

**WifibOT** Lab

- **4 roues motrices**  
(2 roues + 1 roue folle possible)
- *Architecture modulaire et ouverte*
- *Contrôlable en RS232 ou en Wifi*
- *PC x86 embarqué avec une image XPe(ou Linux Ubuntu)*

## **Robot WIFIBOT Lab**

Le Wifibot Lab est une plate forme robotique **modulaire**, qui permet de couvrir un large spectre lié à la **robotique mobile**, à l'**informatique industrielle** et **aux réseaux sans fil**. Utilisée par un nombre croissant de centre R&D, d'école, d'université, et de laboratoire dans le monde, elle se distingue par sa simplicité et son efficacité.

Le système de base est composé d'un **châssis en aluminium** anodisé, d'une **camera USB motorisée**, de **2 capteurs infra rouge** et d'une nappe laser **Hokuyo URG-04LX-UG01 en option**. Le châssis du robot est contrôlable en utilisant un port RS232. L'unité de calcul embarquée qui envoie les commandes au robot est une carte industrielle Intel Atom D510 double coeur au format 3.5 pouces avec une image du système d'exploitation XP embedded SP3 (ou Linux Ubuntu) utilisés dans le monde de l'embarqué. Une carte WIFI assure la liaison sans fils au système avec le point **d'accès configuré fourni gratuitement pour la classe**.

Les utilisateurs peuvent ainsi modifier ou concevoir des programmes directement sur le robot (VGA ou bureau distant via WIFI).

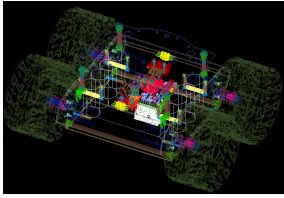
Diverses interfaces de contrôle et API sont proposées aux utilisateurs avec le code source en C/C++. Des logiciels comme **ROS, RTMAPS, URBI, Matlab** ou d'autres peuvent s'interfacer facilement du fait de la simplicité du protocole **ouvert** RS232 ou Ethernet.

La carte bas niveau moteur est aussi ouverte et programmable en C avec le débogueur ICD2/3 et l'outil MPLAB de Microchip, ou simplement, en utilisant le bootloader intégré.

Divers options peuvent être ajoutés au cours du temps: Carte d'acquisition multi camera H264, carte firewire, Camera avec DSP Texas Davincy etc ... et cela selon les orientations des enseignements etc...



[www.wifibot.com](http://www.wifibot.com)



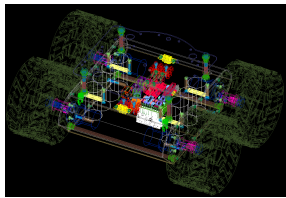
**WifiBOT** Lab

## *Spécifications par défaut*

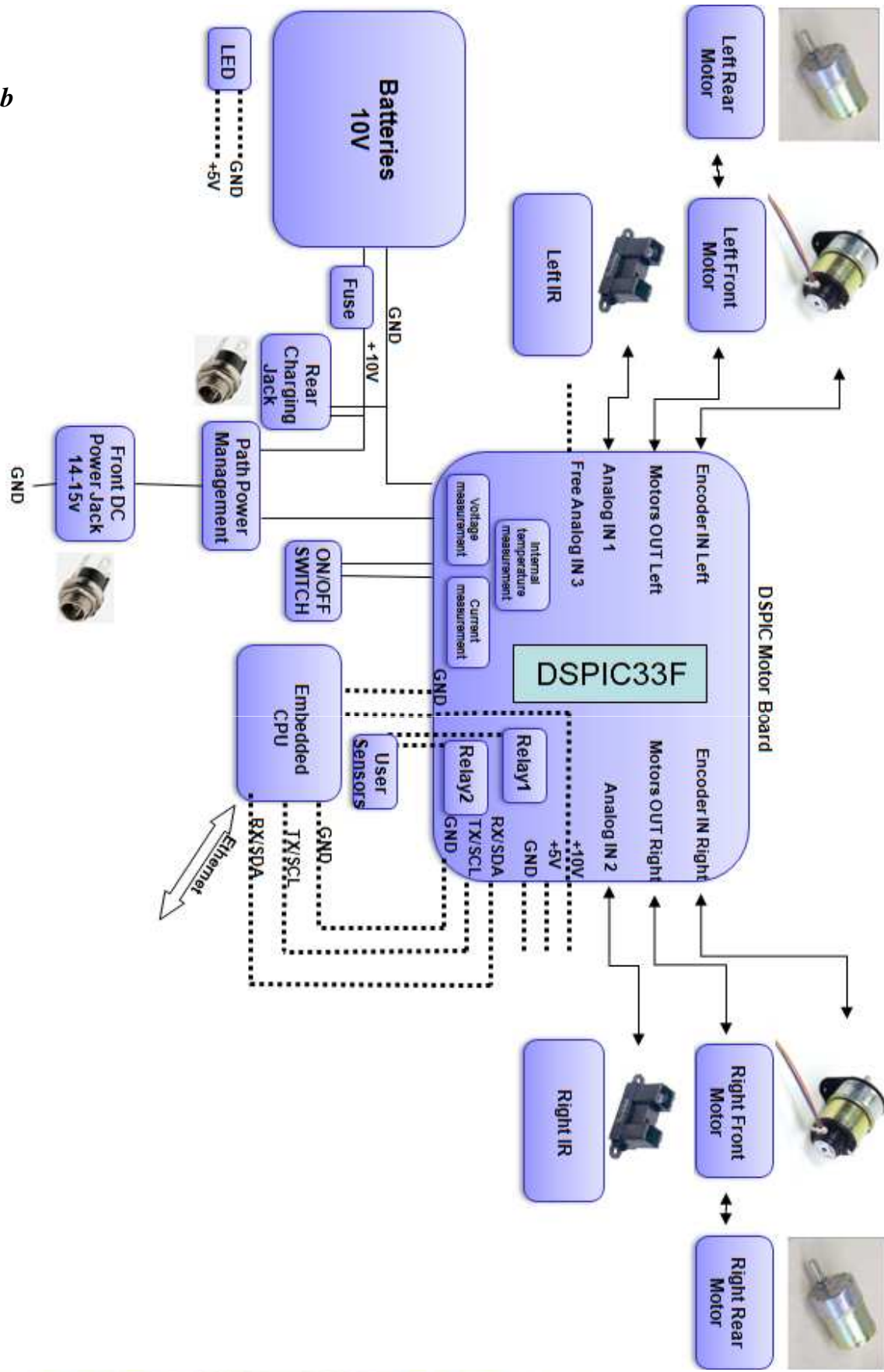
<b>Capteurs moteur:</b>	2 codeurs en quadrature effet hall 2048 tics par tour de roue.
<b>Control vitesse :</b>	2 x PID sur 1 x DSPIC Microchip 33f programmés en C Débugueur ICD2/3 (option)
<b>Moteurs:</b>	4x moteurs 12V Réduction 52:1 planétaire 156 rpm
<b>Dimensions:</b>	L : 30 cm W : 35 cm H : 15 cm W : 3.5Kg
<b>Batteries:</b>	12V NiMh (LIFE 12V possible) 9000 mAH Chargeur 12V/220V Path Power Managment sur 2 Jack : Charge + Alim DC 14-15v de laboratoire .
<b>Bus de contrôle interne:</b>	<b>RS232.</b> Le protocole est très simple et permet de contrôler le robot via l'API en C/C++ ou par n'importe qu'elle logiciel du commerce comme MatLab, RTMAPS, Robotics Studio, URBI ...
<b>Protocole de contrôle distant :</b>	Socket TCP/UDP via WIFI ou RJ45
<b>Calculateur:</b>	Carte industrielle Intel Atom D510 double coeur 1.6Ghz 1G Ram / 4G CF 4 x USB 2.0 4 x RS232/485 1 x Mini-Pci + 1x mini pcie ...
<b>Capteurs:</b>	2 capteurs infra rouge 1 web cam Pan et Tilt 1 Lidar Hokuyo 4m <b>en option</b>
<b>Logiciels:</b>	API C++ de contrôle du robot 2 interfaces de contrôle distantes Serveur web embarqué

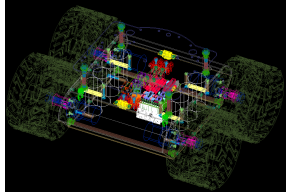


# Architecture bas niveau



**WifibOT** Lab





**WifibOT** Lab

## LE-376

### 3.5" embedded board with Intel® Atom™ dual-core Solution



LE-376 consists of the 13W Intel ATOM D510 and ICH8M, Graphic Processing Unit features power-efficient 32-bit 3D graphics core based on Intel GMA 3150 architecture, video capability with up to 384MB of shared graphics memory, delivers sophisticated graphics for large display applications and with Dual display types such as VGA+LVDS, Enables smoother playback for MPEG-2 codec, a standard video compression format used on Blu-ray, DVDs, broadcasting, and broadband content.

### Specification

Form Factor	3.5" embedded board
CPU	Intel® Atom™ D510, 1.66GHz, 1MB cache (LE-376A) Package type : Micro-FCBGA (FCBGA559)
Memory	1 x 200-pin DDR2-667 SO-DIMM up to 4GB (LE-376H/A) Support Non-ECC, unbuffered memory only
Chipset	Intel® ICH8M
Real Time Clock	Chipset integrated RTC with onboard lithium battery
Watchdog Timer	Generates a system reset internal timer for 1min/sec ~ 255min/sec
Power Management	ACPI 2.0 compliant, supports power saving mode
Integrated Graphics	Intel® integrated extreme GMA 3150 Technology
Video Memory	Up to 384MB shared with system memory
LVDS Interface	Chipset Integrated 18-bit single channel LVDS
Serial ATA Interface	2 x SATAII interface with 300MB/s transfer rate
Solid State Disk	1 x Compact Flash Type-II
Audio Interface	Intel® ICH8M integrated with Realtek ALC888 HD Codec
LAN Interface	3 x Intel® 82583V Gigabit Ethernet controller
Expansion Interface	1 x PCIe mini card & 1 x Mini-PCI socket
Internal I/O Port	1 x Audio, 4 x USB2.0, 1 x LVDS, 1 x LCD Inverter, 1 x LPT 1 x RS232/4224/5, 4 x RS232, 1 x SMBUS, 1 x IrDA
External I/O Port	1 x USB, 3 x RJ45 LAN, 1 x DB15 VGA, 1 x RS232
Power Requirement	DC 9V ~ 24V input



## Annexe 2

# WLAN 802.11a/b/g mini-PCI Module

## DCMA-81

### SPECIFICATION

<b>Frequency Band</b>	<ul style="list-style-type: none"> <li>➤ 2.312 – 2.472GHz, 2.484 GHz</li> <li>➤ U-NII: 5.15 - 5.35GHz, 5.725 - 5.825GHz</li> <li>➤ ISM: 5.725 – 5.850 GHz</li> <li>➤ DSRC: 5.850 – 5.925 GHz</li> <li>➤ Europe: 5.15 - 5.35GHz, 5.47 - 5.725GHz</li> <li>➤ Japan: 4.90 – 5.00GHz, 5.03 – 5.091GHz, 5.15 – 5.35GHz</li> </ul>
<b>Modulation technique</b>	<ul style="list-style-type: none"> <li>➤ <b>802.11 a/b/g</b> DSSS (DBPSK, DQPSK, CCK) OFDM (BPSK, QPSK, 16-QAM, 64-QAM)</li> </ul>
<b>Host interface</b>	Half size Mini PCI Type 3A
<b>Channels support</b>	<ul style="list-style-type: none"> <li>➤ <b>802.11b/g</b> US/Canada: 11 (1 ~ 11) Major European country: 13 (1 ~ 13) France: 4 (10 ~ 13) Japan: 11b: 14 (1~13 or 14<sup>th</sup>), 11g: 13 (1 ~ 13)</li> <li>➤ <b>802.11a</b> US/Canada: 12 non-overlapping channels Europe: 19 non-overlapping channel Japan: 4 non-overlapping channels</li> </ul>

<b>Output power</b>	<ul style="list-style-type: none"> <li>➤ A Mode: +17dBm at 6, 9, 12, 18, and 24Mbps +16dBm at 36Mbps +14dBm at 48Mbps +13dBm at 54Mbps</li> <li>➤ B Mode: +19dBm at 1,2, 5.5, and 11Mbps</li> <li>➤ G Mode: +17dBm at 6, 9, 12, 18, 24 and 36Mbps +16dBm at 48Mbps +15dBm at 54Mbps</li> </ul>
<b>Operation distance</b>	<ul style="list-style-type: none"> <li>➤ <b>802.11a</b>: Outdoor: 85m@54Mbps, 250m@6Mbps Indoor: 20m@54Mbps, 40m@6Mbps</li> <li>➤ <b>802.11b</b>: Outdoor: 250m@11Mbps, 300m@1Mbps Indoor: 30m@11Mbps, 50m@1Mbps</li> <li>➤ <b>802.11g</b>: Outdoor: 80m@54Mbps, 250m@6Mbps Indoor: 15m@54Mbps, 35m@6Mbps</li> </ul>
<b>Operation System supported</b>	➤ Windows® 2K, XP
<b>Dimension</b>	➤ 59.75mm(L) * 25.50mm (W) * 5mm (H)
<b>Security</b>	<ul style="list-style-type: none"> <li>➤ 64-bit, 128-bit, 152-bit WEP Encryption</li> <li>➤ 802.1x Authentication</li> <li>➤ AES-CCM &amp; TKIP Encryption</li> </ul>
<b>Operation mode</b>	➤ Infrastructure & Ad-hoc mode
<b>Operation temperature</b>	➤ 0°C ~ 70°C
<b>Storage temperature</b>	➤ -20°C ~ 70°C

# Annexe 3

## 108M Wireless Access Point TL-WA601G



### Specifications:

Standards	IEEE 802.11g, IEEE 802.11b
Interface	1 10/100M auto-sensing LAN Port
Wireless Signal Rates With Automatic Fallback	Super G™ : 108M 11g: 54/48/36/24/18/12/9/6M(dynamic) 11b: 11/5.5/2/1M(dynamic)
Frequency Range	2.4-2.4835GHz
Wireless Transmit Power	20dBm(Max)
Antenna	3dBi detachable Omni directional antenna
Modulation Technology	IEEE 802.11b: DQPSK, DBPSK, DSSS, and CCK IEEE 802.11g: BPSK, QPSK, 16QAM, 64QAM, OFDM
Receiver Sensitivity	108M: -68dBm@10% PER 54M: -68dBm@10% PER 11M: -85dBm@8% PER 6M: -88dBm@10% PER 1M: -90dBm@8% PER 256K: -105dBm@8% PER
Power Supply Unit	Input: localized to country of sale Output: 9VAC / 0.8A linear PSU
Operating temperature	0°C~40°C (32°F~104°F)
Storage temperature	-40°C~70°C (-40°F~158°F)
Relative humidity	10% ~ 90%, non condensation
Storage Humidity	5%~95% non-condensing
Dimensions	6.2×4.3×1.3 in. 158×110×32 mm

# Annexe 4



## Technical Specifications

- Motorized tracking (189° horizontal and 102° vertical)
- Carl Zeiss® optics
- Autofocus lens system
- Ultra-high resolution 2-megapixel sensor with RightLight™ 2 Technology
- Color depth: 24-bit true color
- Video capture: Up to 1600 by 1200 pixels (HD quality)
- Still-image capture: 8 megapixels (with software enhancement)
- Built-in microphone with RightSound™ Technology
- Frame rate: Up to 30 frames per second
- High-Speed USB 2.0
- Logitech QuickCam® software (with Video Effects™, filters, avatars, and face accessories)
- Works with Skype™, Windows Live™ Messenger, Yahoo®, AOL® and other compatible instant messaging applications



### Motorized tracking

It keeps you right in the middle of the picture, offering 189-degree field of view and 102-degree tilt.



### Carl Zeiss® optics

You'll enjoy razor-sharp images from a lens designed with the help of one of the pioneers in the industry. Find out more about why our collaboration with Carl Zeiss benefits you.

[Learn more.](#)



### Advanced autofocus

Your images stay razor sharp, even in close-ups (up to 10 cm from the camera lens) with built-in autofocus. Learn all about Logitech autofocus.

[Learn more.](#)



### HD video recording

Your friends and family can see you in widescreen video at HD quality (720p).

**2.0** megapixel sensor

### Higher-megapixel performance

With its true 2-megapixel sensor, with up to 8-megapixel photos (software enhanced), every video call and photo will look sharp. Megapixels? Sensor? Why is image quality so important?

[Learn more.](#)



### RightLight™ 2 technology

Even if you make a video call in dim or poorly backlit settings, the camera will intelligently adjust to produce the best possible image. Find out what's right about RightLight 2 technology.

[Learn more.](#)

## *Annexe 5*

# **AC/DC Multi-Functional Balance Silent Charger/Discharger**

*Chargeur AC/DC Multi-Fonctions  
charge/décharge équilibreur silencieux  
Avec monitoring USB par PC*



# GP2Y0A02YK

## Long Distance Measuring Sensor

### ■ Features

1. Less influence on the colors of reflected objects and their reflectivity, due to optical triangle measuring method
2. Distance output type  
(Detection range:20 to 150cm)
3. An external control circuit is not necessary  
Output can be connected directly to a microcomputer

### ■ Applications

1. For detection of human body and various types of objects in home appliances, OA equipment, etc

### ■ Absolute Maximum Ratings (T<sub>a</sub>=25°C)

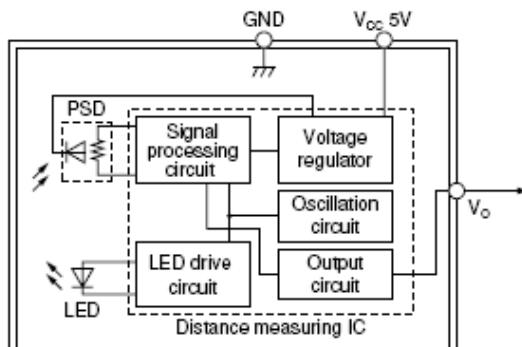
Parameter	Symbol	Rating	Unit
Supply voltage	V <sub>CC</sub>	-0.3 to +7	V
*1 Output terminal voltage	V <sub>O</sub>	-0.3 to V <sub>CC</sub> +0.3	V
Operating temperature	T <sub>opr</sub>	-10 to +60	°C
Storage temperature	T <sub>stg</sub>	-40 to +70	°C

\*1 Open collector output

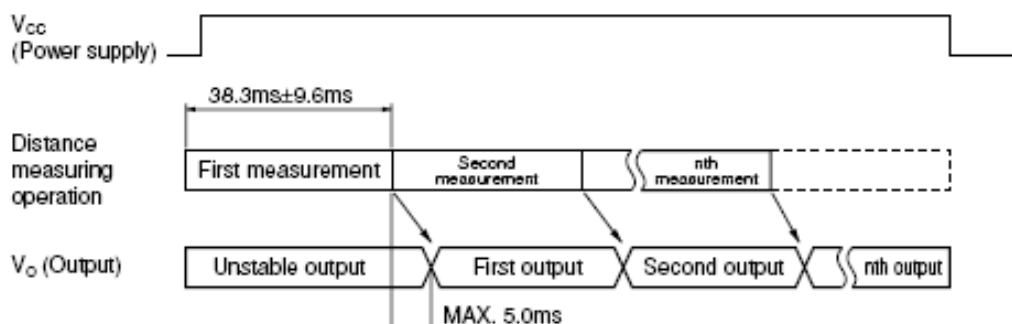
### ■ Recommended Operating Conditions

Parameter	Symbol	Rating	Unit
Operating Supply voltage	V <sub>CC</sub>	4.5 to 5.5	V

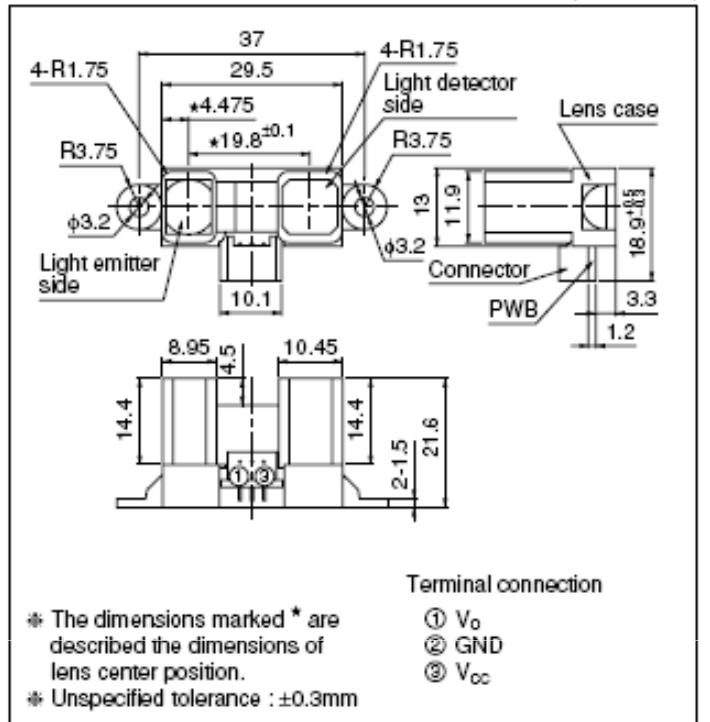
### Internal Block Diagram



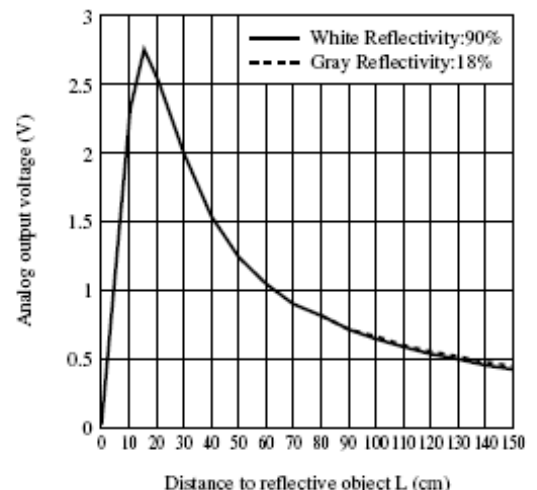
### Timing Chart



### ■ Outline Dimensions (Unit : mm)



### Analog Output Voltage vs. Distance to Reflective Object

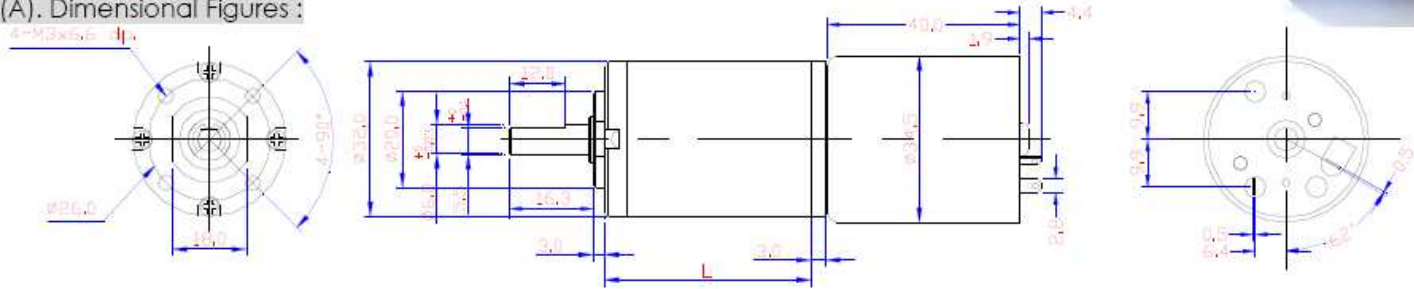


# Annexe 7 (Motor 12V 1/51)

## Model : PK32F Series of DC Planetary Gear Motor



(A). Dimensional Figures :



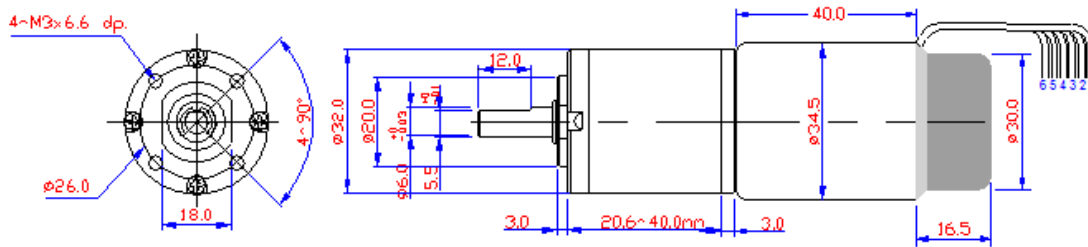
(B). Standard DC Motor Specifications :

DESCRIPTION	Rated Voltage	Speed	Current	Torque	Output	Eff
	VDC	RPM	mA	g-cm	W	%
NO LOAD	12V	6000 ± 600	approx. 136			
	24V	6000 ± 600	approx. 50			
AT MAX. EFF	12V	5000	approx. 710	approx. 105	approx. 5.4	63
	24V	5100	approx. 320	approx. 105	approx. 5.4	71
AT STALL	12V		approx. 3755	approx. 656		
	24V		approx. 2122	approx. 780		

(C). Gearbox Specifications :

Reduction Ratio	Rated Torque	Max. Momentary Tolerance Torque	Efficiency	Radial Play of Shaft	Thrust Play of Shaft	L
1/5	2kgf-cm Max	6 kgf-cm	80%	≤ 0.05 mm	≤ 0.03 mm	17.6
1/27	6kgf-cm Max	18 kgf-cm	70%	↑	↑	24.0
1/51, 1/71	12kgf-cm Max	36 kgf-cm	60%	↑	↑	30.4
1/100	12kgf-cm Max	36 kgf-cm	60%	↑	↑	30.4
1/264	12kgf-cm Max	36 kgf-cm	50%	↑	↑	36.8
1/516	12kgf-cm Max	36 kgf-cm	50%	↑	↑	36.8
1/721	12kgf-cm Max	36 kgf-cm	50%	↑	↑	36.8

## Model: EM3516 One / Two Channel Hall Effect Encoder



■ **Resolution :** 12 Resolution P/R

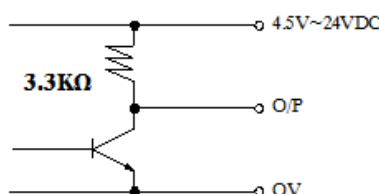
■ **Electrical Specifications**

Power Source	4.5 ~ 24VDC
Current Consumption	30mA or below
Response Frequency	20KHz
Output Mode	With pull up resistor
Output Signal	A, A&B

■ **Feature**

- Hall Effect Sensor
- Speed Position Detection
- Low cost

■ **Output Circuit :**



■ **One Channel Encoder Connections :**

1. Black : HALL SENSOR GND
2. Red : HALL SENSOR Vcc
3. White: HALL SENSOR Aout
4. Green: EMPTY
5. Brown: +MOTOR
6. Blue : - MOTOR

■ **Two Channel Encoder Connections :**

1. Black : HALL SENSOR GND
2. Red : HALL SENSOR Vcc
3. White: HALL SENSOR A Vout
4. Green: HALL SENSOR B Vout
5. Brown: +MOTOR
6. Blue : - MOTOR

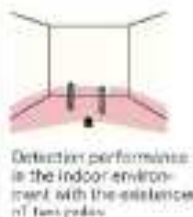
© Please indicate which is the resolution P/R and rotational direction when placing an order.

## URG-04LX-UG01

### Low Cost Compact LRF from **HOKUYO**

Laser Range Finders (LRF) provide continuous time stamped mapping information.

The URG-04LX-UG01 is the smallest & lightest LRF available. With a single USB connection it is ideally suited to mobile robotic applications

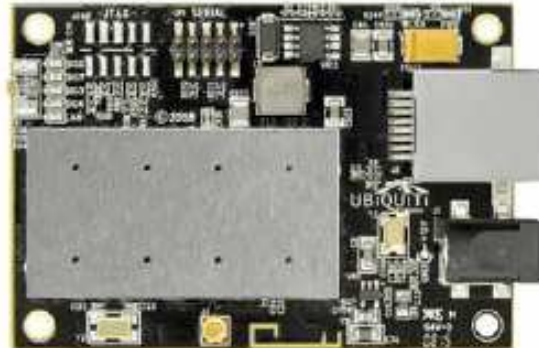


- 5.6 metres range
- 240° scan 0.35° resolution
- 10 scans per second
- Compact: 50 x 50 x 70mm
- Lightweight 160g
- Low Power 5V DC, 2.5W

# Annexe 9 (Option)



**MiniStation**  
World's Smallest WiFi Platform



**FREE LINUX SDK**

SYSTEM INFORMATION							
Processor Specs	Atheros MIPS 4KC, 180MHz						
Memory Information	16MB SDRAM, 4MB Flash						
Networking Interface	1 X 10/100 BASE-TX (Cat. 5, RJ-45) Ethernet Interface						
REGULATORY / COMPLIANCE INFORMATION							
Wireless Approvals	FCC Part 15.247, IC RS210						
RoHS Compliance	YES						
RADIO OPERATING FREQUENCY 2412-2462 MHz							
TX SPECIFICATIONS			RX SPECIFICATIONS				
	DataRate	TX Power	Tolerance		DataRate	Sensitivity	Tolerance
802.11b	1Mbps	26 dBm	+/-2dB	802.11b	1Mbps	-97 dBm	+/-1dB
	2Mbps	26 dBm	+/-2dB		2Mbps	-96 dBm	+/-1dB
	5.5Mbps	26 dBm	+/-2dB		5.5Mbps	-95 dBm	+/-1dB
	11Mbps	26 dBm	+/-2dB		11Mbps	-92 dBm	+/-1dB
802.11g OFDM	6Mbps	26 dBm	+/-2dB	802.11g OFDM	6Mbps	-94 dBm	+/-1dB
	9Mbps	26 dBm	+/-2dB		9Mbps	-93 dBm	+/-1dB
	12Mbps	26 dBm	+/-2dB		12Mbps	-91 dBm	+/-1dB
	18Mbps	26 dBm	+/-2dB		18Mbps	-90 dBm	+/-1dB
	24Mbps	26 dBm	+/-2dB		24Mbps	-86 dBm	+/-1dB
	36Mbps	24 dBm	+/-2dB		36Mbps	-83 dBm	+/-1dB
	48Mbps	22 dBm	+/-2dB		48Mbps	-77 dBm	+/-1dB
54Mbps	21 dBm	+/-2dB	54Mbps	-74 dBm	+/-1dB		
ADJUSTABLE CHANNEL SIZE SUPPORT							
5MHz	10MHz	20MHz	40MHz				
RANGE PERFORMANCE							
Outdoor (Antenna Dependent):	Over 50km						
PHYSICAL / ELECTRICAL / ENVIRONMENTAL							
RF Connector	1xMMCX, 1x integrated PCB printed antenna						
Enclosure Size	5.0.0x2.0x1.2 (cm)						
Max. Power Consumption	5 Watts						
Power Rating	Up to 24V						
Power Method	Passive Power over Ethernet (pairs 4,5+; 7,8 return)						
Operating Temperature	-20C to +70C						
Operating Humidity	5 to 95% Condensing						
Shock and Vibration	ETSI300-019-1.4						
SOFTWARE							

# Annexe 10 (Option)

## Mini-PCI

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### MP-323 - Mini-PCI IEEE 1394a Module

Form Factor: Mini-PCI type III B with 124-pin interface.

Controller: Agere FW323.

Output Function: 3 x 8-pin IEEE1394a Connector.

Dimensions: 45mm x 60mm (W x L).

Accessories: 1x 8-pin IEEE 1394a Cable.

Power Requirements: small 4-pin AT power connector for 12V.



## MP-840

### H.264 Hardware Compression Card with 4 Ports of Video & Audio Inputs

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#### Features

- Mini-PCI interface
- H.264 Hardware Compression
- 4-ch Video & Audio inputs
- Support D1
- Windows XP, Vista (32-bit) SDK & Driver

## MP-878D2

### 2-ch Mini-PCI capture card with Software Develop Kit

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#### Features

- Mini-PCI interface
- 2-ch Video input
- Support D1 , CIF resolution
- Windows Driver & SDK provide
- Linux Driver provide

## MP-6100

### H.264 Hardware Compression Card with 4 Ports of Video & Audio Inputs

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#### Features

- Mini-PCI interface
- H.264 Hardware Compression
- 4-ch Video & Audio inputs
- Support D1 , CIF
- Windows / Linux SDK & Driver

# Annexe 11 (Option)

## Optional CPU (core I5 520M or core I7 620M)

### Industrial Single Board Computer

#### 3.5" Miniboard

#### LS-377

Support Intel® Core™ i7, Core™ i5 and Core™ i3 CPU with DDRIII SO-DIMM, CRT, LVDS, DVI, Gigabit LAN, Mini PCI, PCI Express mini card, Serial ATAll, 7.1Channel HD Audio



Form Factor	3.5" Miniboard
CPU	Intel® Core™ i7, Core™ i5, Core™ i3, Celeron®, and Pentium® Mobile Processor Package type: rPGA988A
Memory	1 x DDRIII SO-DIMM 800/1066 MHz up to 4GB
Chipset	Intel QM57
Real Time Clock	Chipset integrated RTC with onboard lithium battery
Watchdog Timer	Generates a system reset with internal timer for 1min/s ~ 255min/s
Power Management	Supports ACPI 2.0 compliant.
Serial ATA Interface	2 x serial ATAll interface with 300MB/s transfer rate
VGA Interface	Onboard VGA (depend on CPU)
LVDS Interface	Onboard 24-bit dual channel LVDS connector with +3.3V/+5V/+12V supply
DVI Interface	DVI interface
Audio Interface	Realtek ALC888 HD Audio
LAN Interface	1 x Intel 82574L Gigabit LAN
GPIO Interface	Onboard programmable 8-bit Digital I/O interface
Extended Interface	1 x Mini PCIE socket, 1 x Mini PCI socket to support Mini PCI Type IIIA
Internal I/O Port	1 x RS232/422/485, 1 x SMBUS, 1 x GPIO, 4 x USB ports, 1 x IrDA, 1 x LVDS, 1 x DVI, 1 x LCD, 2 x Serial ATA, 1 x LCD Inverter, 1 x HD Audio, 1 x DIO, 1 x DCOUT and 1 x CDIN
External I/O Port	1 x PS/2, 1 x LAN ports, 1 x VGA port, 2 x USB2.0 ports, 1 x RS232 port
Power Requirement	9~24V full range DC Input
Dimension	146mm x 101mm
Temperature	Operating within 0~60 centigrade Storage within -20~85 centigrade