

# RoBoard RB-100

## Hardware Introduction

DMP Electronics Inc  
Robotic Division  
Aug 2010

# Agenda

- DMP SoC Family
- RB-100 Overview
- Hardware Introduction
- Accessory
- Application
- Q & A

# DMP's SoC Family



- Jul. 1998
- 386 – 40MHz
- 0.50 um process

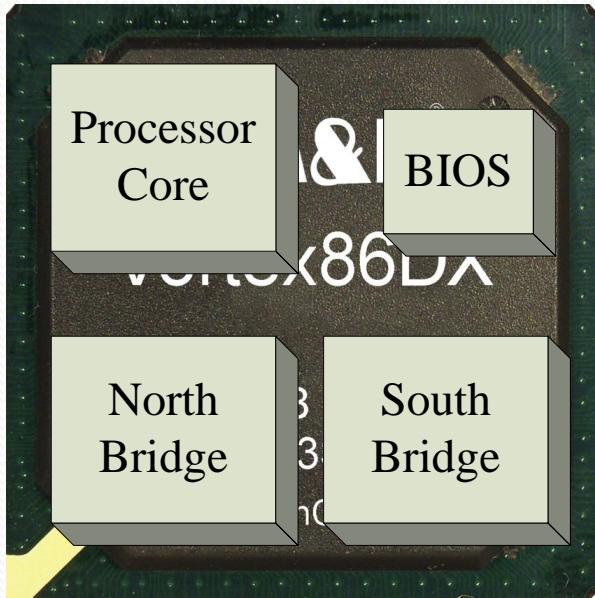


- Feb. 2007
- 486 – 300MHz
- 0.13 um process



- Aug. 2008
- 486 – up to 1GHz
- 90 nm process

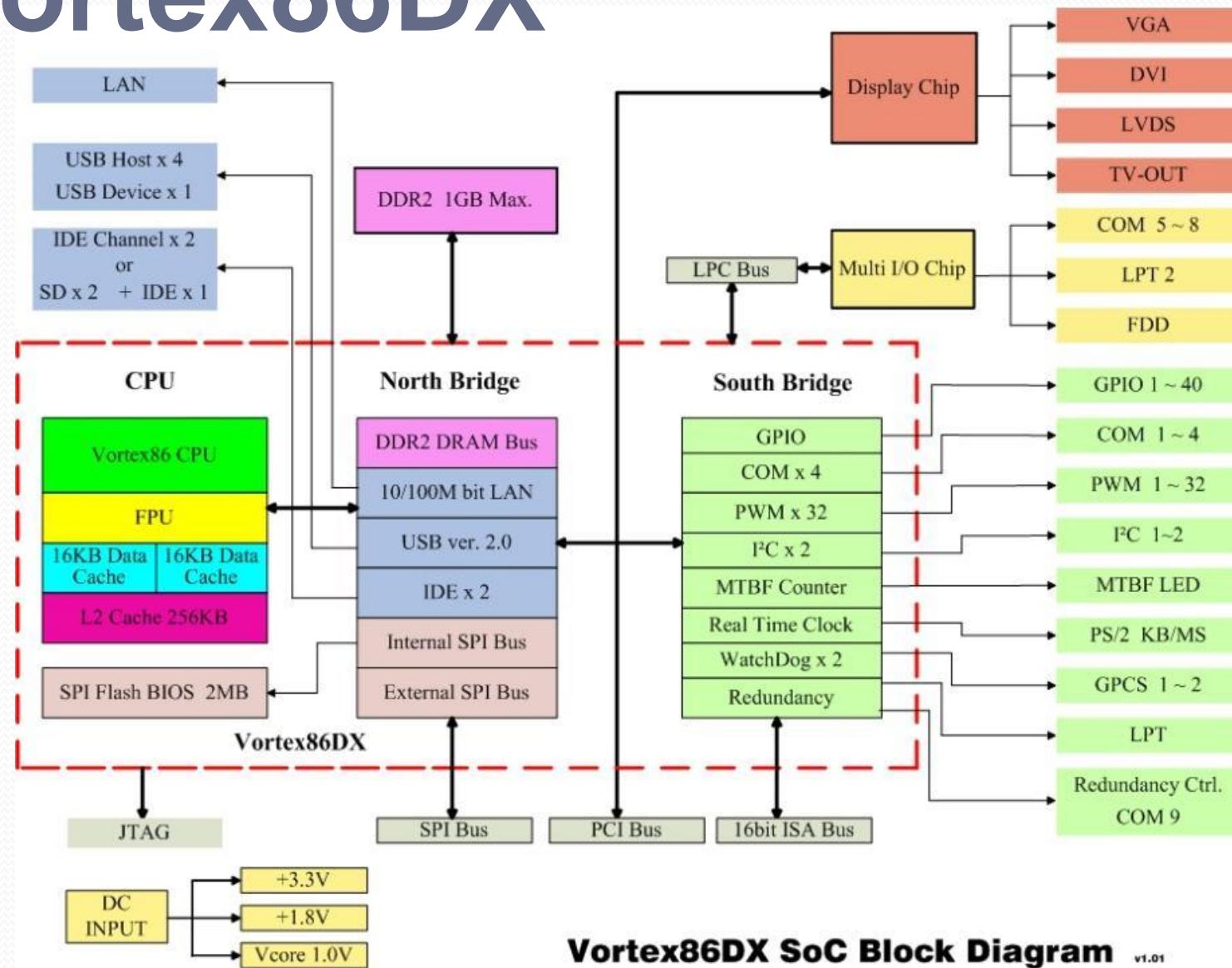
# Vortex86DX



→ 4 in 1 SoC

- x86 Legacy Support
- Unique function for **future** Embedded
- Power Consumption, 2.3Watt@800MHz
- 10 Years Life Cycle , 2008~2017
- Best C/P Ratio ( Cost / Performance )

# Vortex86DX



**Vortex86DX SoC Block Diagram** v1.01

# **OVERVIEW**

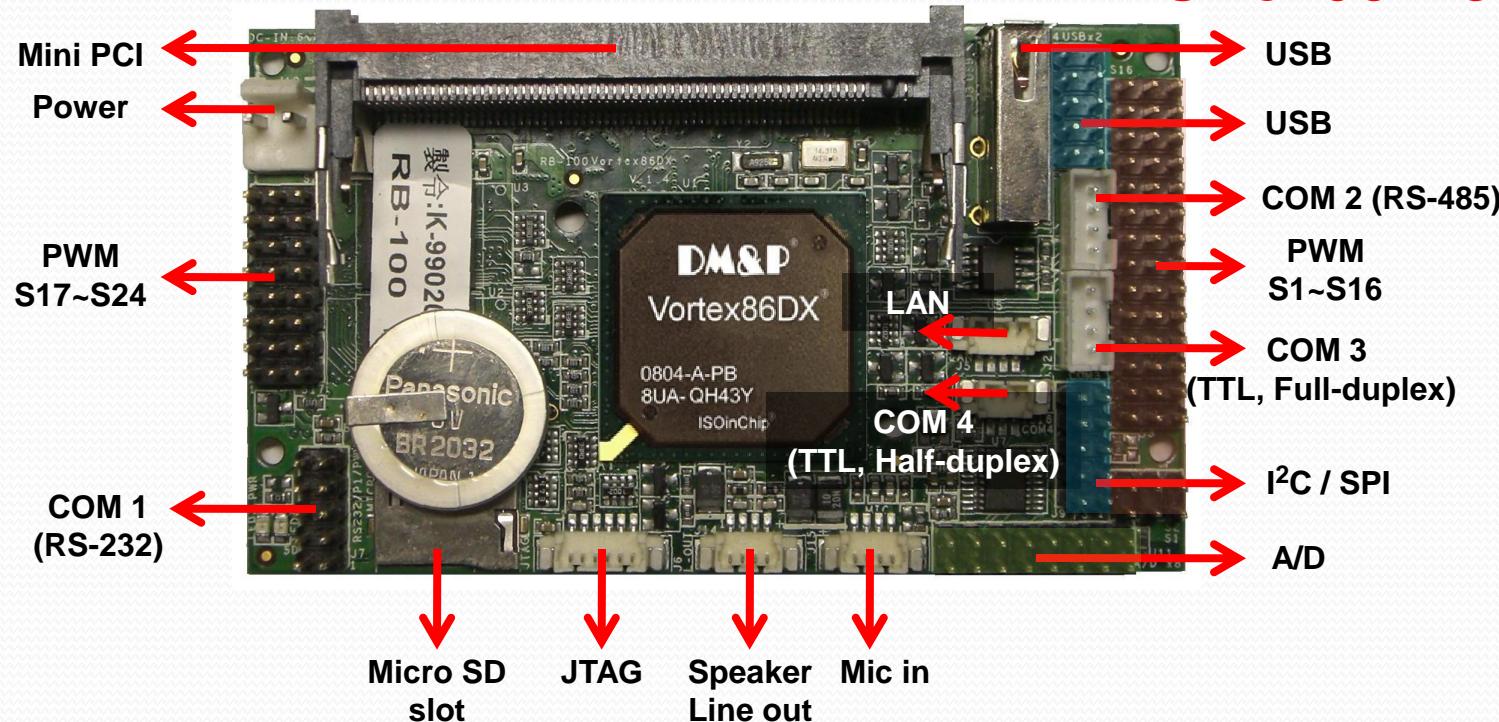
# RoBoard RB-100

- Powerful, Tiny **Computer** dedicated to robotics applications
- Based on the **Vortex86DX**, a 32bit x86 CPU running at 1000MHz with 256MB DRAM
- Compatible with Windows, Linux and DOS
- Open Source C++ Library for RoBoard's unique I/O functions (sensors, actuators, etc.)



# RoBoard RB-100

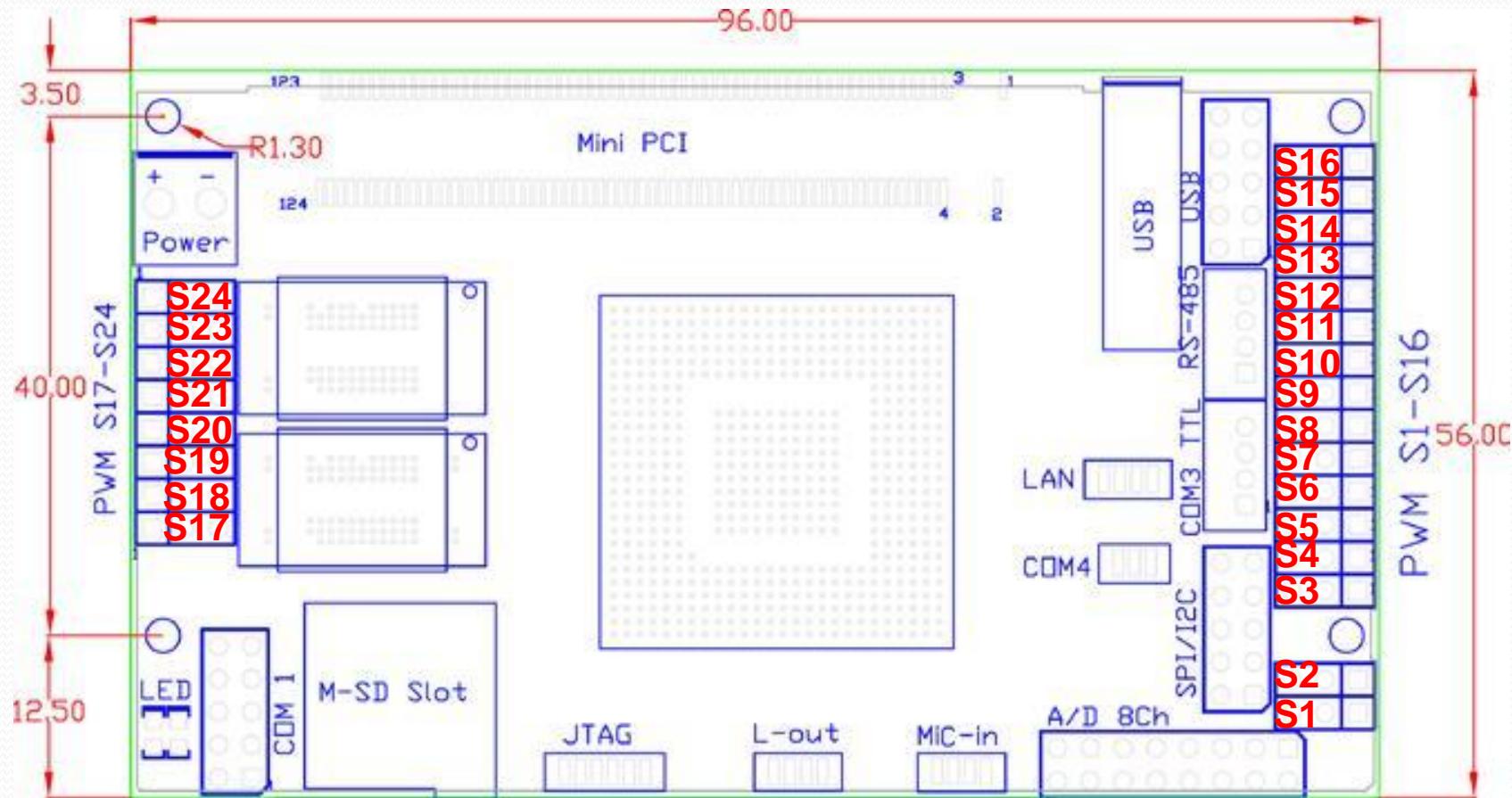
Size: 96 x 56mm



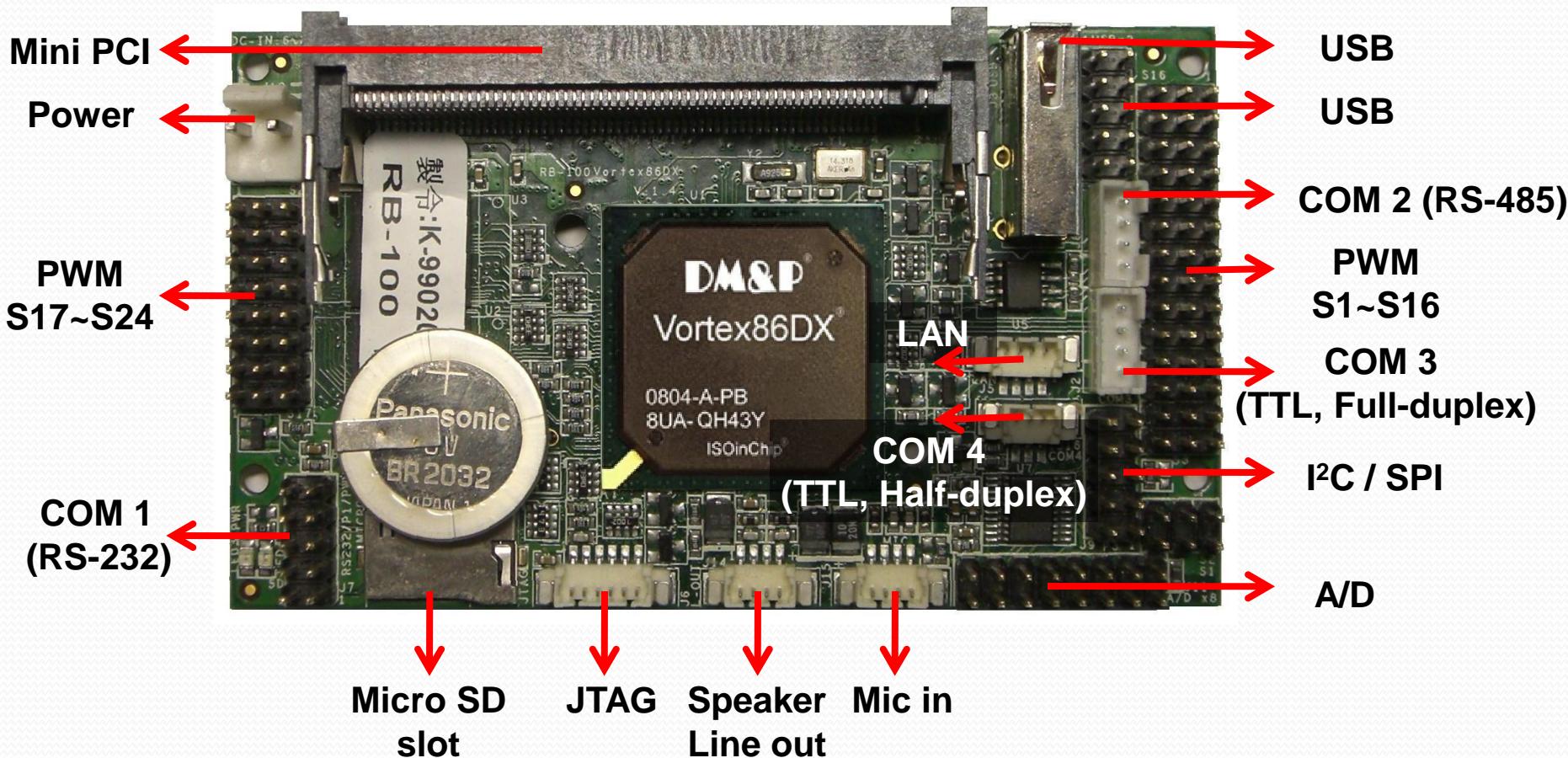
1. 1000MHz, 256MB DDR2
2. PC compatible
3. Build in PWM/GPIO 24Ch
4. USB v2.0 ports × 3
5. TTL COM ports × 2
6. RS-232 port × 1
7. RS-485 port × 1
8. I<sup>2</sup>C Bus
9. SPI Bus
10. Power consumption 5V@400mA (2W)
11. DC 6V-24V

# **HARDWARE INTRODUCTION**

# Locations

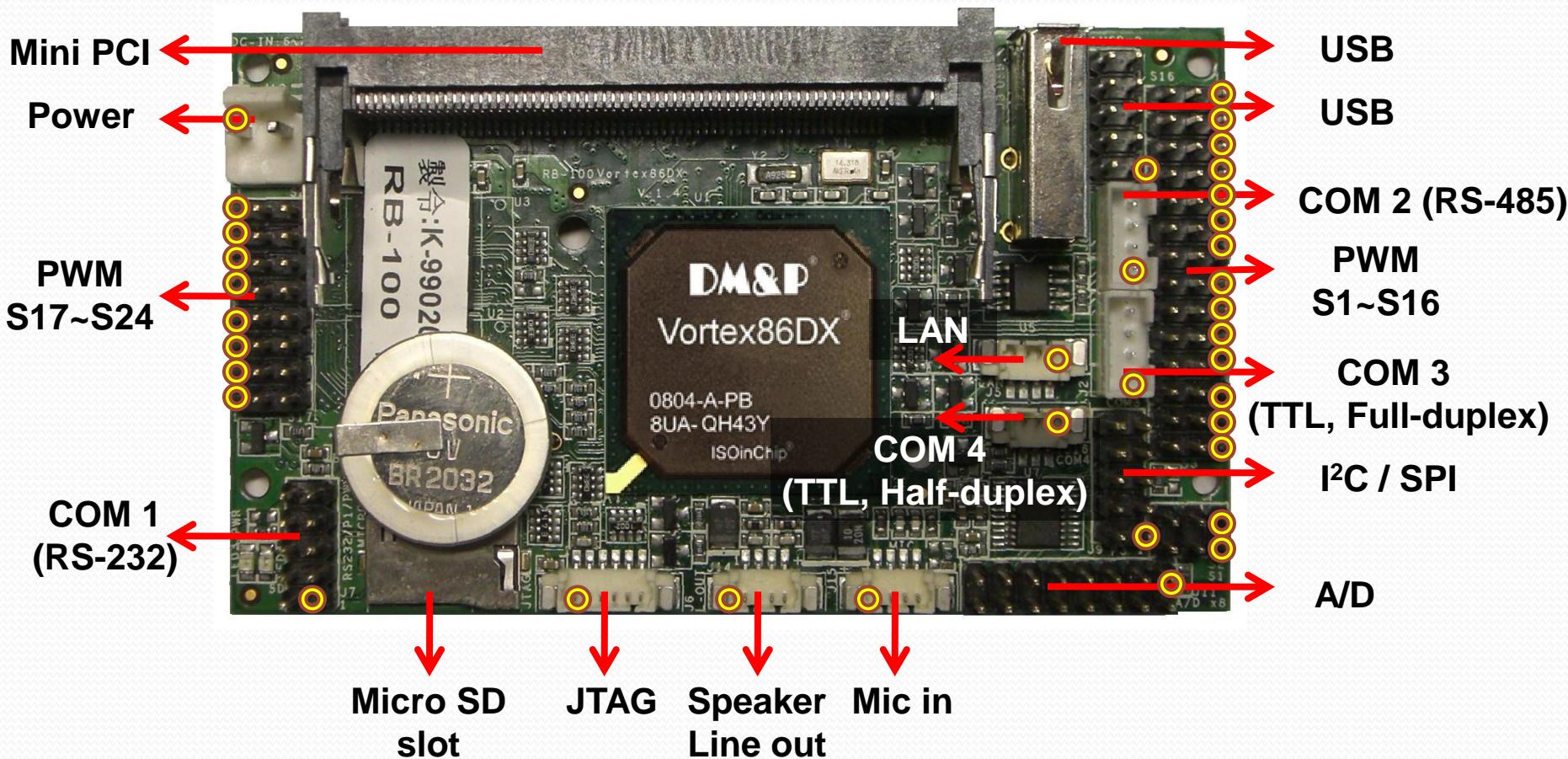


# Locations



# Pin 1 Location

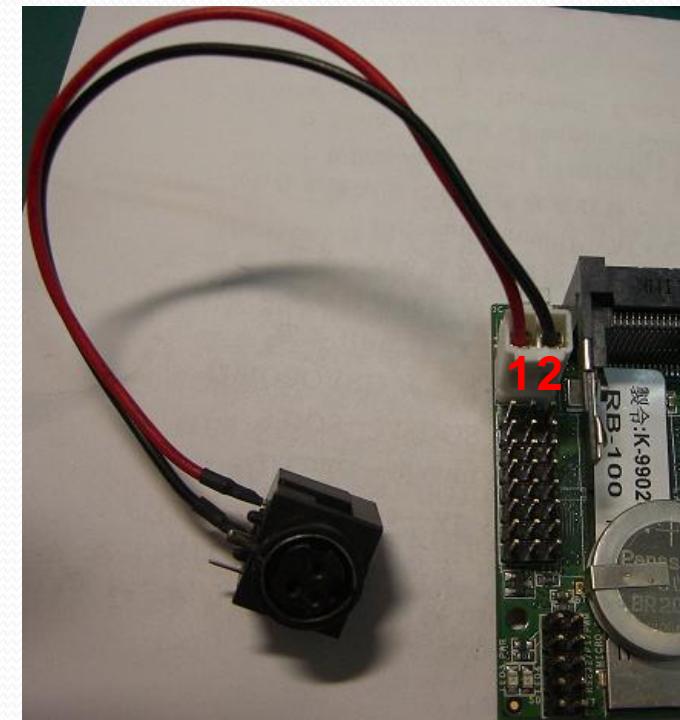
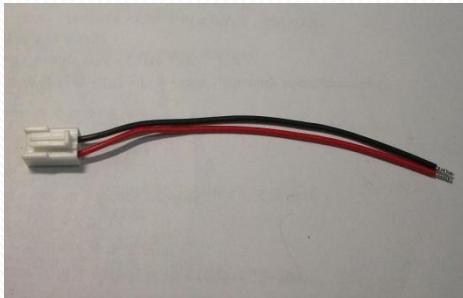
○: Pin 1



# Power connector

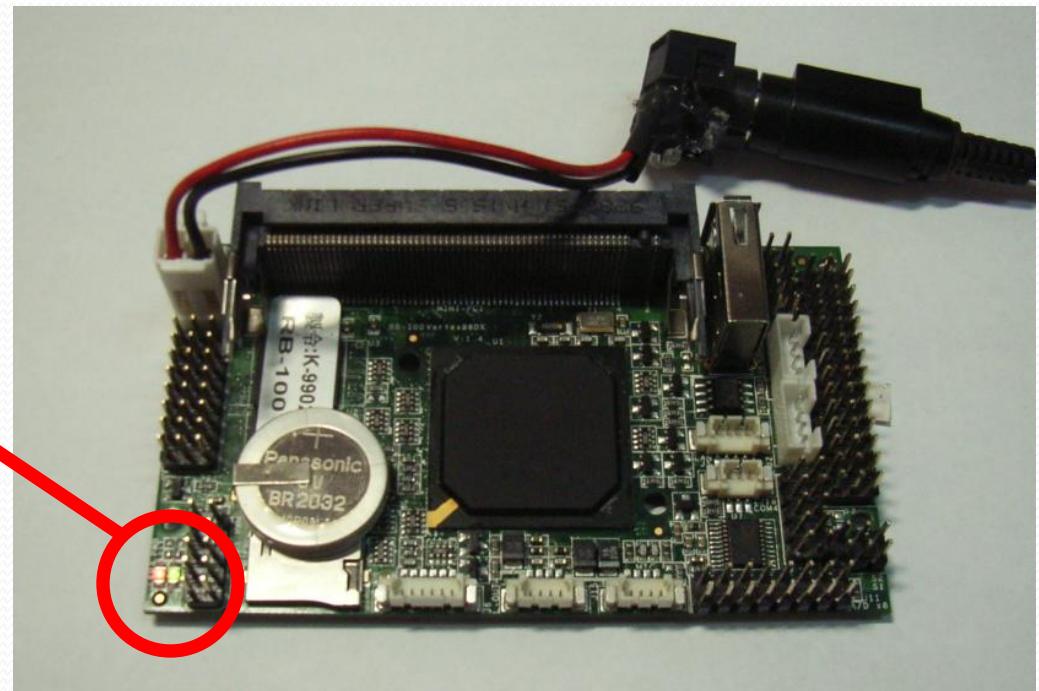
- DC 6V- 24V

Pin #	Signal Name	Line Color
1	Vxx	Red
2	GND	Black



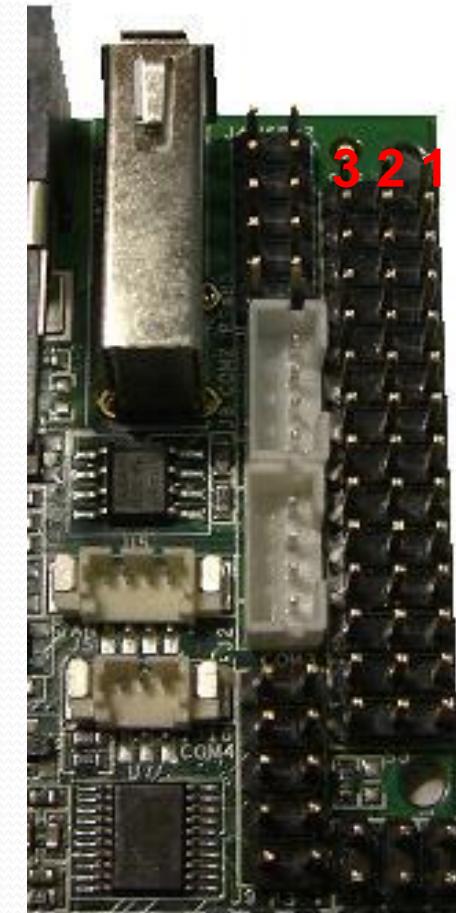
# Power connector

After connecting the Power/HD LED will light

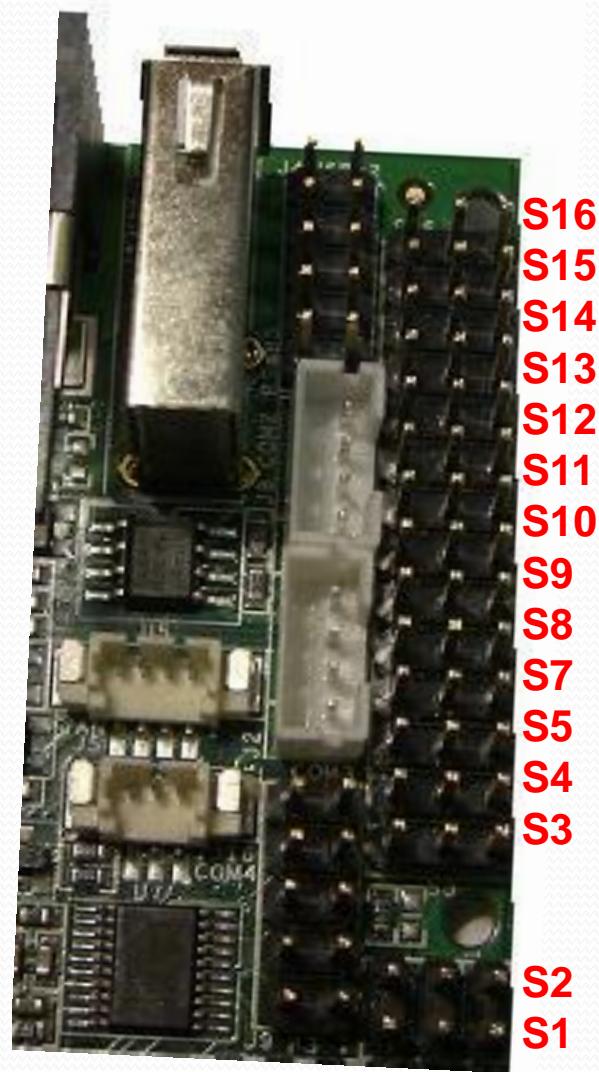


# PWM 24ch

Pin #	Signal Name
1	GND
2	Vxx
3	GPXX

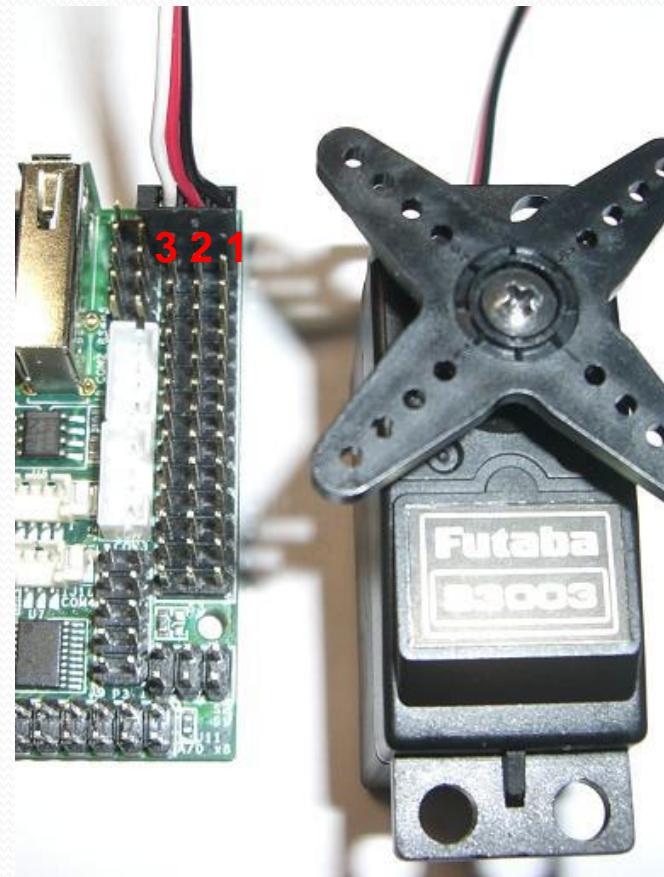
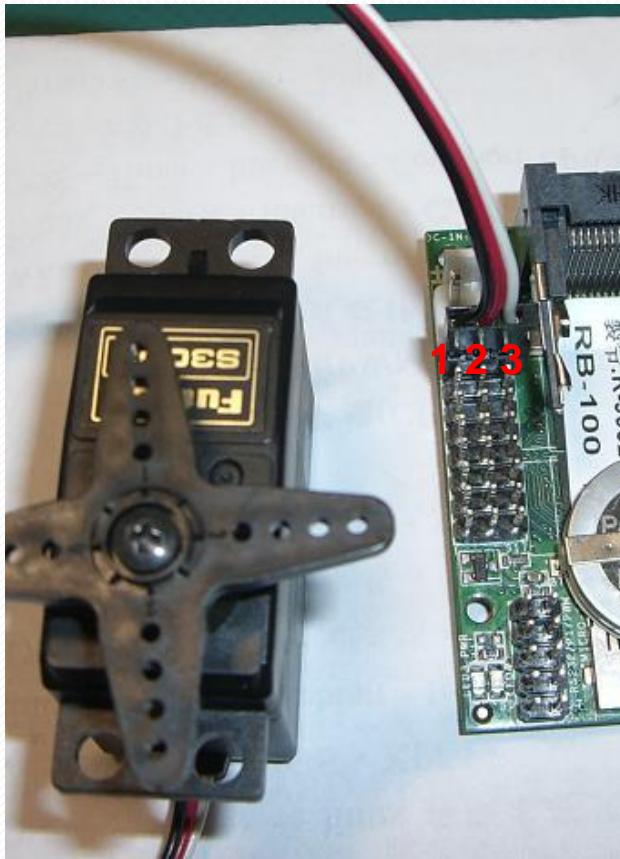


# PWM 24ch



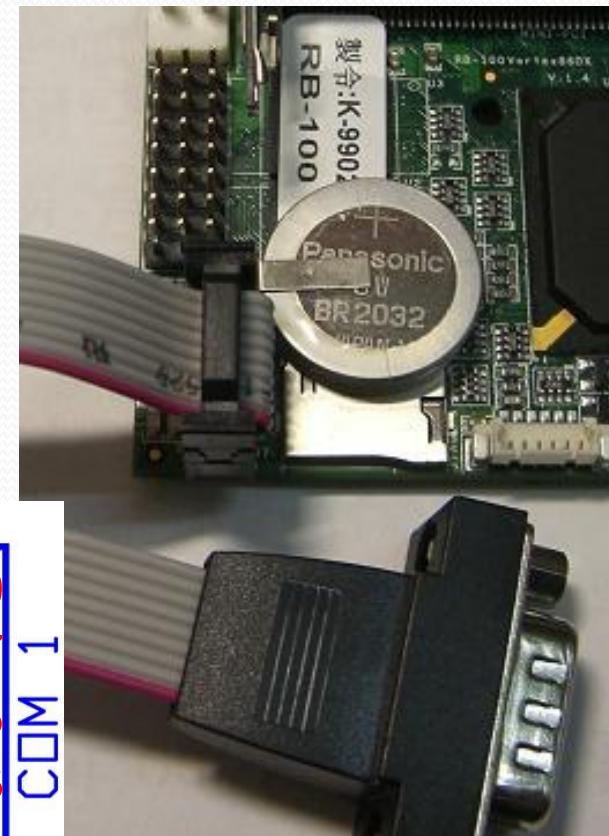
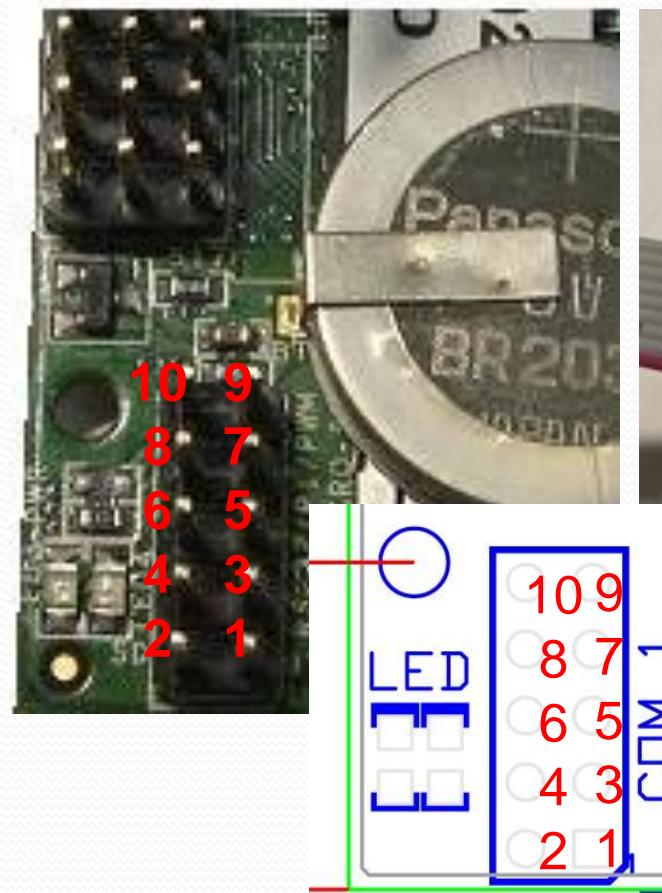
# PWM 24ch

## Connection Example



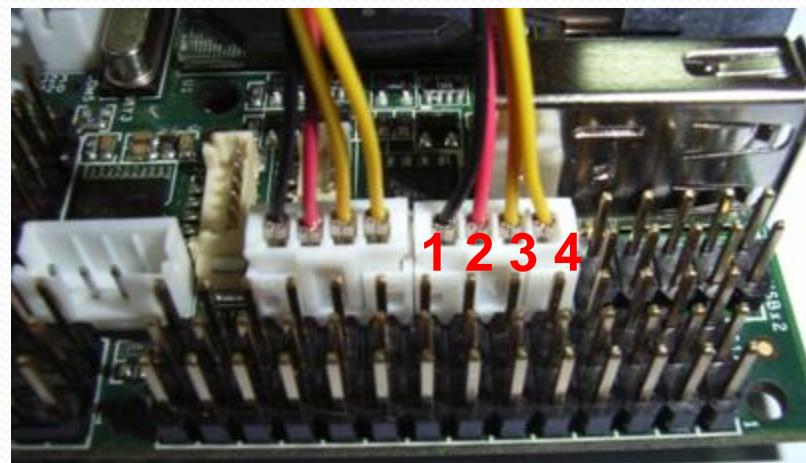
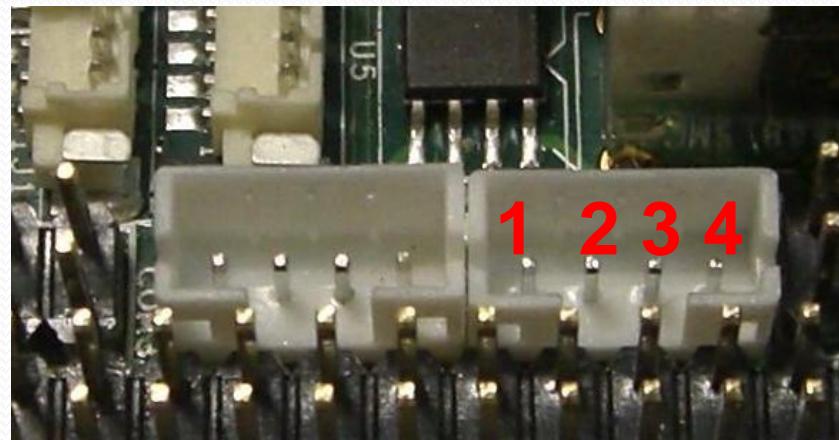
# COM 1 / RS-232

Pin #	Signal Name	Pin #	Signal Name
1	DCD1	2	RXD1
3	TXD1	4	DTR1
5	GND	6	DSR1
7	RTS1	8	CTS1
9	RI1	10	VCC (5V)



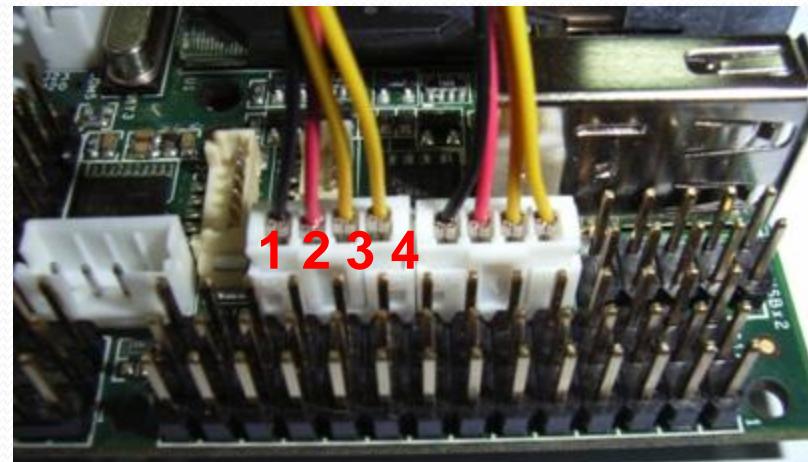
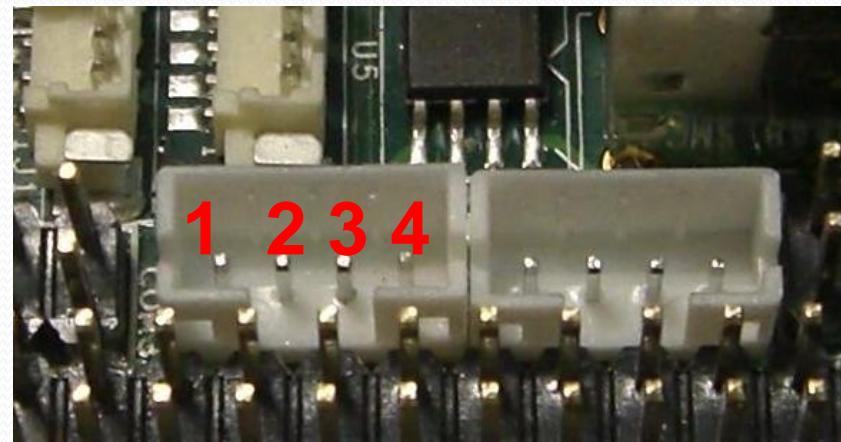
# COM 2 / RS-485

Pin #	Signal Name	Line Color
1	GND	Black
2	Vxx	Red
3	RS485+	Other
4	RS485-	Other



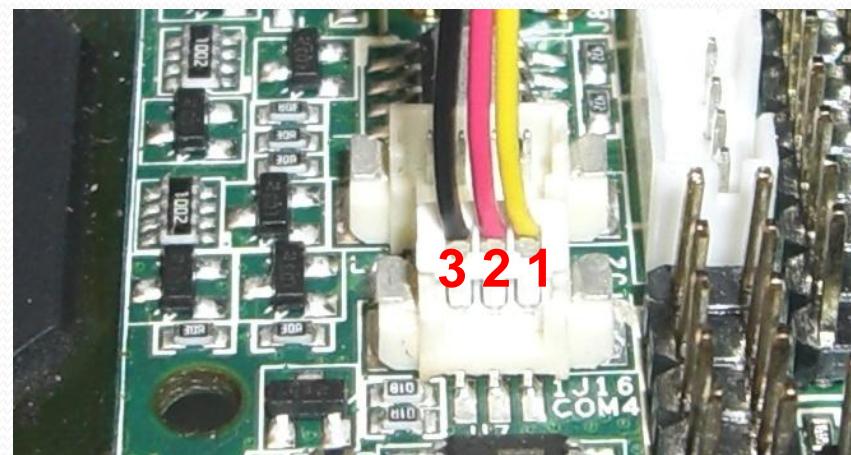
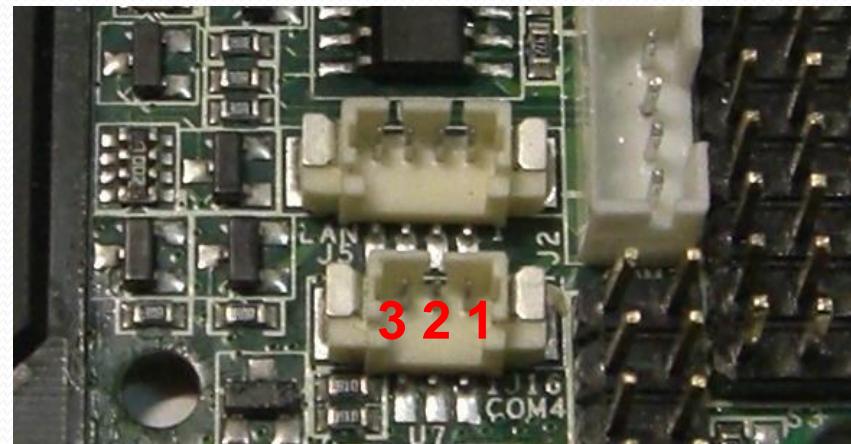
# COM 3 / Full Duplex TTL

Pin #	Signal Name	Line Color
1	GND	Black
2	Vxx	Red
3	TXD3	Other
4	RXD3	Other



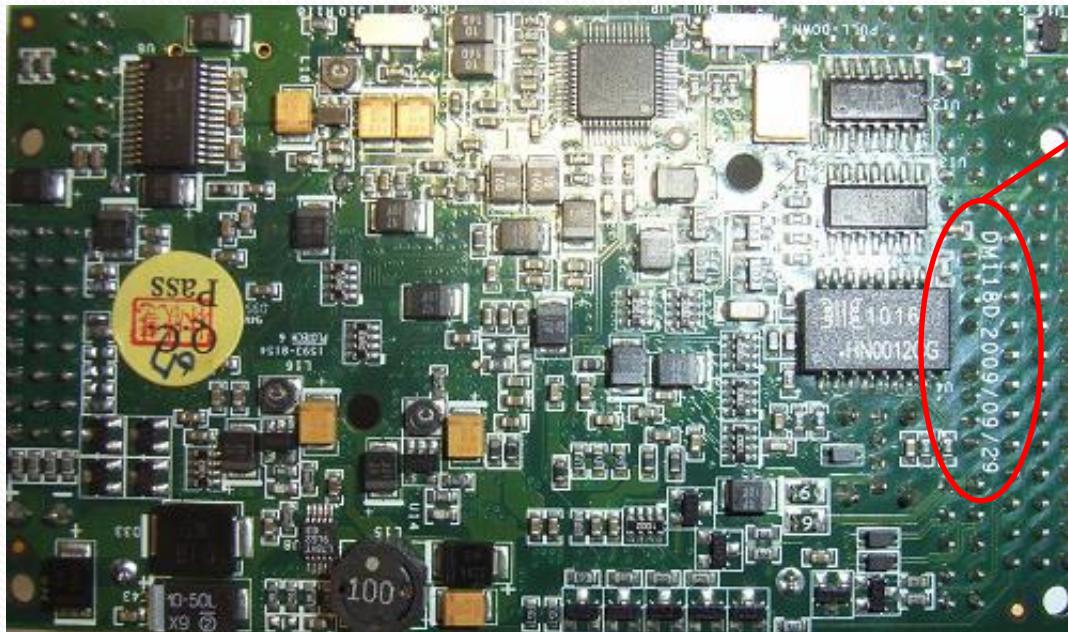
# COM 4 / Half Duplex TTL

Pin #	Signal Name	Line Color
1	GND	Other
2	Vxx	Red
3	TXRX4	Black



# COM 4 / Half Duplex TTL

**Remarks:** COM4 has different configurations on different RB-100 models.



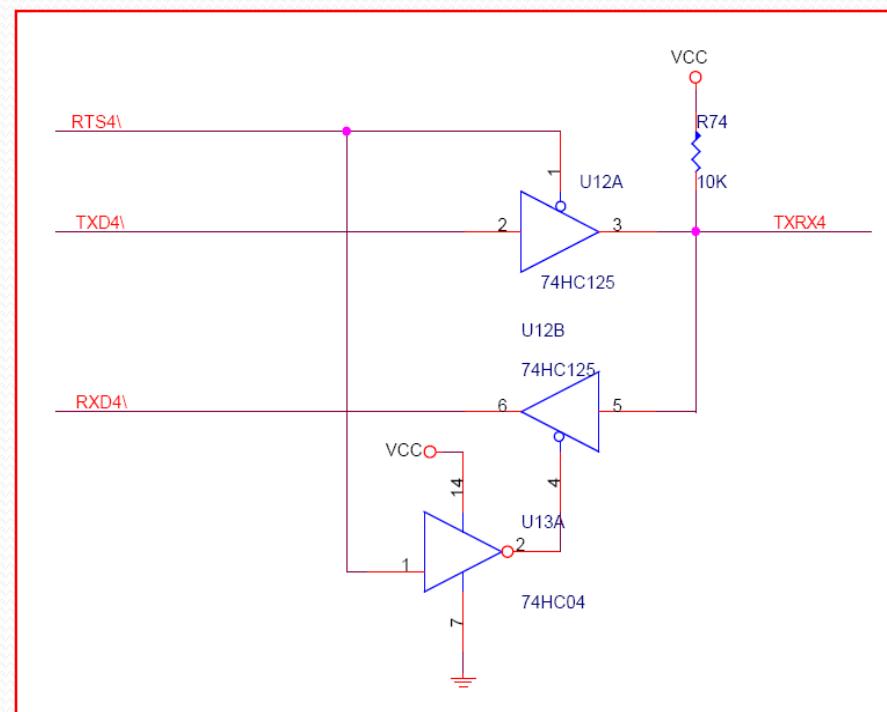
You can check the model no. in the bottom side of RB-100.

# COM 4 / Half Duplex TTL

- For older models:

**DM118A/DM118B/DM118C**

- COM4 is an usual industrial half-duplex port whose data-transfer direction is controlled by **RTS** signal of COM4.
  - RTS enabled: transfer data
  - RTS disabled: receive data

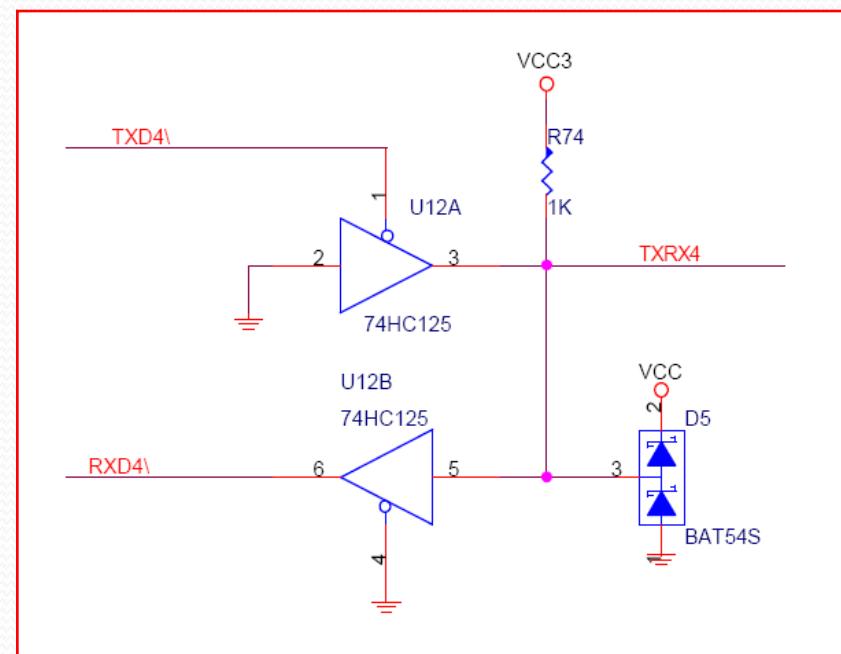


# COM 4 / Half Duplex TTL

- For the newest model:

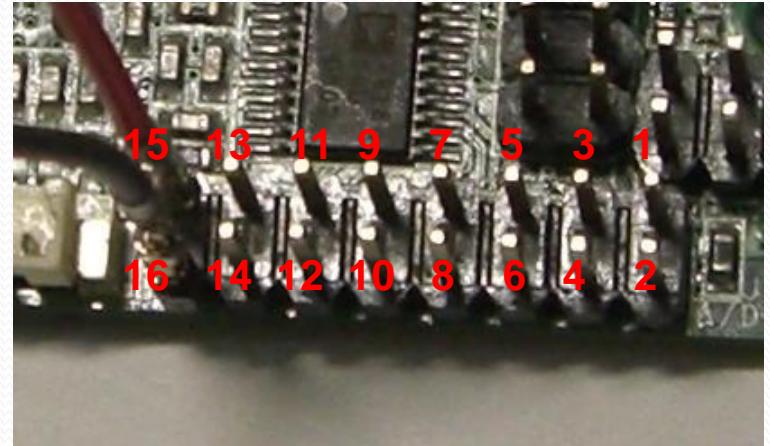
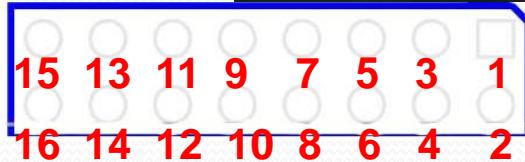
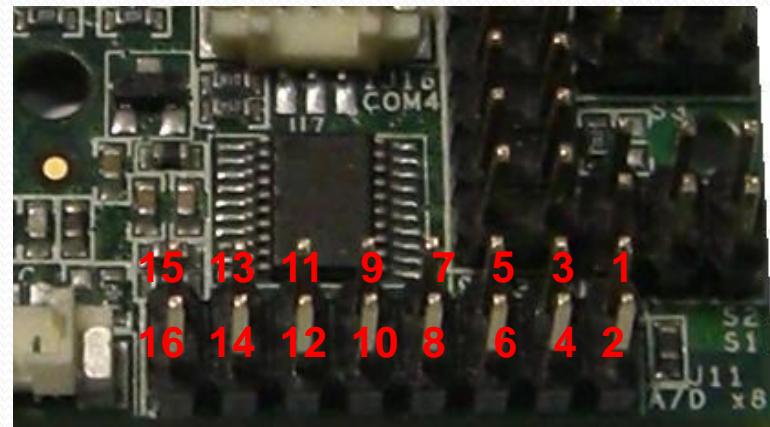
**DM118D**

- COM4 is equivalent to a full-duplex port of TXD/RXD shorted.
- It is the configuration most compatible to common serial servos, such as Bioloid AX-12 and KONDO KRS-2552HV.



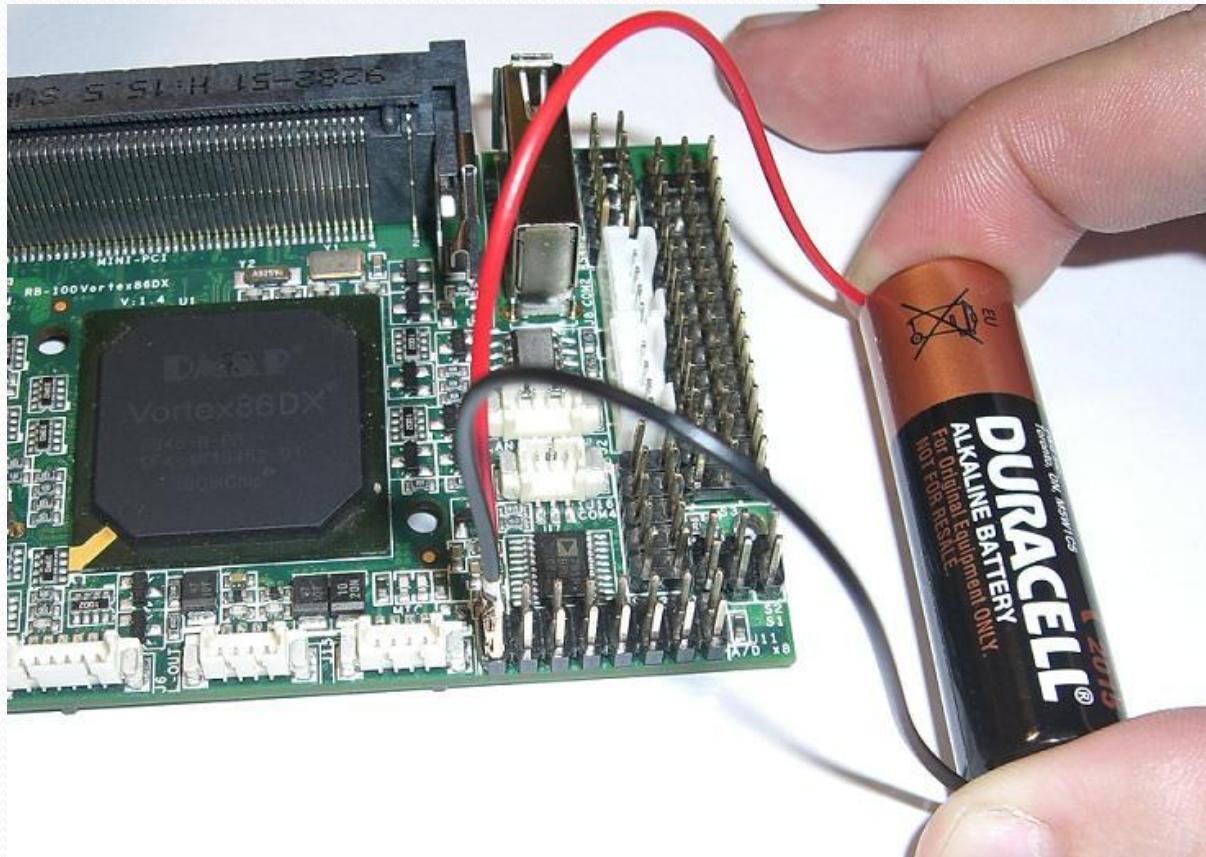
# A/D 8 Ch

Pin #	Signal Name	Pin #	Signal Name
1	AD-VIN0	2	ADGND
3	AD-VIN1	4	ADGND
5	AD-VIN2	6	ADGND
7	AD-VIN3	8	ADGND
9	AD-VIN4	10	ADGND
11	AD-VIN5	12	ADGND
13	AD-VIN6	14	ADGND
15	AD-VIN7	16	ADGND



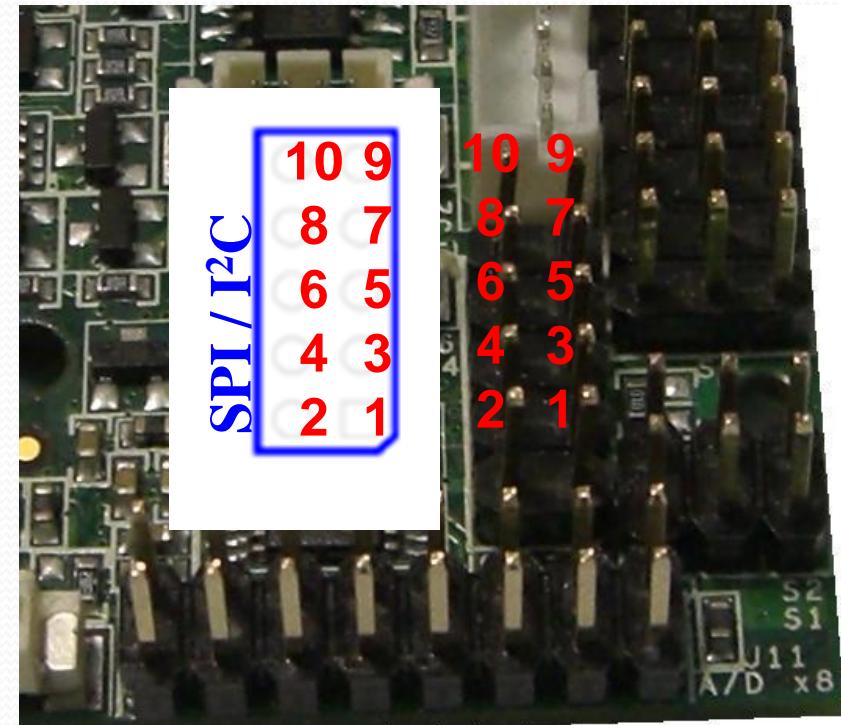
# A/D 8 Ch

**Connection Example – Measure battery voltage  
with A/D Channel7 (AD-VIN7)**



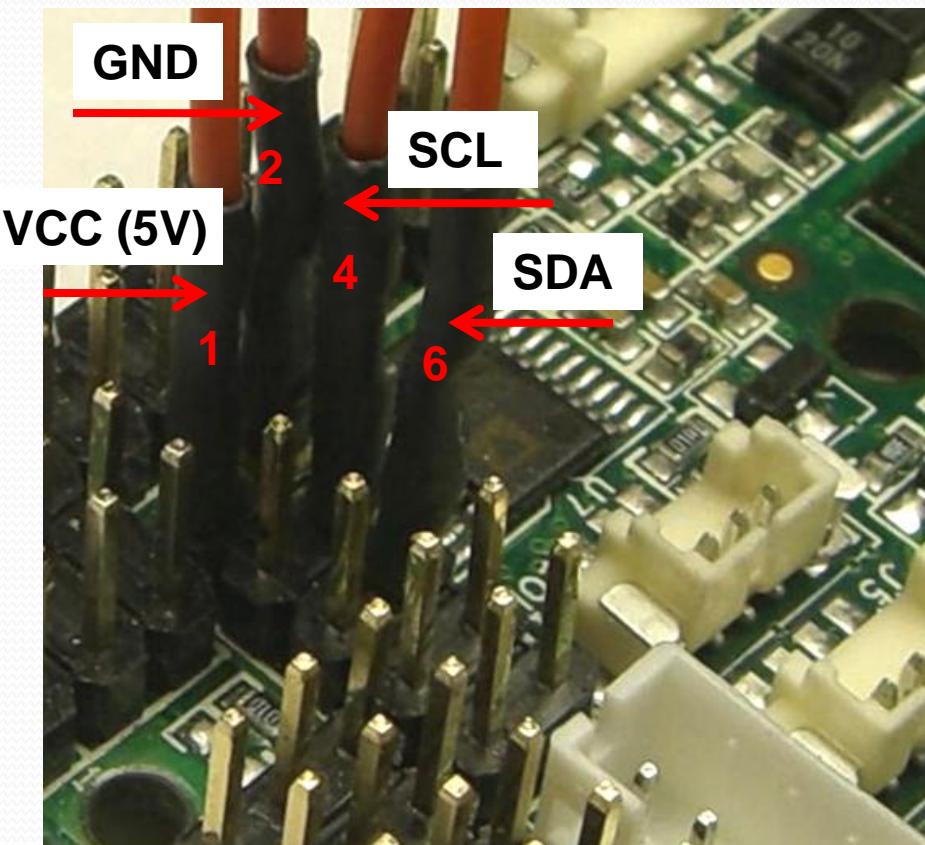
# I<sup>2</sup>C / SPI

Pin #	Signal Name	Pin #	Signal Name
1	GND	2	VCC (5V)
3	SPICLK (CPOL1, CPHA1)	4	I2C0_SCL
5	SPICLK (CPOL0, CPHA1)	6	I2C0_SDA
7	SPIDO	8	Reserved
9	SPIDI	10	SPISS



# I<sup>2</sup>C

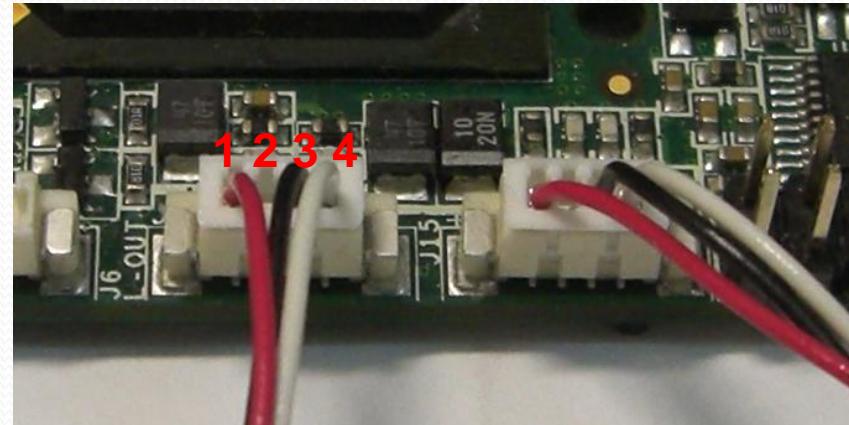
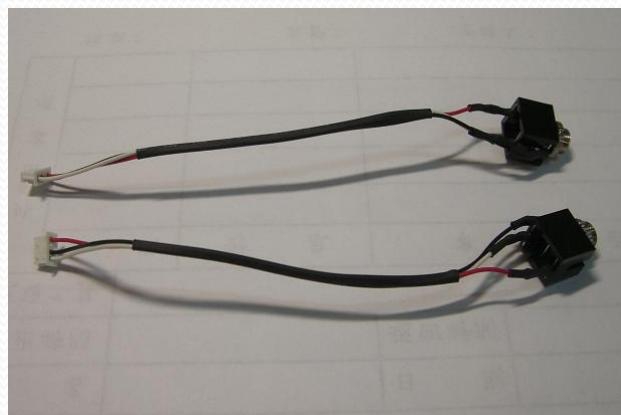
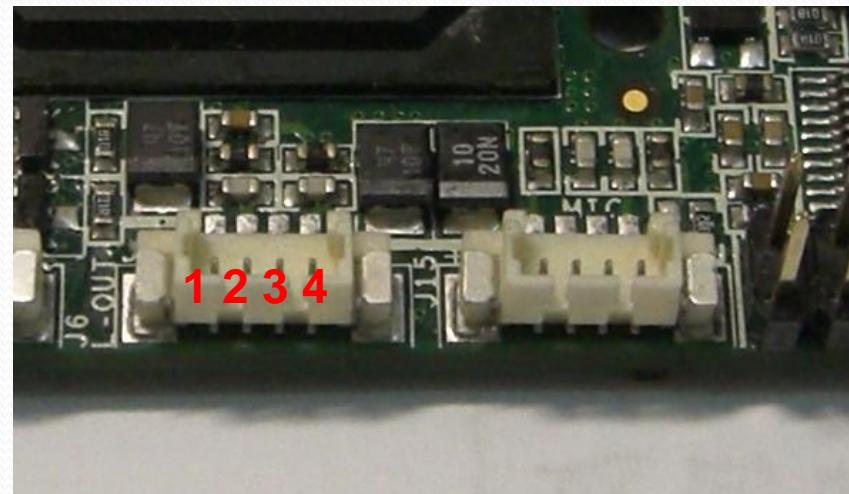
## Connection Example



# Audio connector

## Speaker Line Out

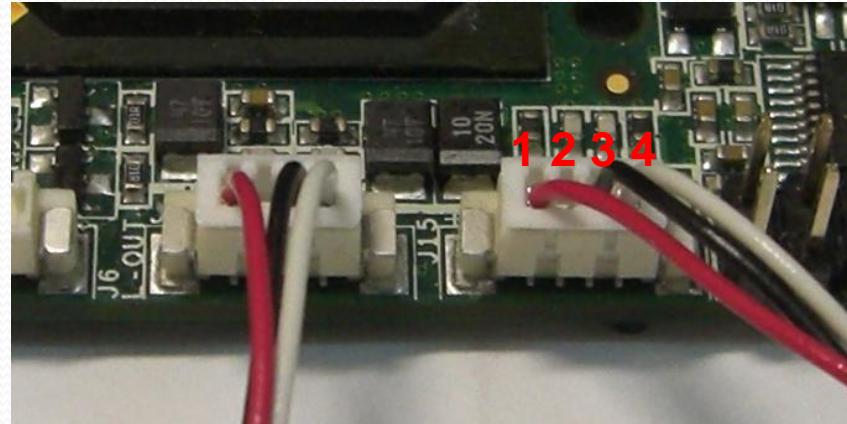
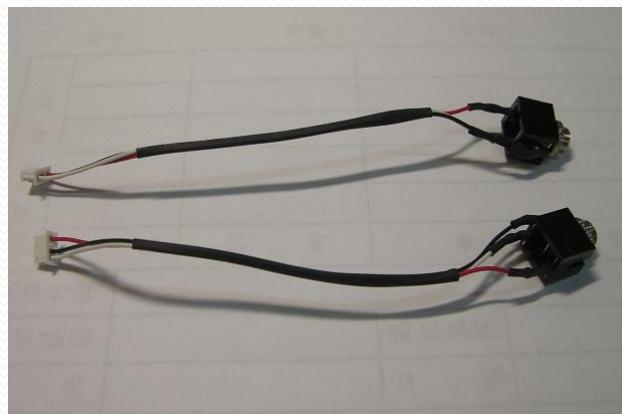
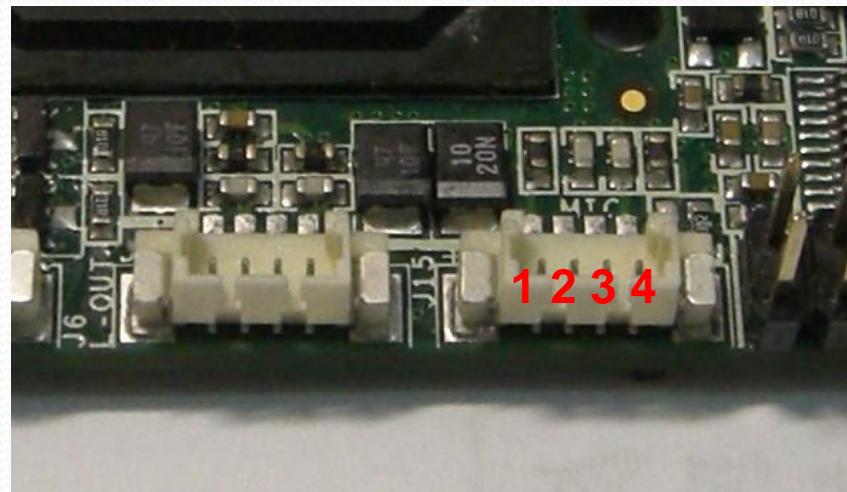
Pin #	Signal Name	Pin #	Signal Name
1	LOUTR	2	GND
3	GND	4	LOUTL



# Audio connector

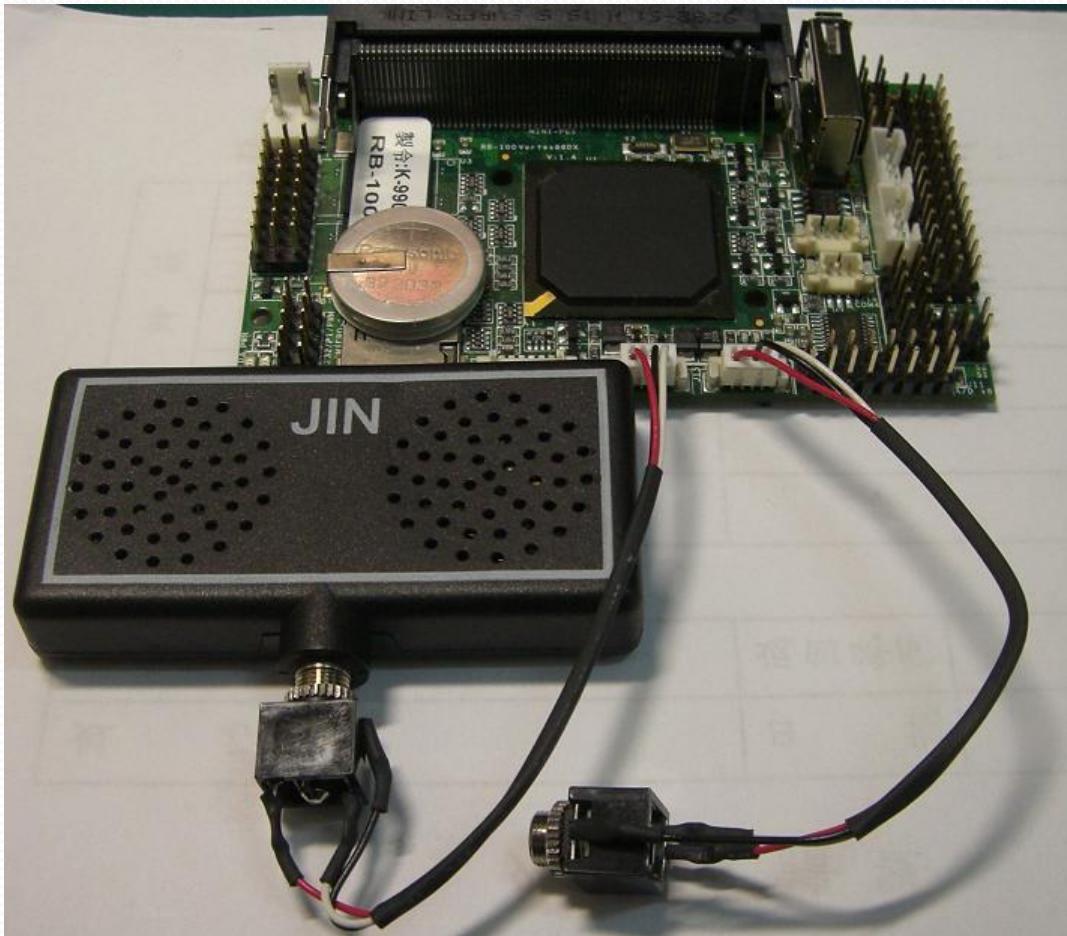
## Mic in

Pin #	Signal Name	Pin #	Signal Name
1	MICVREF	2	GND
3	GND	4	MIC-IN



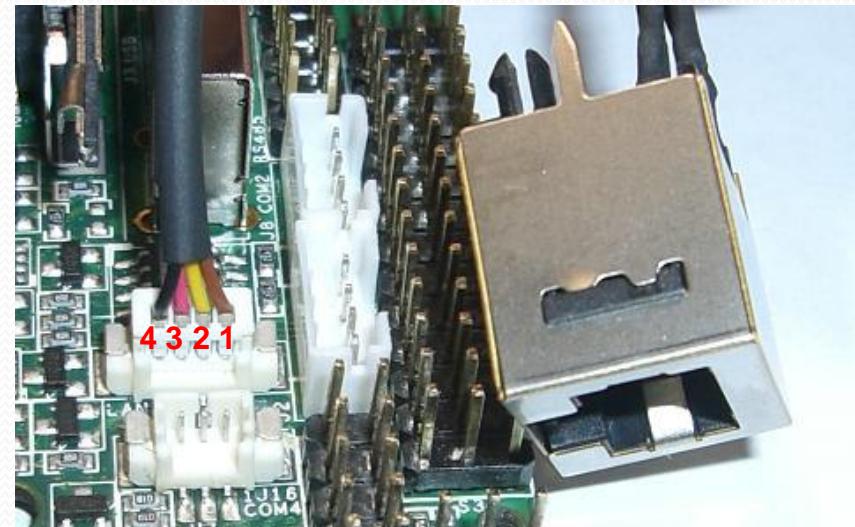
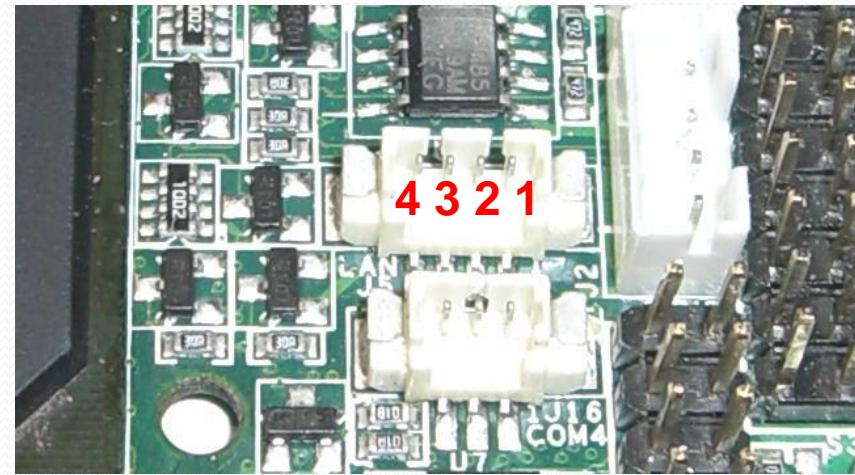
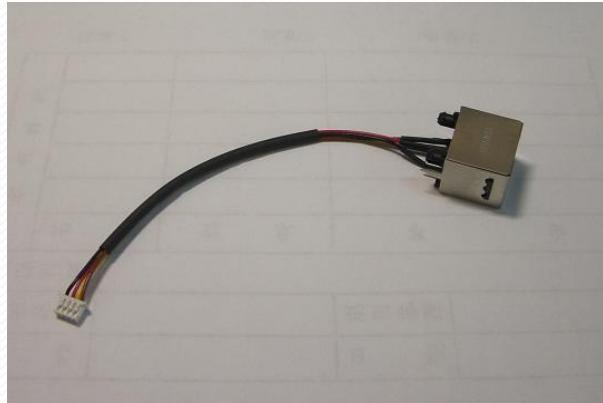
# Audio connector

## Connection Example



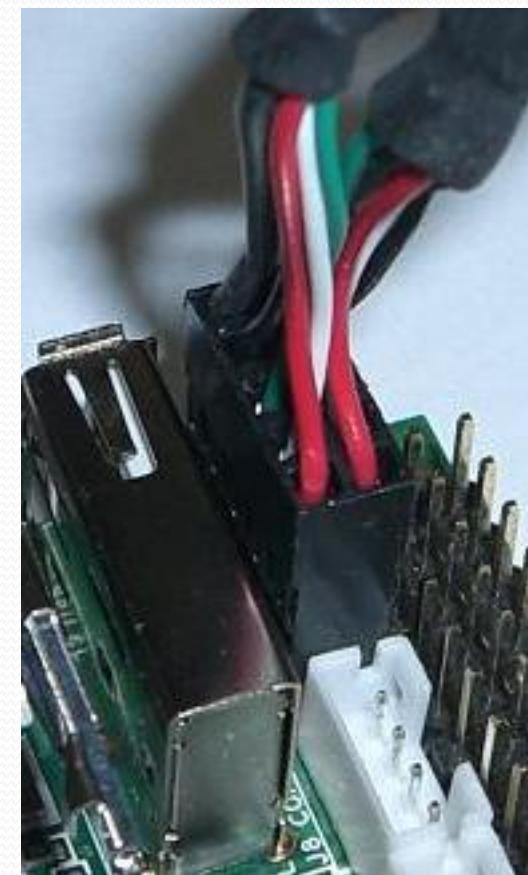
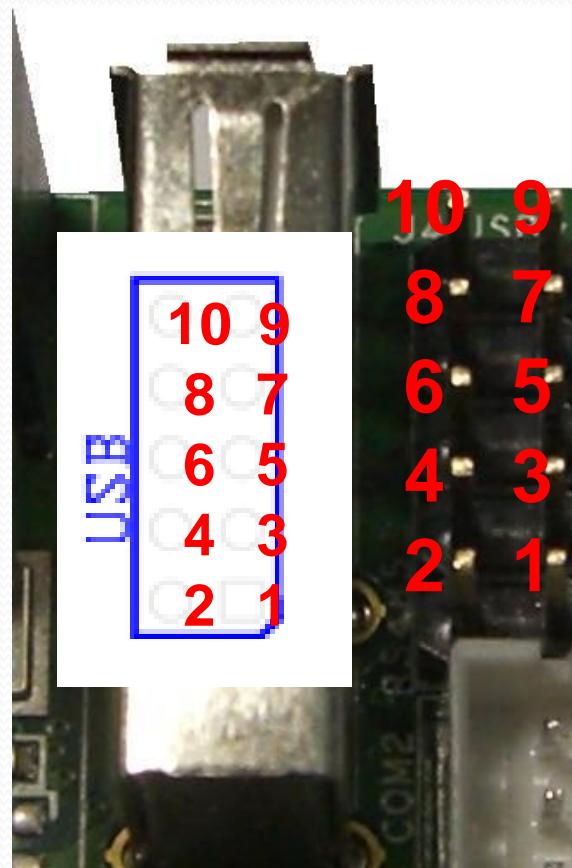
# LAN connector

Pin #	Signal Name	Pin #	Signal Name
1	LAN-TX+	2	LAN-TX-
3	LAN-RX+	4	LAN-RX-



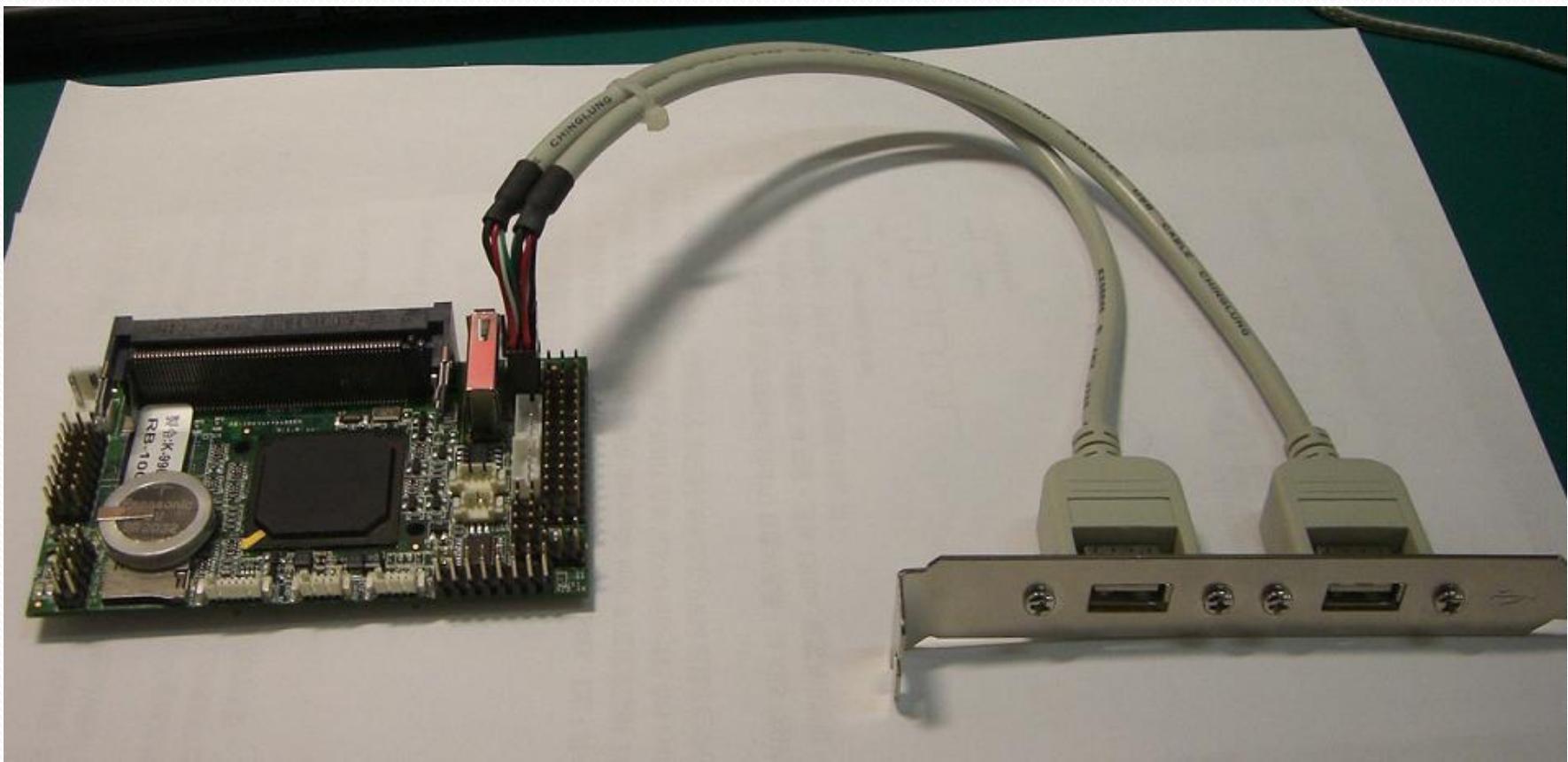
# USB

Pin #	Signal Name	Pin #	Signal Name
1	VCC	2	VCC
3	LUSBD0-	4	LUSBD1-
5	LUSBD0+	6	LUSBD1+
7	GND	8	GND
9	GGND	10	GGND



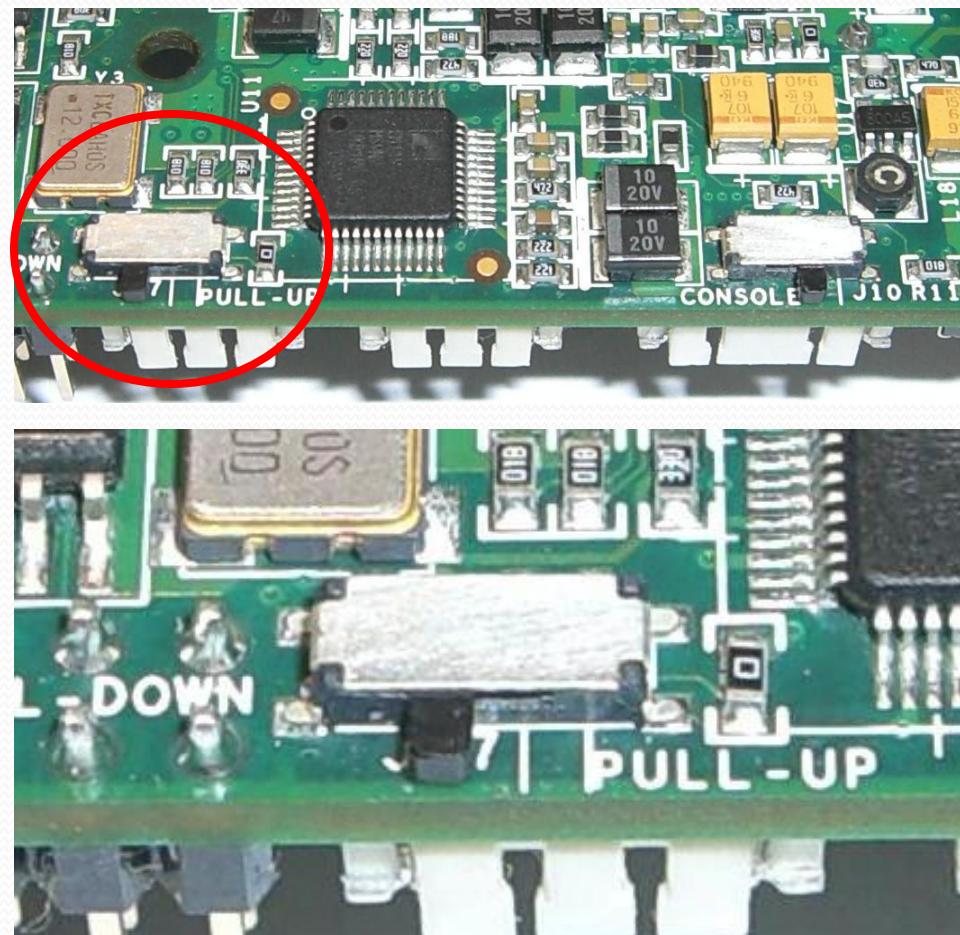
# USB

## Connection Example



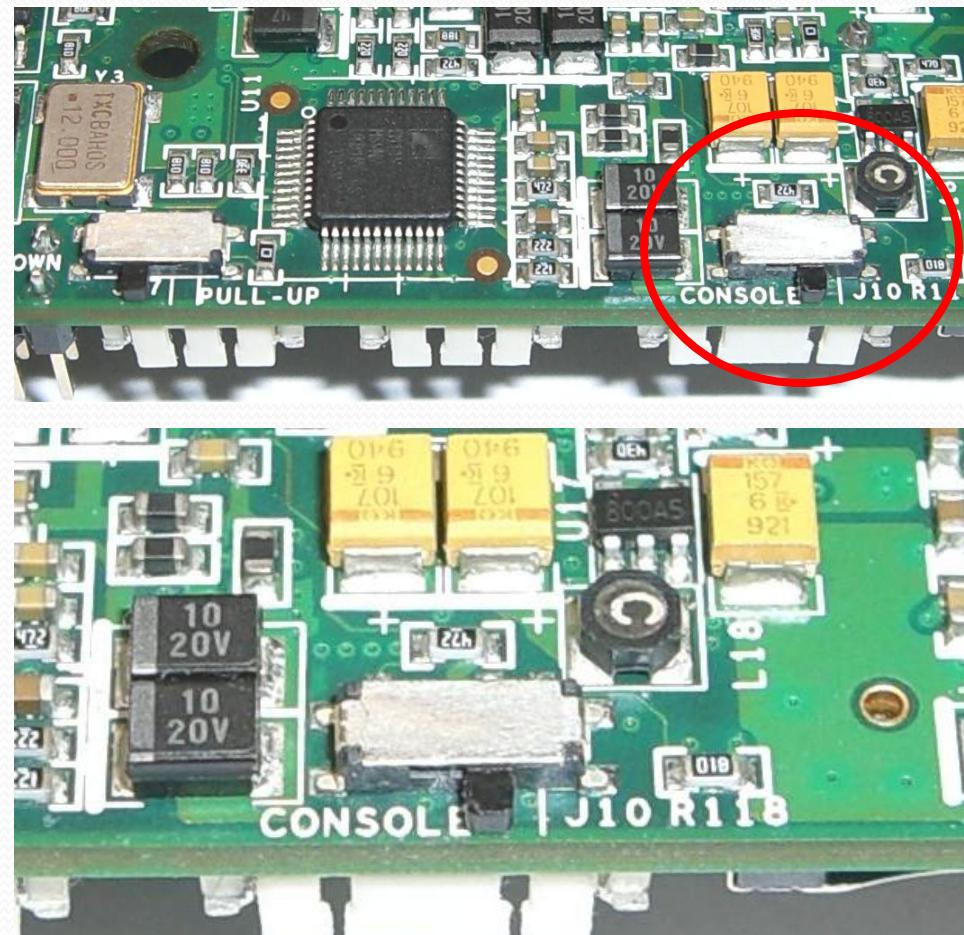
# PWM Initial pull up/down switch

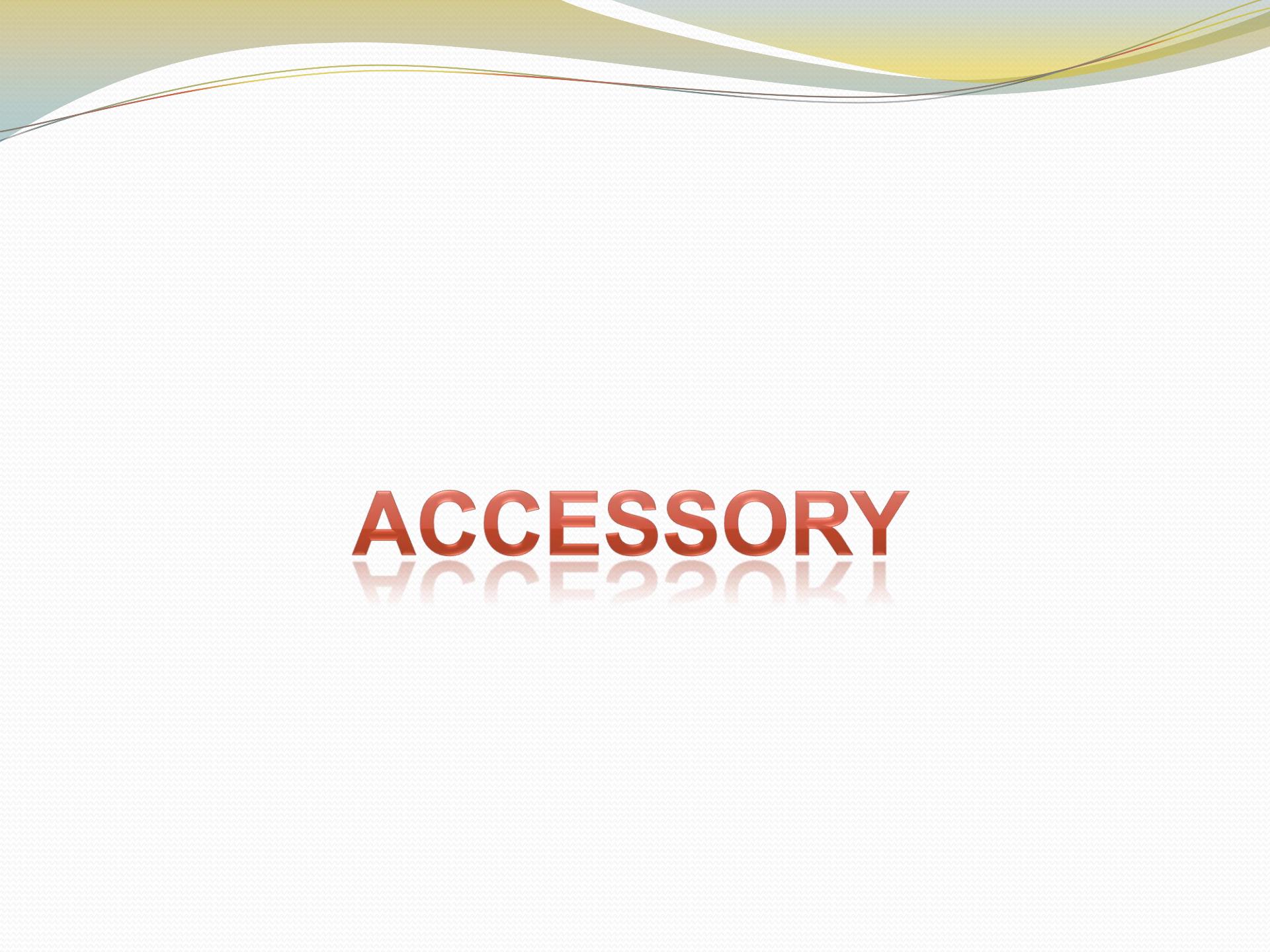
Pin	Signal Name
Left	PWM init Pull Down
Right	PWM init Pull UP



# Console Redirection switch

Pin	Signal Name
Left	Console Redirection enable
Right	Console Redirection disable





# **ACCESSORY**

# Mini VGA Card



- Volari Z9S VGA Chipset with 32MB DDR2
- Up to 1600 x 1200 @16M Color
- Support Windows 98/2000/XP, Linux



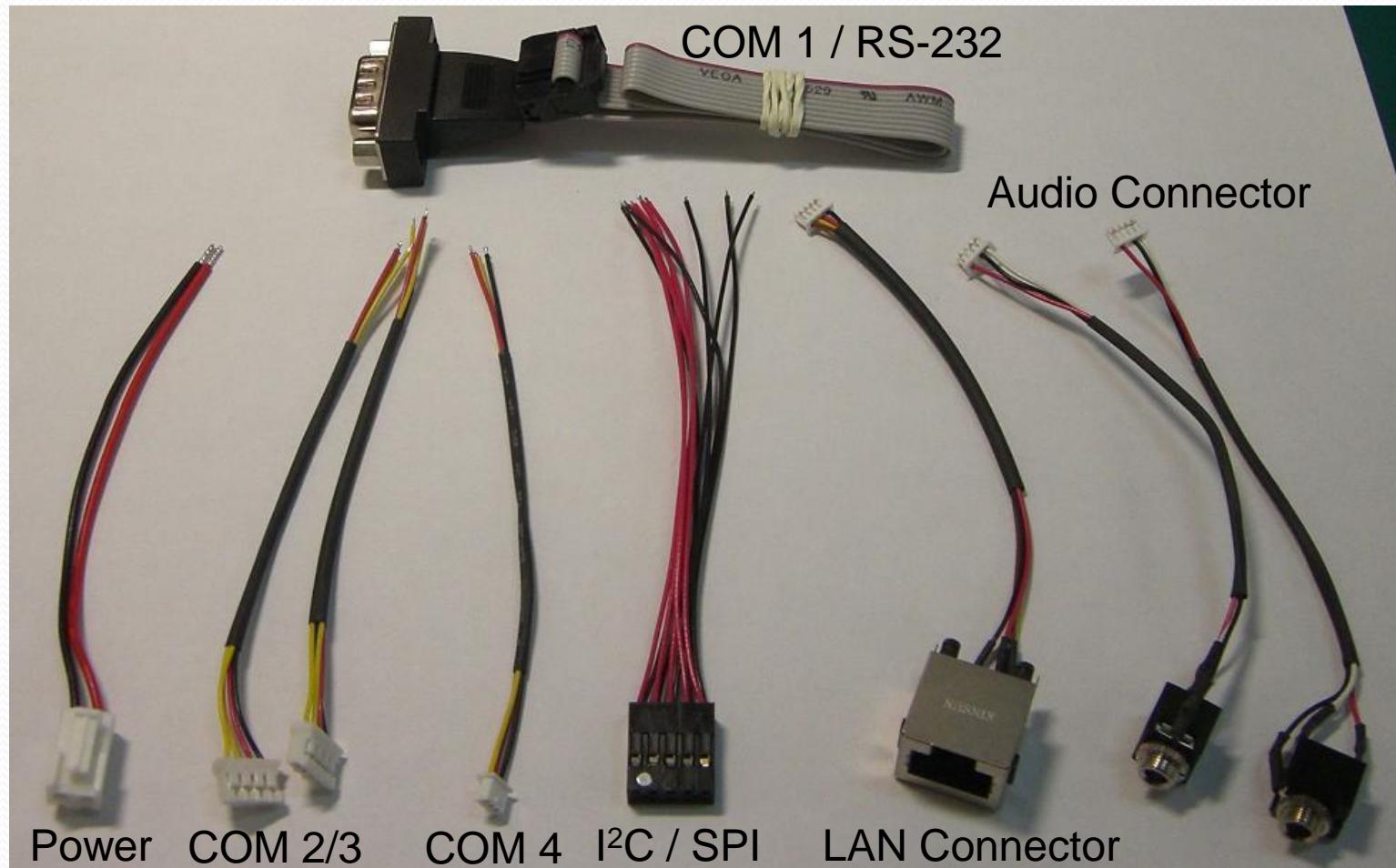
# Mini PCI Wireless Card



- VIA VT6655 Chipset
- 802.11b/g



# RoBoard RB-100 Cable set



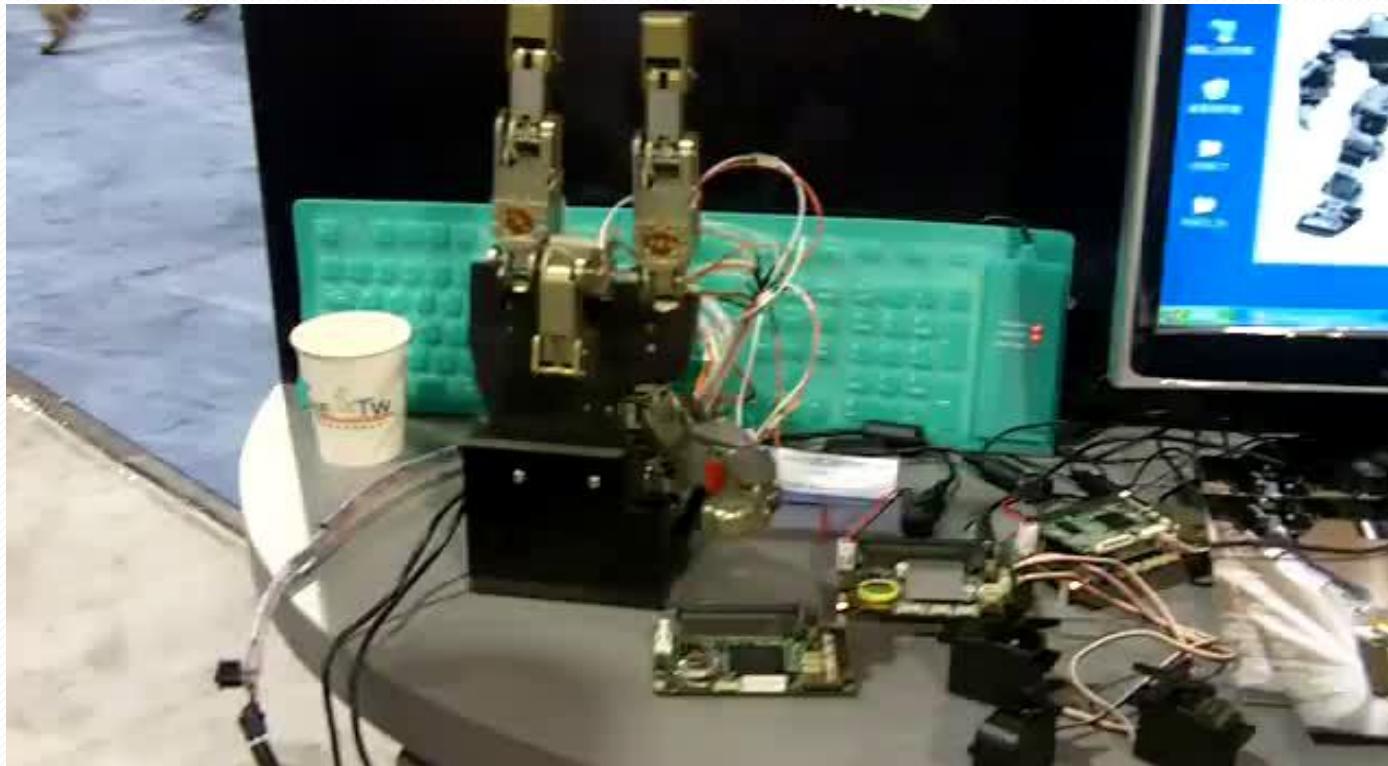
# APPLICATION

# RoBoard Booth in Computex



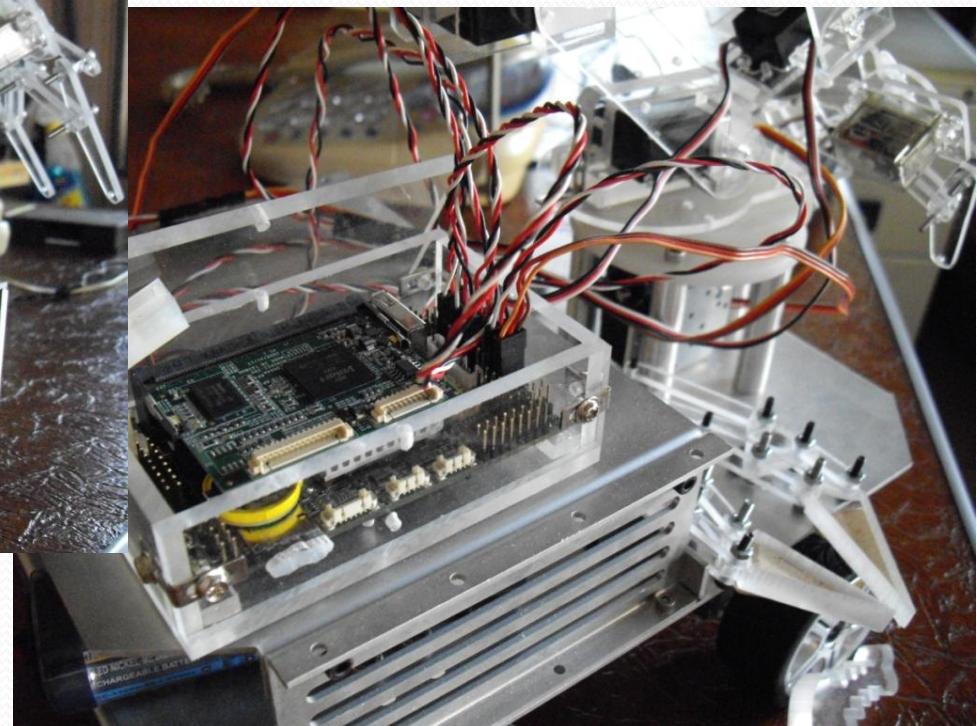
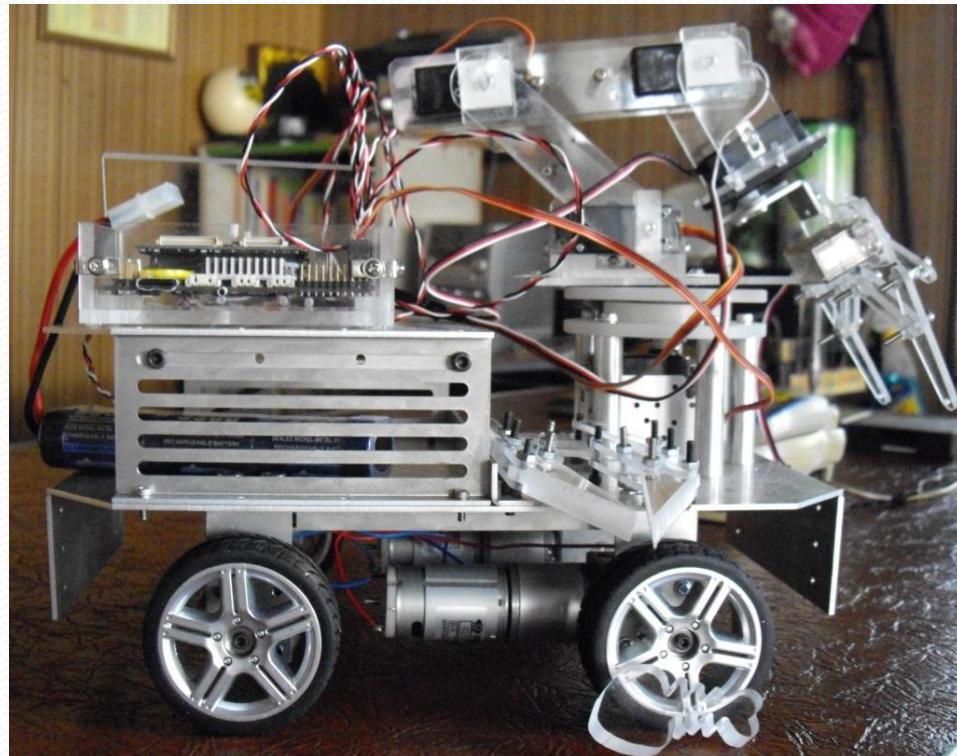
it.oc.com.tw

# RoBoard Application (DMP Robot Hand)

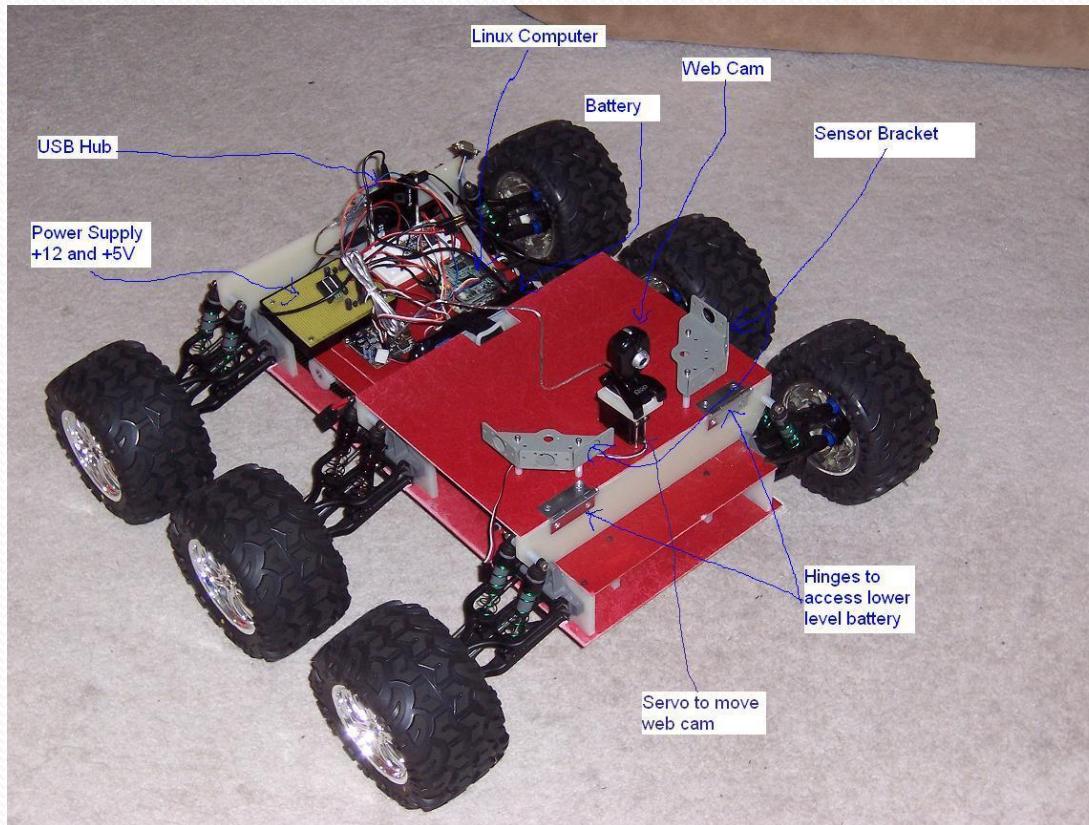


[http://www.youtube.com/watch?v=Xsld8eyI\\_Ag](http://www.youtube.com/watch?v=Xsld8eyI_Ag)

# RoBoard Application (吳明展, Taiwan)



# RoBoard Application (Asbury Robotics, US)

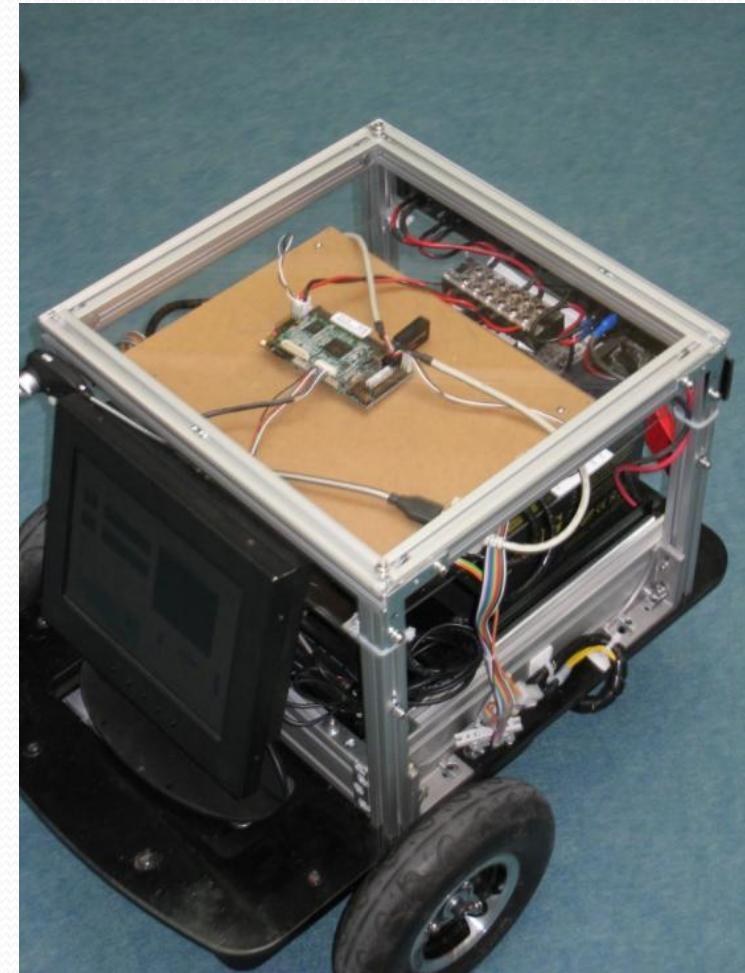
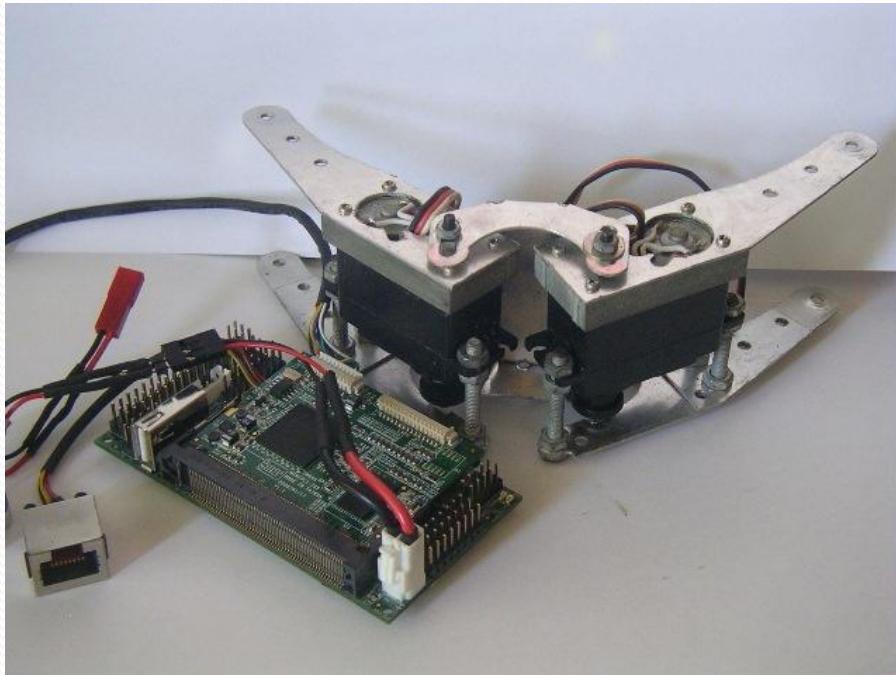


<http://asburyrobotics.com/>

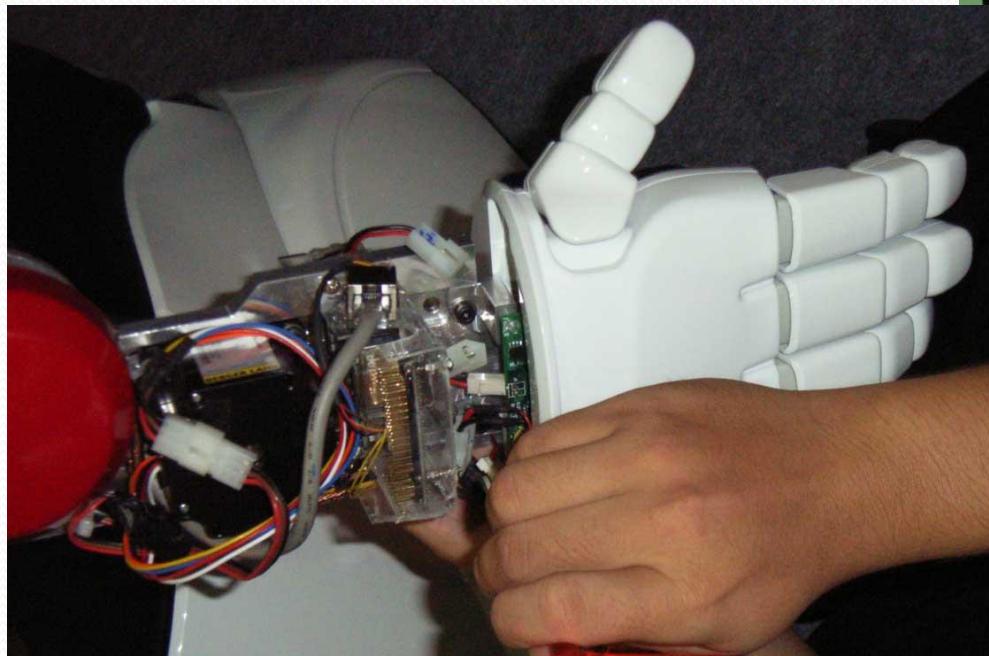
# RoBoard Application (UAV Surrogate, US)



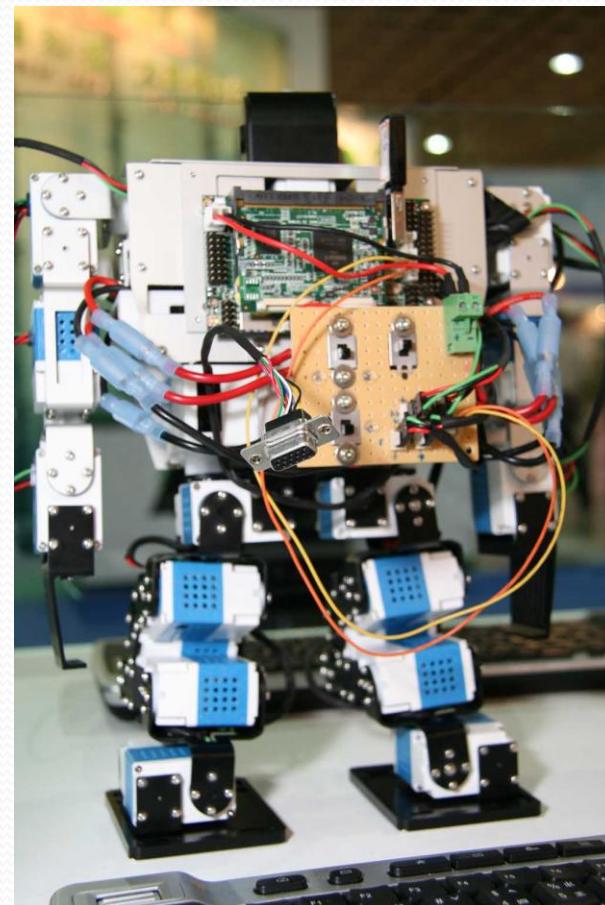
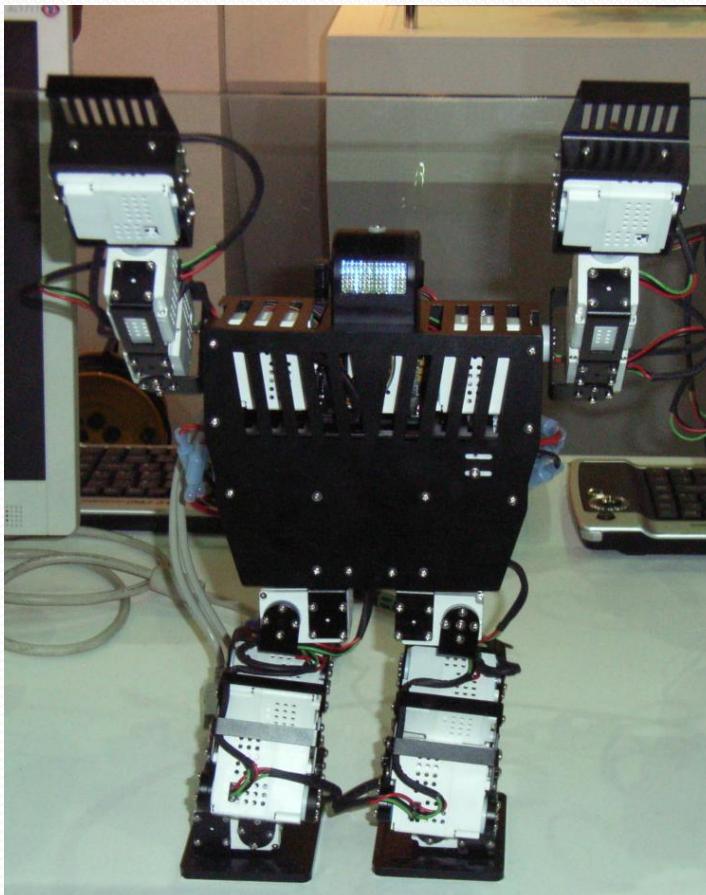
# RoBoard Application (PMC, Taiwan)



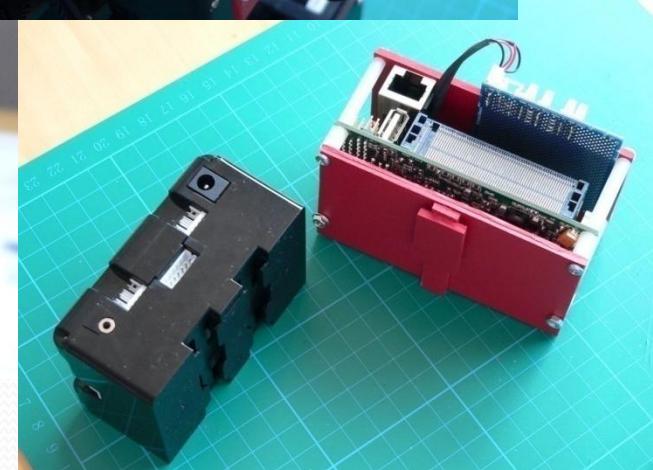
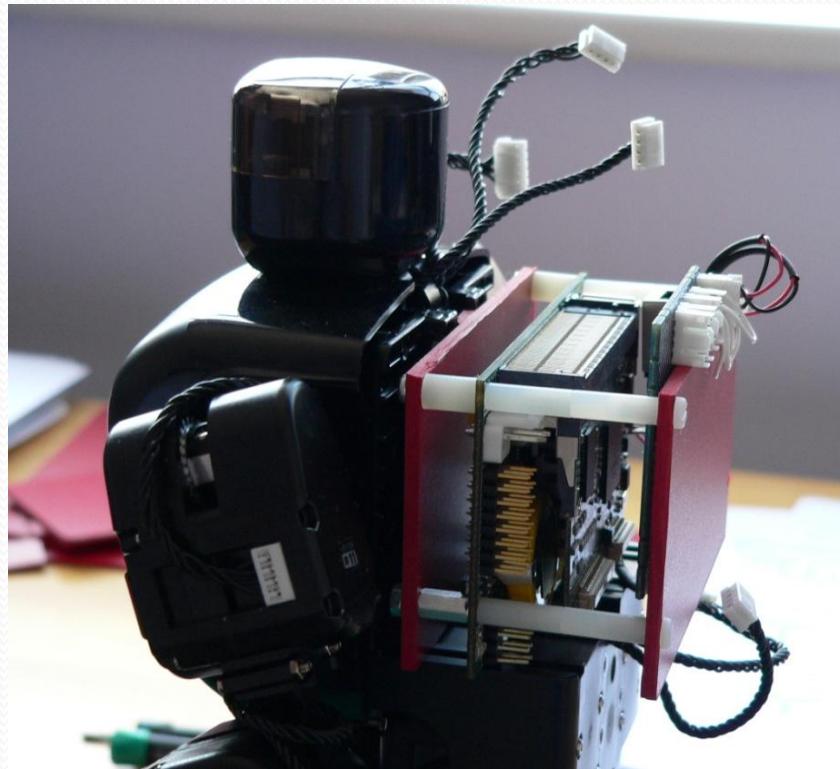
# RoBoard Application (PMC Upitor, Taiwan)



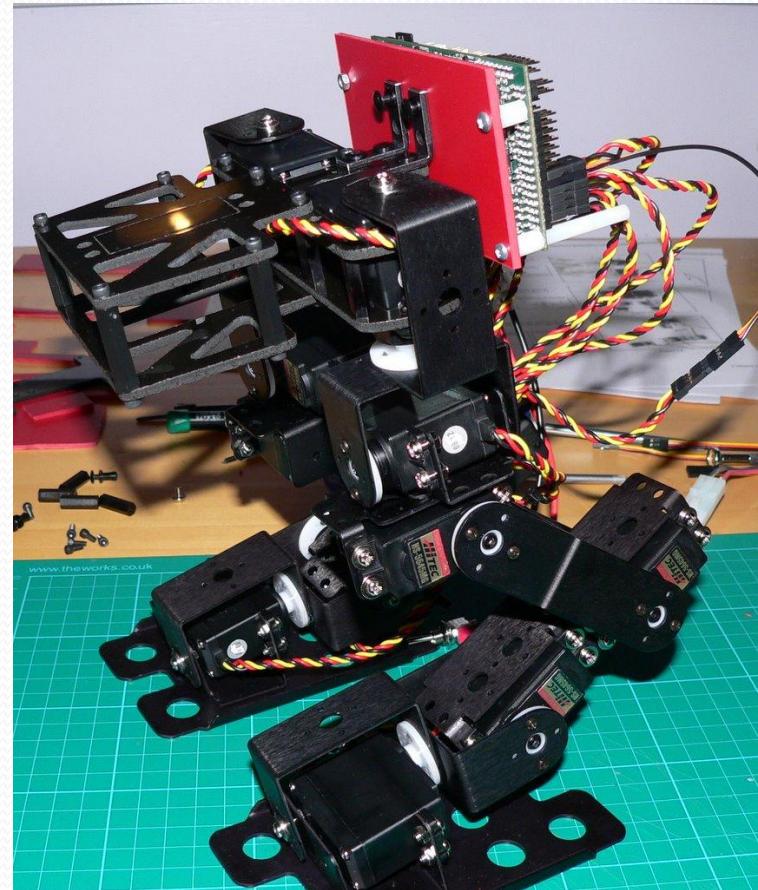
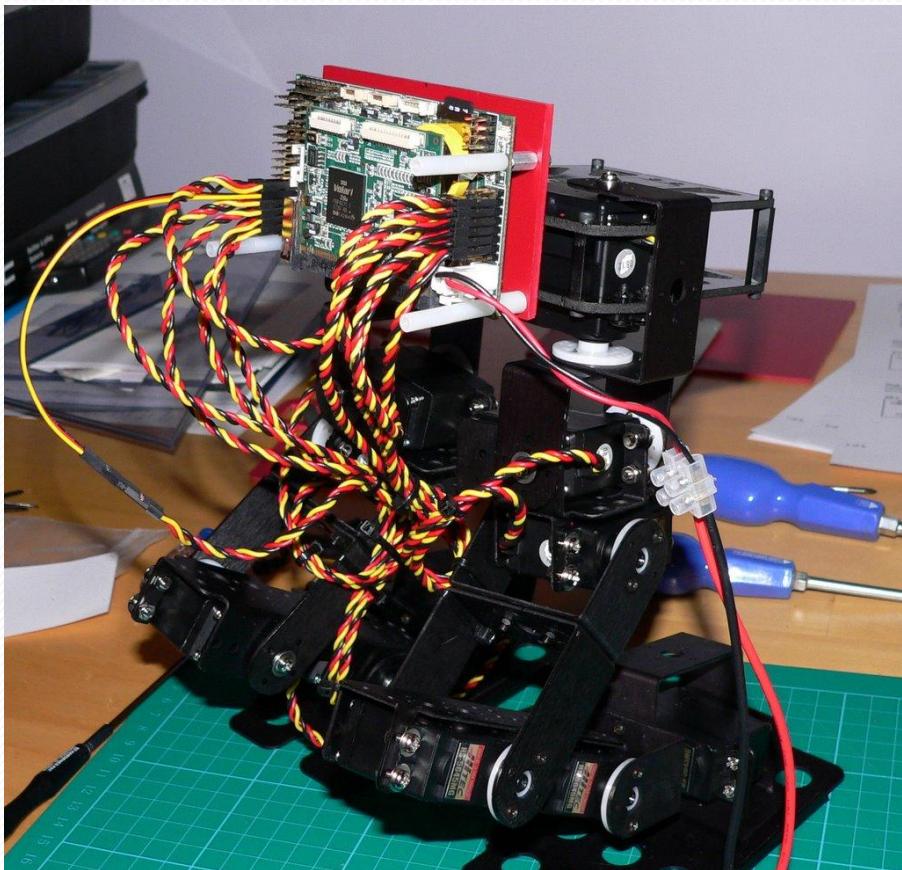
# RoBoard Application (PMC Humanoid, Taiwan)



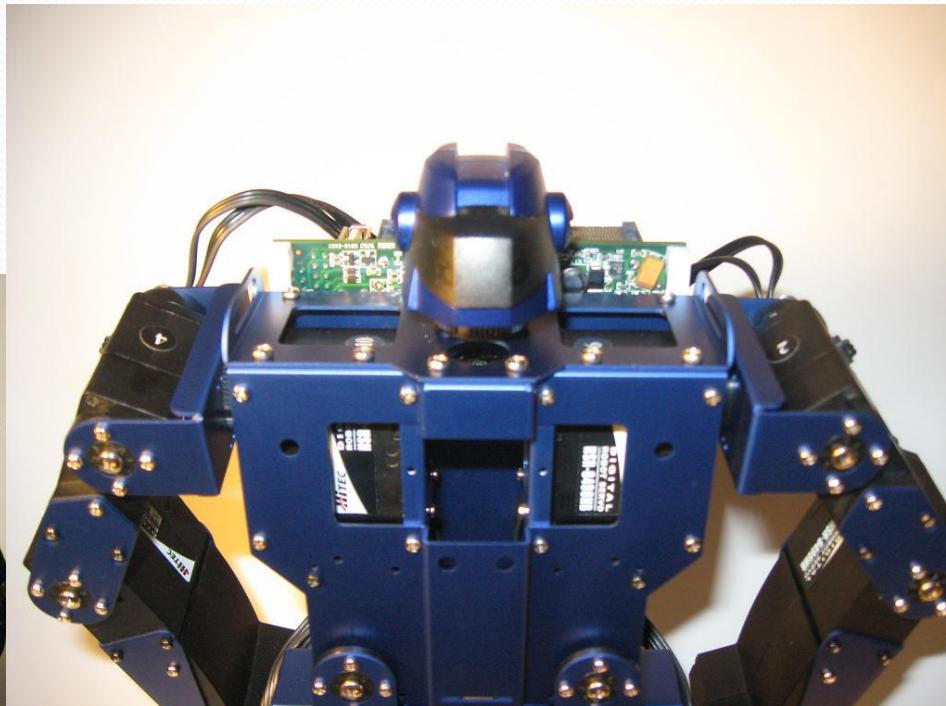
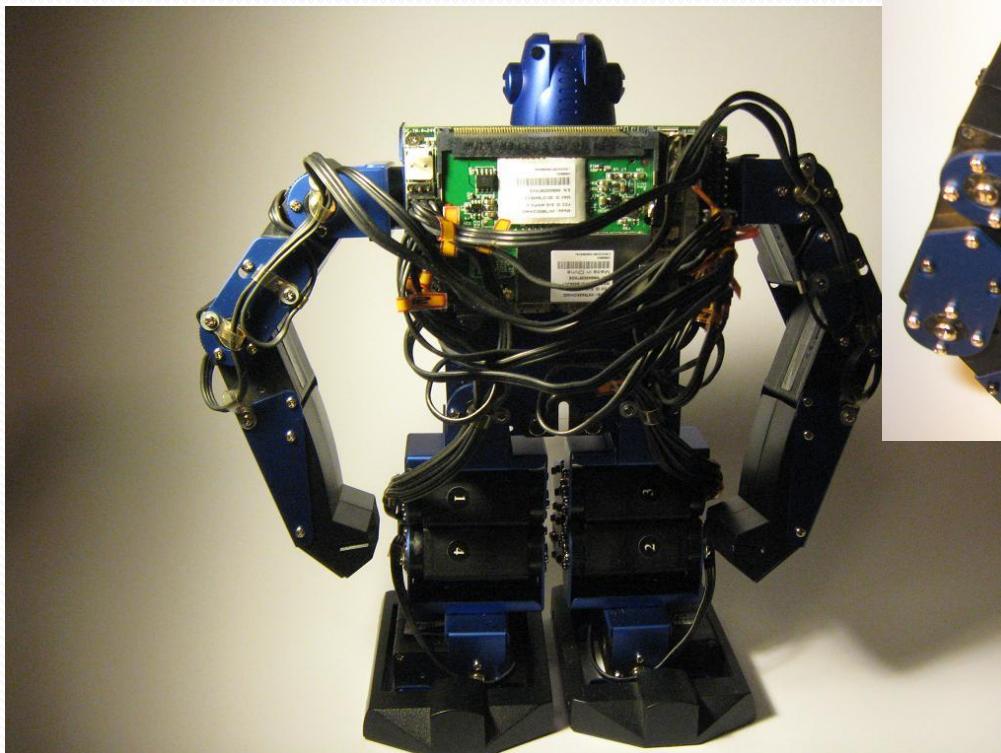
# RoBoard Application (Robobuilder, UK)



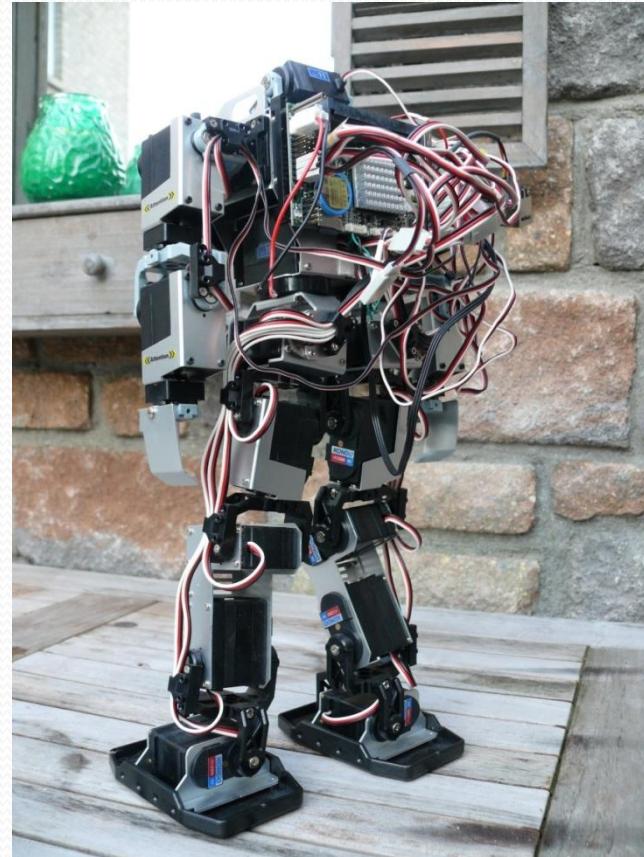
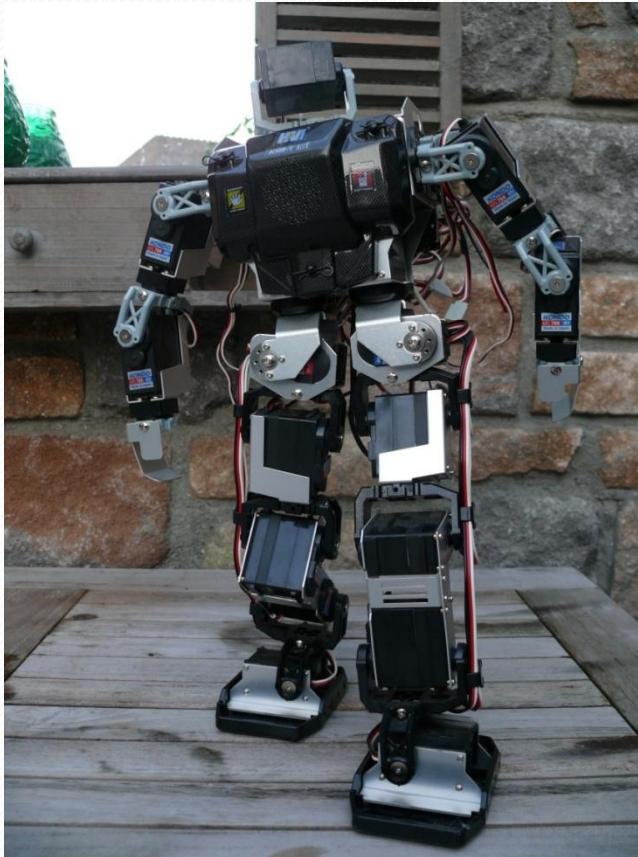
# RoBoard Application (Lynxmotion, UK)



# RoBoard Application (Robonova, Virginia, US)



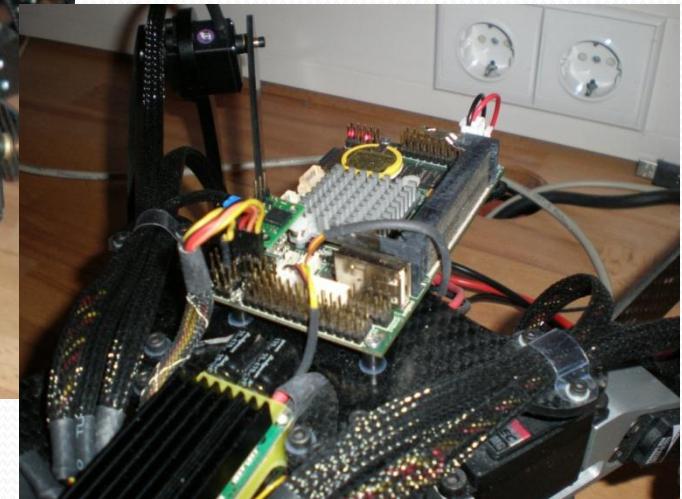
# RoBoard Application (KONDO, Netherlands)



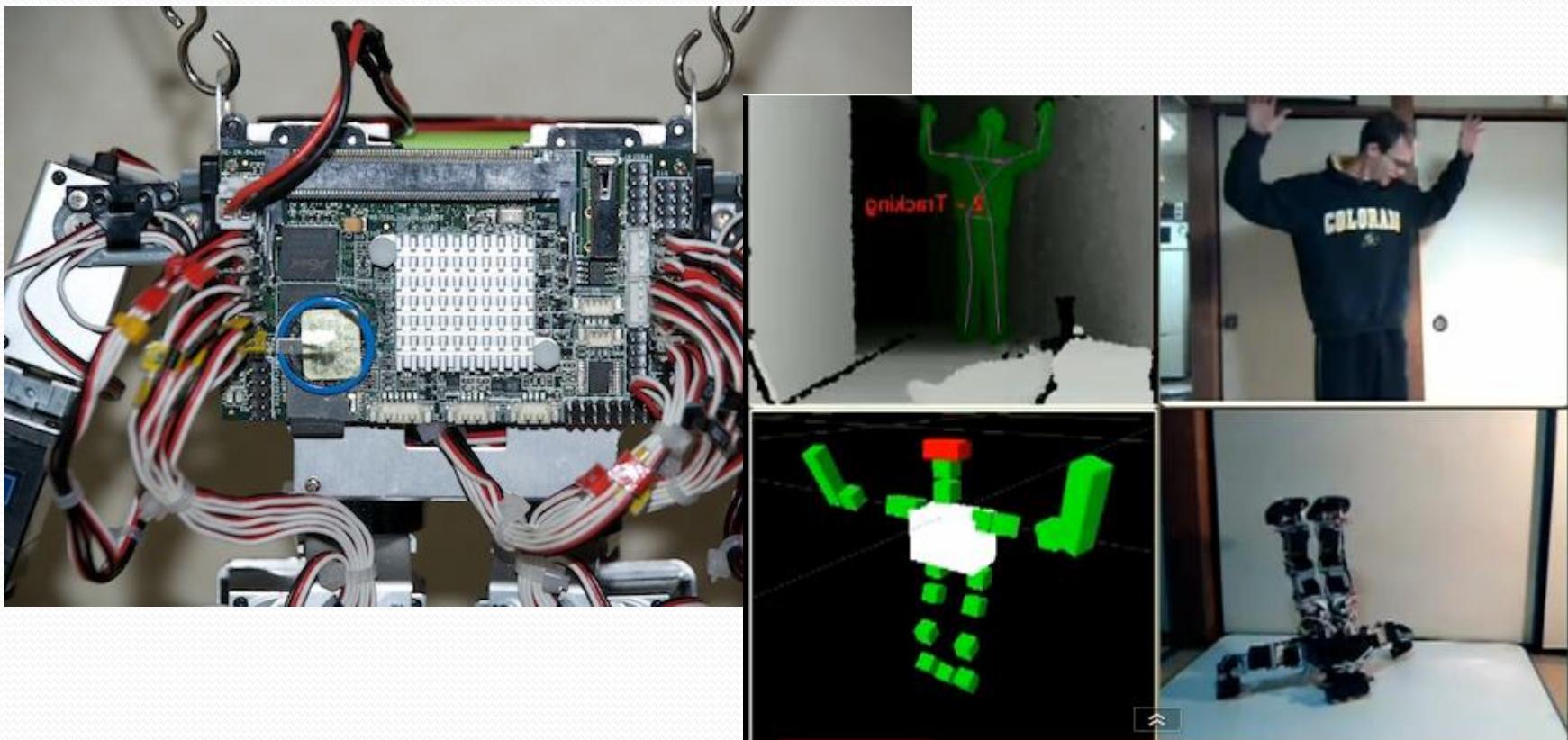
# RoBoard Application (Humanoid, Mexico)



# RoBoard Application (Spider, Mexico)



# RoBoard Application (Veltrobot, Kinect + ROS, Japan)



<http://taylor.veltrop.com/robotics/khrhumanoidv2.php>  
<http://www.youtube.com/watch?v=GdSfLyZl4N0>

# The heart of Robotics

## THANK YOU

[info@roboard.com](mailto:info@roboard.com)  
<http://www.roboard.com>