

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

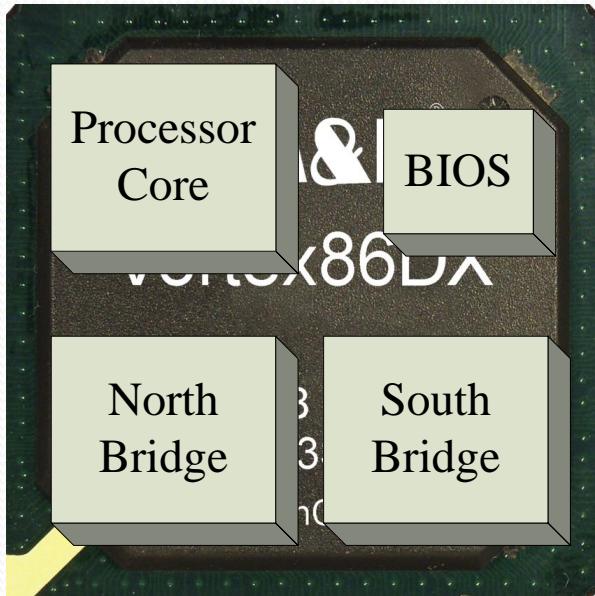


- Feb. 2007
- 486 – 300MHz
- 0.13 um process



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

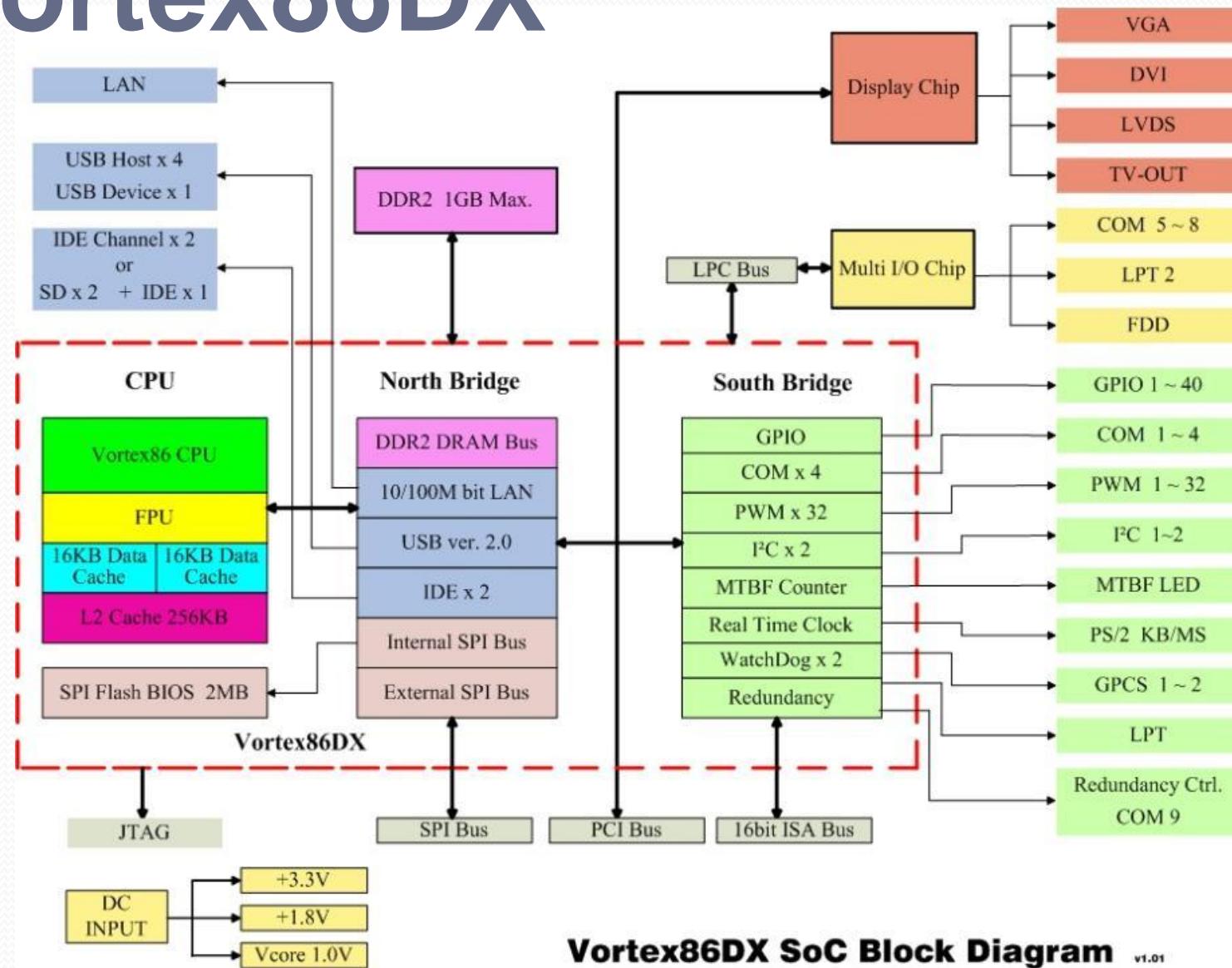
Vortex86DX



→ 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

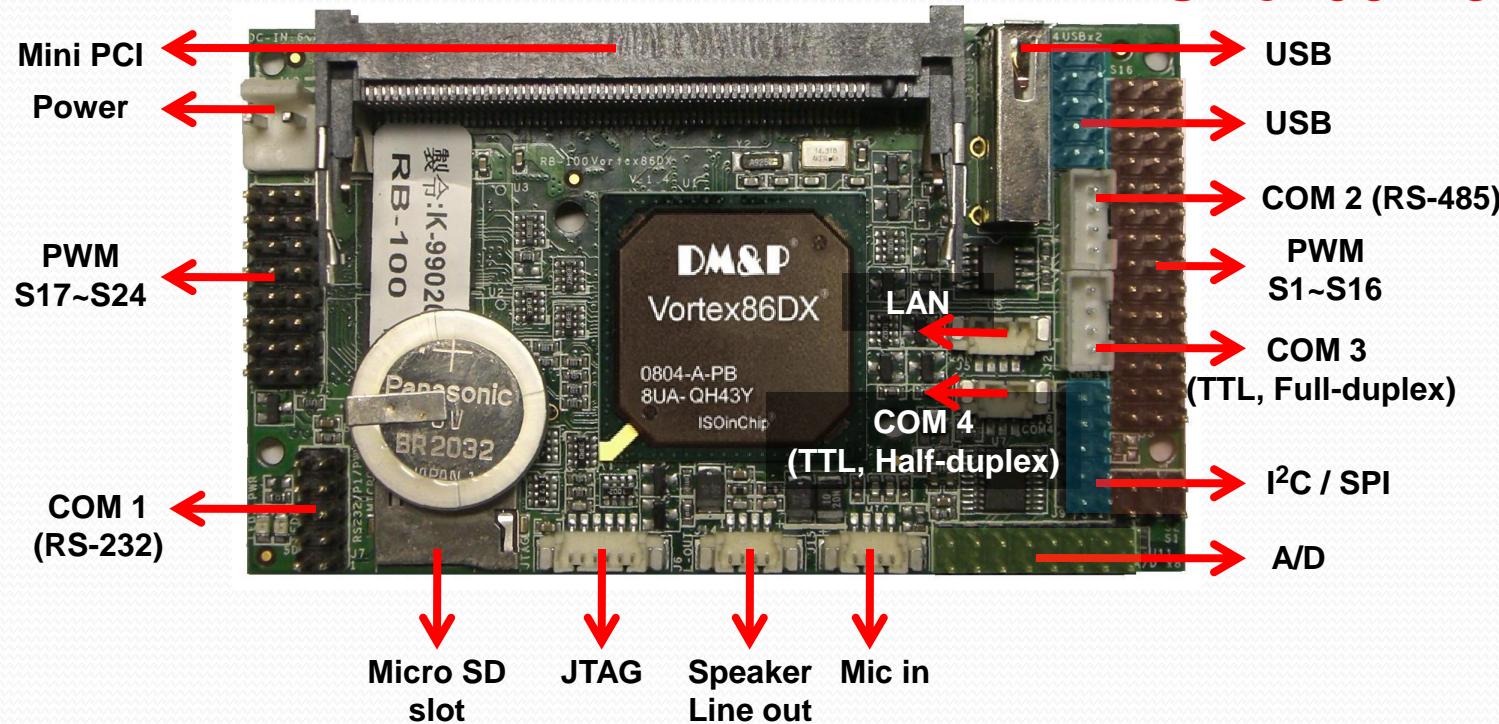
RoBoard RB-100

- 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

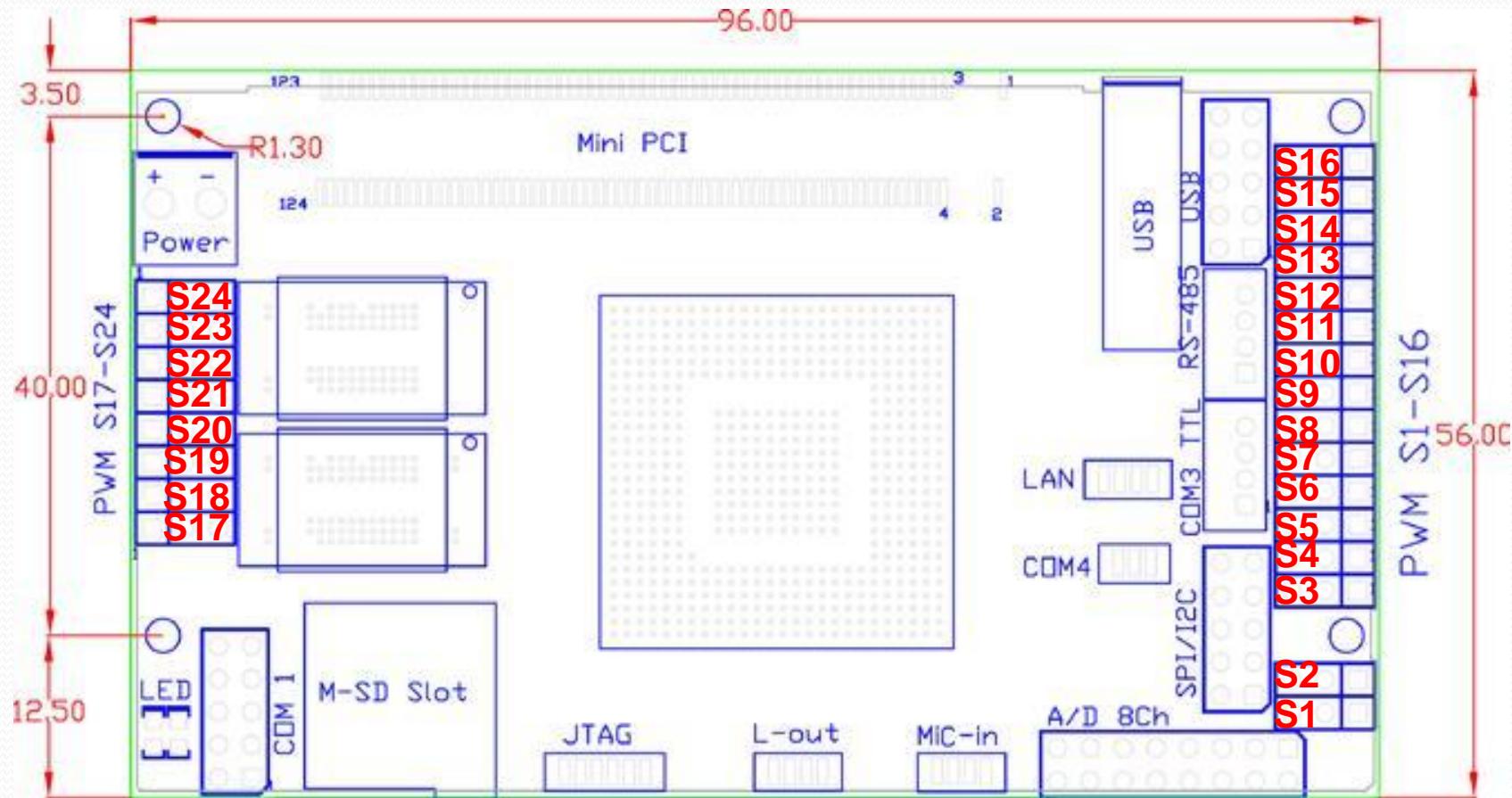
Size: 96 x 56mm



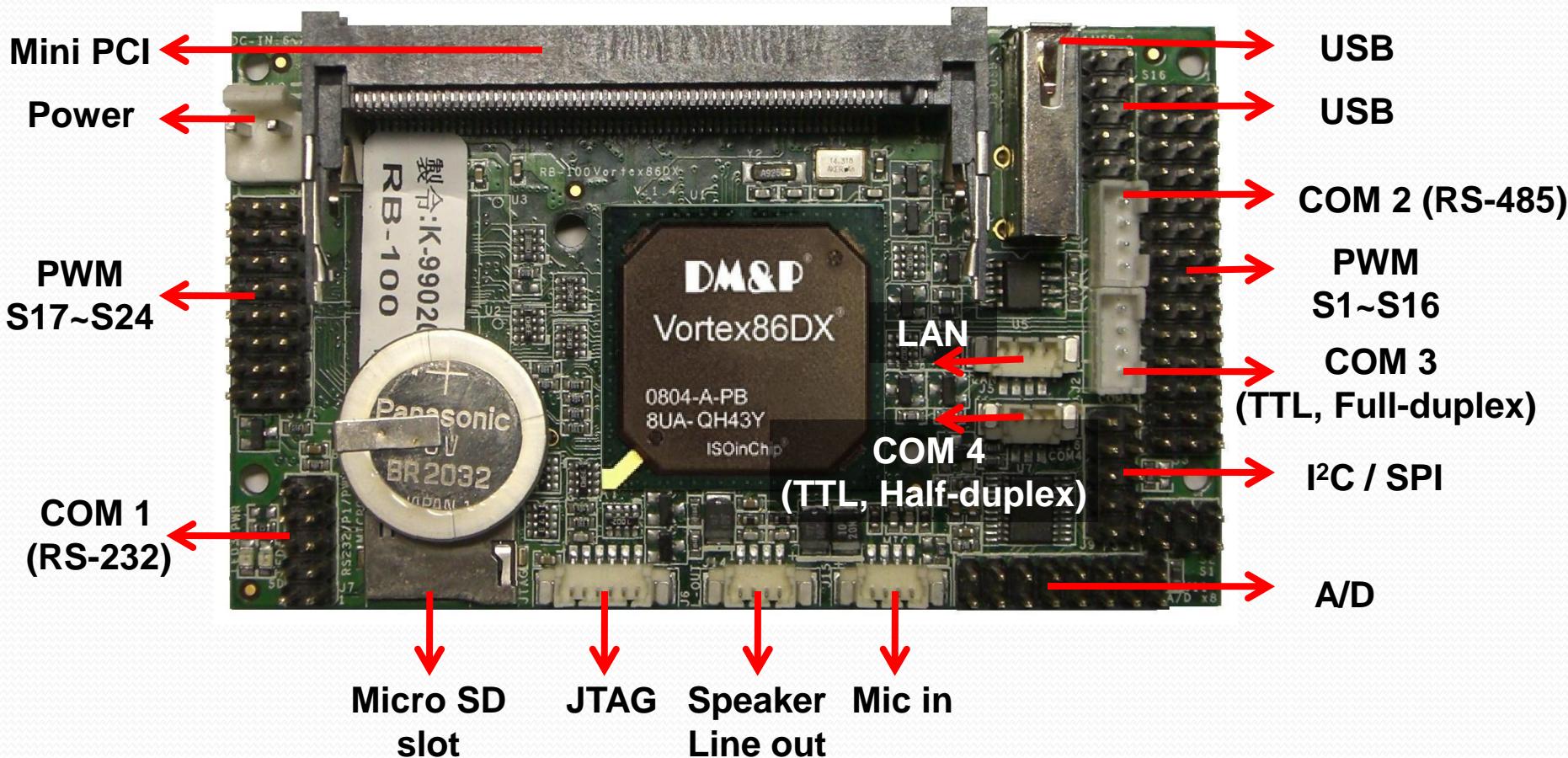
1. 1000MHz, 256MB DDR2
2. PC compatible
3. Build in PWM/GPIO 24Ch
4. USB v2.0 ports × 3
5. TTL COM ports × 2
6. RS-232 port × 1
7. RS-485 port × 1
8. I²C Bus
9. SPI Bus
10. Power consumption 5V@400mA (2W)
11. DC 6V-24V

HARDWARE INTRODUCTION

Locations

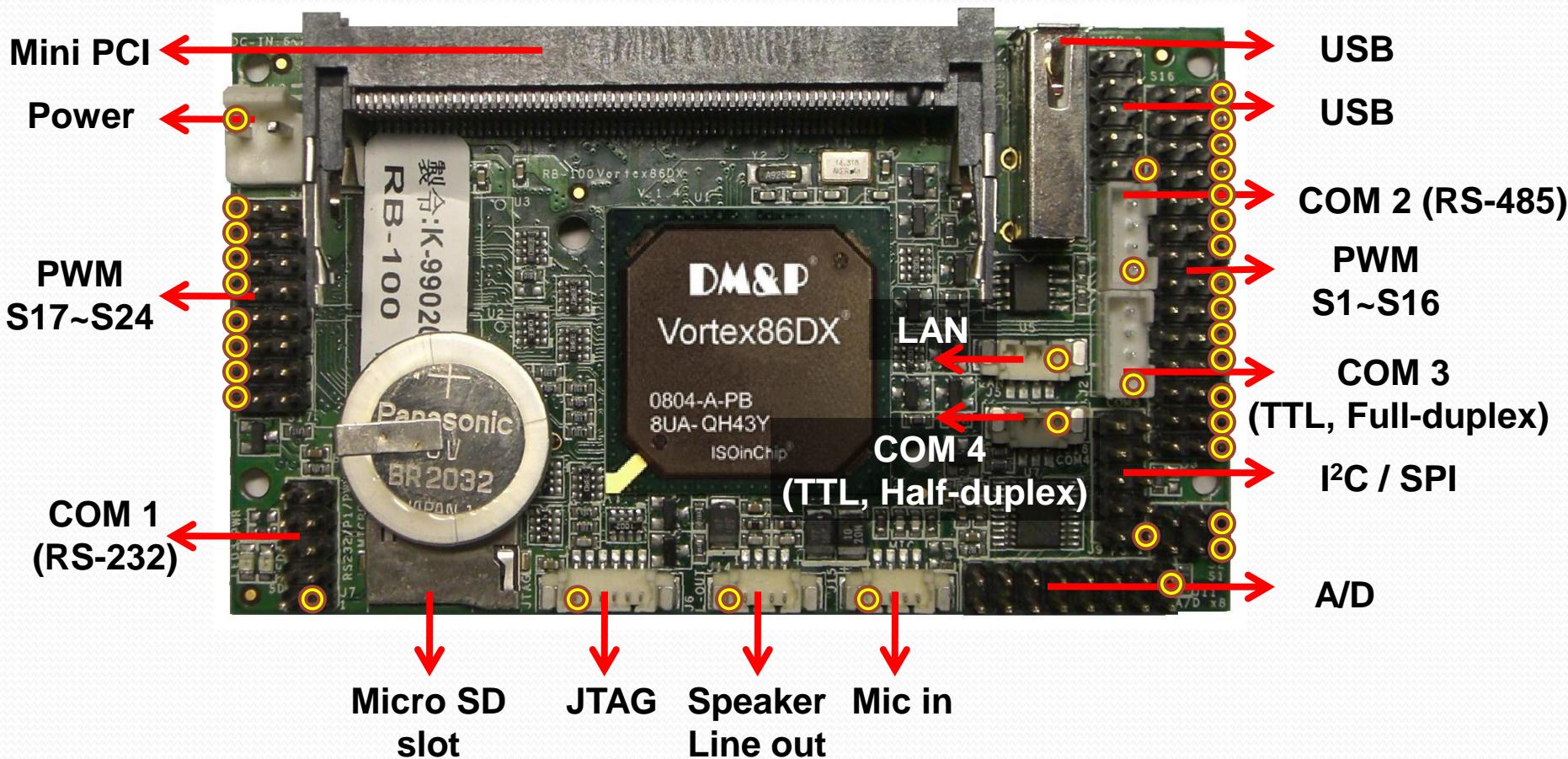


Locations



Pin 1 Location

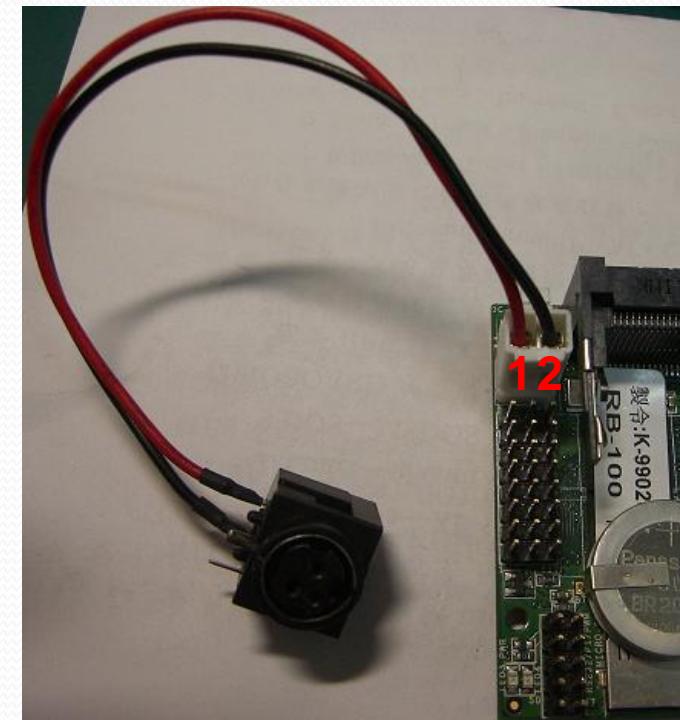
○: Pin 1



Power connector

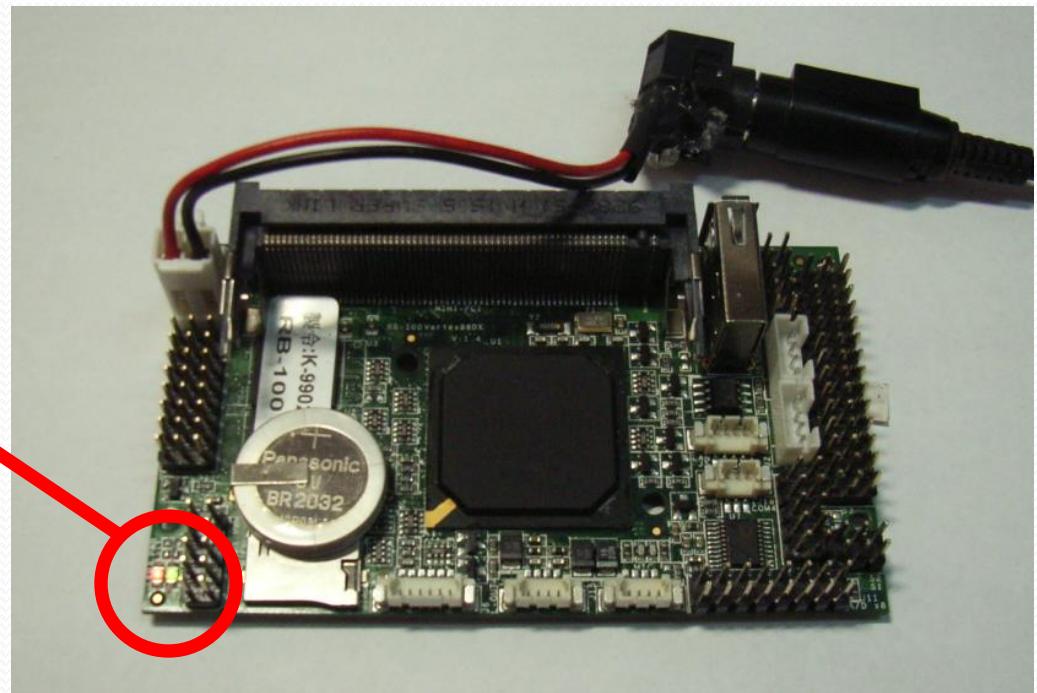
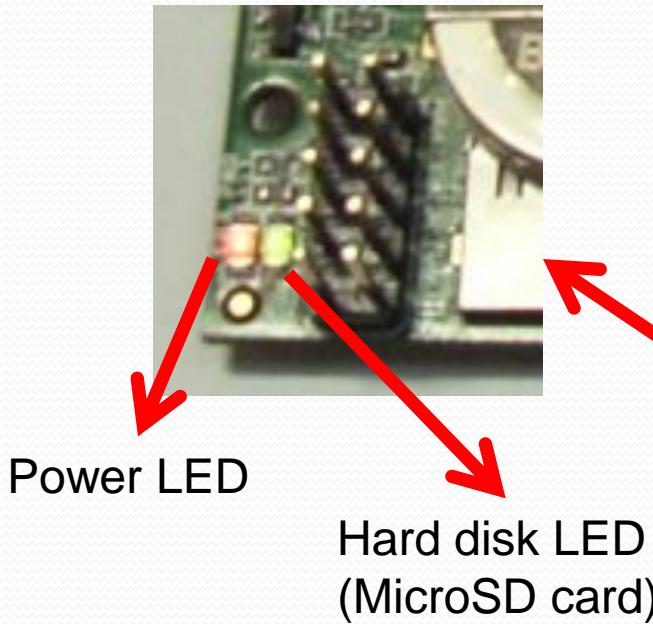
- DC 6V- 24V

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



Power connector

After connecting the Power/HD LED will light

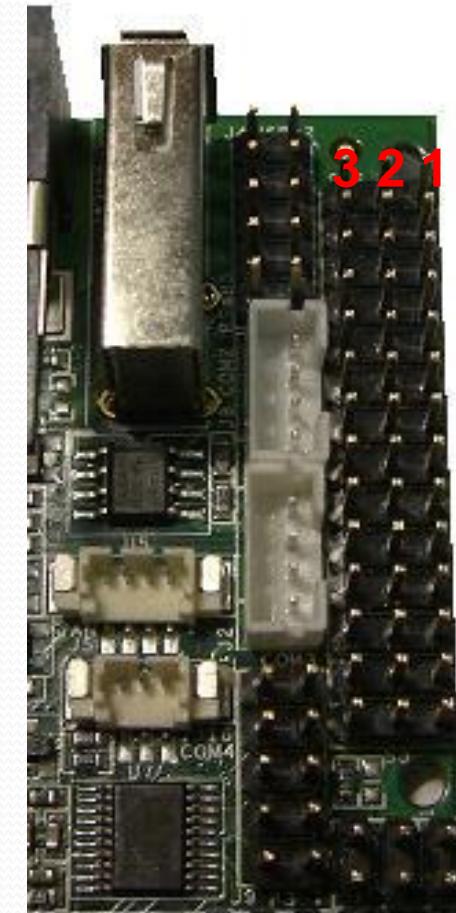


Hard Disk: MicroSD

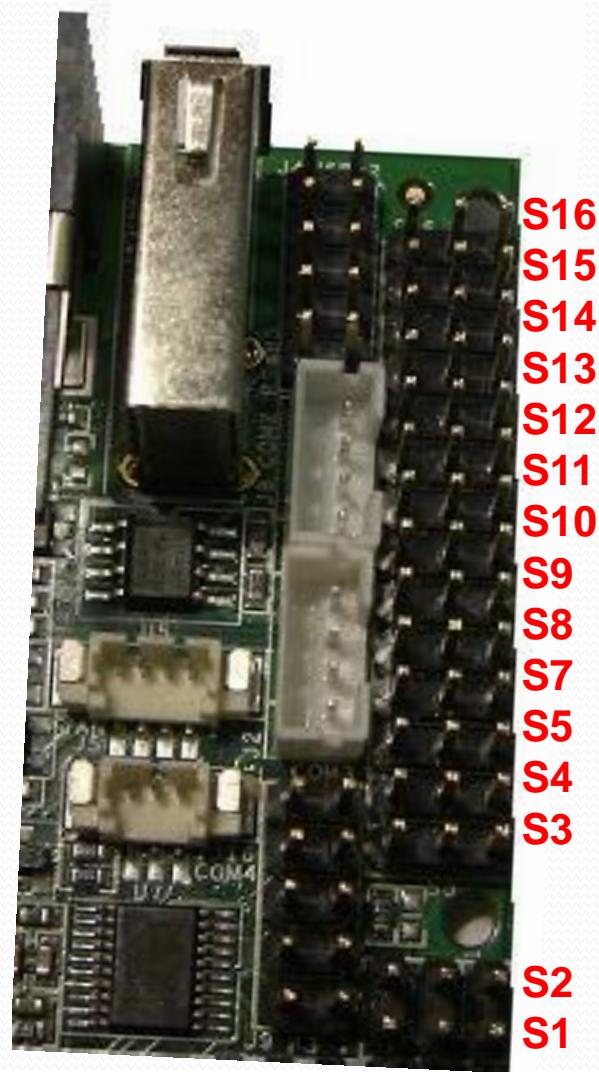
- As a hard disk, the MicroSD's speed affects RoBoard's performance dramatically.
 - A low-class MicroSD can make RoBoard boot/run very slowly.
- **Suggestions**
 - The speed of MicroSD should be at least **Class 6**.
 - Use MicroSD from credible manufacturers (e.g., SanDisk, Toshiba, ...)

PWM 24ch

Pin #	Signal Name
1	GND
2	Vxx
3	GPXX

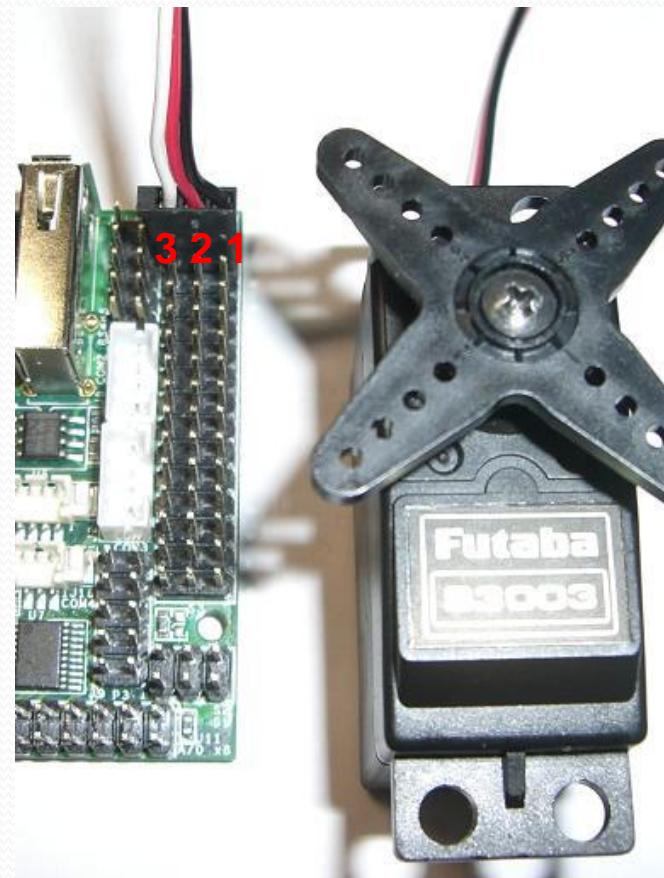
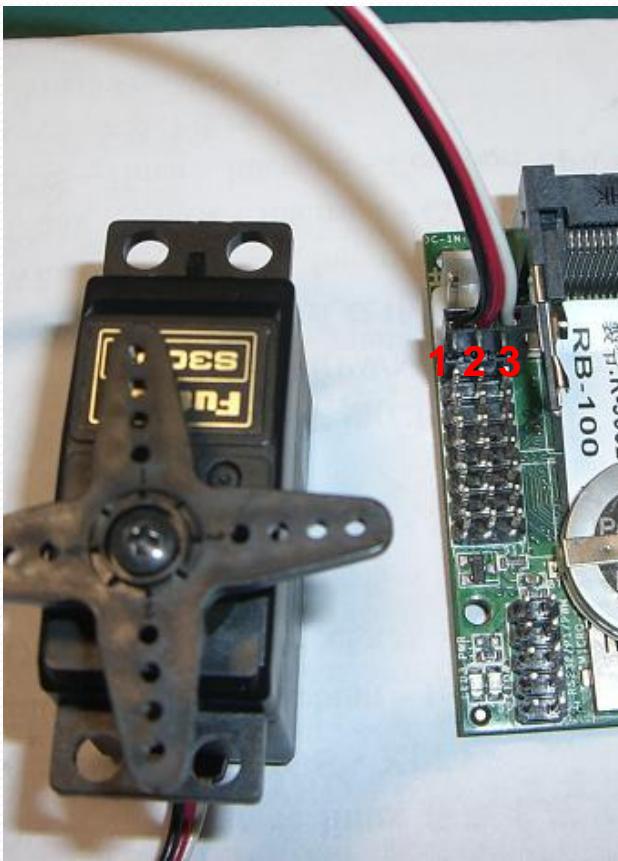


PWM 24ch



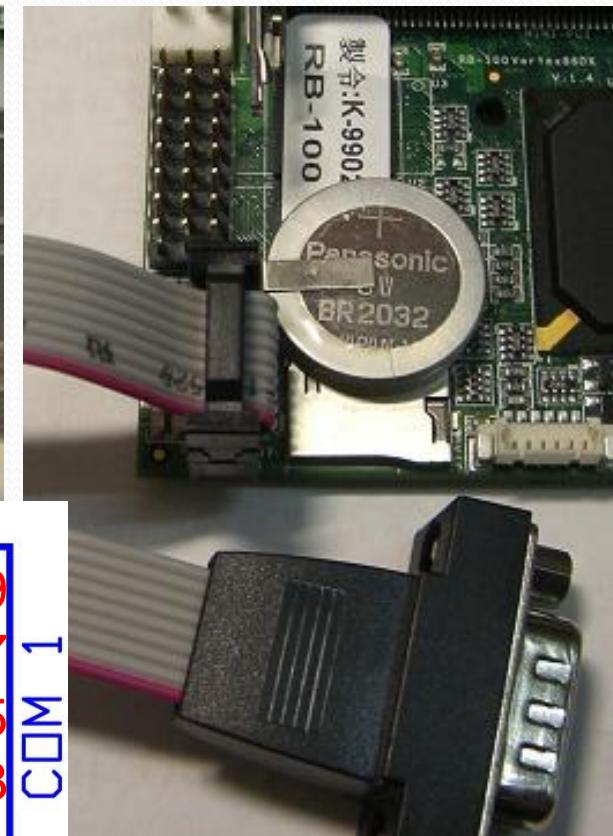
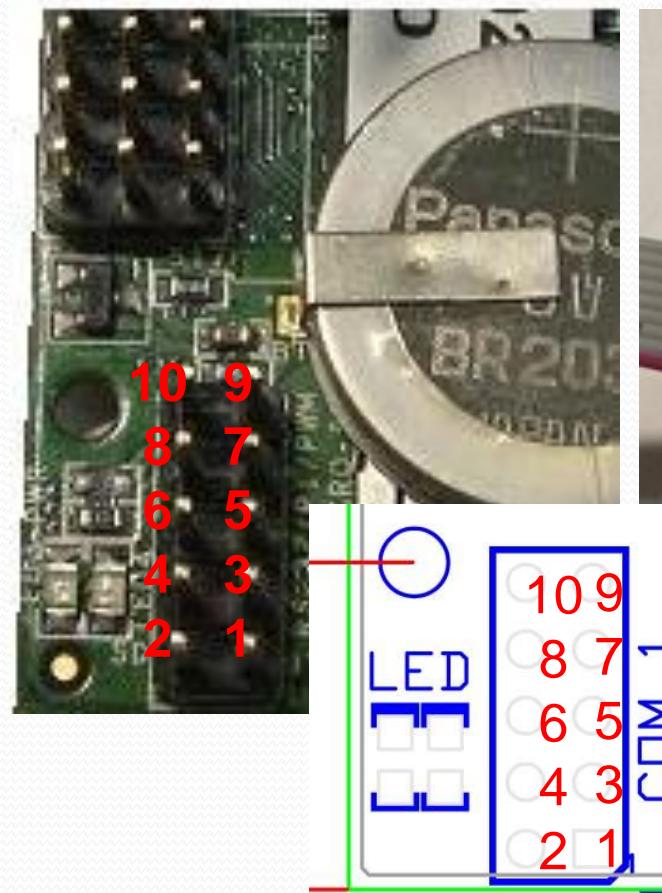
PWM 24ch

Connection Example



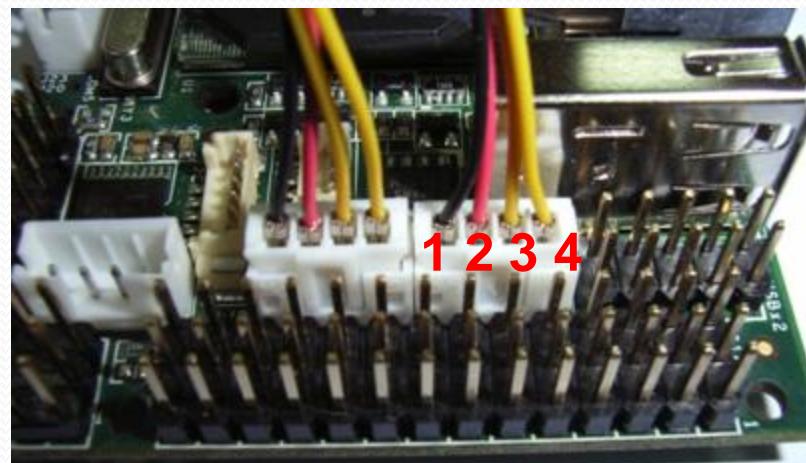
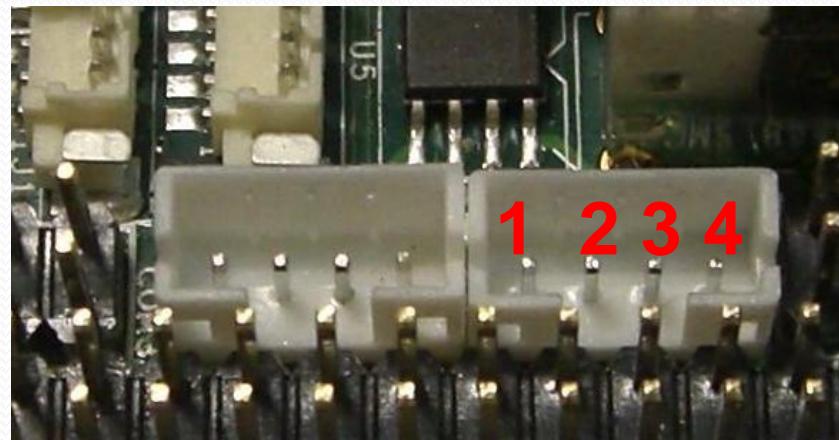
COM 1 / RS-232

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)



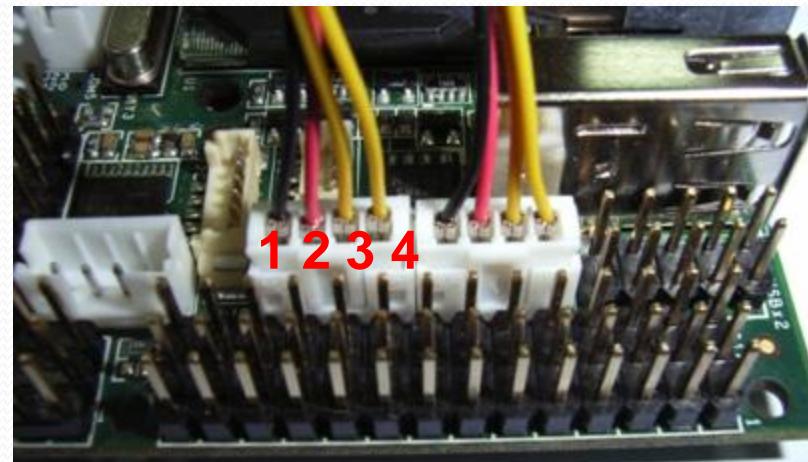
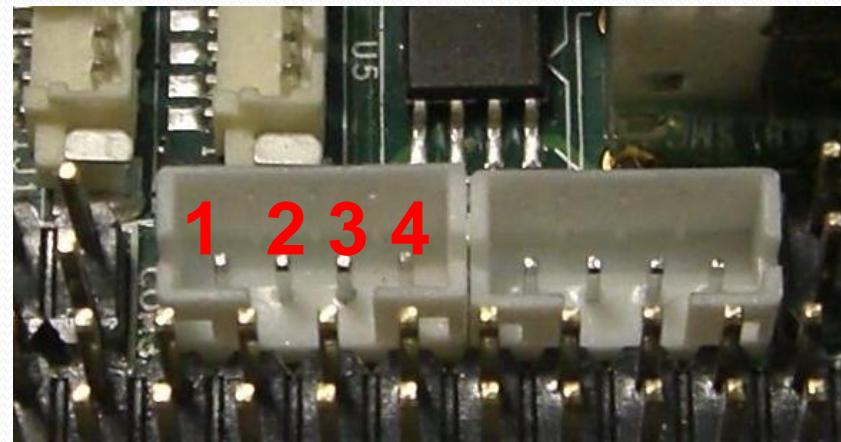
COM 2 / RS-485

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



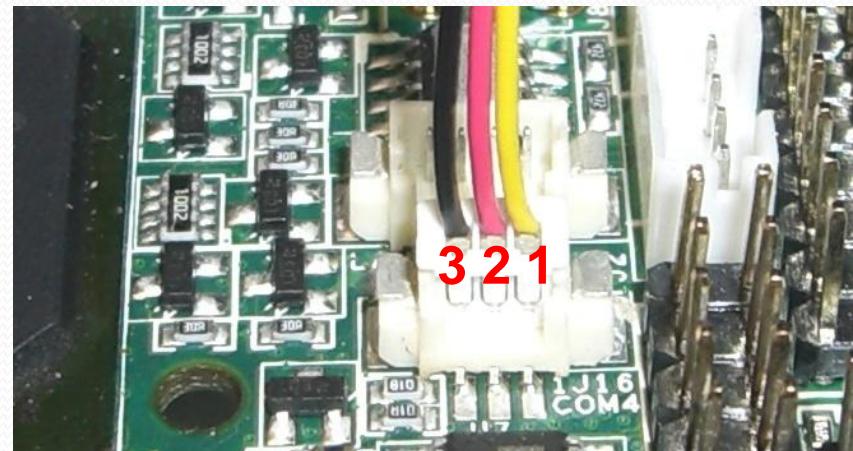
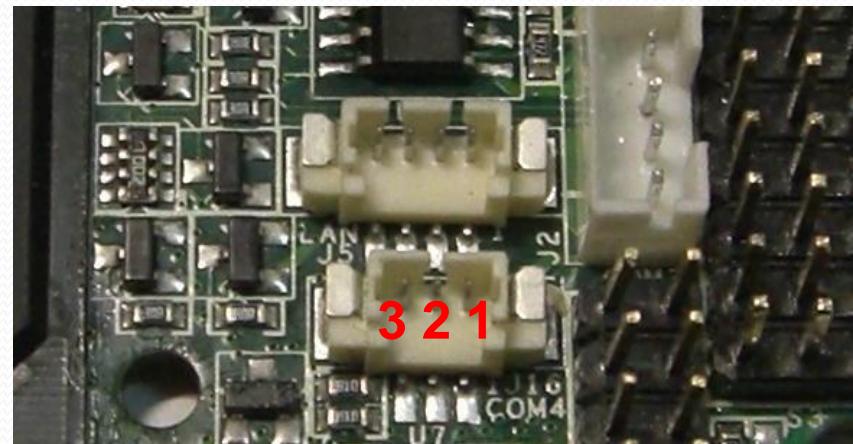
COM 3 / Full Duplex TTL

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



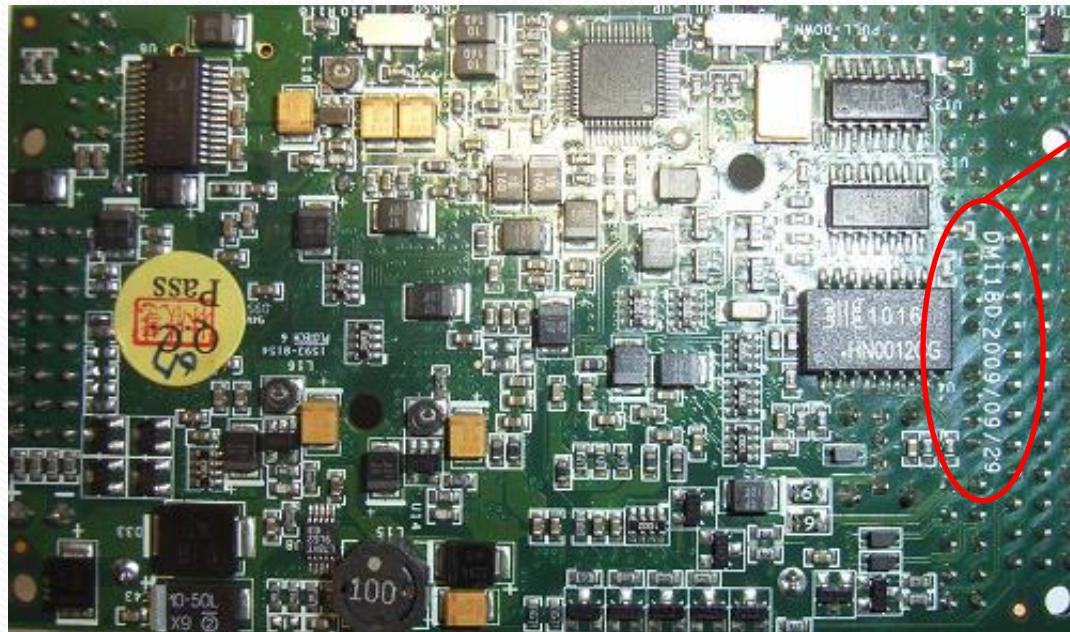
COM 4 / Half Duplex TTL

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.



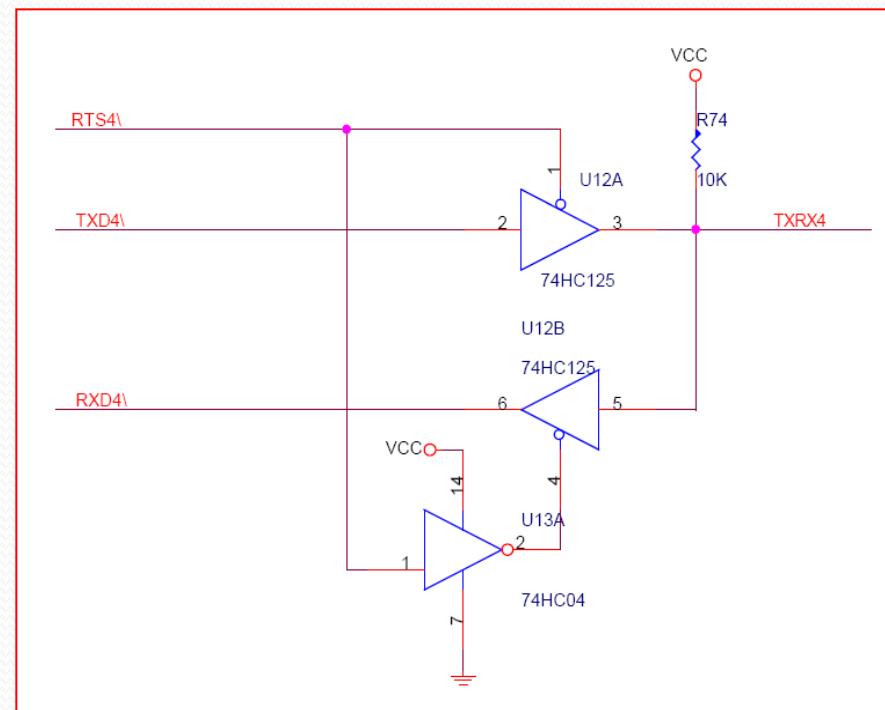
You can check the model no. in the bottom side of RB-100.

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

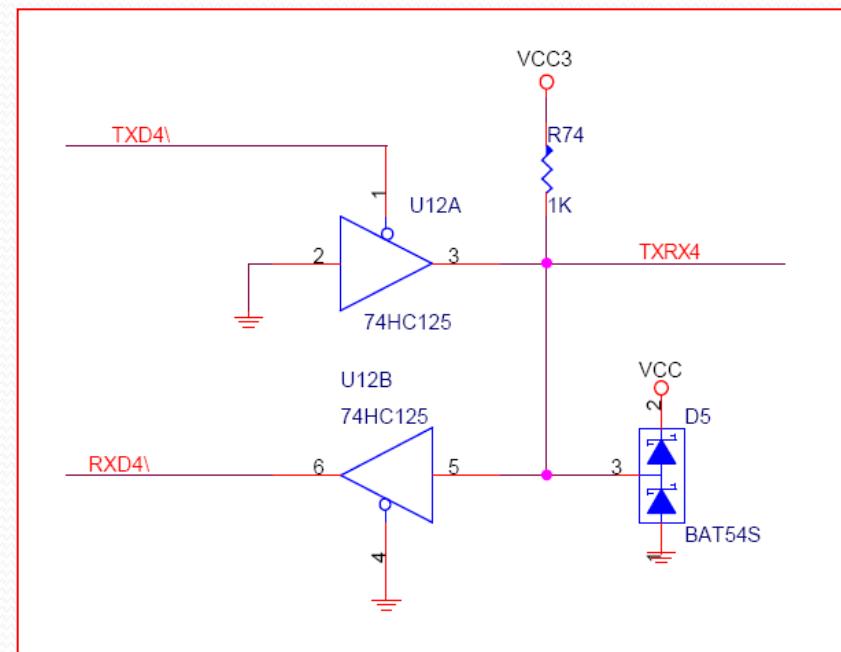


COM 4 / Half Duplex TTL

- For the newest model:

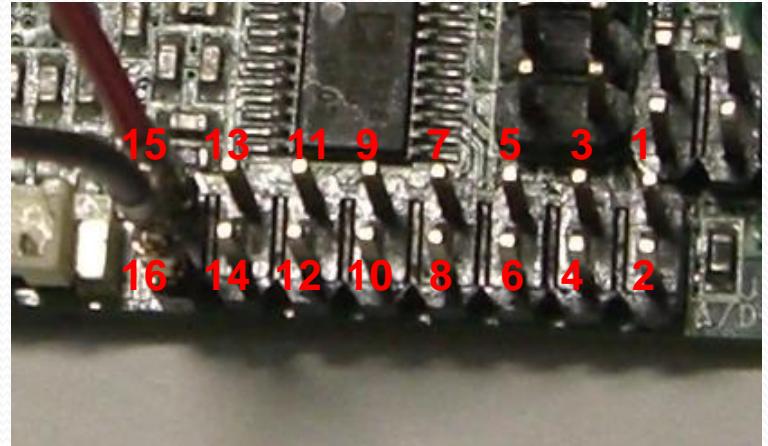
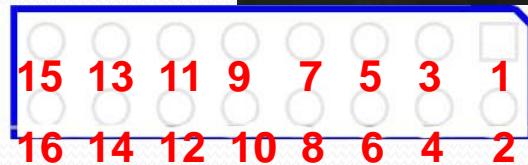
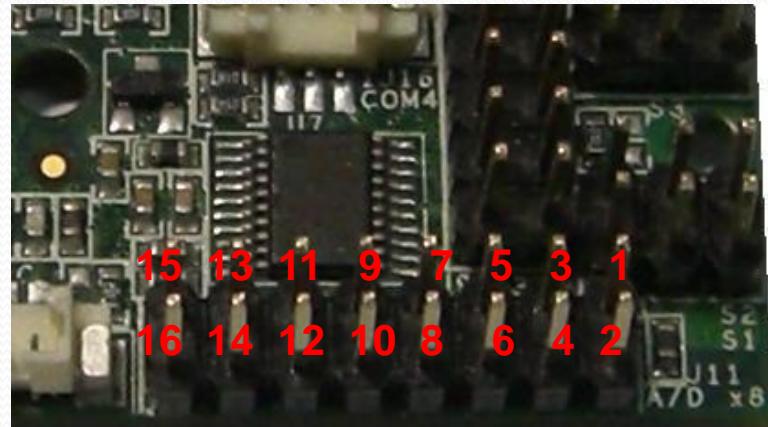
DM118D

- 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.



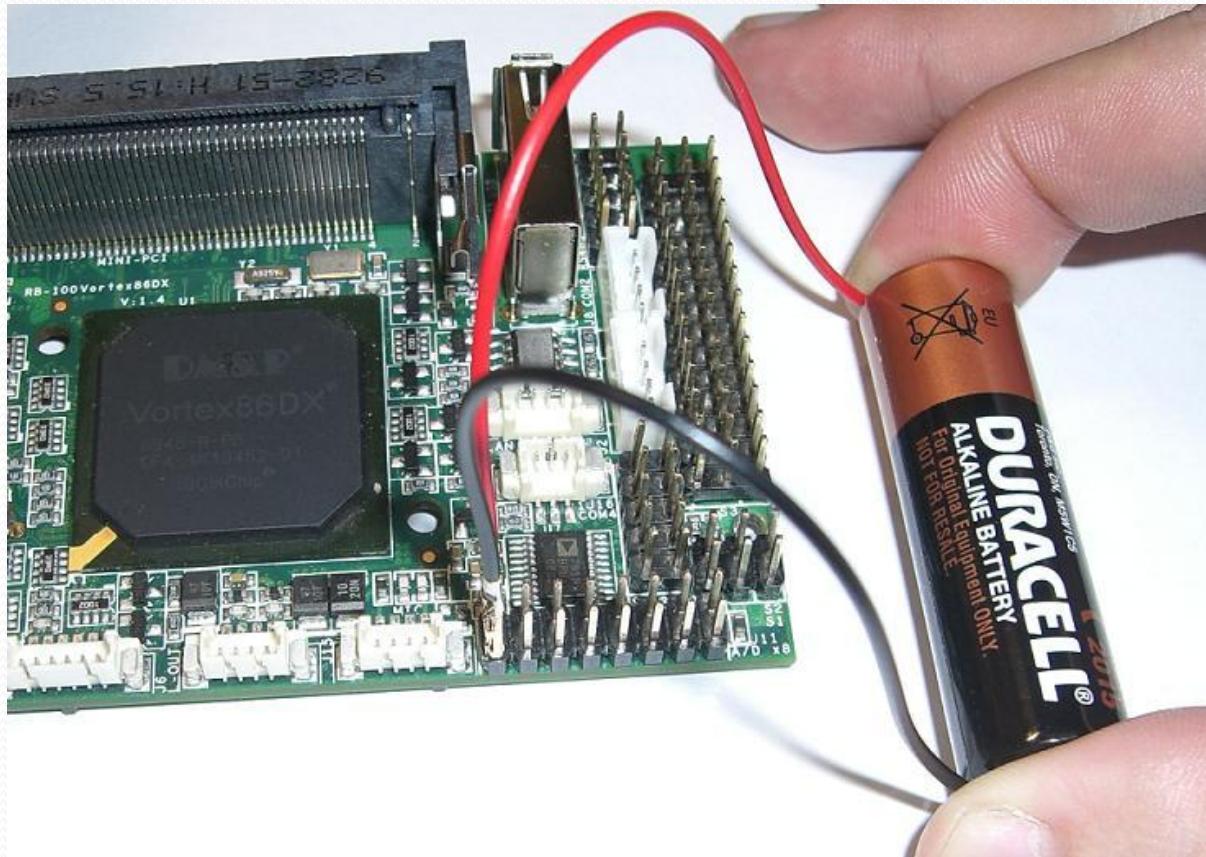
A/D 8 Ch

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



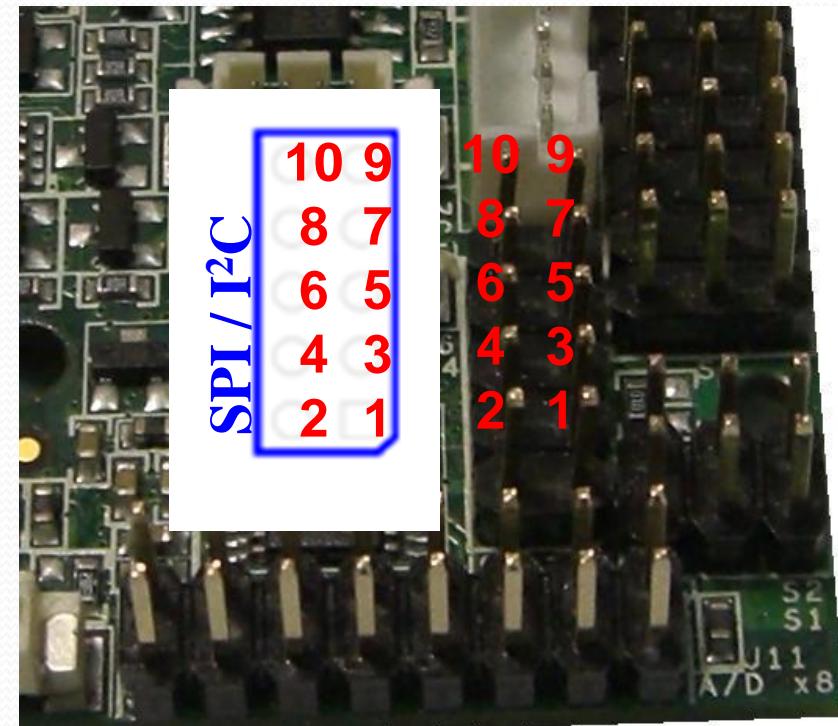
A/D 8 Ch

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



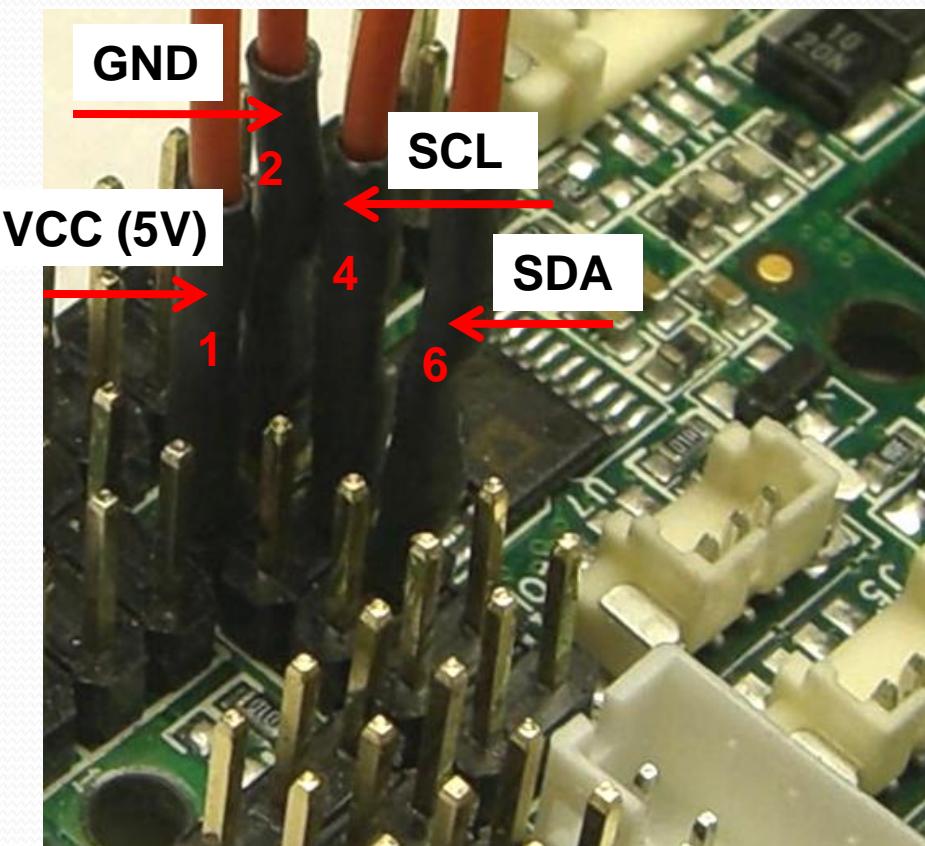
I²C / SPI

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



I²C

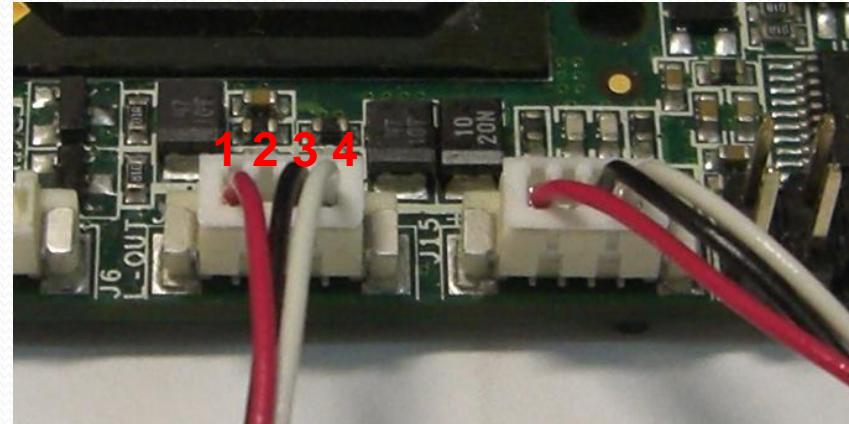
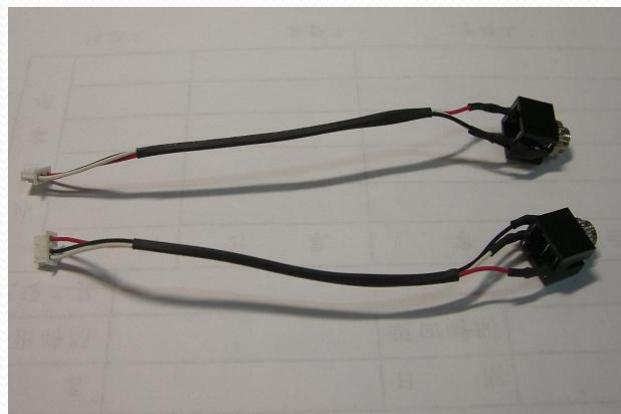
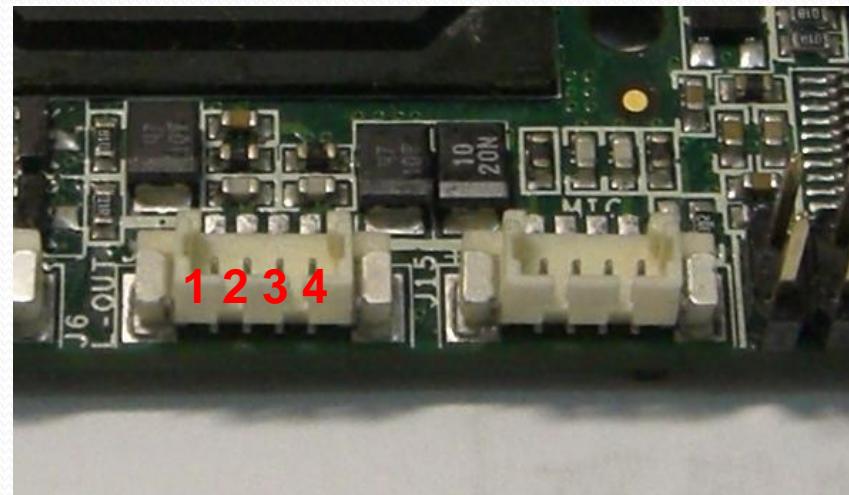
Connection Example



Audio connector

Speaker Line Out

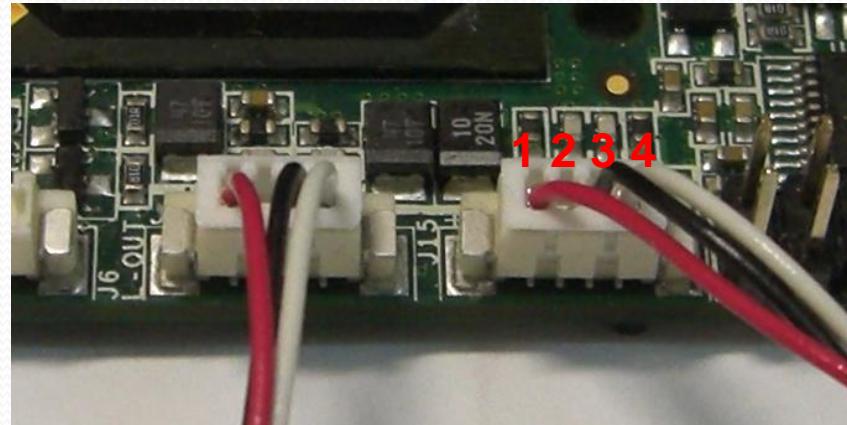
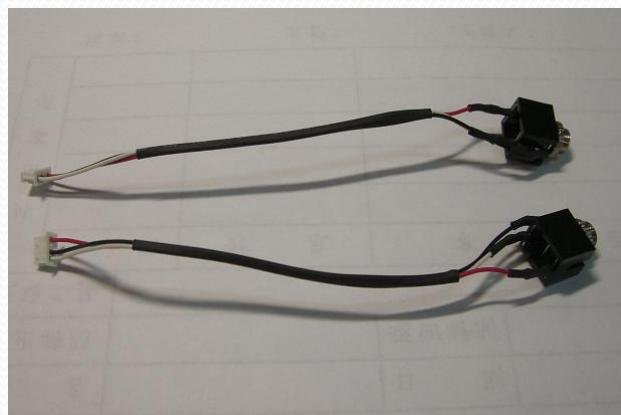
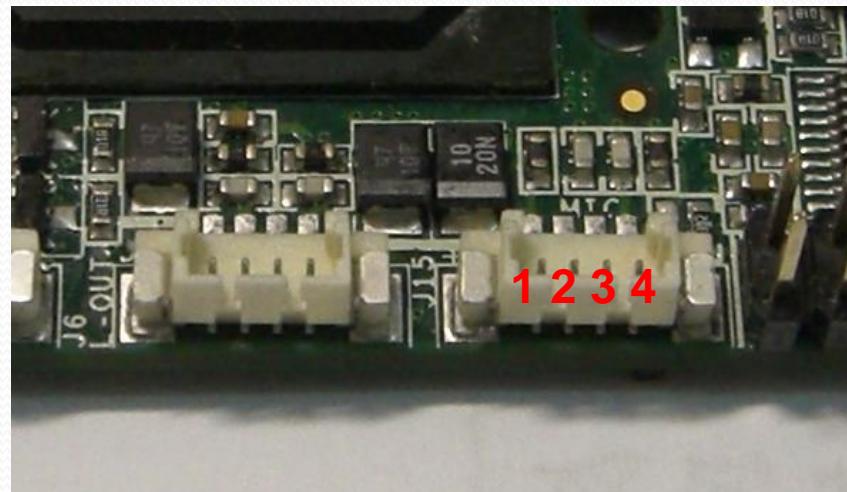
Pin #	Signal Name	Pin #	Signal Name
1	LOUTR	2	GND
3	GND	4	LOUTL



Audio connector

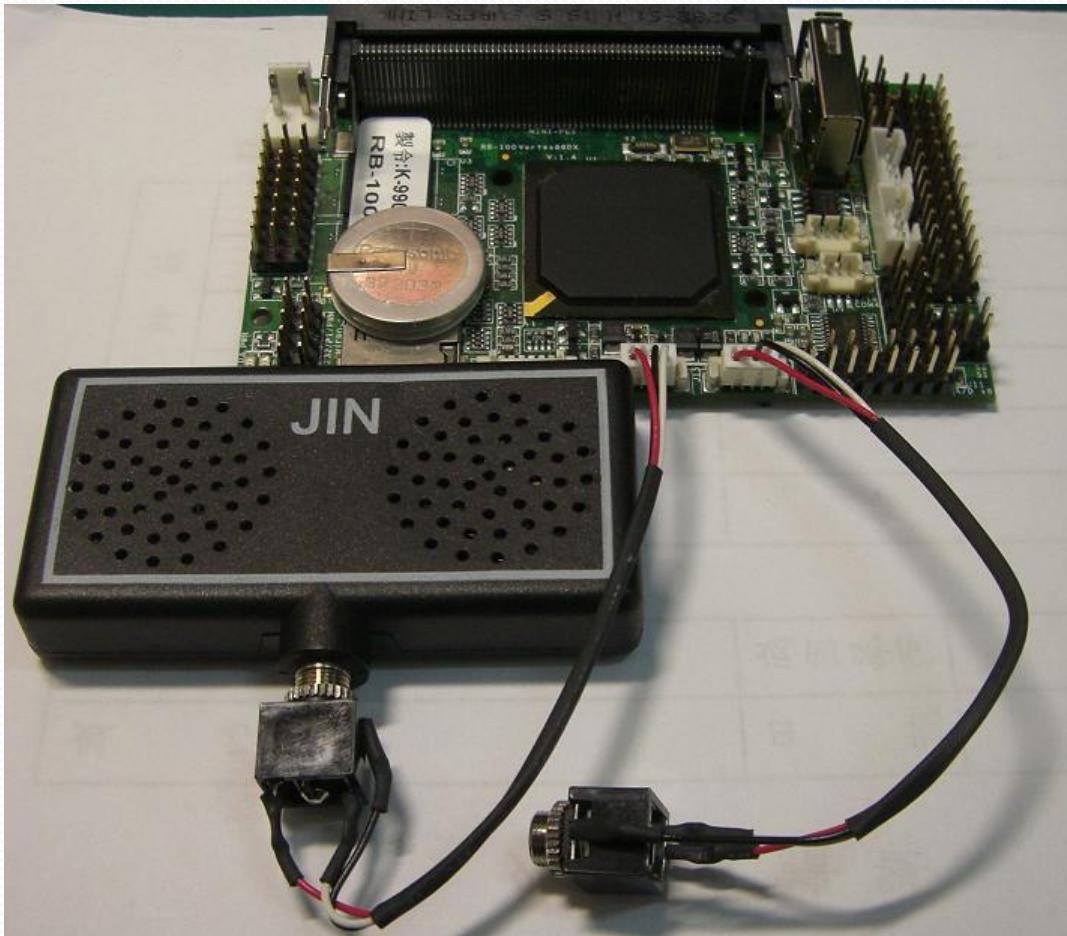
Mic in

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



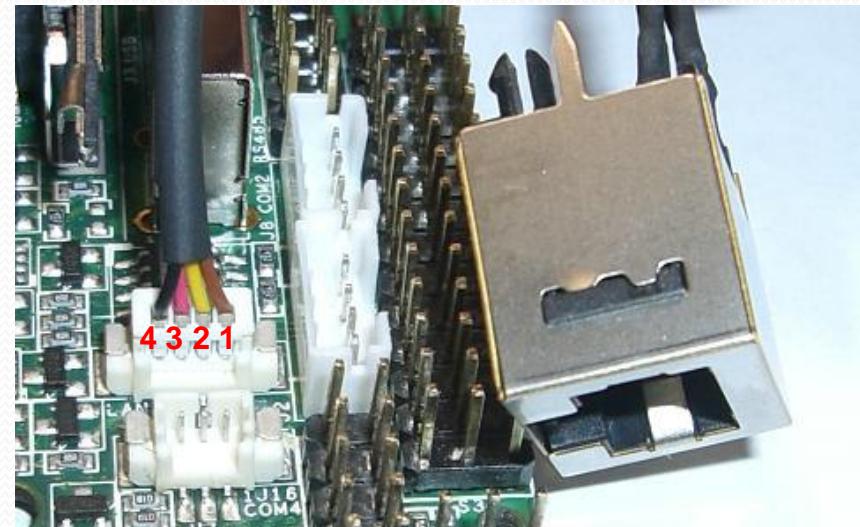
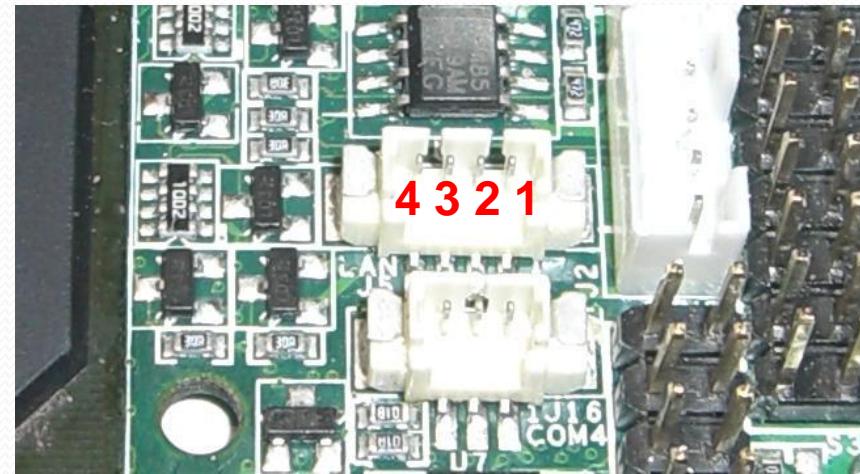
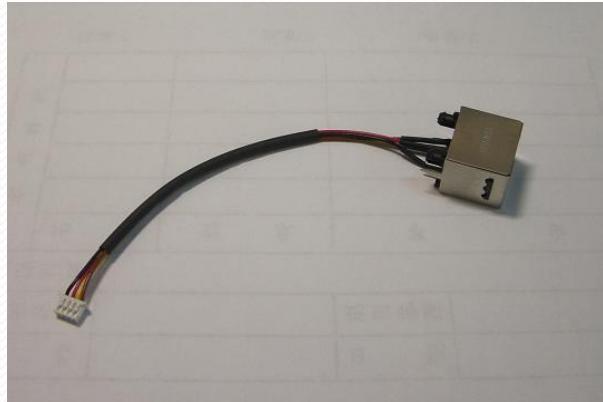
Audio connector

Connection Example



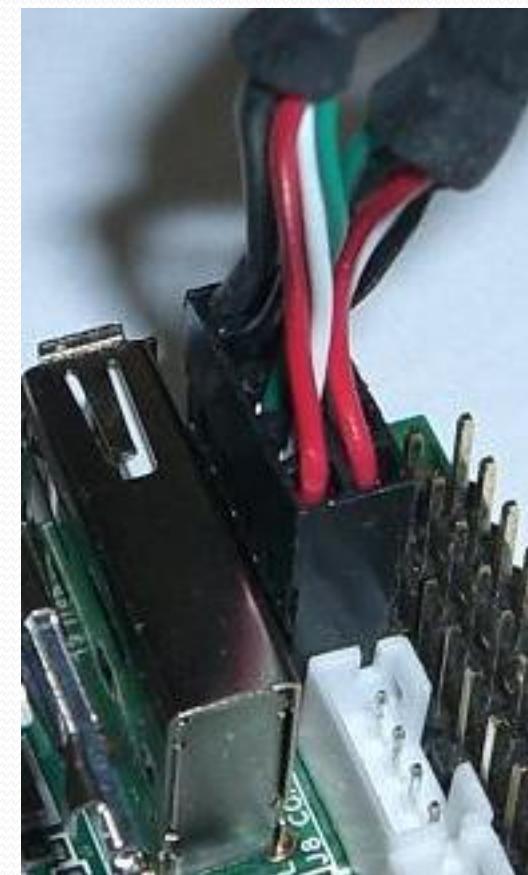
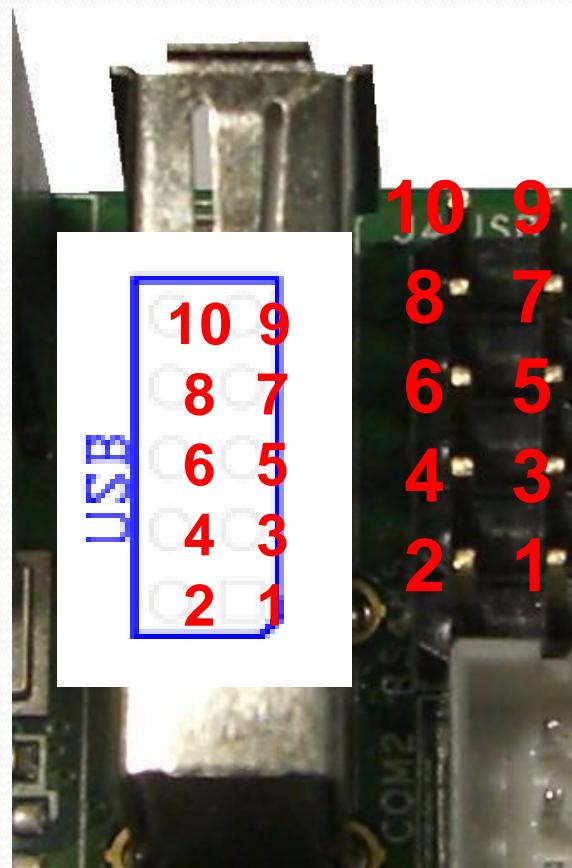
LAN connector

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



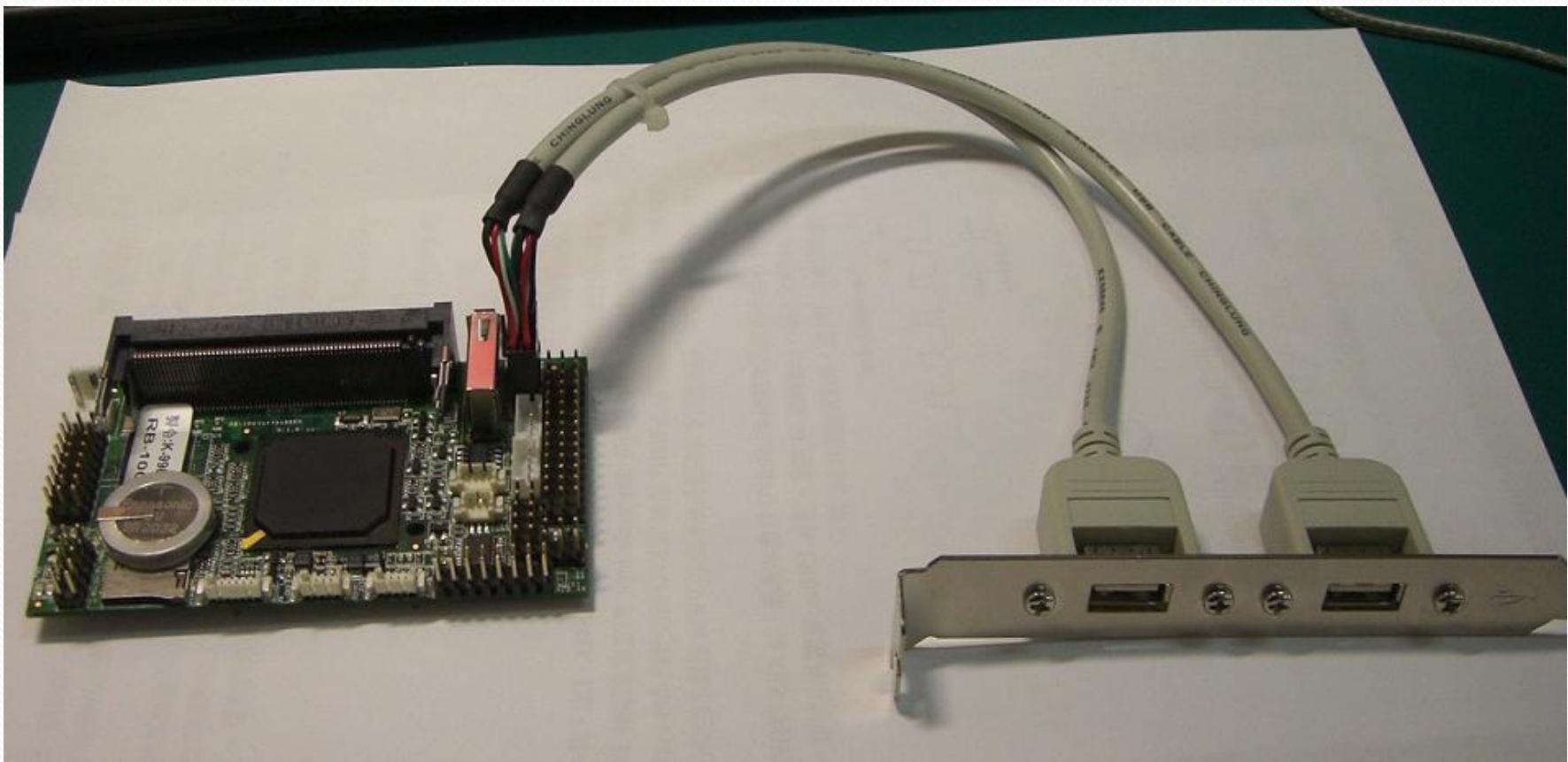
USB

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



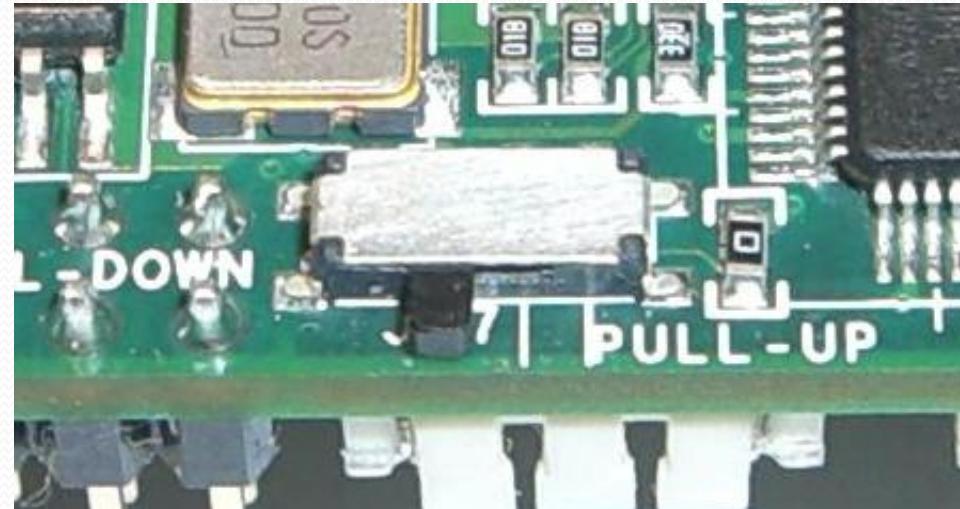
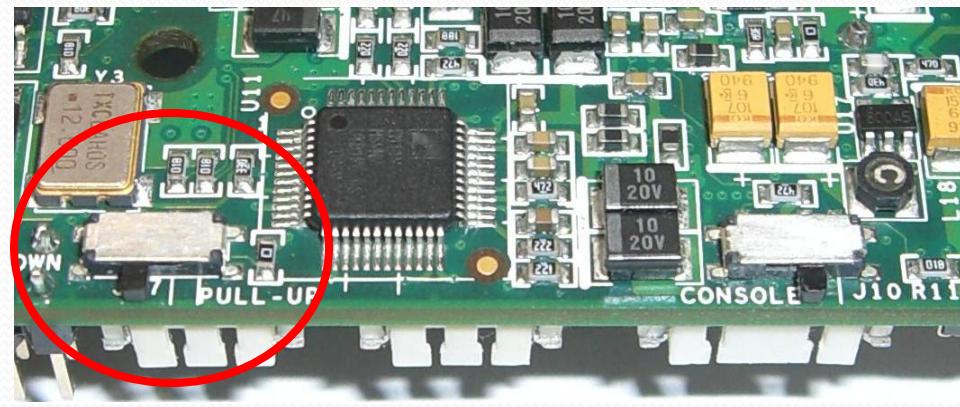
USB

Connection Example



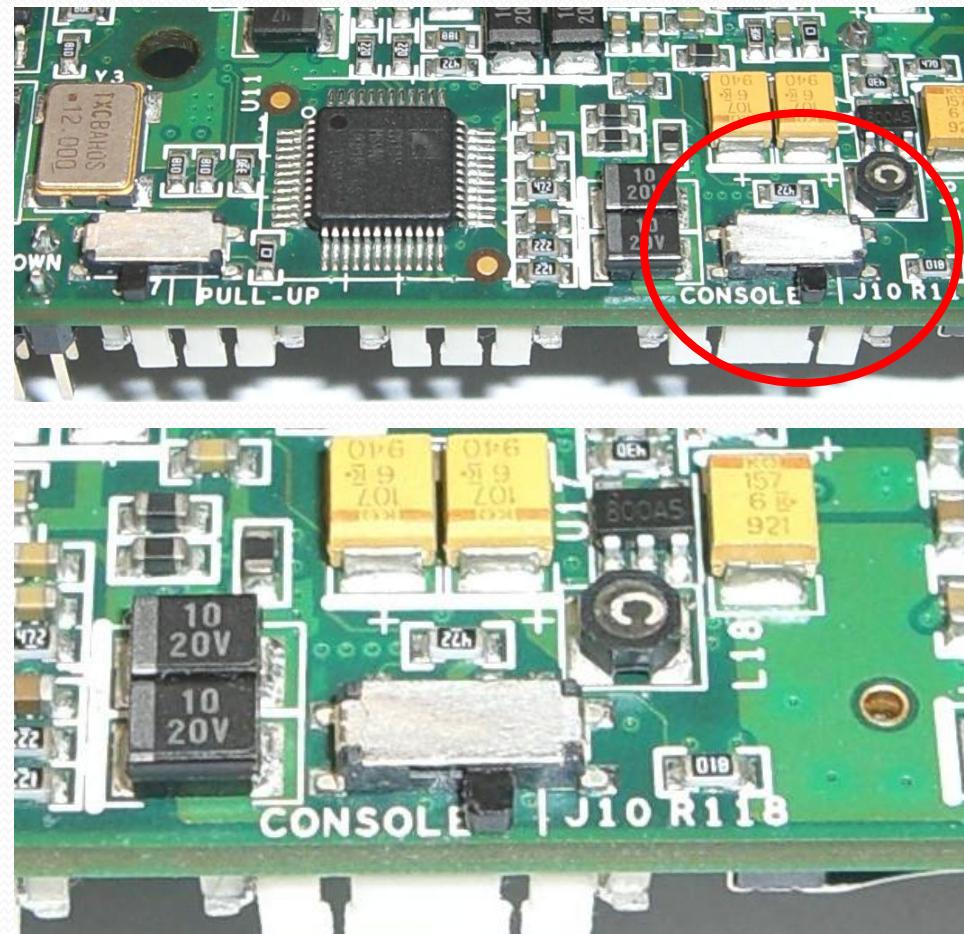
PWM Initial pull up/down switch

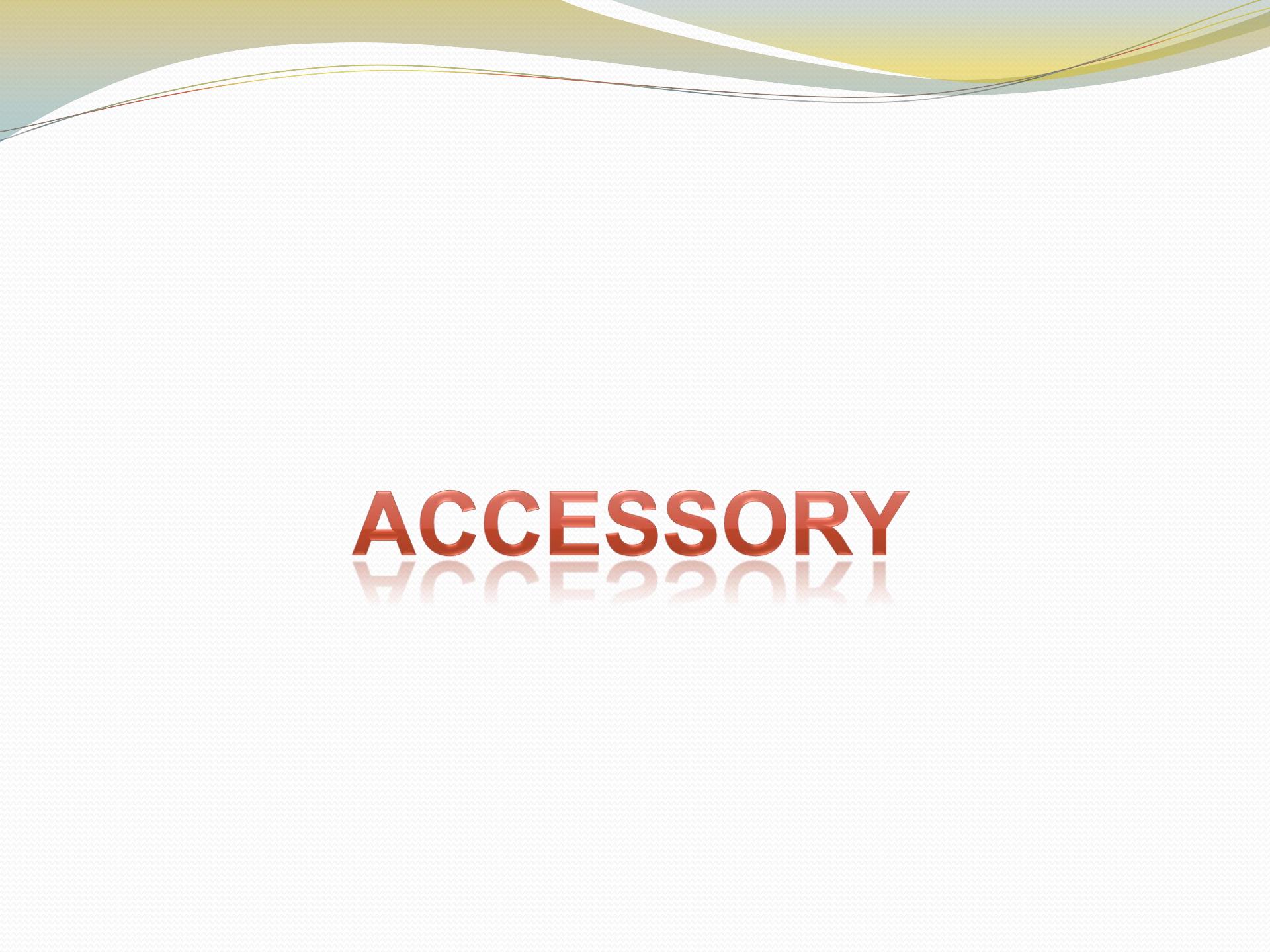
Pin	Signal Name
Left	PWM init Pull Down
Right	PWM init Pull UP



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



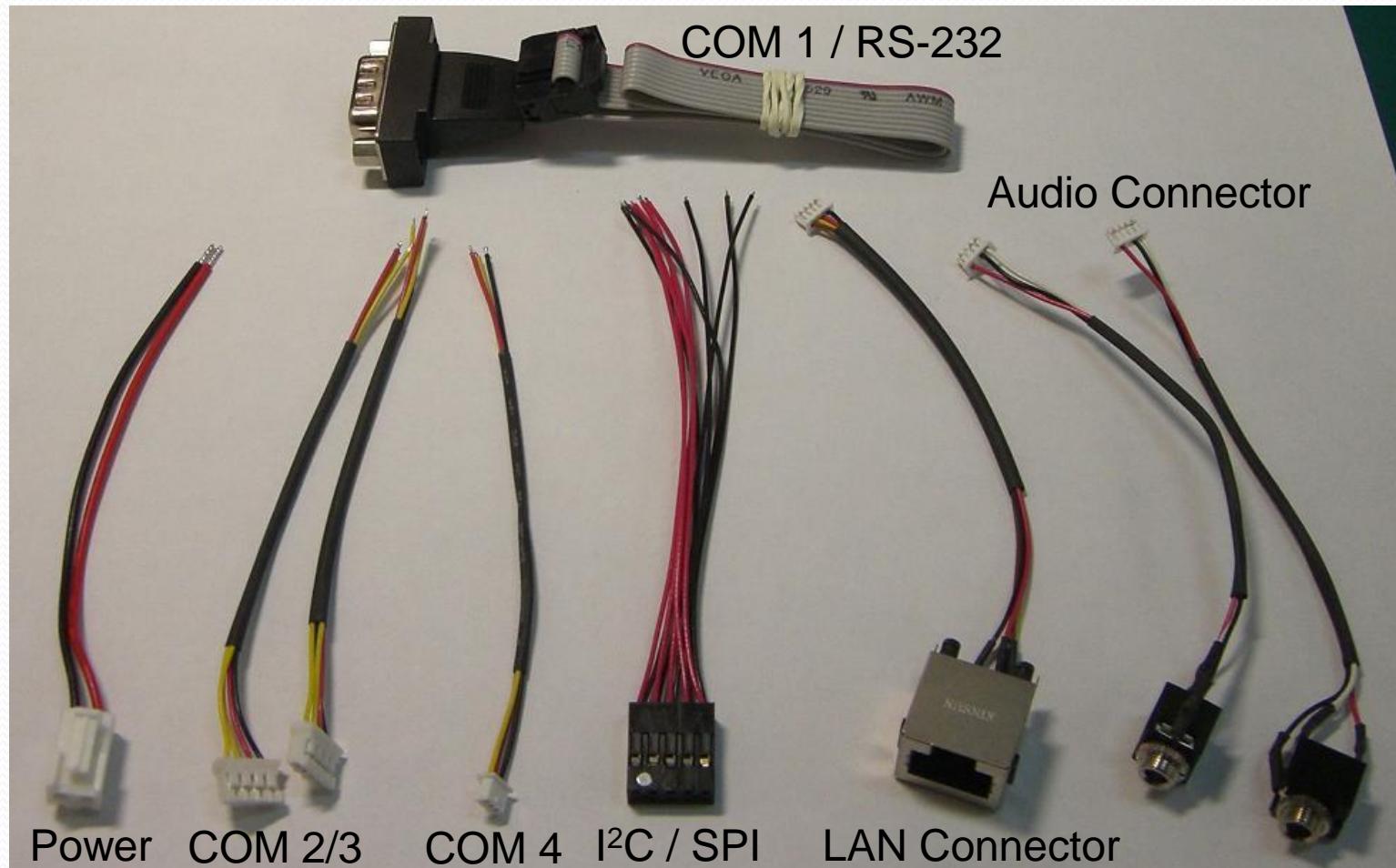
Mini PCI Wireless Card



- VIA VT6655 Chipset
- 802.11b/g



RoBoard RB-100 Cable set



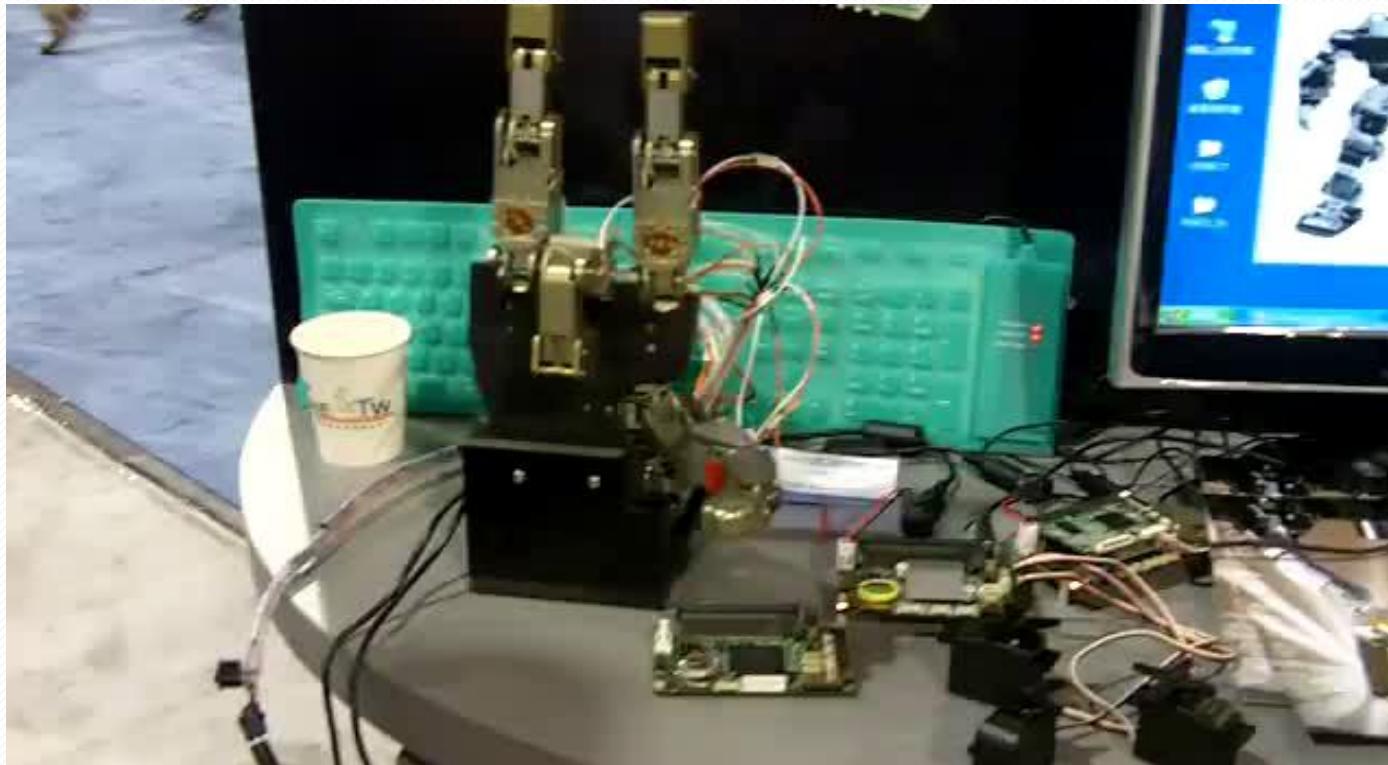
APPLICATION

RoBoard Booth in Computex



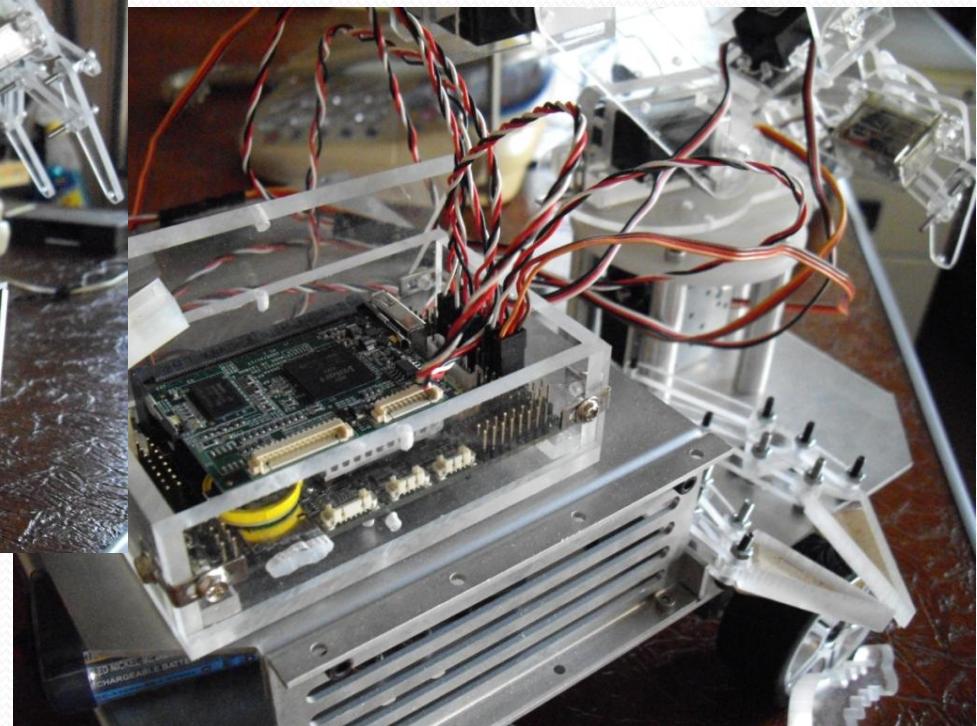
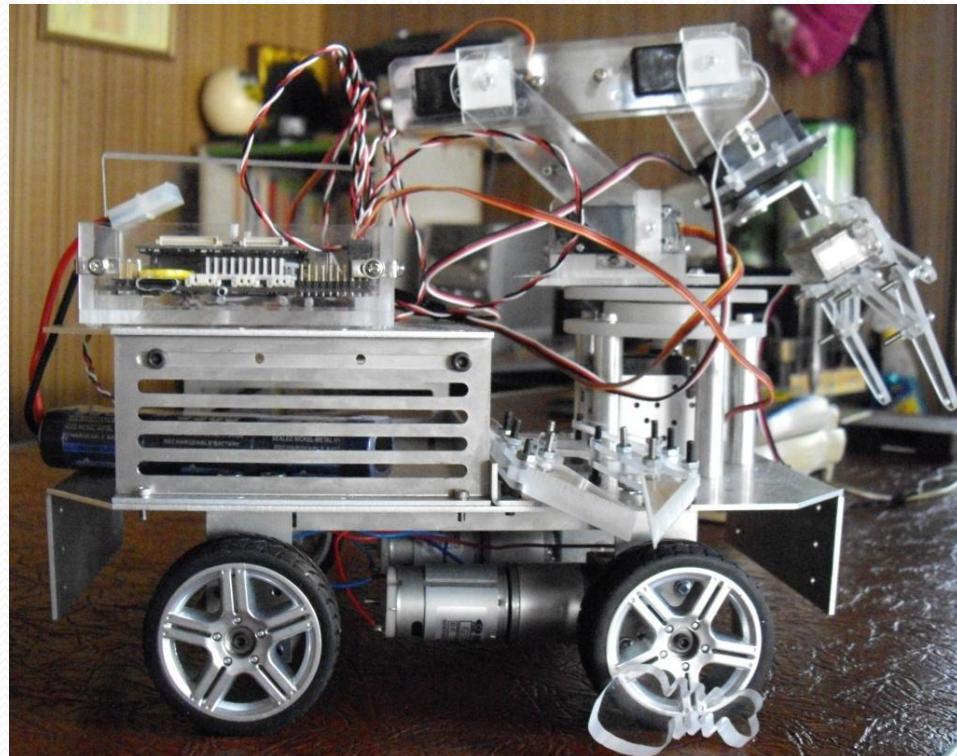
it.oc.com.tw

RoBoard Application (DMP Robot Hand)

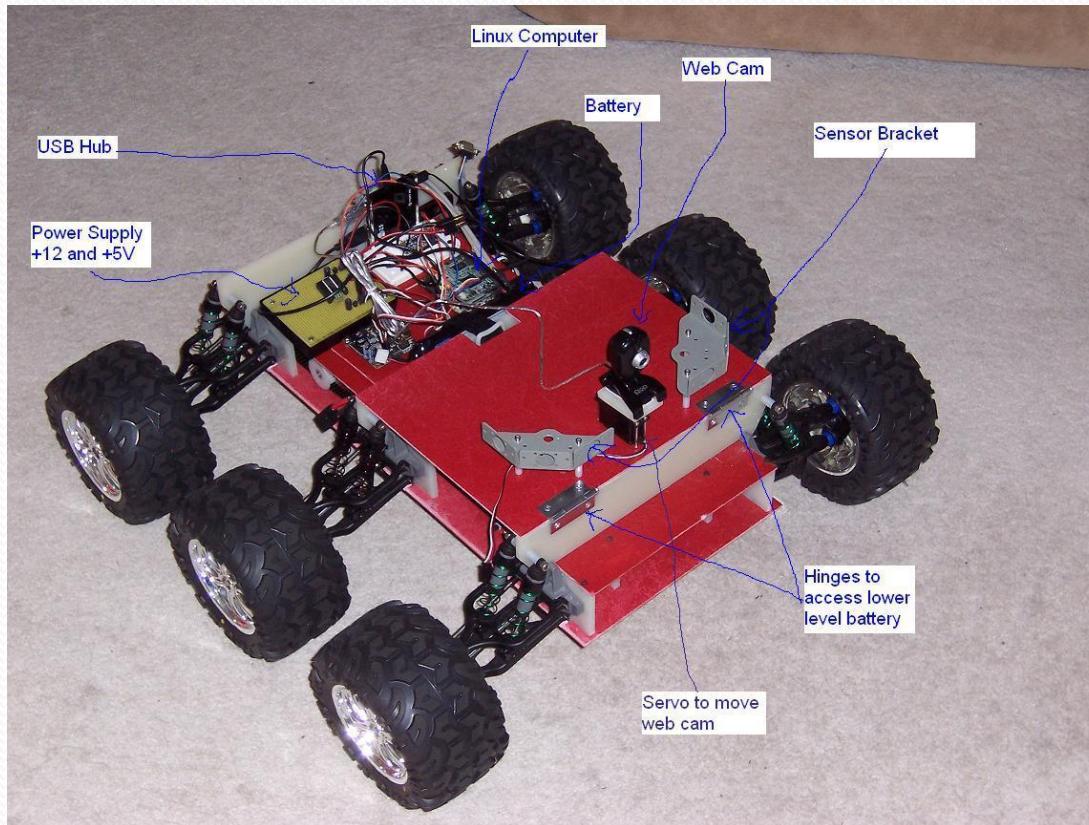


http://www.youtube.com/watch?v=Xsld8eyI_Ag

RoBoard Application (吳明展 , Taiwan)



RoBoard Application (Asbury Robotics, US)

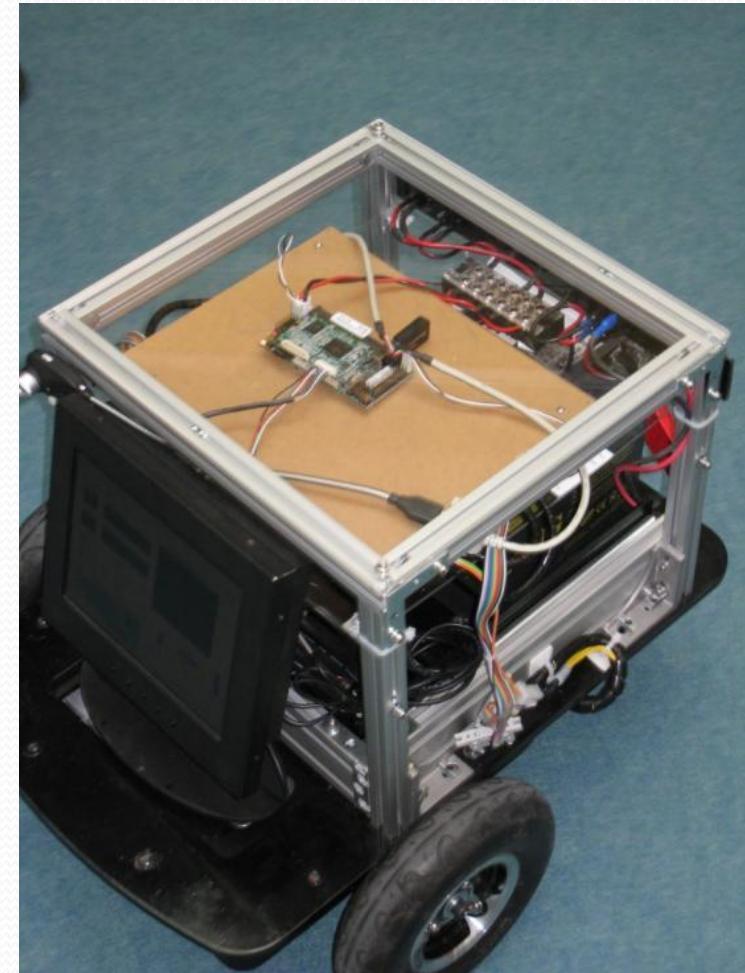
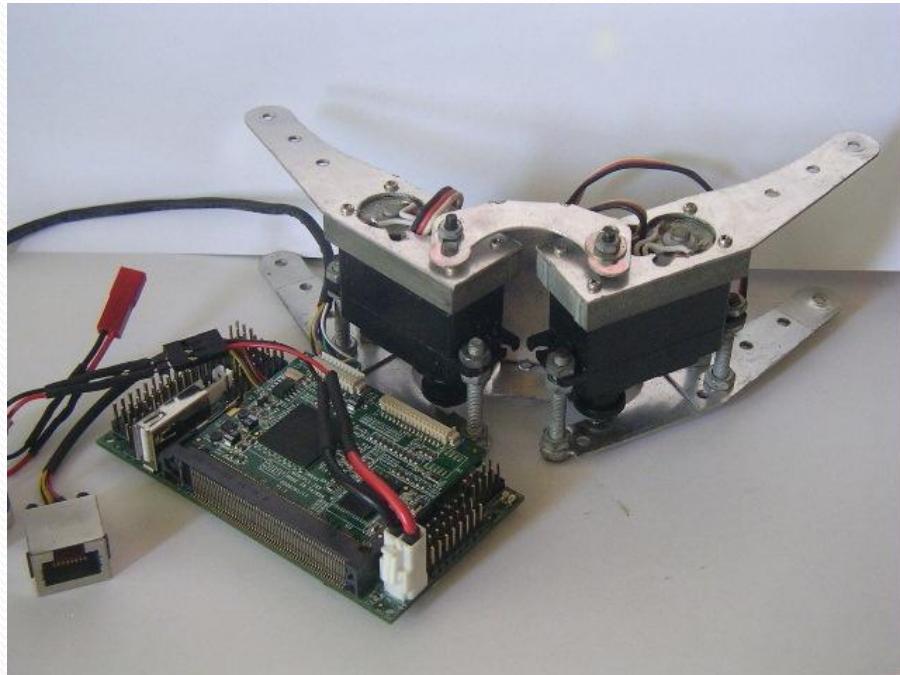


<http://asburyrobotics.com/>

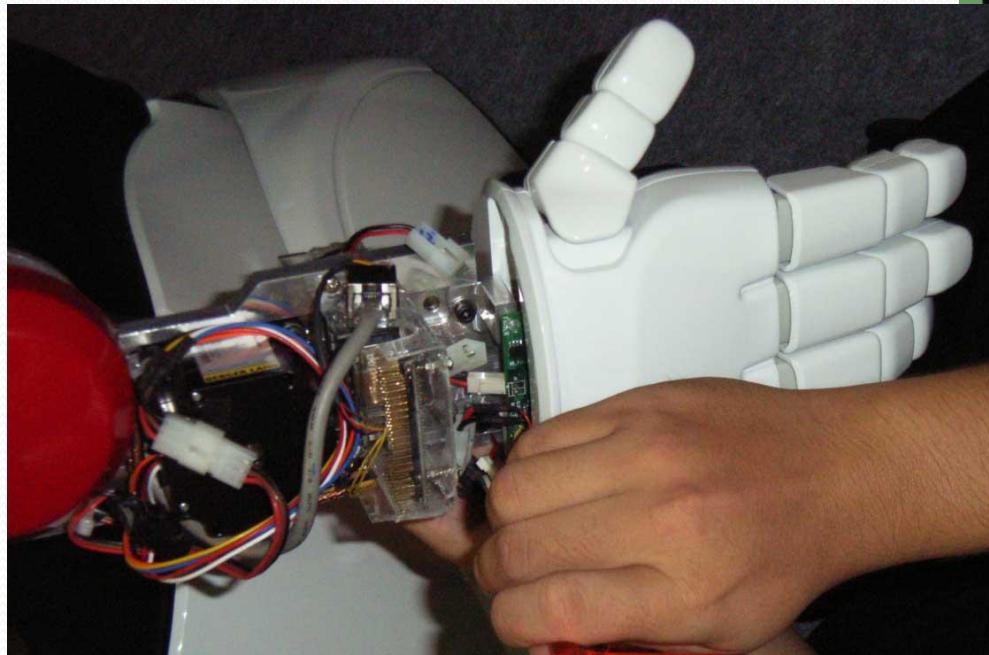
RoBoard Application (UAV Surrogate, US)



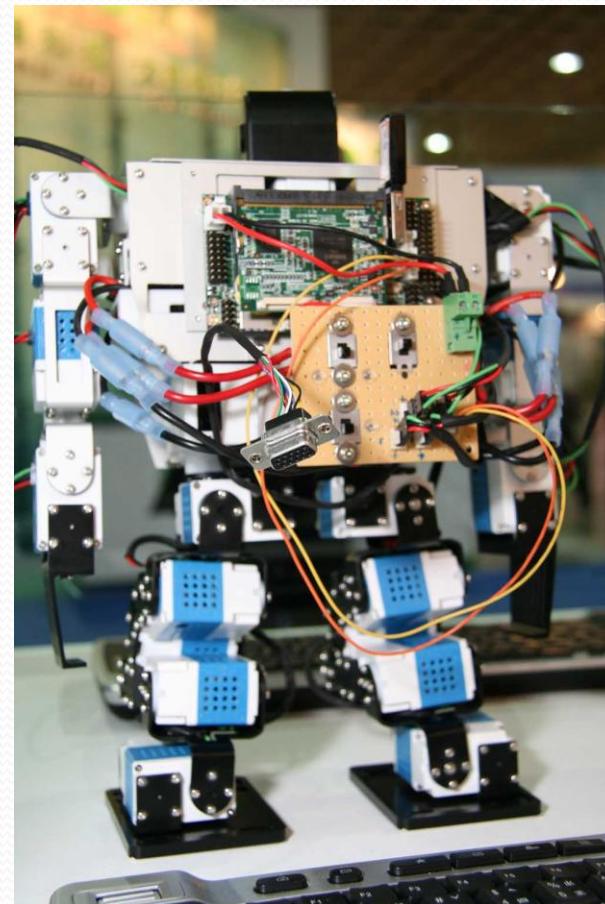
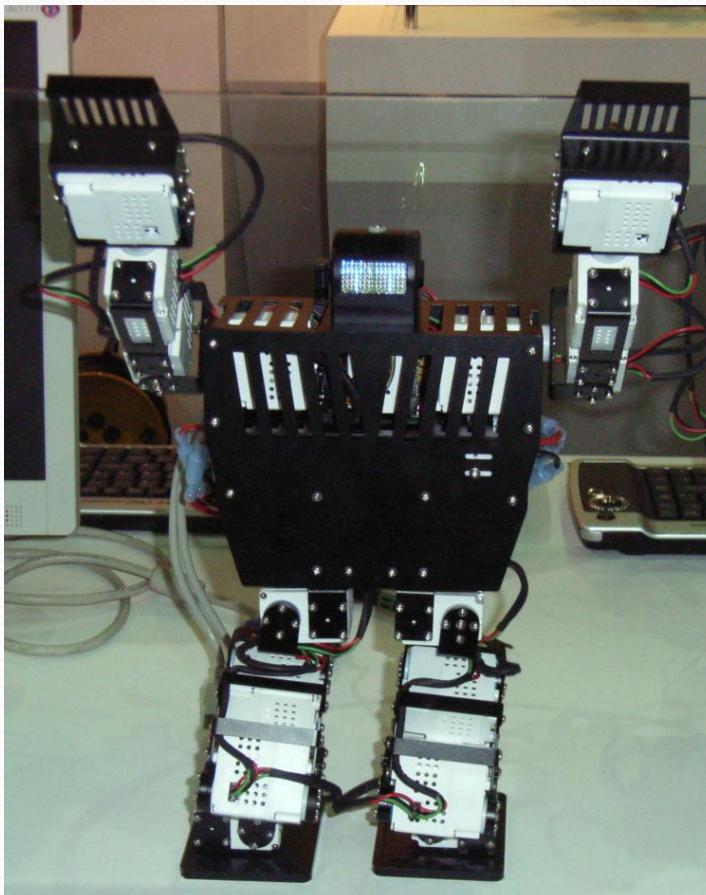
RoBoard Application (PMC, Taiwan)



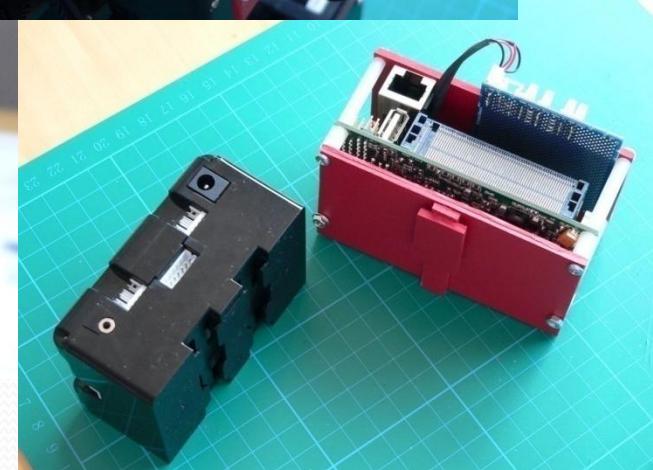
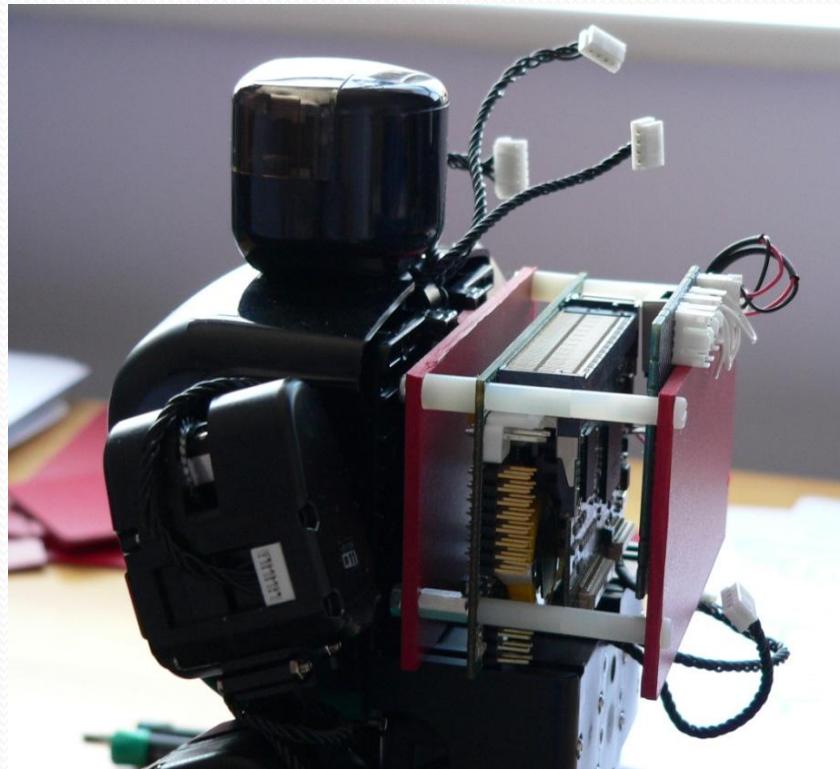
RoBoard Application (PMC Upitor, Taiwan)



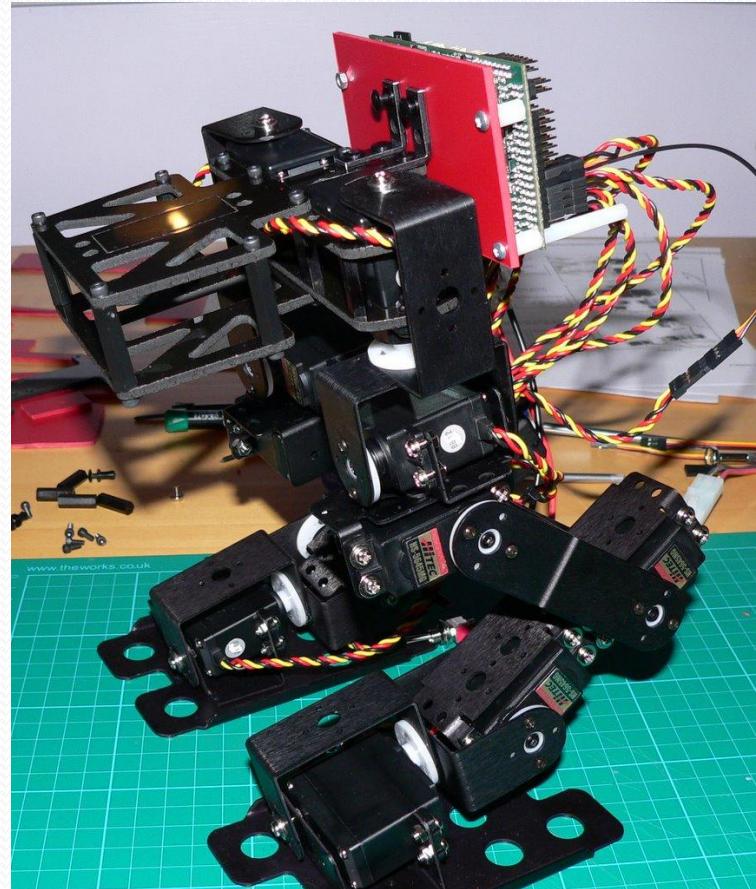
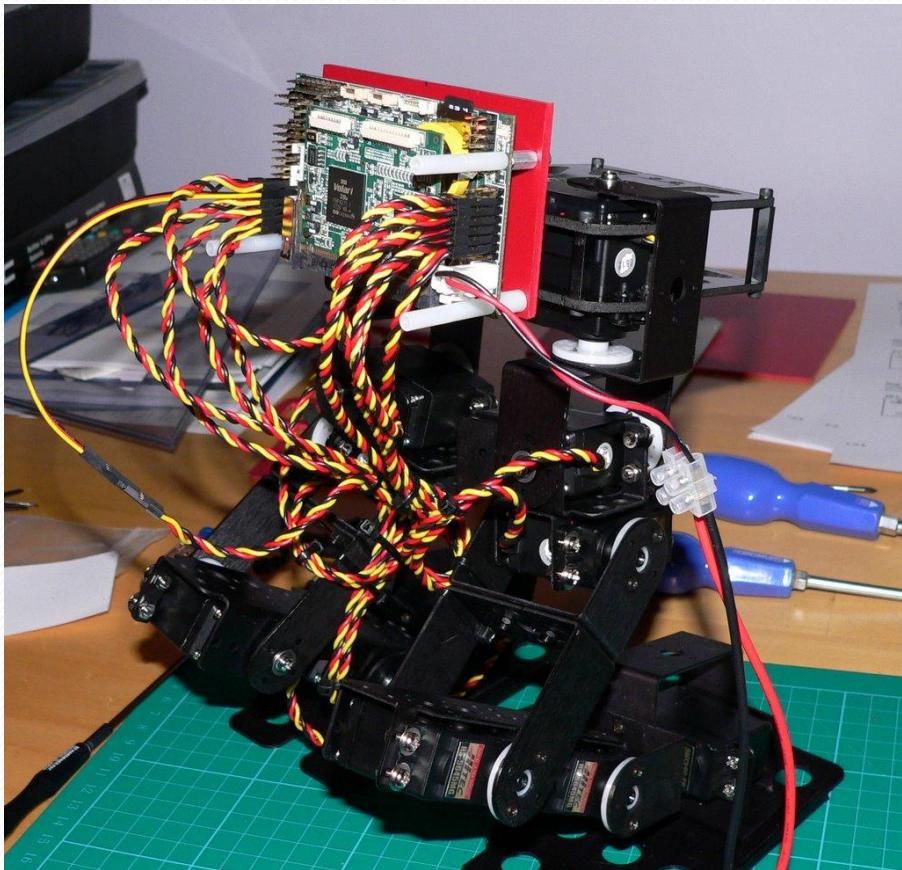
RoBoard Application (PMC Humanoid, Taiwan)



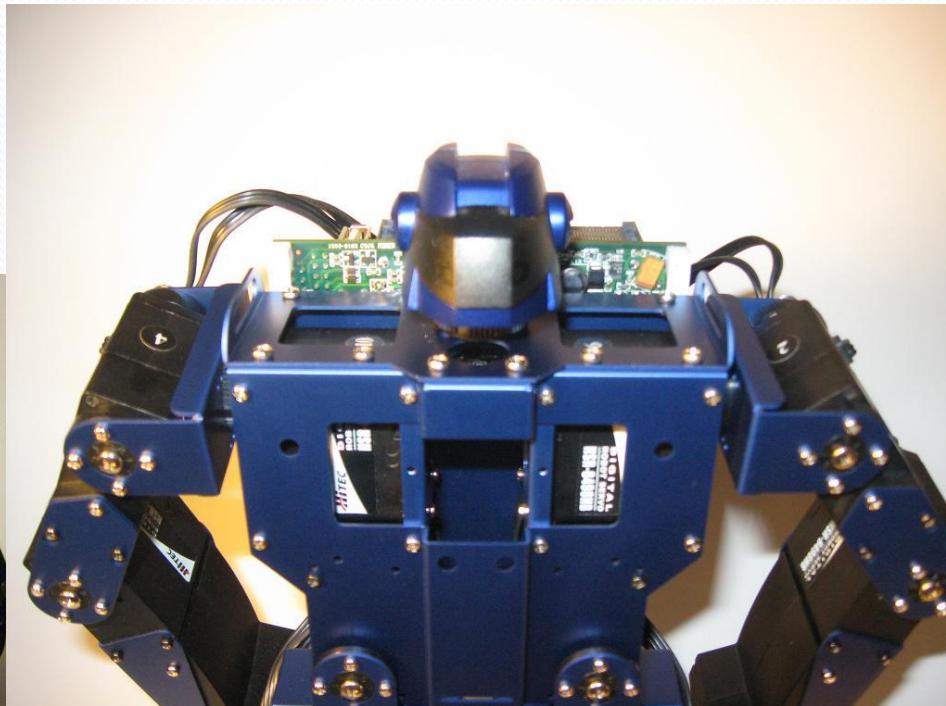
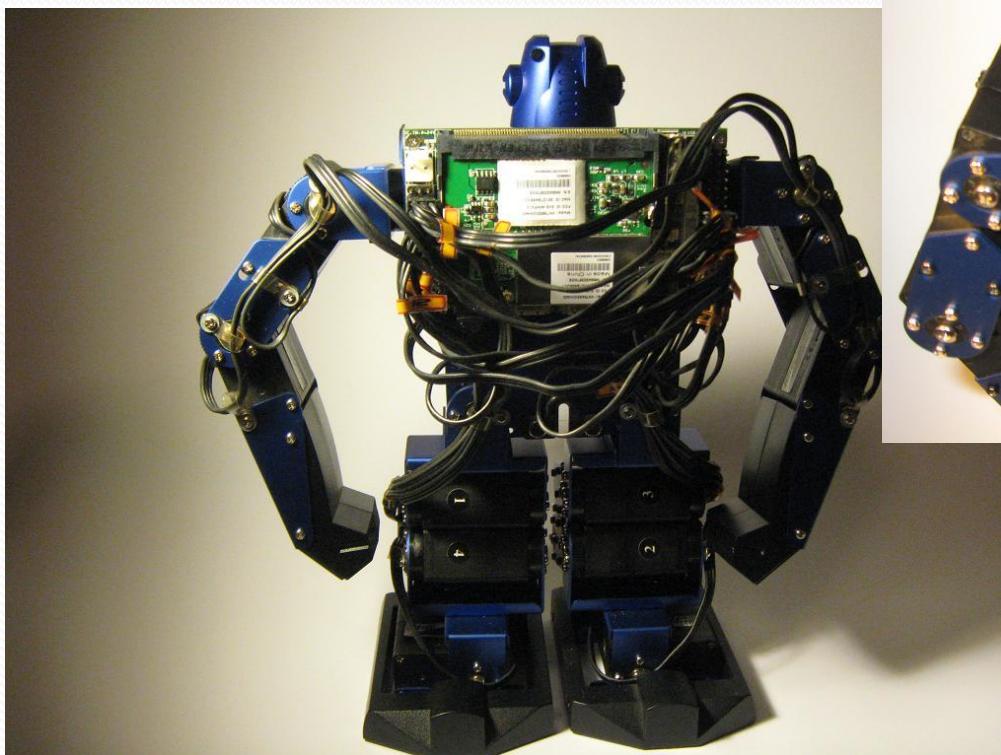
RoBoard Application (Robobuilder, UK)



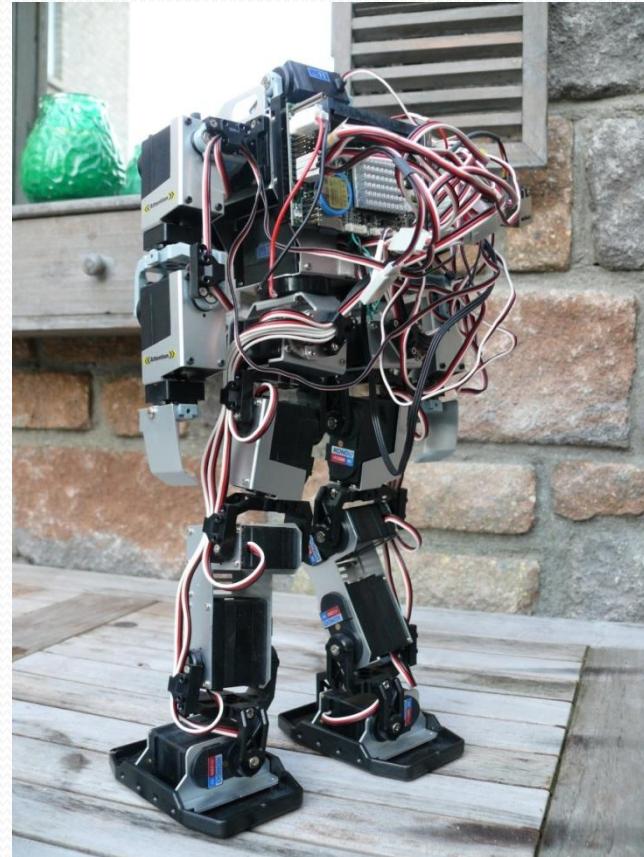
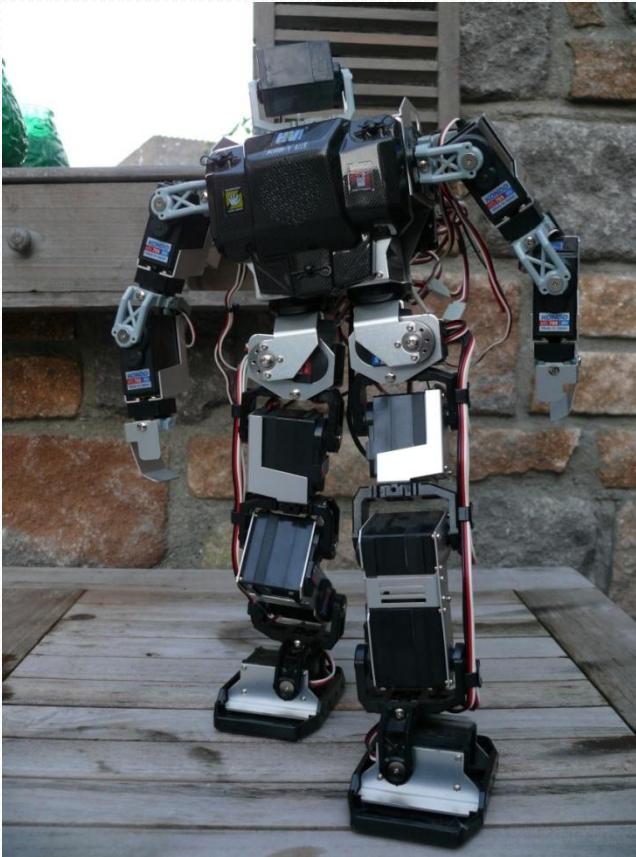
RoBoard Application (Lynxmotion, UK)



RoBoard Application (Robonova, Virginia, US)



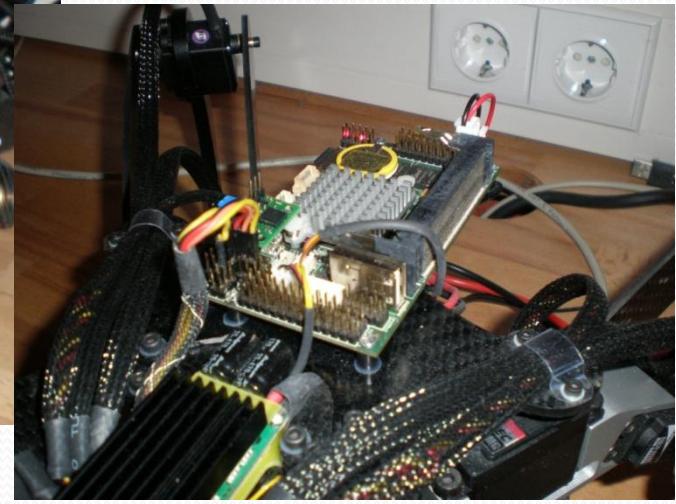
RoBoard Application (KONDO, Netherlands)



RoBoard Application (Humanoid, Mexico)

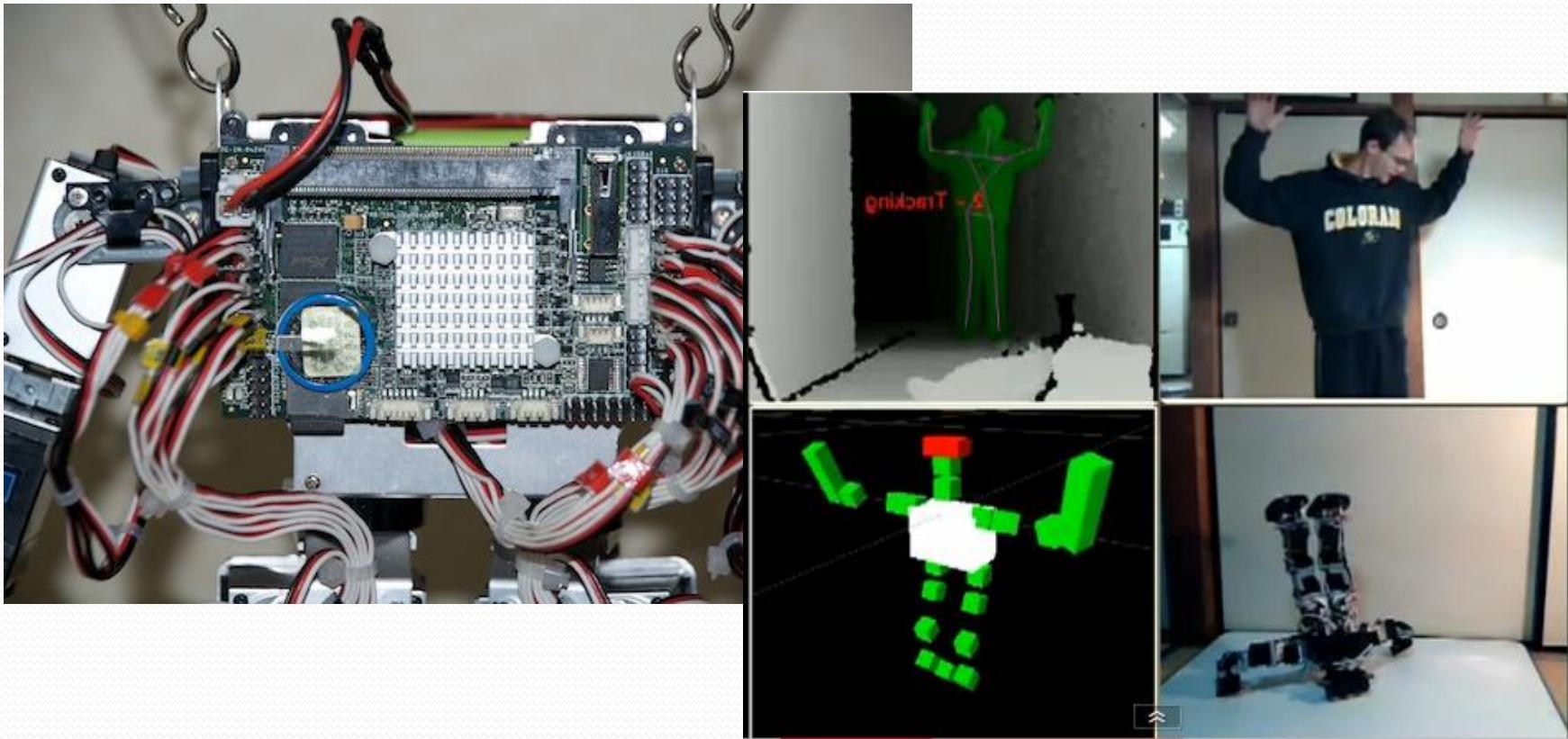


RoBoard Application (Mendel Hexabot, Germany)



<http://forums.trossenrobotics.com/member.php?3139-Chaosmann>

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

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<http://www.roboard.com>