AIoT

IT EDUCATION PLATFORMS

EdNex

XNode Home

IoT connectivity application practical training equipment based on wireless personal area network (WPAN)

XNode Home

Product Features

IoT connectivity application training equipment based on wireless personal network (WPAN)

By using the mesh network method, it can be used in large quantities in a wide range of areas such as wireless control and monitoring, and a wide range of communication is possible

Provides an environment for building a smart home with devices used in real home appliances such as door locks, gas circuit breakers, gas detectors, fans, and LED lights

DC power is supplied and measured by the XNode Power board, and the measured usage can be monitored remotely

Provides sensors such as GPS, IrThermo, IMU, and PIR in addition to the Basic Module

The sensor node provides a 2100mA battery so that it can be operated independently, and also provides an LED for an indicator, and a light sensor and temperature/humidity sensor based on lux units

Provided sensor node supports interpreter-style Python 3 to write control programs easily and concisely

Visual Studio Code-based integrated development environment for professional application development

Provides training contents for Python-based sensor nodes

Software Specifications

List	Specifications	
Node B	MicroPython 3 (built in node)	
	VSCode4Soda	
	Configuration Software (compatible with Linux, OS X and Windows)	
	Remote Terminal & Remote Desktop support	
	Pop Library	Output Object: LED, Buzzer Input Object: Switch, PIR, Thermopile, 9Axis IMU, GPS

Hardware Specifications

List	Specifications		List	Specifications	
XNode Power	RAM: 128KB		XNode Auto	RAM: 128KB	
	Flash Memory: 1MB			Flash Memory: 1MB	
	Interface: UART, SPI, I^{2}C, ADC, PWM, GPIO			Interface: UART, SPI, I^{2}C, ADC, PWM, GPIO	
	Indicator: LED			Indicator: LED	
	ZigBee 3.0	Frequency: 2.4GHz Range: Max 3200m (Outdoor), Max 90m(Indoor) Data Rate: 250kbps Sensitivity: 103dBm Output Power: 19dBm Receiver Sensitivity: 100dBm Bluetooth Support		ZigBee 3.0	Frequency: 2.4GHz Range: Max 3200m (Outdoor), Max 90m(Indoor) Data Rate: 250kbps Sensitivity: 103dBm Output Power: 19dBm Receiver Sensitivity: 100dBm Bluetooth Support
	Measure: DC Current			Relay: 3ch	DC: 5A/30VDC AC: 5A/250VAC
	Power Output: DC 12V x 3EA			Motor Driver: Dual FullBridge Driver(4A/46V)	
	Size: 93.5 x 76(mm)			Size: 103 x 89(mm)	

Hardware Specifications

List		Specifications
Node B (3a)	RAM: 128KB	
	Flash Memory: 1MB	
	Interface: UART, SPI, I²C, ADC, PWM, GPIO	
	Indicator: LED	
	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
	Power	Micro USB B Type(+5V) Expansion Connector (+5V) LiPo Type 3.7V/2100mAh (1EA)
Expansion Module	Basic	Input Device: Tact Switch x 2EA(GPIO) Output Device: LED 8EA(I²C) Actuator: Passive Buzzer(GPIO) Size: 46x44(mm)
	9axis Sensor	Acceleration ranges: ±2g/±4g/±8g/±16g Gyroscope ranges: ±125°/s to ±2000°/s Magnetic Field Range: ±1300uT(x,y axis), ±2500uT(z axis) Interface: I²C Size: 46x44(mm)

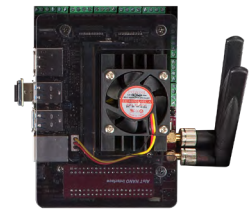
List		Specifications
Expansion Module	PIR Senor	Sensing Range: 110° Spectral Response: 5 ~ 14 um I/O Interface: Digital Out Size: 46x44(mm)
	Infrared Thermometer	Measurement Resolution: 0.02℃ Measure Range: 40°C ~ +125°C Interface: I²C Size: 46x44(mm)
	GPS Module	Sensitivity: 165dBm Update Rate: up to 10Hz AGPS Support for Fast TTFF Consumption Current(@3.3V) Acquisition: 25mA Typ Tracking: 20mA Typ Size: 46x44(mm)
	Door Lock	Method: One Way Solution (Secret Code) Operating Voltage: 8V
	Gas Sensor	Operating Voltage: 12V Type: Stand Alone, Immediate, Diffusion Applicable Gas: LNG, Town Gas Alarm Indication: Flashing Yellow, Buzzer
	Gas Circuit Breaker	Shutoff Method: Geared Motor Opening/Closing Speed: 〉10s Current Rating: Max 500mA
	MR16 LED	12V/6W
	FAN	12V/140mA FAN Speed: 1300rpm Size: 60x60x15(mm)

Edge Server [Option]

Edge server supports sensor node control and artificial intelligence convergence programming in a web browser environment through Soda OS, an AIoT-only operating system, and Pop Library

Edge server supports mDNS/DNS-SD, SSH, SFTP, SMB/CIFS, MQTT, NXX Window protocol

Soda OS and Pop Library, an AIoT-only operating system are provided



Edge Server
Option

Software Specifications

List			Specifications
Edge Server (Gateway)	Soda OS	Linux Kernel	aarch32 4.x or aarch64 4.x
		Lightweight Desktop	X-Server, Openbox, lxdm, Tint2, blueman, network-manager, conky pcmanfm, lxterminal
		CLI	Zsh with Oh-My-Zsh, Tmux, Peco, powerlevel9k thema, Powerline fonts
		Tool Chain	GCC (c, c++), JDK, Node JS, Python3, Cling
		IDE	Visual Studio Code, NeoVim, Geany
		Multimedia	PulseAudio, sox (lame, oggenc), snowboy, Google Assistant OpenGL ES, OpenCV 4
		Data Science & AI	Numpy, Matplotlib, Pandas, Scipy, Seaborn Scikit-learn, TensorFlow, Keras, PyTorch, TorchVision, OpenAI Gym
		Jupyter Lab	Python3 and Cling support IPython Widgets Terminal support
	Pop Library	Multimedia Object	AudioPlay, AudioPlayList, AudioRecord, Tone, SoundMeter
		Voice Assistant Object	GAssistant, create_conversation_stream
		AI Object	Linear Regression, Logistic Regression, Perceptron, ANN, DNN, CNN, DQN Pilot with AutoCar & SerBot

Hardware Specifications

List		Specifications
Edge Server (Gateway)	CPU CPU Max Freq	6-core NVIDIA Carmel ARM v8.2 64-bit 6MB L2 + 4MB L3 2-core@1900MHz, 4/6-core@1400Mhz
	GPU	384-core NVIDIA VoltaTM GPU with 48 Tensor Cores GPU Max Freq: 1100MHz
	Memory	8GB 128-bit LPDDR4x@ 1600MHz
	Storage	16GB eMMC 5.1
	Video Encoder	2x464MP/sec(HEVC), 2x4k@ 30(HEVC) 6x 1080p@ 60(HEVC), 14x 1080p@ 30(HEVC)
	Video Decoder	2x690MP/sec(HEVC), 2x4k@ 60(HEVC), 4x4k@30(HEVC) 12x1080p@ 60(HEVC), 32x 1080p@ 30(HEVC), 16x 1080p@30(H.264)
	CSI Camera	Up to 6 Cameras(36 Via Virtual Channels) 12 Lanes MIPI CSI-2, D-PHY 1.2(up to 30 Gbps)
	Connectivity	Dual Band Wireless Wi-Fi 2GHz/5GHz Band, 867Mbps, 802.11ac Bluetooth 4.2 10/100/1000 Base-T Ethernet
	Display	2 multi-mode DP 1.4/eDP 1.4/HDMI 2.0
	USB	4x USB 3.0, USB 2.0 Micro-B

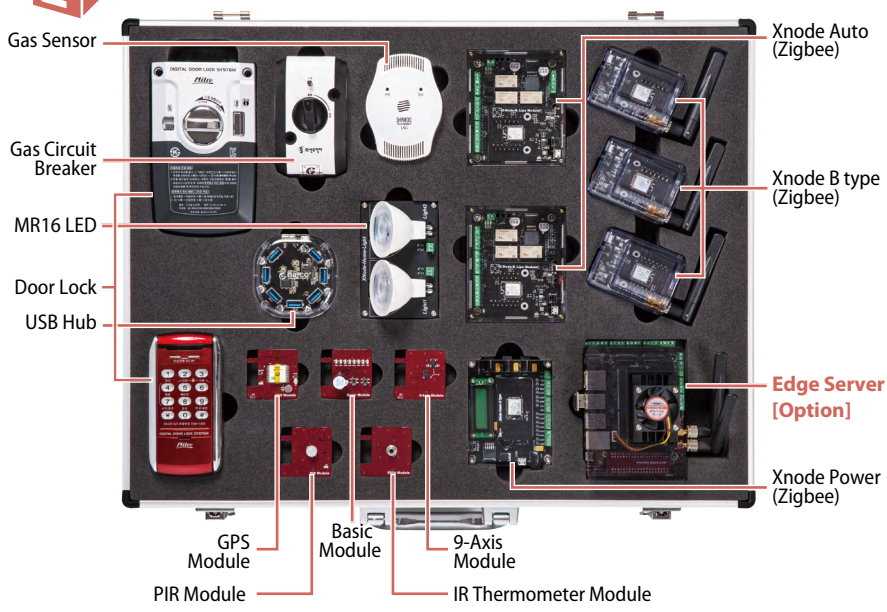
Training Contents

1. Components and Concepts of Sensor Network
2. Sensor Network Platform
3. Sensor Network Protocol
4. Sensor Network Development Environment
5. Basic Sensor Control
6. Extension Module Control
7. Zigbee Basic Communication
8. Zigbee Communication Extension
9. Zigbee and BLE
10. Sensor Network Application Project

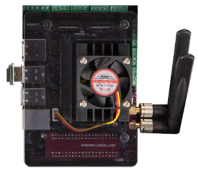
Appendix

1. Visual Studio Code Add-on
2. Edge Server Initialization
3. Python

Layout



Composition



Edge Server

Option

Composition

Platform USB 1EA

Micro USB Cable 5EA

User Guide book 1EA

DC Jack Cable 2EA

12V/4A Adaptor 1EA