

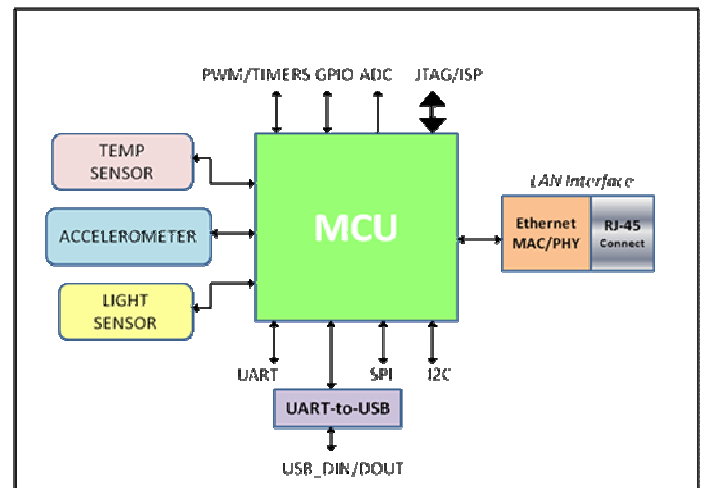
Indriya™ is a hardware development environment for building ambient intelligence based sensor network applications.

Features

- Simple, pervasive & low power 8-bit microcontroller core with IEEE802.3 Ethernet LAN interface
- ± 0.5 °C accurate low power digital (¹²C) on-board temperature sensor
- Miniaturized human eye response based digital (¹²C) ambient light sensor
- Small, low-power on-board 3-axis $\pm 3g$ accelerometer
- (Optional) add-on sensor interface boards for range of sensor network applications
- Multiple timer/counter, PWM channel
- Data acquisition, configuring, debugging, on-chip serial port access from PC and many more simply via on-board USB interface
- 2 x AA battery option available for standalone operation
- Data rate supported ranges upto 10Mbps

- One of the few sensor network platforms that can support embedded operating system *TinyOS*
- Ease of integration to facilities with existing Ethernet LAN infrastructure via supported TCP/IPv4 stack & associated configurable APIs

Block Diagram



Target Applications

- Indoor building automation
- Ambient condition monitoring
- Remote security
- Surveillance
- Academic research

Highlights

This Indriya development platform (IDP) variant features one of most common AVR family's low-power microcontroller unit (MCU), Atmega128L.

The hardware architecture of Indriya is consistent with every mote in IDP having essential components organized on base & add-on sensor boards to enable suit to fast & easy adaptability in building systems to cater range of sensor networking applications based on ambient intelligence.

The heart of the IDP is the MCU core *Atmega128L*. This is a low voltage 8-bit, 16MIPS core computing unit with 128 KB in-system programmable flash while the essential communication link remains the pervasive IEEE 802.3 10-BaseT Ethernet LAN integrated MAC/PHY from Microchip.

The base board encompasses ultra low-power digital ambient sensors like temperature, light and vibration/tilt sensor all on a single board. In addition, MCU's numerous on-chip resources are all available for interfacing to external world of developer's choice.

Table 1: Summary of characteristics – 10BaseT Ethernet LAN based IDP

Component Characteristics	Specifications	Comments
Microcontroller	Atmega128L	
Performance	< 16 MIPS throughput	
In-system programmable Flash Memory	128 KB	
RAM	16 KB	
Configuration EEPROM	4 KB	
Operating Voltage	2.7V to 5.5V	
Current consumed	2.5 mA 5.5 mA	Idle 4 MHz, V _{CC} = 3V Active 4 MHz, V _{CC} = 3V

Component Characteristics	Specifications	Comments
Analog-to-Digital Converter	8-channel, 10-bit	
Timer/Counter/PWM channels	Available	For motor control & other applications
Serial Communication Interface	1 - SPI 2 - USART 1 - I2C/TWI	
Programming Interfaces	ISP & JTAG	
Communication Interface		Part # ENC28J60
Radio Protocol	IEEE 802.3	
Data rate	upto 10Mbps	
Tx/Rx Current consumed	180 mA	
On-board Sensors Interface		
Temperature Sensor		Part# : TMP-275
Range	-40 to +125	In °C
Accuracy	0.5	In °C
Resolution	0.0625	In °C
Current Consumed	50 µA	
Ambient Light Sensor range	Visible Light Spectrum upto 10,000 Lux	Part# : APDS9300
Accelerometer	3-axis, ±3g	Part# : ADXL335
Software Support		
Embedded Operating System	TinyOS	
Protocol stacks support	TCP/IPv4 Stacks	Includes preloaded embedded APIs
Others		
Battery Supply	2 x AA alkaline 1.5Volts each	
PC Interface	via UART -to- USB	

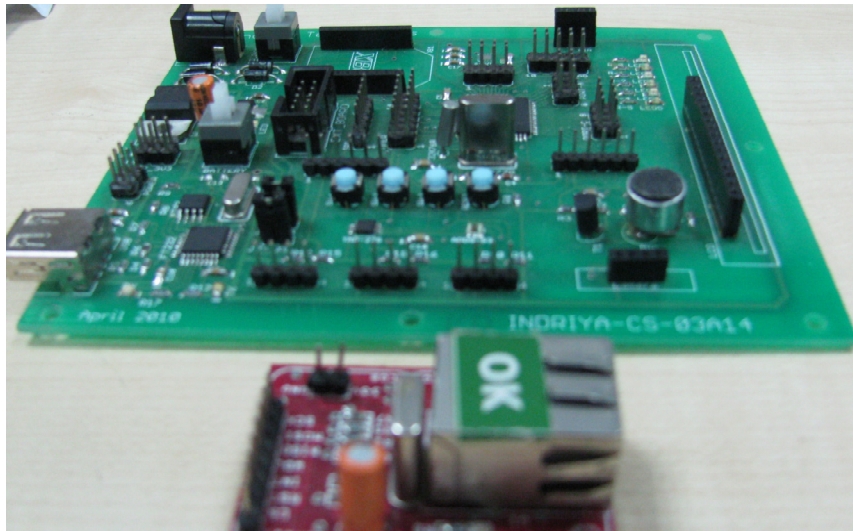
Optional add-ons with IDP

IDP's thoughtful hardware architecture fuels evasive development of range of wireless sensor based activities like WSN based irrigation management, structural health monitoring, commercial space automation and so on with just the right choice of off-the-shelf Indrion's sensor modules without hassle.

Table 2: Range of sensor plug-on modules that suit with this IDP are listed as under

Part #	Sensing platform	Sensors	Application Suite
AS1124	Air Quality	Humidity Sensor, Co2 Sensor	Indoor air-quality management
AS101216	Acoustics	Ultrasonic, Magnetometer	Range measurement, direction finding, tracking
SS21	Camera	Image Sensor	Security & surveillance
OS34	Occupancy Detection	PIR	Human activity based controls

For more specific details on the above listed sensor plug-on modules request vendor for specific datasheet.



Snapshot of Ethernet LAN based Sensor network development platform

Programmers & debuggers supported

Are available as a separate module on request. Contact Indrion for the same.