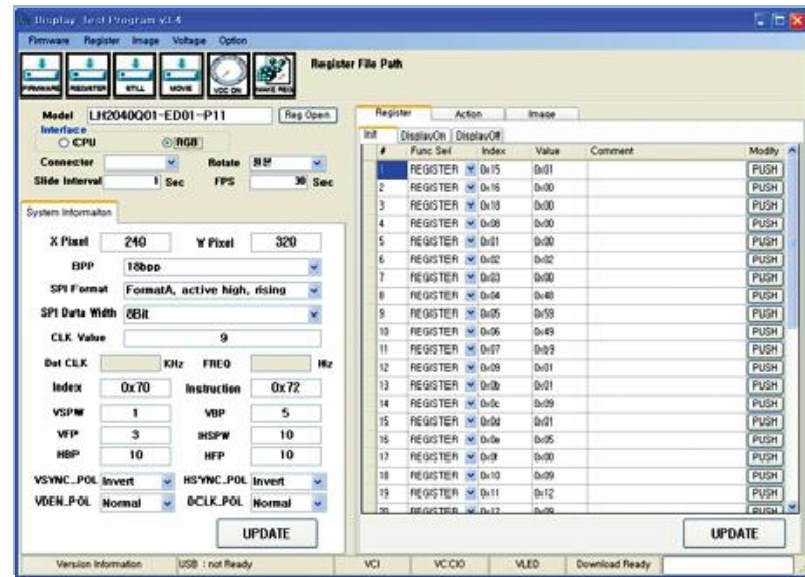
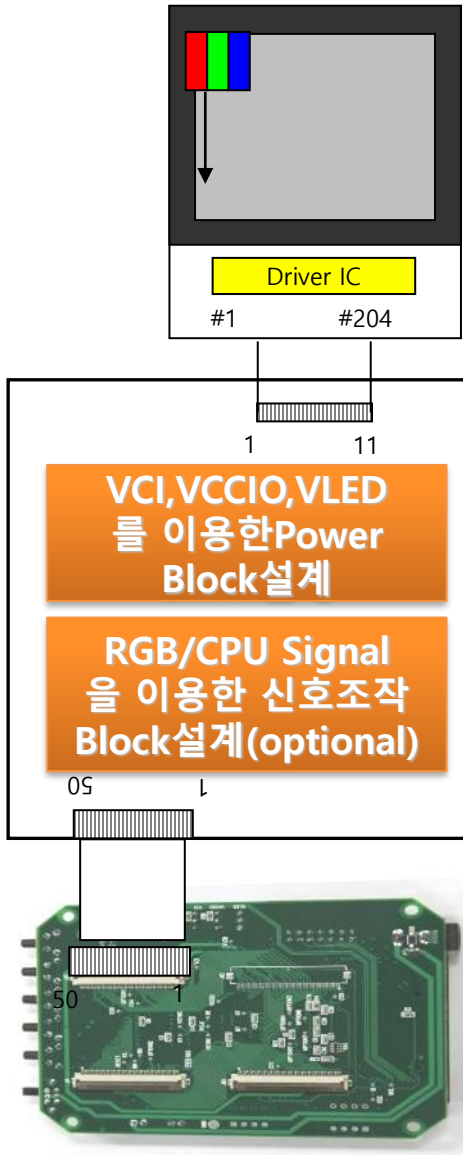
SIZE	100mm(W)x80mm(L)x15mm(H) Small Size
CPU	S3C2410A(ARM920T) 266MHz
MEMORY	2MB NOR , 64MB NAND, 64MB(32MB x 2) SDRAM
I/O	Power(2Pin), Serial(3Pin), JTAG(7Pin), External I/O(160 Pin)
UART	RS-232 1ch
ADC	Resolution 10bit, 1ch.(0~3.3V)
TOUCH	Resistive Overlay Type
USB	Device(B Type) 1ch. Support
JTAG	14Pin
Data Line	RGB (24Bit Data Line, 2ch.) CPU (16Bit Data Line, 2ch.)
Function Key	<b>(User Customized)</b> <ul style="list-style-type: none"><li>- Key1 : Still Image Previous</li><li>- Key2 : Still Image Next</li><li>- Key3 : Moving Image Show</li><li>- Key4 : Auto Slide &amp; Full Show Mode</li><li>- Key5 : Reset</li></ul>
Disk	SD Card Support
Application	LCD Demo Display Kit, Pattern Generator, LCD Engineering Tester



# LCD Module Control System

## PC Program Function :

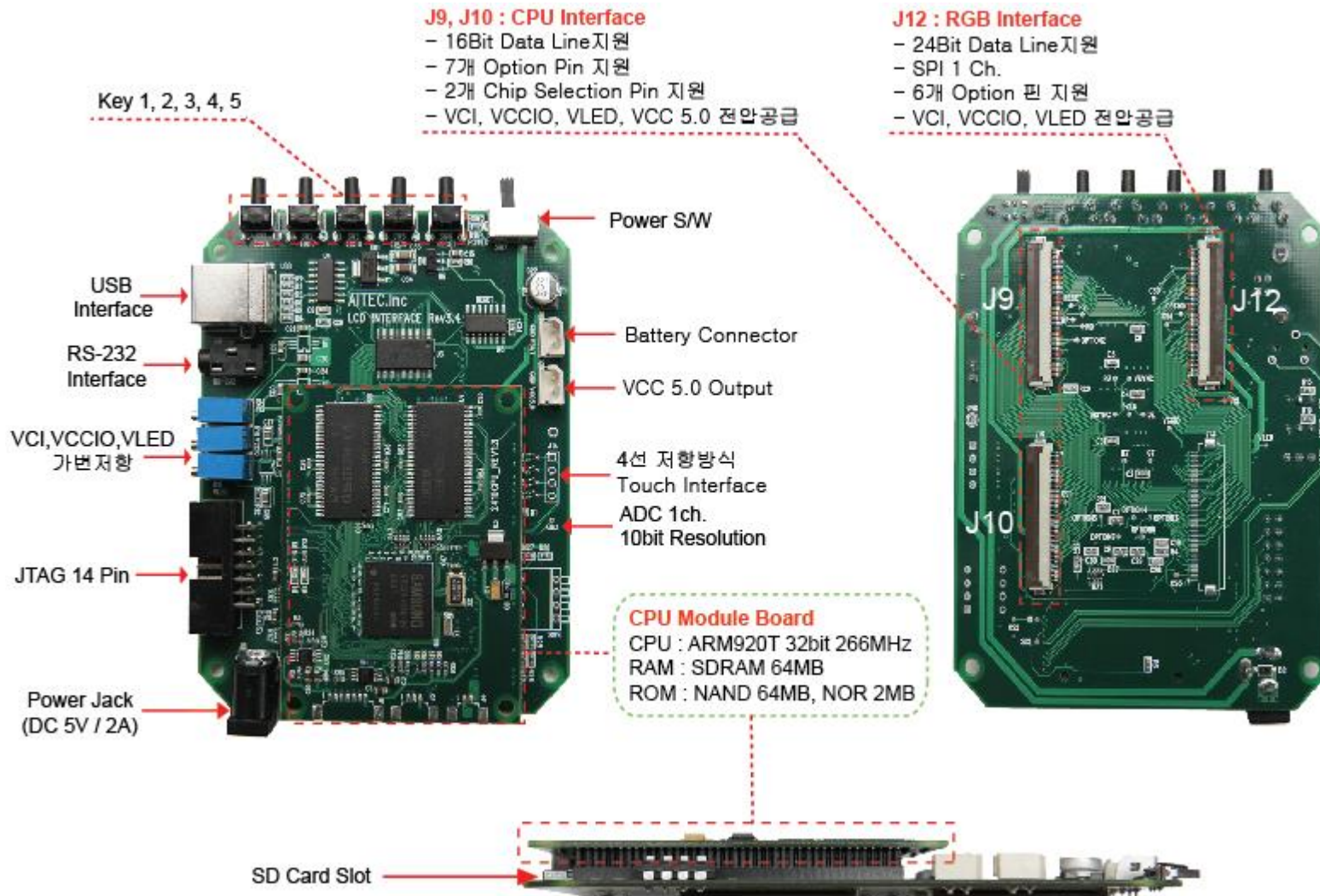
- Operating System : Windows XP
- Connection : USB
- Menu : Firmware, Register, Image, Voltage, Option
- Test Application :
  - Register information Modify
  - Still/Moving Image Control



PC Program

# LCD Module Control System

## Mobile LCD Control Board





# LCD Module Control System

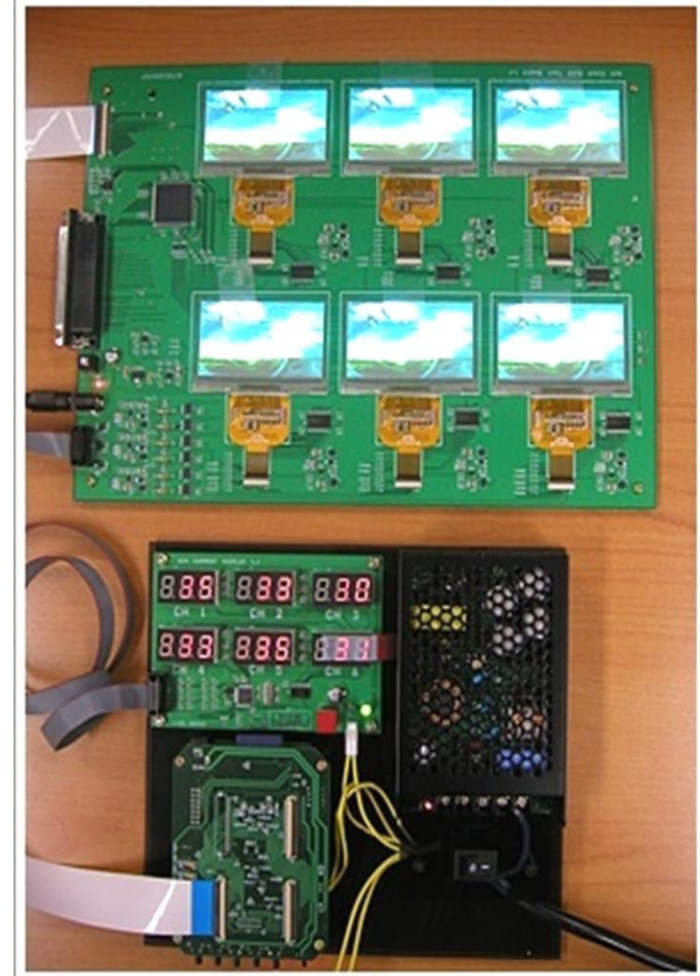
## Mobile LCD module test & demo board



Mobile LCD Control Board



MDDI Control Board



OLED reliability test System



LCD display control



Mobile LCD current monitoring

# EPD Module Control System



# EPD Module Control System

## EPD Module Tester (AI-PGT100E) ■ Specification



AI-PGT100E

SIZE	235mm(W)x200mm(H)x135mm(D) Small Size
Weight	2.01 Kg
output frequency	2MB NOR , 64MB NAND, 64MB(32MB x 2) SDRAM
Monitor	480x272 Color TFT (WQVGA 4.3")
UART	RS-232 1ch
Memory	SDRAM 64Mbyte, NAND Flash 64Mbyte ,1Gbyte SD CARD (External Memory)
Output conn.	62pin connector (HDSUB female), 25pin connector (DSUB female)
Power	9.0V --- 3.0A
main function	<ul style="list-style-type: none"><li>- 2048 X 2048 High display resolution support</li><li>- Test pattern image from PC</li><li>- EPD timing generation</li><li>- PC interface using RS-232 &amp; USB</li><li>- JIG control interface support</li><li>- save test module information</li><li>- save test sequence</li><li>- EPD driving voltage/current control / monitor</li><li>- supply test sequence editing program</li><li>- external control (RS-232)</li><li>- other signal extension board</li></ul>
Operation env.	pneumatic test zig : <b>Optional (1ch, 2ch)</b>
Application	EPD Demo Display Kit, Pattern Generator, EPD Engineering Tester

# EPD Module Control System

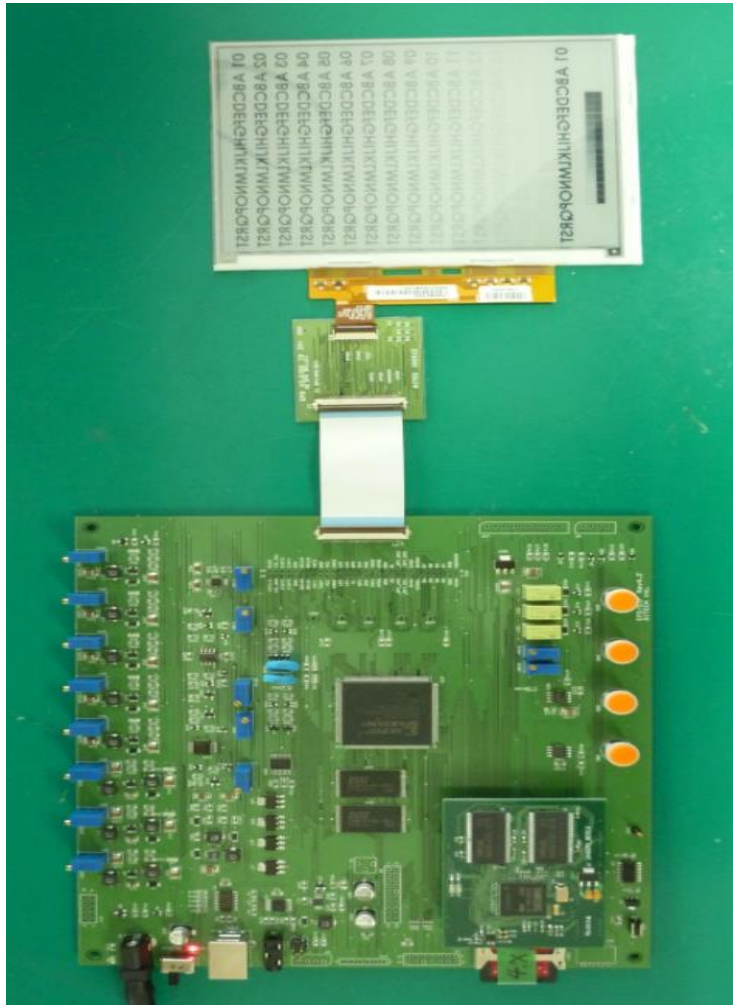


## EPD Module Tester (AI-PGT100E) Application



# EPD Module Control System

## EPD/GIP Module Control Board



### ■ Specification

SIZE	200mm(W)x180mm(L)x15mm(H)
CPU	S3C2410A(ARM920T) 266MHz
MEMORY	2MB NOR , 64MB NAND, 64MB(32MB x 2) SDRAM
I/O	Power(2Pin), Serial(3Pin), JTAG(7Pin),External I/O(160 Pin)
UART	RS-232 1ch
FPGA	XILINX SPARTAN XC3S250E
TOUCH	Resistive Overlay Type
USB	Device(B Type) 1ch. Support
주요기능	<ul style="list-style-type: none"><li>- resolution(2048x2048) : 2Mbyte x 2 SRAM memory</li><li>- 150frame : 512bit x 150 block RAM</li><li>- 9.7 inch power design</li><li>- Vcom voltage control : <math>\pm 10V \sim \pm 25V</math></li><li>- 50pin FPCB connector</li><li>- VPOS, VNEG, GVDD, GVEE signal control</li><li>- VGH1, VGH2, GCLK1~4 : use Tr switch for high resolution</li><li>- VPOS, VNEG, GVDD, GVEE, GVDD2, GVEE2, Vref, Vcom voltage setting</li></ul>
Disk	SD Card Support
Appliction	EPD Demo Display Kit, Pattern Generator, EPD Engineering Tester



# EPD Module Control System

## EPD ORT 60Ch. reliability test chambers system





# Sensor signal processing & monitoring system

# LCD Module Tester

## Optical Sensor Tester (AI-OPT100)



Optical Sensor System

### ▪ Specification

SIZE	<ul style="list-style-type: none"><li>• Optical Sensor Board(Control B/D) : 70x55x20mm</li><li>• Gray Sensor Board(Sensor B/D) : 70x55x13mm</li><li>• Color Sensor Board(Sensor B/D) : 70x55x13mm</li></ul>
CPU	ARM 32bit Cortex M3
SENSOR	<ul style="list-style-type: none"><li>• Gray Sensor : S1087(Ceramic package photodiode)</li><li>• Color Sensor : S9702(3-channel(R,G,B) Si photodiode)</li><li>• Temp. Sensor : LM35DZ (Rated for full -55°C to +150°C range)</li></ul>
FUNCTION	<ul style="list-style-type: none"><li>• Luminance for C/R</li><li>• Chromaticity for Gamma correction<ul style="list-style-type: none"><li>- Flicker : 1% ~25% ( 3Cd/m<sup>2</sup> ↑ )</li><li>- Luminance : 0.1 ~ 5000 Cd/m<sup>2</sup></li><li>- Accuracy : 0.1 Cd/m<sup>2</sup> or 1% of full scale</li><li>- Display : 0.1 Cd/m<sup>2</sup></li><li>- Measurement point : 1~ 5</li></ul></li></ul>
POWER	5.0V --- 2.0A
function	<ul style="list-style-type: none"><li>• data interface between sensor board and window program</li><li>• save sensor data at PC</li><li>• control sensor using window program</li><li>• graphic display at the window program</li><li>• data analysis and saving</li><li>• small optical mesurment</li><li>• hand type portable system</li></ul>

# Scale Thickness measurement

## Scale Thickness Guage



SENSOR

Scale Thickness Gauge

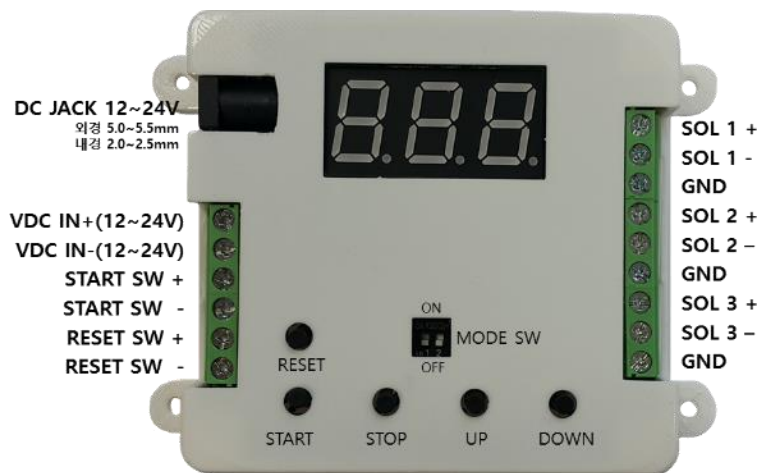
### ▪ Function

- magnetic induction seosor
- scale thickness measurement
- nondistructive test
- fast & correct measure
- portable system
- rechargeable battery
- coating thickness measure
- fitting curve selection according to different steel plate

# Other Products



# 3ch cylinder controller



## mode setting

- input : 12V, 24V DC
- output : 2 port
- button : START, UP, DN, SET
  - START : start / stop button
  - UP : timer increase
  - DN : timer decrease
  - SET : parameter set
  - MODE : DIP SW 3,4 → 4mode
  - SW1 : basic/integrated selection
  - SW2 : auto / manual selection
- Setting
  - delay time set
  - reclyce time set

# BB shooting game system

## shooting game system



- motor moving target load system
- BB shooting rifle
- arcade game center

### ■ Game

- start game as enter coin
- shooting BB pellets
- get the points
- target size is different as the point

### ■ specifications

- target system size : 0.6M x 0.8M x 0.15M / system
- shooting distance : 5M ~ 8.0M
- parts : target control + rifle control + coin system

Korea patent: 10-2017-0111361

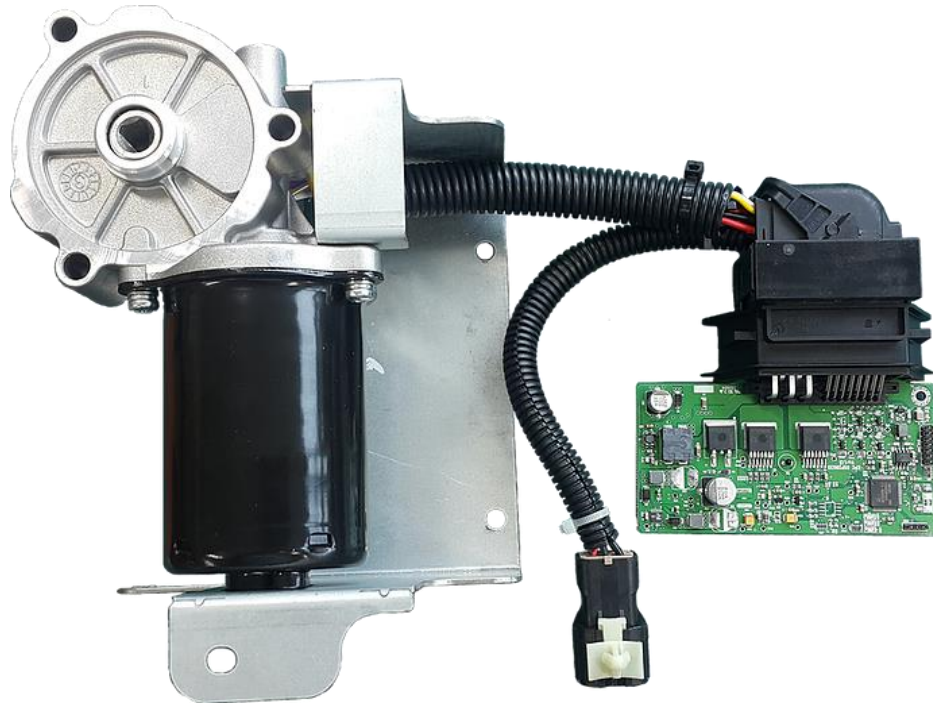


## ■ Parts

voice magazine 10EA / 5V 5A adaptor 1EA /  
10 mutifal jack 1EA / 220V AC power cable 1EA /  
hard case 1EA / manual 1EA

# Electrical Parking Pawl(EPP)

## Electrical parking pawl for electric car



- ECU(Electronic Control Unit), DC Motor, sensor
- Can Bus communication
- ECU control parking pawl
- input : DC 12V



## **2000 Lumen LED Light**

- 4step manual brightness control
- 2step auto brightness control as the speed
- Auto control (2000 lumen/1800 lumen)
  - => using acceleration sensor
- 4LED Cree - XML
- 18650 battery 3 EA



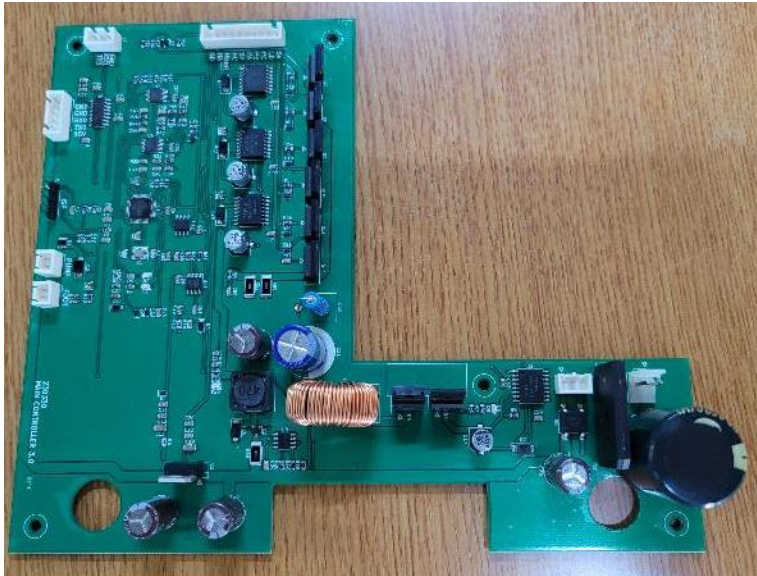
# Embedded training kit



- STM32F207ZG chip
- contents
  - introduction to embedded development
  - RTOS / ARM Microprocessor
  - Digital IO, Analog IO, motor control
  - I2C, SPI, UART, CAN communication
  - Lan, Wifi, Bluetooth
  - introduction to AIoT



# Medical implant motor controller



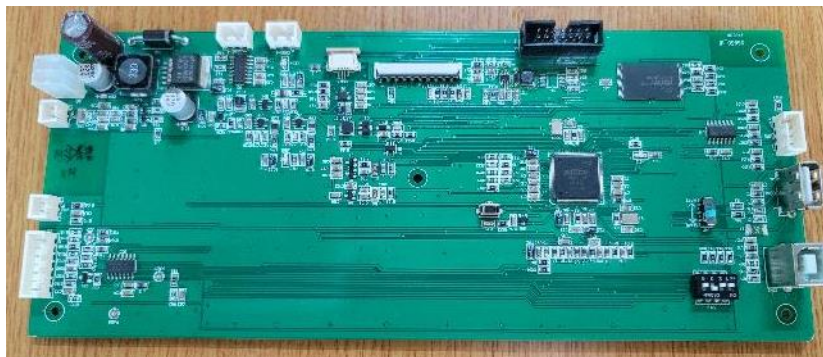
- User Interface
  - 8inch TFT LCD with touch interface
  - touch interface
  - motor parameter setting
  - Foot controller interface
  
- motor specifications
  - motor: H180E type Motor
  - spec : DC 39V, 50,000rpm, Max torque 6N.cm
  - BLDC motor speed control, FWD/REV
  - speed : 0 ~ 40,000(1:1), 0 ~ 2,000(20:1) rpm
  - torque : 1 ~ 6N.cm(1:1), 5 ~ 80N.cm(20:1)
  - Torque calibration
  
- Foot controller
  - Foot pedal (analog signal): speed control
  - Digital switch 3ea
    - ✓ fwd/rvs/osc
    - ✓ water pump control
    - ✓ program mode change



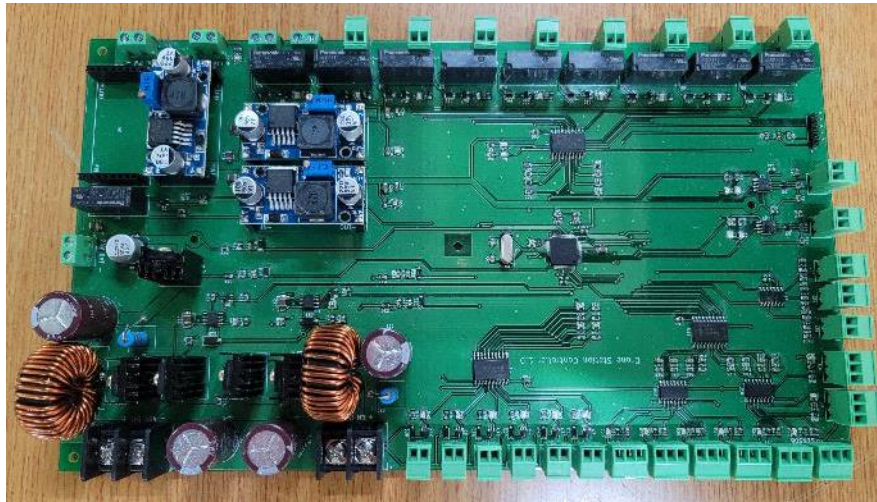
# Medical born surgery controller



- embedded MCU
- input : 220V
- output : 230W
- motor port : 3
- kind : 40K Drill, 80K Drill, Reciprocating Saw, Sagital Saw, Oscillating Saw, Gun Drill
- speed : 0 ~ 80,000 rpm
- application : drilling & cutting of human body skin & born for surgery
- UI : 8inch TFT touch screen

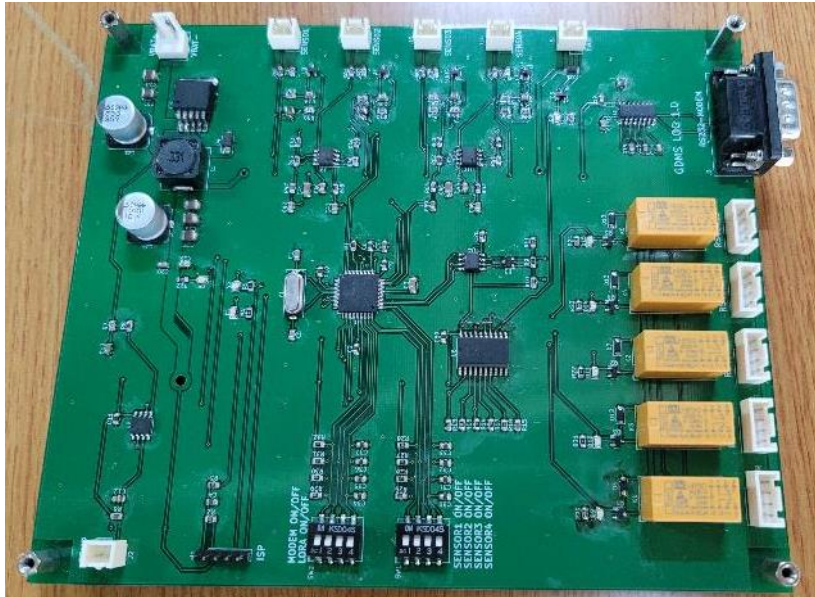


# Dron station control board



- embedded MCU
- RS485 communication with main controller
- door open/ close
- dron battery change
- dron battery charging
- dron stage moving control
- system battery state monitoring

# GDMS control board



- GDMS : ground deformation measurement system
- embedded MCU
- RS485 \* 5 port : sensor communication
- RS232 \* 1 : modem communication
- 16 sensor per port
- data transfer to server using LTE modem / LORA
- solar cell battery system



# Ground deformation monitoring sensor



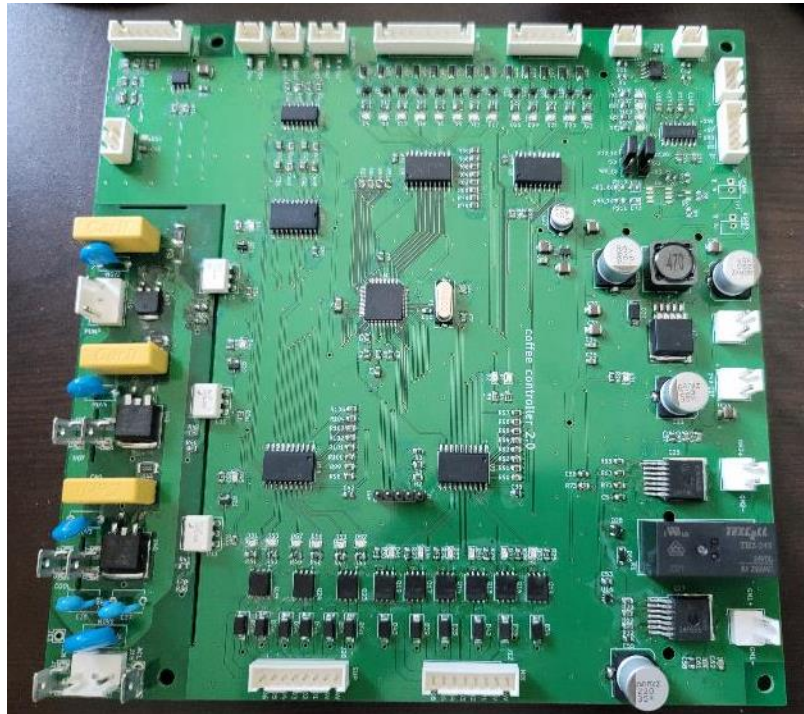
- low power embedded MCU
- data transfer using RS485
- X, Y, Z axis rotation detection
- size : 7cm x 2.5cm
- optimum for small plastic pipeline
- low power circuit design

# Main controller for vending machine



- Raspberry 4B one board computer
- 23.8인치 Full HD display
- kiosk program for menu selection & payment
- 4port RS232 communication
- card payment control
- coffee board control
- ade board control
- cup board control
- server communication with LAN

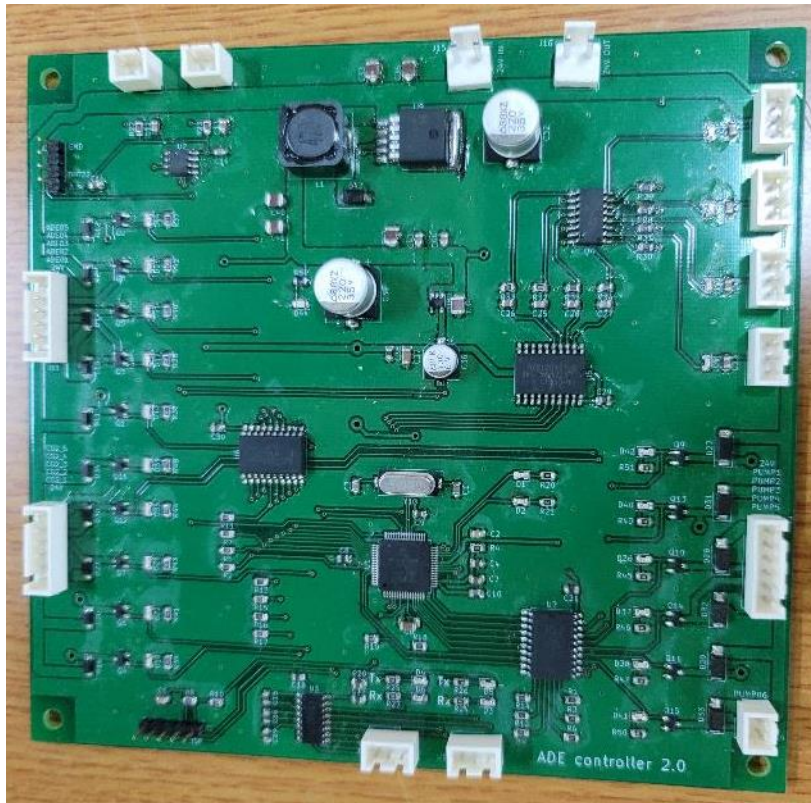
# coffee making control board



- 8bit embedded MCU
- gring motor control \* 2
- bromac motor control
- supply motor control \* 6
- mixing motor & valve control \* 6
- hot water supply control
- hot water temperature control
- cup detection
- operation using RS232 communication



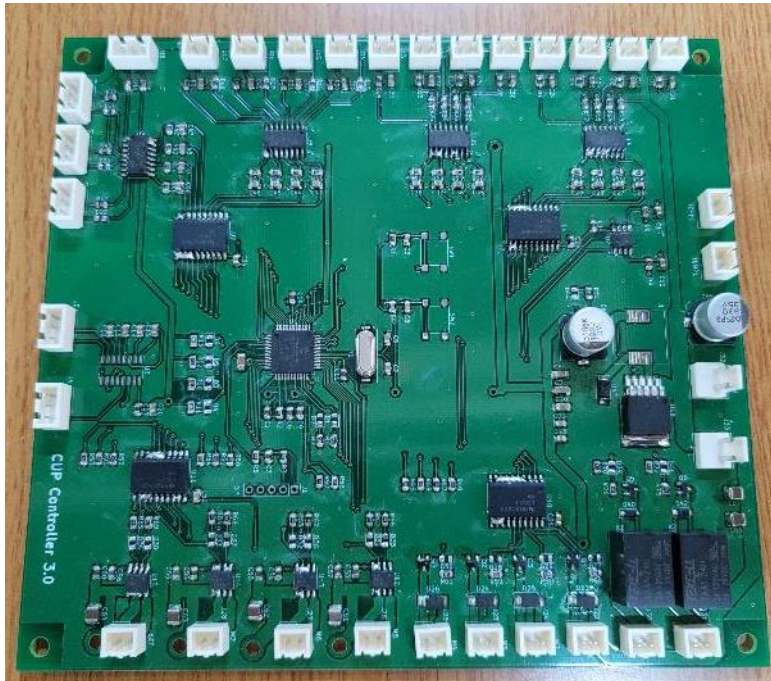
# ADE making control board



- 8bit embedded MCU
- ade supply motor control \* 5
- ade supply valve control \* 5
- soda water supply valve control\* 6
- soda water stock detection
- cup sensing input
- RS232 communication port



# Automatic cup moving controller



- using embedded MCU
- cup moving motor control \* 6
- cup position sensor input \* 12
- door on/off control
- hand sensing control
- operation control using

# Development List (1)

2023	<b>Main controller for vending machine</b>
	coffee making control board
	ADE making control board
	Automatic cup moving controller
2023	GDMS control board
	Ground deformation monitoring sensor
2023	Dron station control board
2022	STM32F207ZG Embedded training kit
	kiosk program for ordering
	Table order system

# Development List (2)

2022	Medical born surgery controller
2021	Medical implant motor controller
2018	BB shooting game system
	3ch cylinder controller
2017	Voice Magazine
	Scale Thickness measurement
2016	Electrical Parking Pawl(EPP)
	LCD Module Tester

# 감사합니다.

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