

AIOT TEST BED

AIoT Test Bed Platform Based on Smart Home



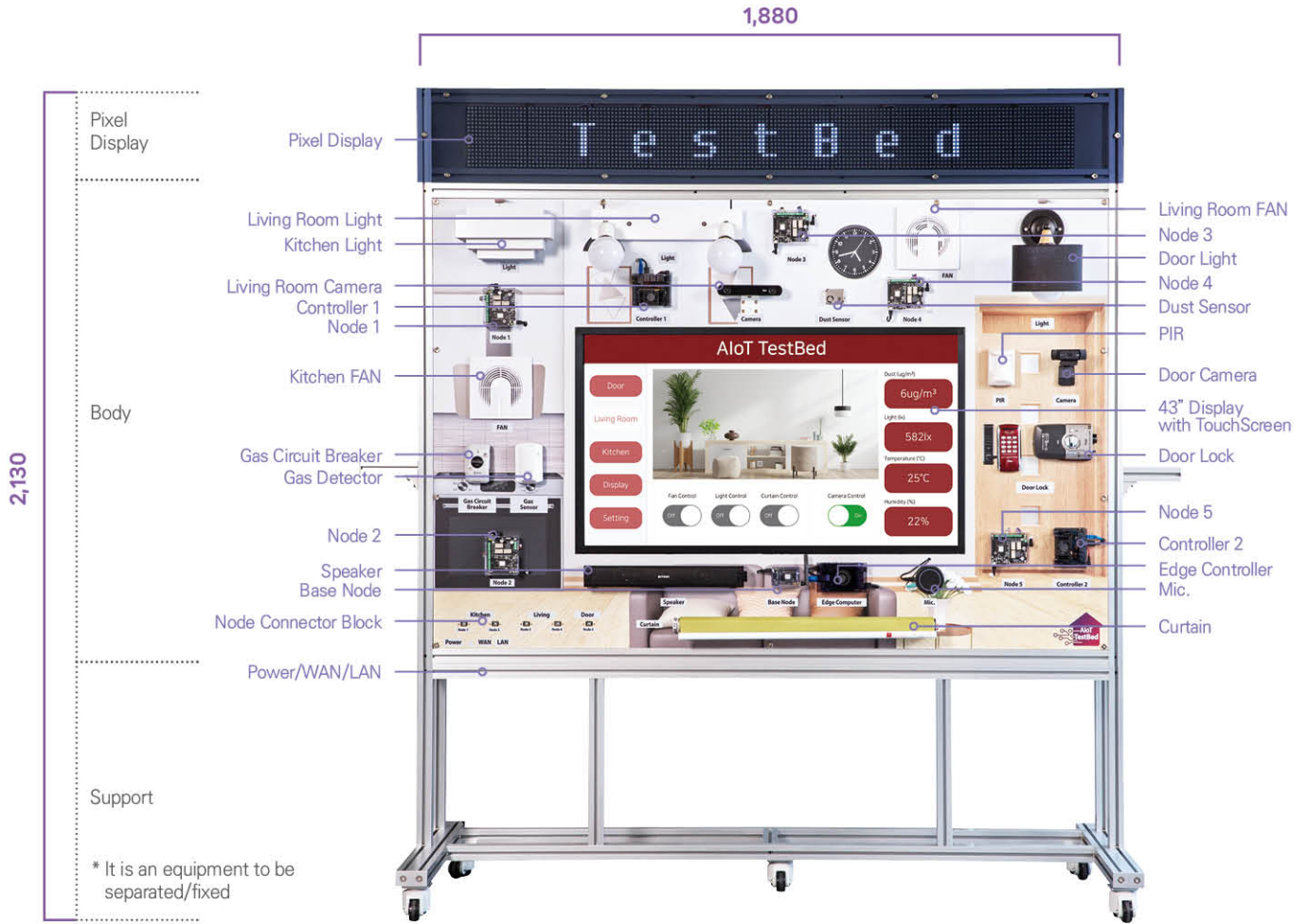
HANBACK ELECTRONICS CO.,LTD.

518 Yuseong-daero, Yuseong-Gu, Daejeon 34202, South Korea
TEL. +82-42-610-1111, 1164 (Dir.)
FAX. 042. 610. 1199
E mail. support@hanback.co.kr



Homepage

AIOT TESTBED



Training Contents

- Lab Environment of AIoT Test Bed
- Low Power Wireless Sensor Network Programming
- IoT Sensor Control Programming by Voice Command
- Smartphone Interlocking Programming
- Cloud Programming
- Face Recognition Programming Based on Deep Learning

Software Specifications HANBACK ELECTRONICS

	List	Specifications
Soda OS	Linux Kernel	4.19
	Desktop	X-Server, Openbox, LightDM, Tint2, blueman, network-manager, conky
	CLI	Zsh, Tmux, Peco, powerlevel9k thema, Powerline fonts
	Tool Chain	GCC 9, JDK, Node JS, Python3, Clang
	IDE	Visual Studio Code, NeoVim, Geany
	Connectivity	Mosquitto(MQTT), Bluez, mtr, nmap, iptraf, Samba, Blynk Server, Remove Desktop Server
	Multimedia	portaudio, sox, OpenCV 4, snowboy, Google Assistant
Pop Library	Data Science & AI	Python3, Numpy, Matplotlib, sympy, Pandas, Seaborn, Scipy, Gym Scikit-learn, Tensorflow, Keras
	Output Object (C/C++, Python3)	Led, Laser, Buzzer, Relay, RGBLed, DCMotor, StepMotor, OLed PiezoBuzzer, PixelDisplay, TextLCD, FND, Led Bar
	Input Object (C/C++, Python3)	Switch, Touch, Reed, LimitSwitch, Mercury, Knock, Tilt, Opto, Pir, Flame LineTrace, TempHumi, UltraSonic, Shock, Sound, Potentiometer, Cds SoilMoisture, Thermistor, Temperature, Gas, Dust, Psd, Gesture
	Multimedia (Python3)	AudioPlay, AudioPlayList, AudioRecord, Tone, SoundMeter
	Voice Assistant (Python3)	GAssistant, create_conversation_stream
	AI (Python3)	Linear Regression, Logistic Regression, Perceptron, ANN, DNN, CNN, DQN

Hardware Specifications

List	Specifications	
IoT Server Part	CPU: Intel 8th m3-8100 Core: 1.1-3.4GHz Dual-Core, Four-Thread RAM: 8G LPDDR3 Memory: 64GB eMMC V5.0, 512G M.2 SSD Graphics: Intel HD Graphics 615, 300-900MHz, NVIDIA GeForce RTX 20	
	External Memory	1xM.2M Key, PCIe4x, Supports NVMe SSD and SATA SSD 1xM.2E Key, PCIe2x, Supports USB2.0,UART,PCM
	Connectivity	WiFi 802.11ac, 2.4G & 5G Dual Band Bluetooth 4.2 Gigabit Ethernet
	USB Ports	3x USB3.0 Type A 1x USB Type C, Supports PD, DP, USB3.0
	Display	HDMI Output Type-C DP Support Extendable eDP Touch Displays
	Co processor: Arduino Leonardo	
	GPIO & Other Features	2x50p GPIOs Including I2C, I2S, USB, UART, RTC, Power Management Extendable Power Button
	GPU: NVIDIA GeForce® GTX 1080 Ti	CUDA Core: 3584 Memory: 11GB(GDDR5X 352bit/4848.4 GB/s) Power Consumption: 250W
	Display	Screen Size: 43"(16:9 Wide) Resolution: 4K UHD Interface: HDMI High Dynamic Range Support
		Touch Screen
Speaker	Power Rating: 7W Speaker Unit: 2.0" Full Range Speaker+Vibrating Diaphragm Channel: 2.0CH Power: DC5V(USB) High Performance Digital Microphone x 4EA Sensitivity: -26 dBFS(Omnidirectional) Acoustic Overload Point: 120dB SPL SNR: 63dB	
Microphone	Memory: 128MB Flash WAN: 10/100/1000Mbps x1 LAN: 10/100/1000Mbps x8 Protocols: HTTP, DHCP, PPPoE	
Ethernet Access Point		
Edge Computer	CPU: Quad-Core ARM A57 @ 1.43 GHz GPU: Maxwell Core 128EA Memory: 4GB 64-bit LPDDR4 25.6 GB/s Storage: MicroSD (64GB) Video Encoder: 4K@30 4x 1080p@30 9x 720p@30 (H.264/H.265) Video Decoder: 4K@60 2x 4K@30 8x 1080p@30 18x 720p@30 (H.264/H.265) Camera: MIPI CSI-2 DPHY lanes	
	Connectivity	Dual Band Wireless WiFi 2GHz/5GHz Band, 867Mbps, 802.11ac Bluetooth 4.2 Gigabit Ethernet
	Display: HDMI and Display Port	
	USB: 4x USB 3.0, USB 2.0 Micro-B	
	High Performance 32-bit 76.8 MHz ARM Cortex®-M33	
	RAM: 128KB / Flash Memory: 1MB	
	ZigBee 3.0	Frequency: 2.4GHz Range: Max 3200m (outdoor), Max 90m(indoor) Data Rate: 250kbps Sensitivity: -103dBm Output Power: 19dBm Receiver Sensitivity: -100 dBm Bluetooth Support
	Light Sensor	Illuminance: 1 ~ 65535(lx) Interface: I2C
	HUMIDITY & TEMPERATURE Sensor	Humidity Resolution: 12bit(0.04%RH), 8bit(0.7%RH) Humidity Accuracy: +-3%RH Temperature Resolution: 14bit(0.01C), 12bit(0.04C) Temperature Accuracy: +-4°C Interface: I2C
	Motor Driver	Up to 46V/4A 3.5mm Terminal Block Nominal Switching Capacity: AC 8A/250V, DC 5A/30V Output: NO, COM
Living Room	I/O Interface: I2C, GPIO Terminal Block	
	Type: Downlight LED Normal Voltage: 220V/60Hz Socket Size: E26 Size: 320x80x100(mm)	
FAN	Normal Voltage: 220V/60Hz Power Consumption: 13W Size: 166x166x84(mm)	
Camera	Dual Image Sensor(1/3" 4MP CMOS) Array Size: 2688 x 1520 pixels Output Resolution: 2x(1920x1080) @15/30fps Cropping Mode 2x(672x376) @15/30/60/100fps binning 4x4 mode Baseline: 120mm(4.7") Field of View: Max. 110°(H)x70°(V)x120°(D) Accelerometer Range: ±8G Gyroscope Range: ±1000dps Magnetic Field Range: ±2500uT(z), ±1300uF(x,y) Pressure Range: 300to 1100hPa Temperature Range: -40 to 125°C	
	Measurement Range	PM1.0 : 0 ~ 10000ug/m3 PM2.5 : 0 ~ 10000ug/m3 PM10 : 0 ~ 10000ug/m3
	Resolution: 1ug/m3 Respond Time: 1sec	
	Time to First Reading: ≤8seconds Operating Voltage: 3.3V	
	I/O Interface: I2C	
	Curtain	Roll Curtain Electric Motor Suit for Roller Blinds Suit for Pipe with 36mm Inner Diameter Support Weight: About 4kg

List	Specifications	
Kitchen	High Performance 32-bit 76.8 MHz ARM Cortex®-M33 RAM: 128KB / Flash Memory: 1MB	
	ZigBee 3.0	Frequency: 2.4GHz Range: Max 3200m (Outdoor), Max 90m(Indoor) Data Rate: 250kbps Sensitivity: -103dBm Output Power: 19dBm Receiver Sensitivity: -100 dBm Bluetooth Support
	Light Sensor	Illuminance: 1 ~ 65535(lx) Interface: I2C Humidity Resolution: 12bit(0.04%RH), 8bit(0.7%RH) Humidity Accuracy: +-3%RH Temperature Resolution: 14bit(0.01C), 12bit(0.04C) Temperature Accuracy: +-4°C Interface: I2C
	HUMIDITY & TEMPERATURE Sensor	Humidity Resolution: 12bit(0.04%RH), 8bit(0.7%RH) Humidity Accuracy: +-3%RH Temperature Resolution: 14bit(0.01C), 12bit(0.04C) Temperature Accuracy: +-4°C Interface: I2C
	Motor Driver	Up to 46V/4A 3.5mm Terminal Block Nominal Switching Capacity: AC 8A/250V, DC 5A/30V Output: NO, COM
	Relay Control	Nominal Switching Capacity: AC 8A/250V, DC 5A/30V Output: NO, COM
	I/O Interface: I2C, GPIO Terminal Block	
	Type: Single Instant Diffusion and Burning Type	
	Appropriate Gas: LPG, LNG	
	Alarm Indication: Yellow LED Flashes and Alarm Sound	
Output: DC5V(when alarm)		
Gas Sensor	Shut-off Method: Geared Motor Opening/Closing Speed: >10s Current Rating: Max 500mA	
Gas circuit breaker	Type: Downlight LED Normal Voltage: 220V/60Hz Socket Size: E14 Size: 250x140x110(mm)	
Light	Normal Voltage: 220V/60Hz Power Consumption: 13W Size: 166x166x84(mm)	
FAN		
Edge Computer	CPU: Quad-Core ARM A57 @ 1.43 GHz GPU: Maxwell Core 128EA Memory: 4GB 64-bit LPDDR4 25.6 GB/s Storage: MicroSD (64GB) Video Encoder: 4K@30 4x 1080p@30 9x 720p@30 (H.264/H.265) Video Decoder: 4K@60 2x 4K@30 8x 1080p@30 18x 720p@30 (H.264/H.265) Camera: MIPI CSI-2 DPHY Lanes	
	Connectivity	Dual Band Wireless Wi-Fi 2GHz/5GHz Band, 867Mbps, 802.11ac Bluetooth 4.2 Gigabit Ethernet
	Display: HDMI and Display Port	
	USB: 4x USB 3.0, USB 2.0 Micro-B	
	High Performance 32-bit 76.8 MHz ARM Cortex®-M33	
	RAM: 128KB / Flash Memory: 1MB	
	ZigBee 3.0	Frequency: 2.4GHz Range: Max 3200m (Outdoor), Max 90m(Indoor) Data Rate: 250kbps Sensitivity: -103dBm Output Power: 19dBm Receiver Sensitivity: -100 dBm Bluetooth Support
	Light Sensor	Illuminance: 1 ~ 65535(lx) Interface: I2C
	HUMIDITY & TEMPERATURE Sensor	Humidity Resolution: 12bit(0.04%RH), 8bit(0.7%RH) Humidity Accuracy: +-3%RH Temperature Resolution: 14bit(0.01C), 12bit(0.04C) Temperature Accuracy: +-4°C Interface: I2C
	Motor Driver	Up to 46V/4A 3.5mm Terminal Block Nominal Switching Capacity: AC 8A/250V, DC 5A/30V Output: NO, COM
Door	I/O Interface: I2C, GPIO Terminal Block	
	Type: Downlight LED Normal Voltage: 220V/60Hz Socket Size: E26 Size: 270x230x180(mm)	
Light	Resolution: 1080p/30fps Focus: Auto Lens: Full HD Glass Field of View: 78° Interface: USB	
Camera	Method: Passive Infrared Operating Voltage: 10 ~ 15V Detect Zone: Max 12m	
PIR	Method: One Way Solution(Secret Code) Operating Voltage: 8V	
Door Lock	CPU: Broadcom BCM2711, Quad core Cortex-A72 (ARM v8) 64-bit SoC @ 1.5GHz Memory: 2GB LPDDR4-3200 Connectivity: Gigabit Ethernet, Wi-Fi 2.4G & 5G 802.11ac, Bluetooth 5.0, BLE USB: USB 3.0 2port, 2.0 2port HDMI: micro-HDMI 2port (Up to 4kp60 Supported) Codec: H.265 (4kp60 decode), H264 (1080p60 Decode, 1080p30 Encode) Graphics: OpenGL ES 3.0 Data Storage: 32 GB Micro SD Color: Pixel RGB Pixel: 160 x 16 I/O Interface: GPIO(Serial Protocol) SMPS: 5V/18A Size: 1880x250x180(mm) AC: 220V AC-DC SMPS: 700W Type: Panel Dimension: 1,880 x 2,130 x 300 (mm)	
Pixel Display		
Frame		

	IoT test bed platform based on Open API that can test the interworking of smart home products
	Divided into door, living room, and kitchen area, and AI IoT Service for each area is provided
	Consists of high-performance AIoT server, high-performance access point, IoT nodes (sensors and actuators), display panel, camera, and audio (microphone, speaker)
	High-performance IoT server supports AI accelerated computation through CUDA GPGPU
	GUI-based test bed operation monitoring through 43-inch 4K UHD large monitor including touch screen
	Provides a large pixel display that can implement emotional lighting and real-time notification services
	Supports various IoT connectivity through Gigabit Ethernet, Wi-Fi, Bluetooth, and ZigBee
	Provides high-performance digital microphones and speakers necessary for implementing AI-based voice command services
	Supports for deep learning-based image recognition services required to implement customized services
	Soda OS and Pop library, the AIoT dedicated operating system
	Interpreter-based C/C++ development environments optimized for programming beginners, including Python 3
	A dedicated web browser-based learning environment for training Python 3 and C/C++ simultaneously on PCs and tablets
	mDNS/DNS-SD based distributed name resolution, network service publishing and discovery support
	Open Integrated development environment based on Visual Studio Code for professional application development
	Provides comprehensive AIoT practical exercise contents in connection to existing AIoT education training kit

Product Configuration

