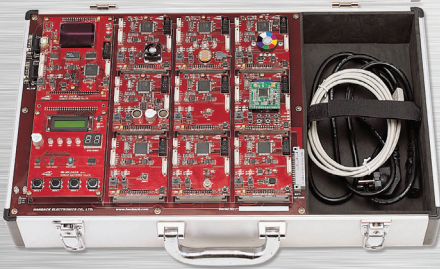


>>IT Convergence

CAN / LIN Communication Test Equipment HBE-CAN



- CAN/LIN System Equipment for Communication between various Sensors and Actuator
- CAN/LIN is used for smooth communication between Electronic Control Unit and Sub System
- CAN 2.0A(ISO 11898) Standard Protocol
- LIN 2.0(ISO 9141) Standard Protocol
- Used for ship and navigation Control System, elevator, medical instruments, car, and etc.

Features

- CAN/LIN configuration test available through modeling the communication between Electronic Control Unit and Sub system in a car
- Makes up CAN/LIN through bus system for networking between various sensors and actuator.
- Easy to mount and dismount nodes. Used as a user wants. Extension of option node considered as much as possible by applying ext. Connector of Standard Interface.
- Provides various samples for application experiment(ex.Car)
- Available of interworking with embedded equipment to maximize the use of equipment.
- Provides Interface(DSUB 9) which can interwork with CAN/LIN equipment by other company.
- Suitable for communication tests of medical instruments, car, airplane, subway, and Robot.
- Made with 8bit Microcontroller and various peripherals

Hardware Specification

MCU • Peripheral

Item	Description	Remarks
I/O	TextLCD	2Line 16char Text LCD
	2digit Dynamic Array FND	Red Color
	LED(Light emitting diode) 4EA	Red Color
	Push Button Switch 4ea	
Memory	Two-wire Serial EEPROM	1K(128 x 8)
	SPI Serial Flash Memory	512K(65,536 x 8)
Sensor	Photo Diode	ADC

• Master Node

Item	Description	Remarks
MCU-AT90CAN128	Up to 16MIPS Throughput at 16MHz	
	CAN Controller 2.0A & 2.0B(ISO16845)	
	JTAG Interface, ISP Program	
	128k Bytes FLASH, 4k Bytes Internal SRAM	
	4k Byte EEPROM	
I/O	8-channel PWM, 8-channel 10-bit ADC	
	I ² C, Dual UART, SPI	
	OLED Display	160x128xRGB Dots
Extension Connector	USB	PC Interface
	CAN Transceiver 2.0A	ATA6660
	LIN Transceiver 2.0, Master	ATA6661(VBAT 5~18V)
Extension Connector	CAN/LIN Port	
	JTAG, ISP Connector	
	UART	

HBE-IPTV

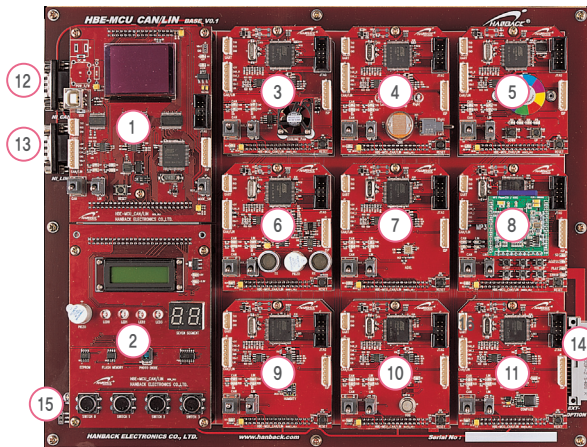
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• CAN Node

Module name	Main Component	Sensor and Actuator	Usage
Node 1	AT90CAN128 CAN Transceiver 2.0A LIN Transceiver 2.0	Temperature Sensor FAN	For Temperature sensing and Cooling System control
Node 2	AT90CAN128 CAN Transceiver 2.0A LIN Transceiver 2.0	CdS Sensor L, R Switch LED(Light emitting diode) 4EA	For Light intensity sensing For Directional light control For Light intensity control
Node 3	AT90CAN128 CAN Transceiver 2.0A LIN Transceiver 2.0	Up, Down Switch Step Motor	For Switch Control For Motor Control
Node 4	AT90CAN128 CAN Transceiver 2.0A LIN Transceiver 2.0	Ultrasonic Sensor Piezo(Buzzer)	For Distance Recognition For Object Recognition For Notice Function
Node 5	AT90CAN128 CAN Transceiver 2.0A LIN Transceiver 2.0	2-Axis Tilt Sensing Sensor For Horizontal Control	For Horizontal Control For Direction Control
Node 6	AT90CAN128 CAN Transceiver 2.0A LIN Transceiver 2.0	MP3 Module	Audio System
Node 7	AT90CAN128 CAN Transceiver 2.0A LIN Transceiver 2.0	Temperature/Humidity Sensor	For Temperature/Humidity Sensing and Control
Node 8	AT90CAN128 CAN Transceiver 2.0A LIN Transceiver 2.0	Gas Sensor	For Gas Detection
Node 9	AT90CAN128 CAN Transceiver 2.0A LIN Transceiver 2.0	Digital Compass Sensor	For Direction Control

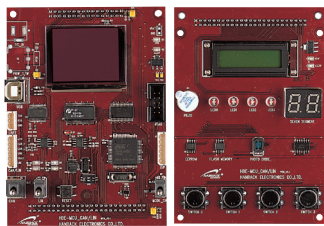
※ Specifications can be changed without notice

Configuration and Names



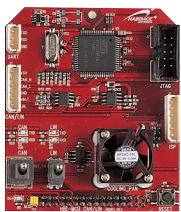
1. MCU(CAN Node 0/LIN Master Node)
2. Peripheral
3. CAN/LIN Node 1(Cooling Fan)
4. CAN/LIN Node 2(CdS Sensor)
5. CAN/LIN Node 3(Step Motor)
6. CAN/LIN Node 4(Ultrasonic Sensor)
7. CAN/LIN Node 5(2-Axis Tilt)
8. CAN/LIN Node 6(MP3 Player)
9. CAN/LIN Node 7(Temperature/Humidity Sensor)
10. CAN/LIN Node 8(Gas Sensor)
11. CAN/LIN Node 9(Compass)
12. Extension CAN Node Connector
13. Extension LIN Node Connector
14. Option CAN/LIN Connector
15. Power LED(+12V, +5V)

Functions of Modules



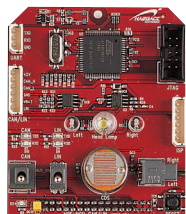
MCU & Peripheral

- Master Node. Slave Requirement of Transmission and Control for Node
- Checks the message is transmitted between nodes through OLED
- Simultaneous Control for CAN/LIN available
- Provides various test themes through AT90CAN128
- CAN/LIN Port External Interface Available
- CAN 2.0A(ISO 11898)
- LIN 2.0(ISO 9141)
- ON/OFF through Switch on CAN Bus
- ON/OFF through Switch on LIN Bus
- Available as stand alone module(Another Power Adapter available)



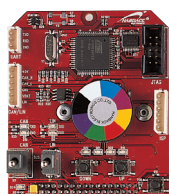
Node1(Cooling Fan)

- Cooling Fan Control by Temperature Sensing
- CAN/LIN Port External Interface Available
- CAN 2.0A (ISO 11898)
- LIN 2.0 (ISO 9141)
- ON/OFF through Switch on CAN Bus
- ON/OFF through Switch on LIN Bus
- Available as stand alone module(Another Power Adapter available)



Node2(CdS Sensor)

- Turns on Head Lamp by CdS sensor
- Directional indicator by Switch(Left, Right)
- CAN/LIN Port External Interface Available
- CAN 2.0A(ISO 11898)
- LIN 2.0(ISO 9141)
- ON/OFF through Switch on CAN Bus
- ON/OFF through Switch on LIN Bus
- Available as stand alone module(Another Power Adapter available)



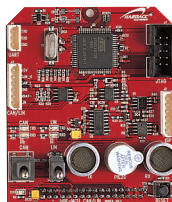
Node3(Step Motor)

- Motor operated by UP, Down(Door Window) switch
- CAN/LIN Port External Interface Available
- CAN 2.0A(ISO 11898)
- LIN 2.0(ISO 9141)
- ON/OFF through Switch on CAN Bus
- ON/OFF through Switch on LIN Bus
- Available as stand alone module(Another Power Adapter available)

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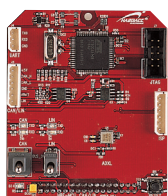
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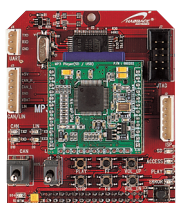
Node4 (Ultrasonic Sensor)

- Sound alarm by Distance detection(Buzzer)
- CAN/LIN Port External Interface Available
- CAN 2.0A(ISO 11898)
- LIN 2.0(ISO 9141)
- ON/OFF through Switch on CAN Bus
- ON/OFF through Switch on LIN Bus
- Available as stand alone module(Another Power Adapter available)



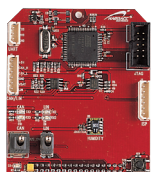
Node5 (2-Axis Tilt)

- 2-Axis Tilt Monitoring
- CAN/LIN Port External Interface Available
- CAN 2.0A(ISO 11898)
- LIN 2.0(ISO 9141)
- ON/OFF through Switch on CAN Bus
- ON/OFF through Switch on LIN Bus
- Available as stand alone module(Another Power Adapter available)



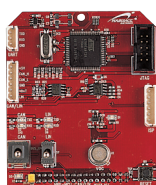
Node6 (MP3 Player)

- MP3 Player
- Play/Pause, Stop, FF, FB, VOL+, VOL- Control Available
- CAN/LIN Port External Interface Available
- CAN 2.0A(ISO 11898)
- LIN 2.0(ISO 9141)
- ON/OFF through Switch on CAN Bus
- ON/OFF through Switch on LIN Bus
- Available as stand alone module(Another Power Adapter available)



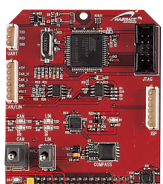
Node7 (Temperature/Humidity Sensor)

- Temperature/Humidity Monitoring
- CAN/LIN Port External Interface Available
- CAN 2.0A(ISO 11898)
- LIN 2.0(ISO 9141)
- ON/OFF through Switch on CAN Bus
- ON/OFF through Switch on LIN Bus
- Available as stand alone module(Another Power Adapter available)



Node8 (Gas Sensor)

- Detecting noxious Gas
- CAN/LIN Port External Interface Available
- CAN 2.0A(ISO 11898)
- LIN 2.0(ISO 9141)
- ON/OFF through Switch on CAN Bus
- ON/OFF through Switch on LIN Bus
- Available as stand alone module(Another Power Adapter available)



Node9 (Compass)

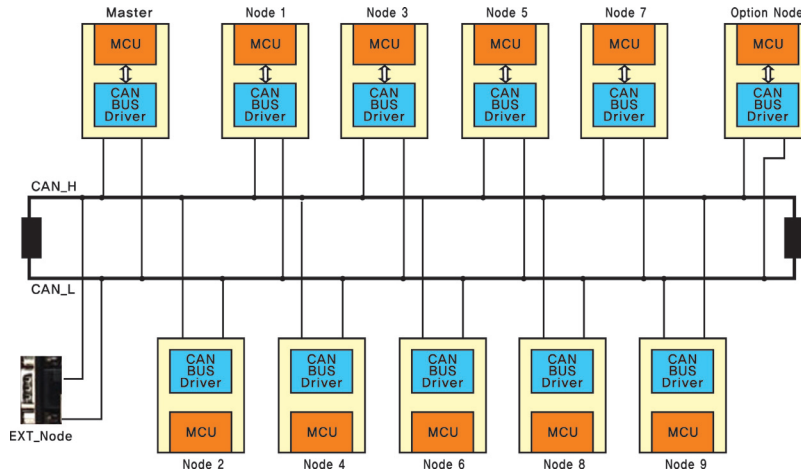
- Digital Compass
- Available of CAN/LIN Port External Interface
- CAN 2.0A(ISO 11898)
- LIN 2.0(ISO 9141)
- ON/OFF through Switch on CAN Bus
- ON/OFF through Switch on LIN Bus
- Available as stand alone module(Another Power Adapter available)

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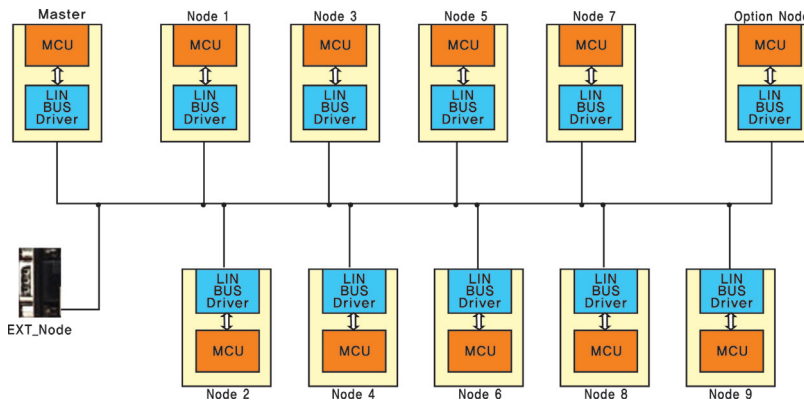
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Network

• CAN



• LIN

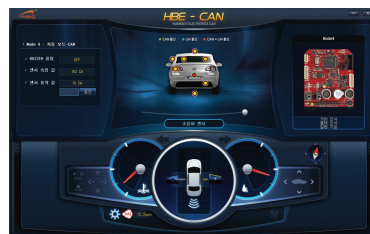


PC control software

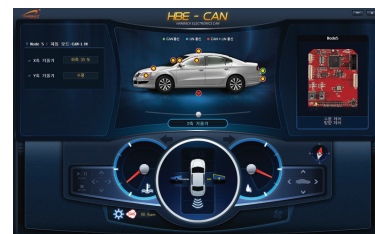
• HBE-CAN Simulation Program



Cooling system
(temperature sensing and control)

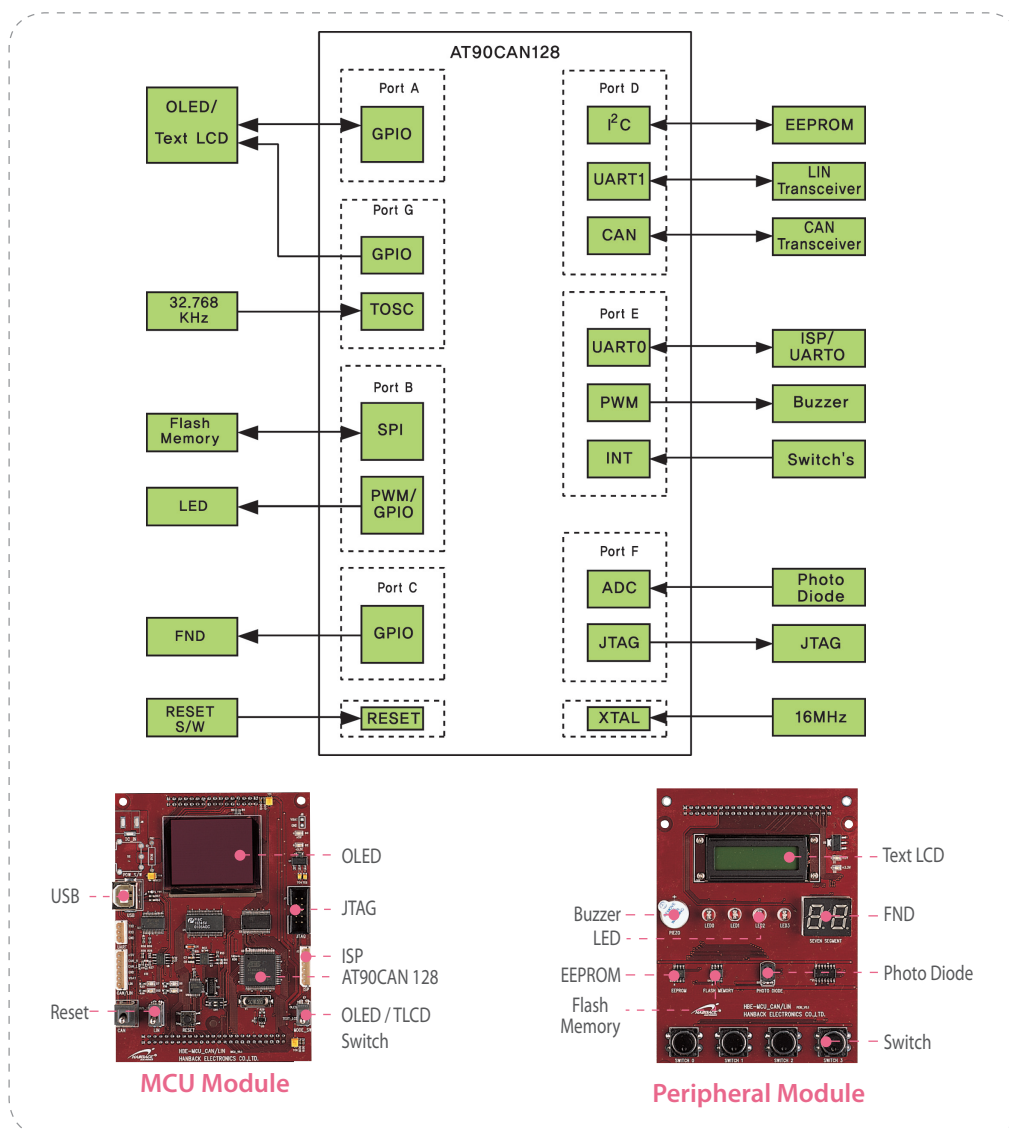


Ultrasonic module
(distance, object detection and alarm)



Acceleration Module
(Horizontal and directional awareness and control)

Block Diagram



Education

Item	Description
Introduction	CAN/LIN Microcontroller
Using Microcontroller	GPIO I/O Control Interrupt Timer, Counter, PWM UART A/D Converter Serial Interface
Using CAN	Configuration of CAN Communication CAN Communication I between Multi Nodes (Cooling Fan Control by Temperature Sensing) CAN Communication II between Multi Nodes (Sound Alarm by Distance Sensing)
Using CAN	Configuration of LIN Communication LIN Communication I between Multi Nodes (Turns On Head Lamp by CdS Sensor) LIN Communication II between Multi Nodes (2-Axis Tilt Status Monitor)