RoBoard RB-110
Hardware Introduction

DMP Electronics Inc
Robotic Division
Mar 2010

Agenda

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

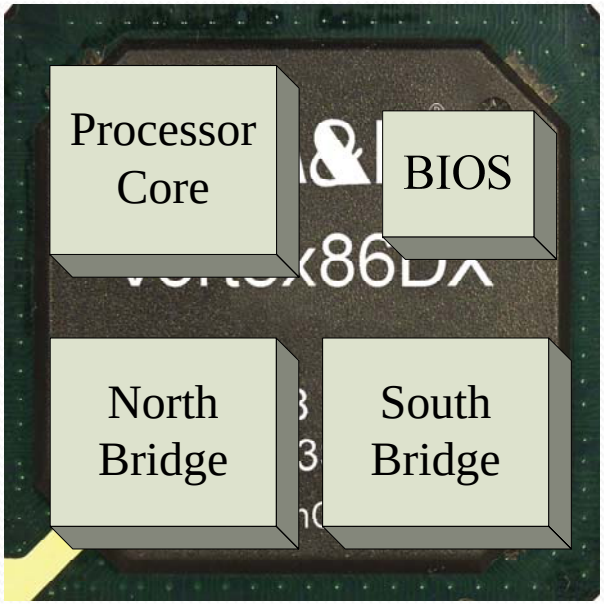
DMP's SoC Family

- 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

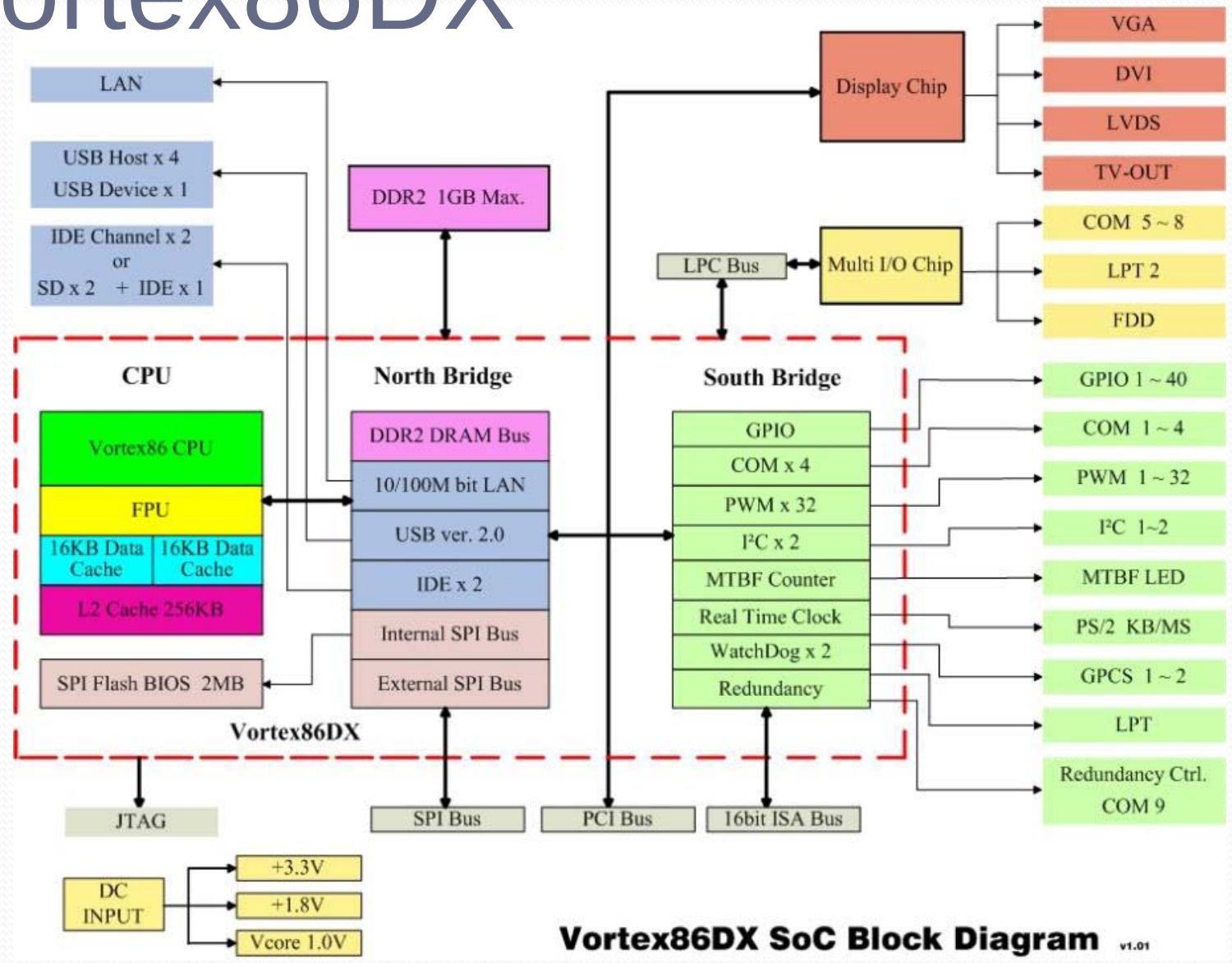
Vortex86DX



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)

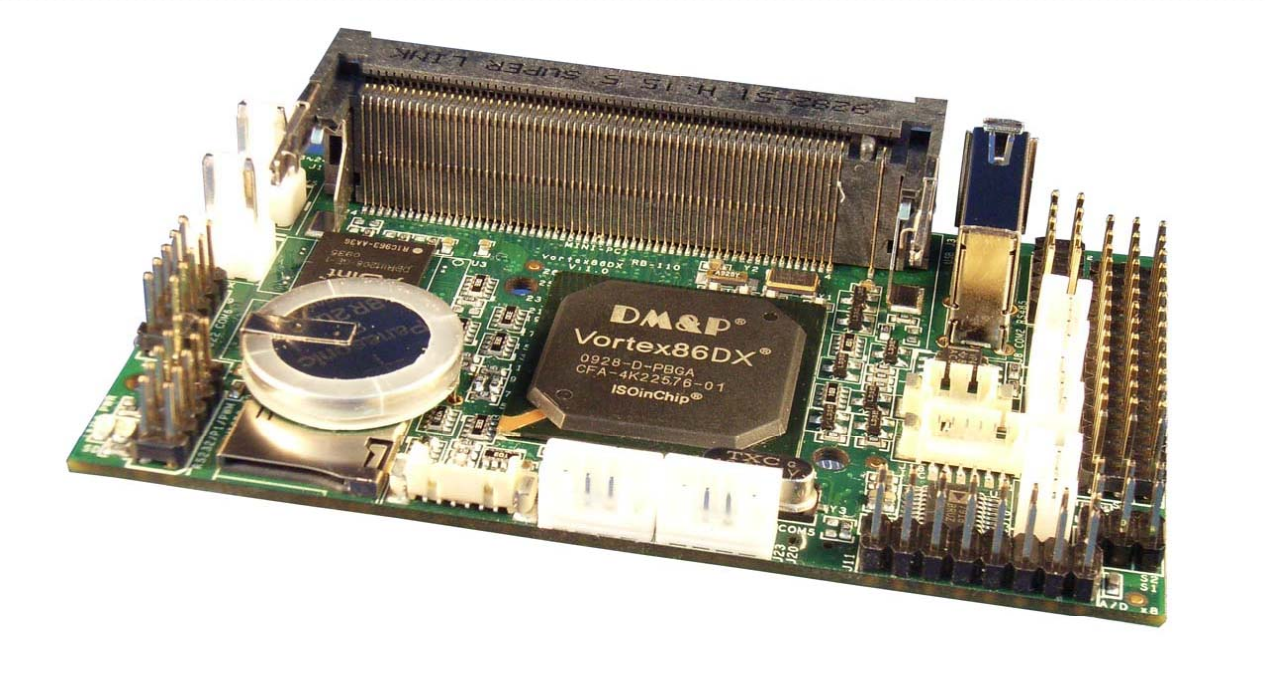
Vortex86DX


LAN
USB Host x 4
USB Device x 1
IDE Channel x 2
or
SD x 2 + IDE x 1
DDR2 1GB Max.
Display Chip
VGA
DVI
LVDS
TV-OUT
LPC Bus
Multi I/O Chip
COM 5 ~ 8
LPT 2
FDD
CPU
North Bridge
South Bridge
Vortex86 CPU
FPU
16KB Data Cache
16KB Data Cache
L2 Cache 256KB
DDR2 DRAM Bus
10/100M bit LAN
USB ver. 2.0
IDE x 2
Internal SPI Bus
External SPI Bus
SPI Flash BIOS 2MB
GPIO
COM x 4
PWM x 32
I²C x 2
MTBF Counter
Real Time Clock
WatchDog x 2
Redundancy
GPIO 1 ~ 40
COM 1 ~ 4
PWM 1 ~ 32
I²C 1~2
MTBF LED
PS/2 KB/MS
GPCS 1 ~ 2
LPT
Redundancy Ctrl.
COM 9
Vortex86DX
JTAG
SPI Bus
PCI Bus
16bit ISA Bus
DC INPUT
+3.3V
+1.8V
Vcore 1.0V
Vortex86DX SoC Block Diagram v1.01

OVERVIEW

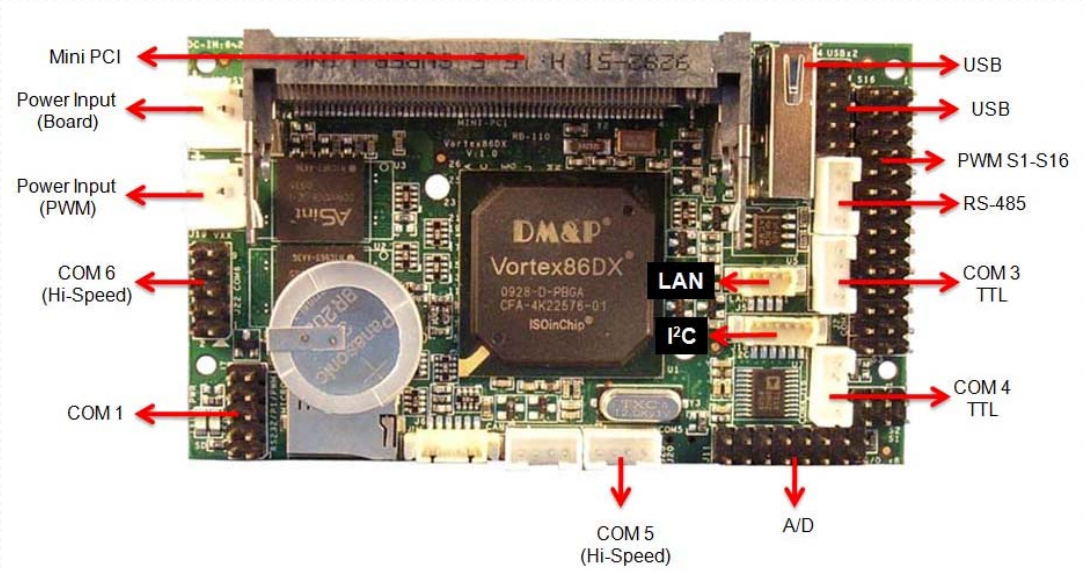
RoBoard RB-110

- Powerful **Computer** dedicated to robotics applications
- Based on the **Vortex86DX**, a 32bit x86 CPU running at 1000MHz with 256MB DRAM
- High Speed Serial Port (Up to 12M)
- Compatible with Windows, Linux and DOS
- Open Source C++ Library for Roboard‘s unique I/O functions (sensors, actuators, etc.)



RoBoard RB-110

Size: 96 x 56mm



1. 1000MHz, 256MB DDR2
2. PC compatible
3. Build in PWM 16Ch
4. Build in 24 bit GPIO
5. USB V2.0 x 3 ports
6. TTL COM ports x 2, RS-232 and RS/485 X 1
7. Hi-Speed serial port x 2
8. I^2C Bus
9. Power consumption 5V@400mA (2W)
10. DC 6V-24V

Specification

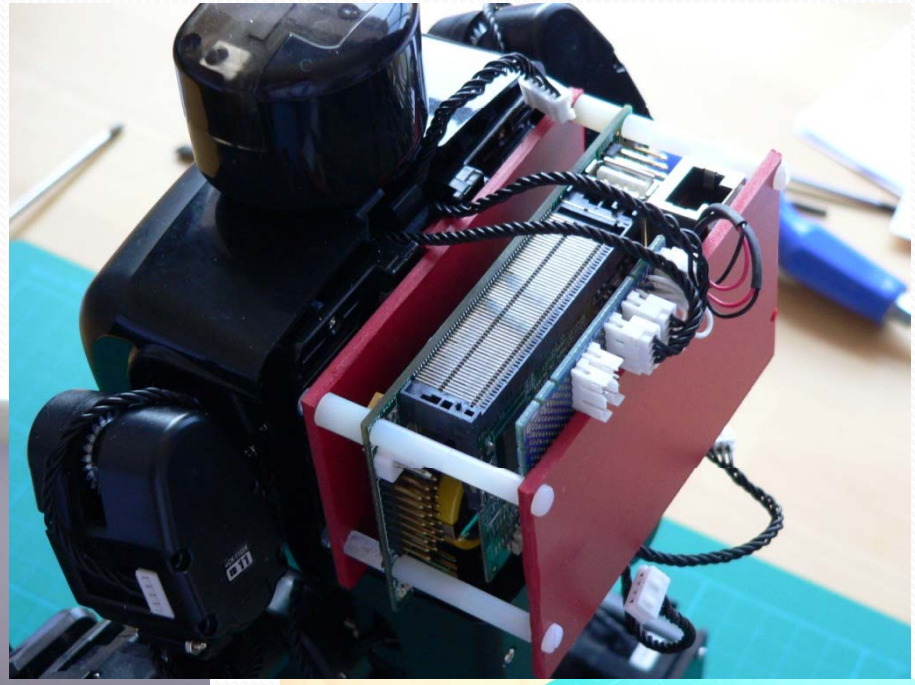
Model	RB-110
Processor	DM&P Vortex86DX
BIOS	AMI BIOS
Memory	256MB DDR 2 onboard
ADCs	Analog Devices AD-7918 10-bit
Hi-Speed USB UAR	FTDI FT2232HL Hi-Speed UART
I /O Interface	•Micro SD slot •USB 2.0 version
Power Consumption	+5V @ 400mA
Power Input	DC-in 6V to 24V
Dimension	96 x 56 mm
Weight	40 g
Resolution	PWM : 20ns Serial : 115200bps I^2C : 1Kbps ~ 3.3Mbps
Compatible O/S	DOS, Windows 98/ME, Windows XP Windows Embedded CE, Windows Embedded Standard Linux distribution kernel 2.4.24, 2.4.26, 2.4.29

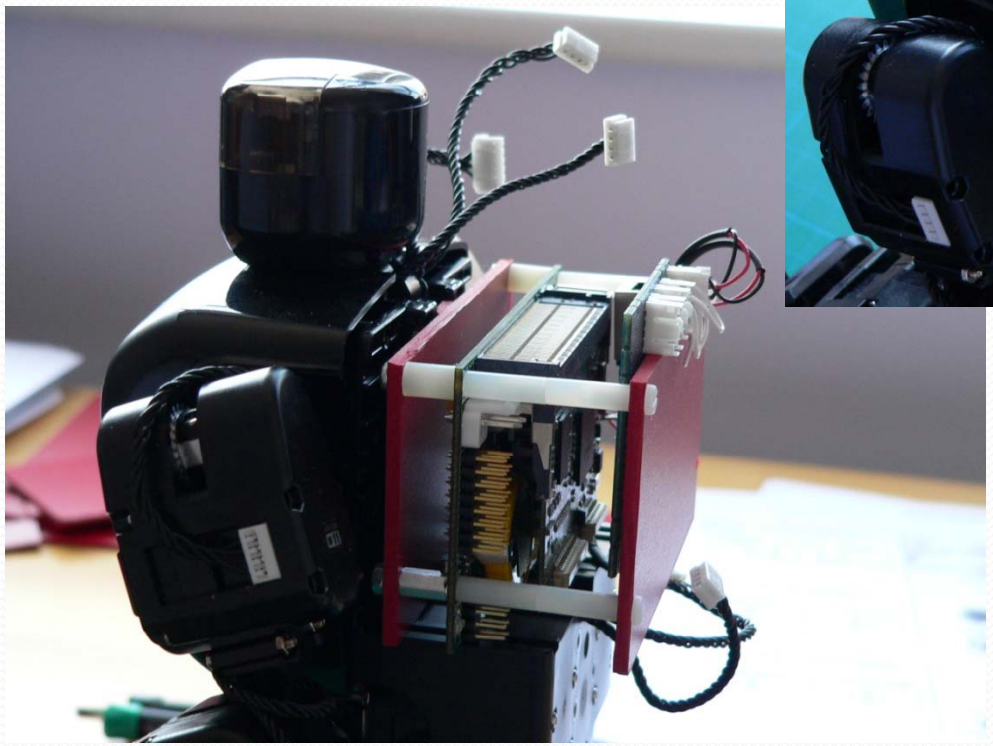
APPLICATION

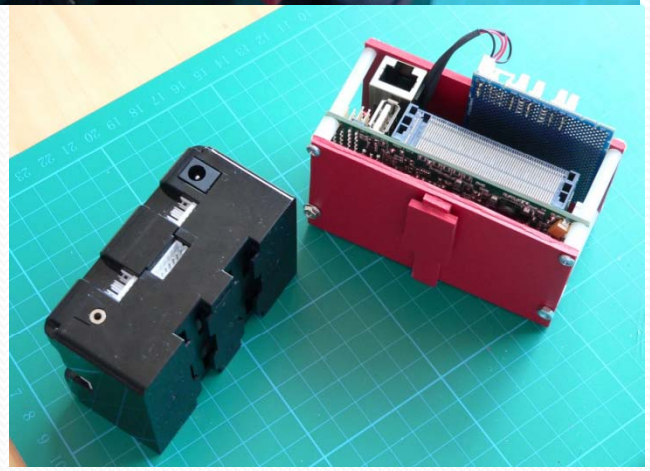
PWM 32ch Control

RoBoard Application

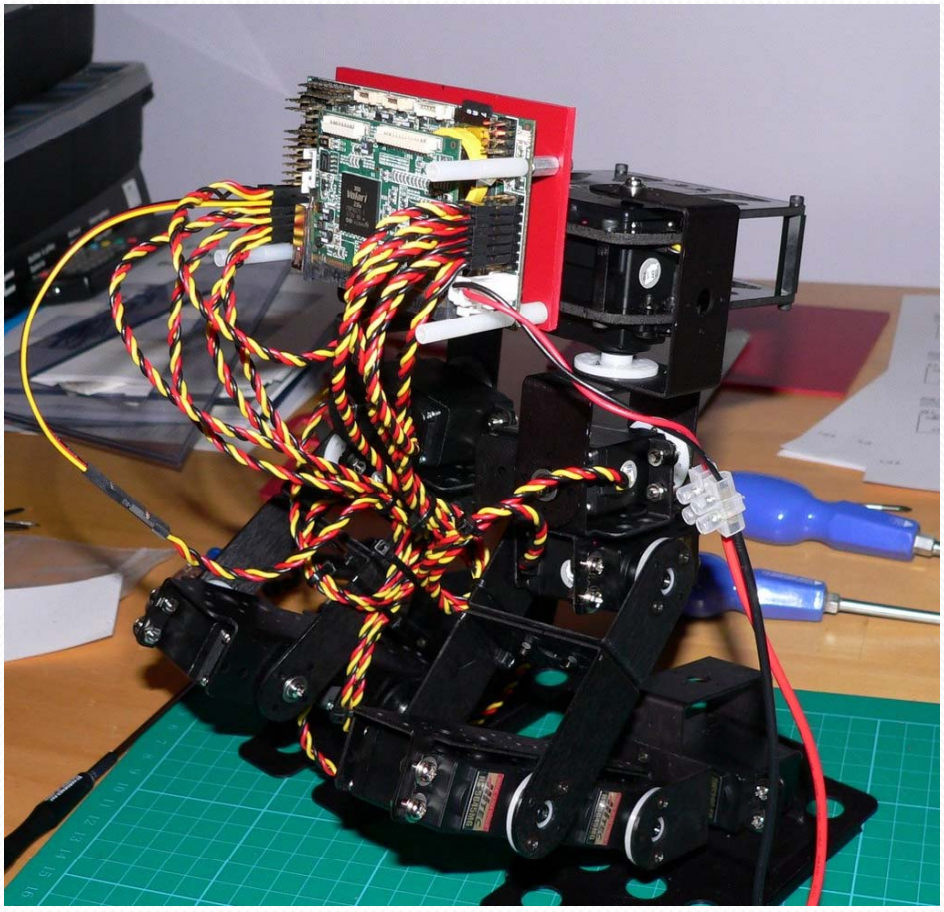
RoBoard Application

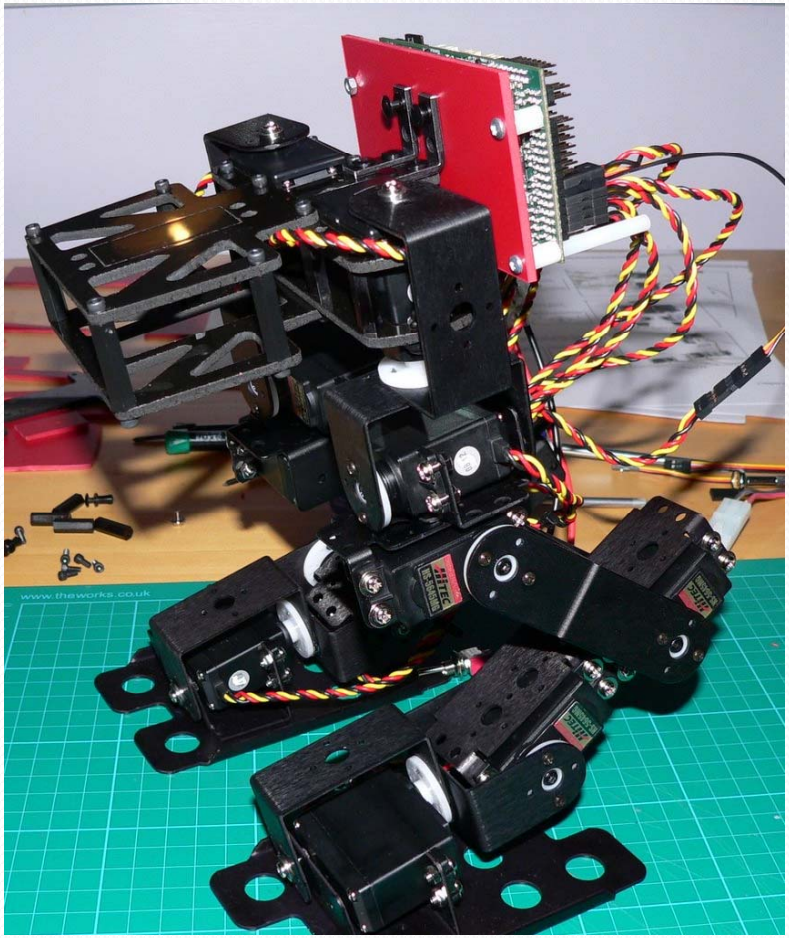




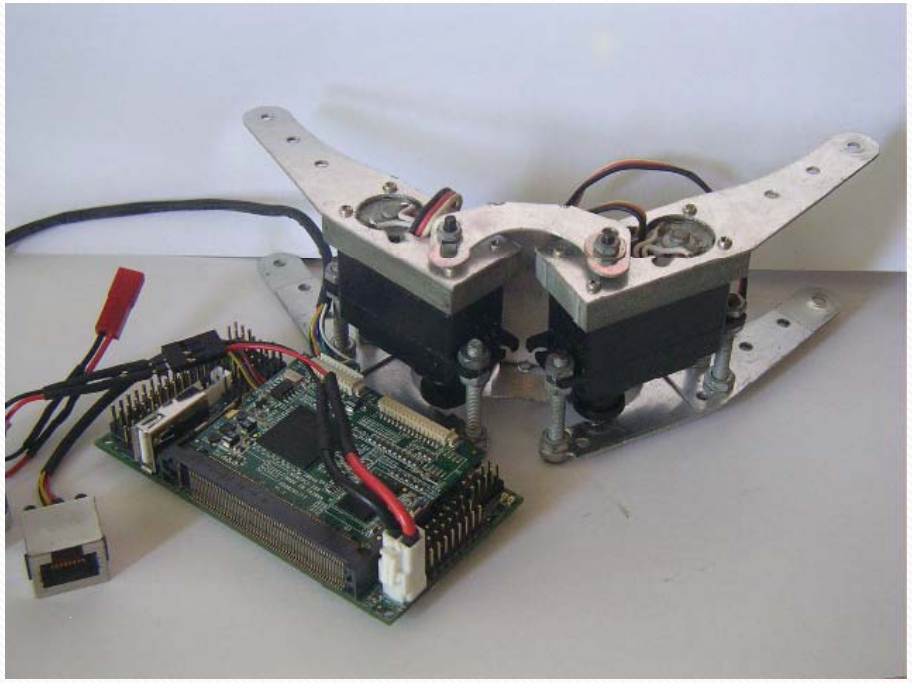


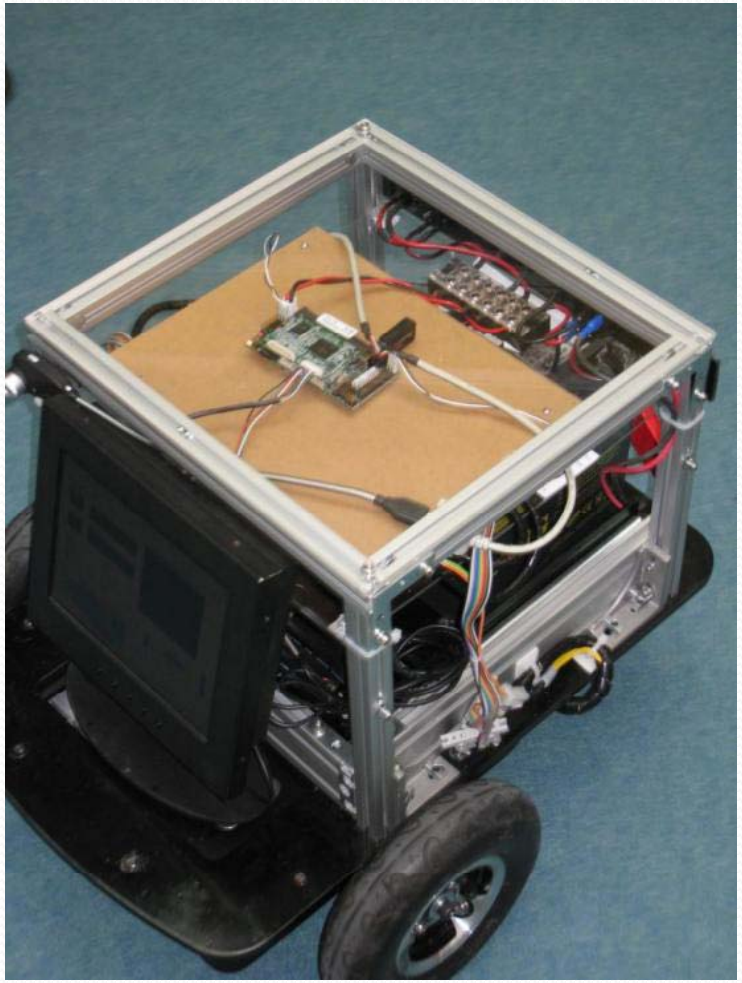
RoBoard Application





RoBoard Application





SUPPORT LIST

Support List

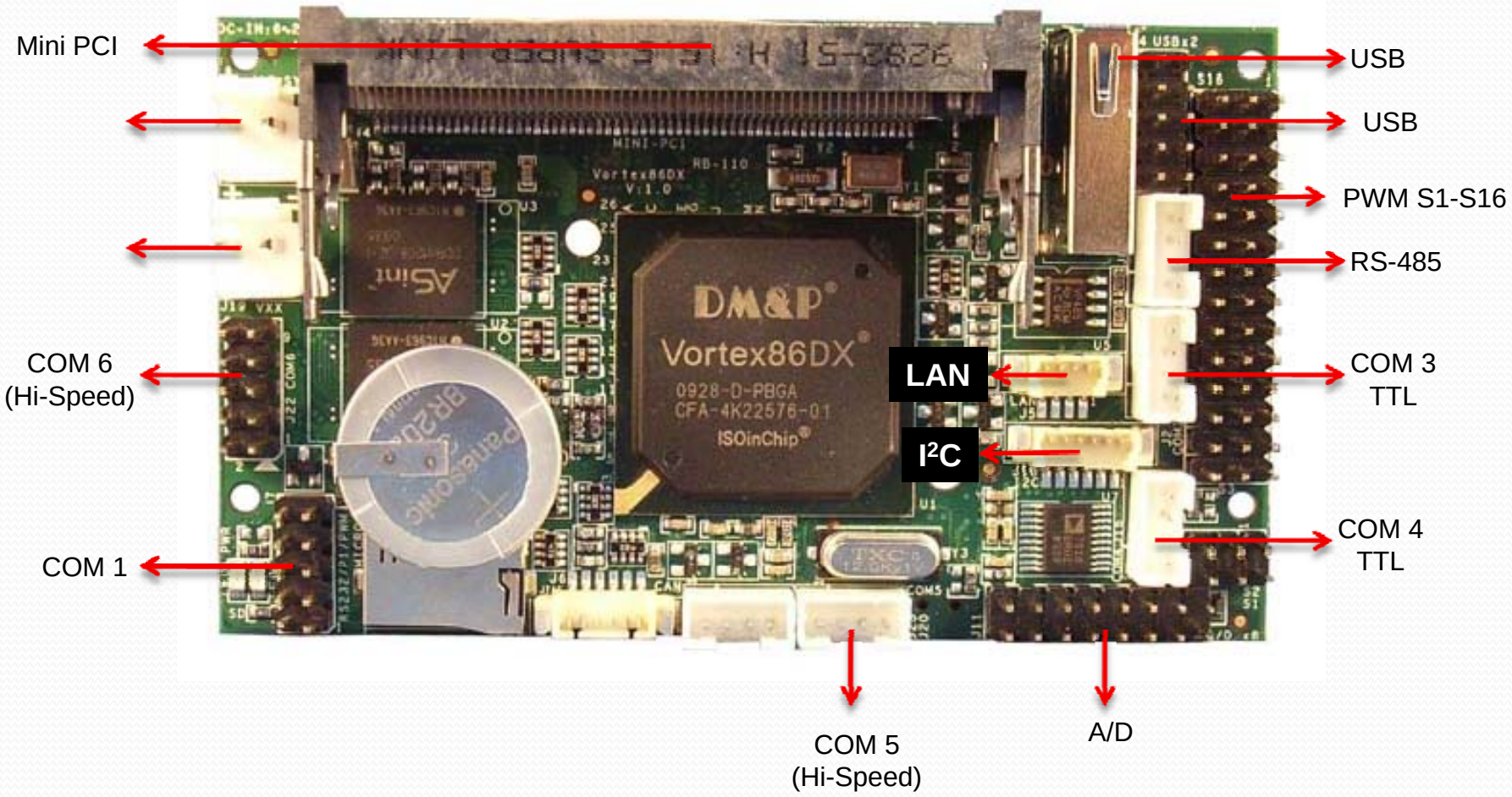
- **PWM Control**
  Kondo KRS series
  HiTEC HSR-8498HB
  HB-25 Motor Controller
  SYS servo series
  GWS servo series

- **COM 2/3 Control**
  Robotis Dynamixel RX-28
  HiTEC HSR-8498HB serial mode
  Robotis Dynamixel AX-12+
  AI MOTOR-1001
  wCK servo series

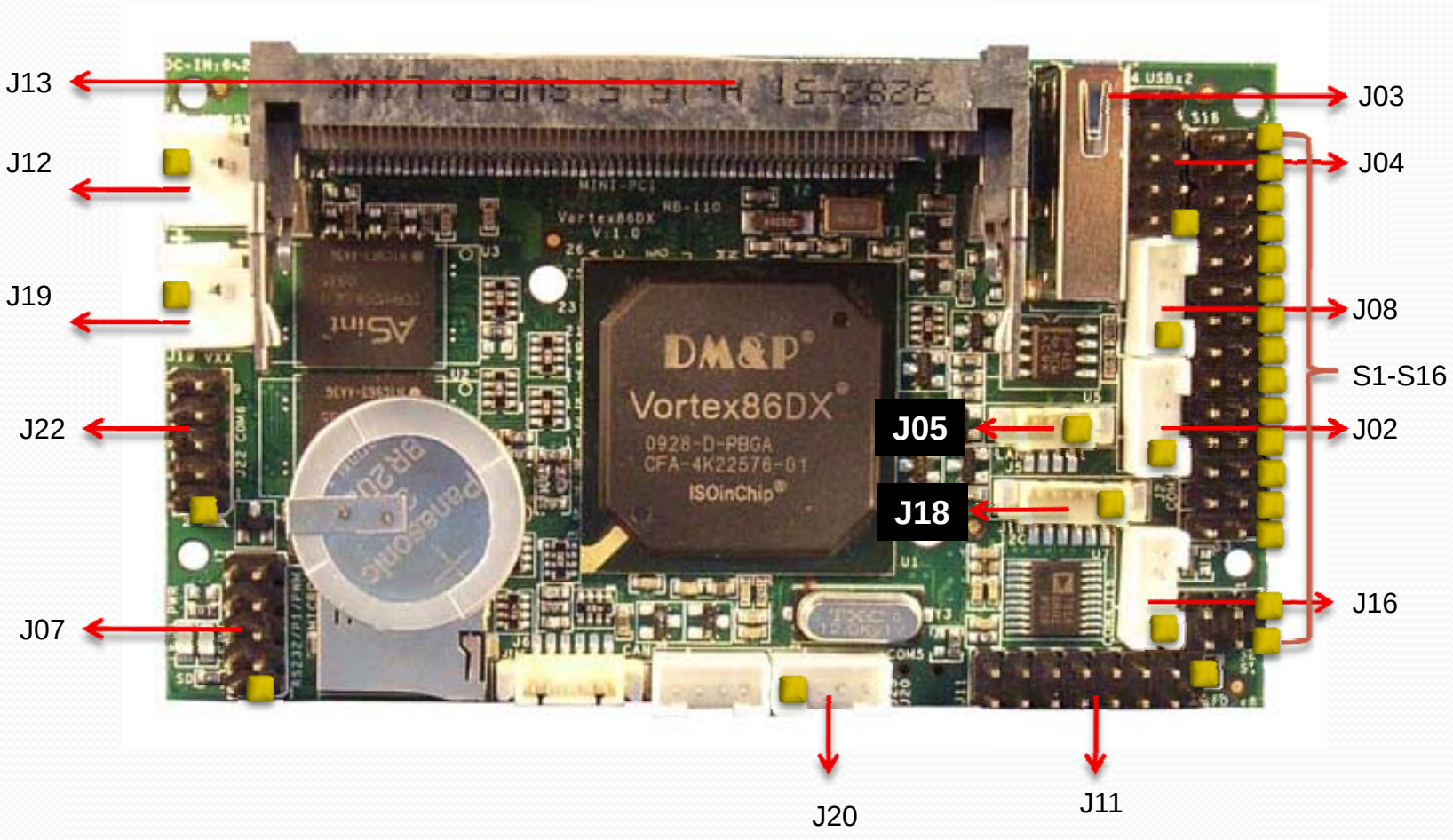
- **I2C Control**
  CATCAM series

HARDWARE INTRODUCTION

Locations


Mini PCI
USB
USB
PWM S1-S16
RS-485
COM 6
(Hi-Speed)
LAN
COM 3
TTL
I²C
COM 4
TTL
COM 1
COM 5
(Hi-Speed)
A/D
DM&P
Vortex86DX
0928-D-PBGA
CFA-4K22576-01
ISOinChip

Pin 1 Location



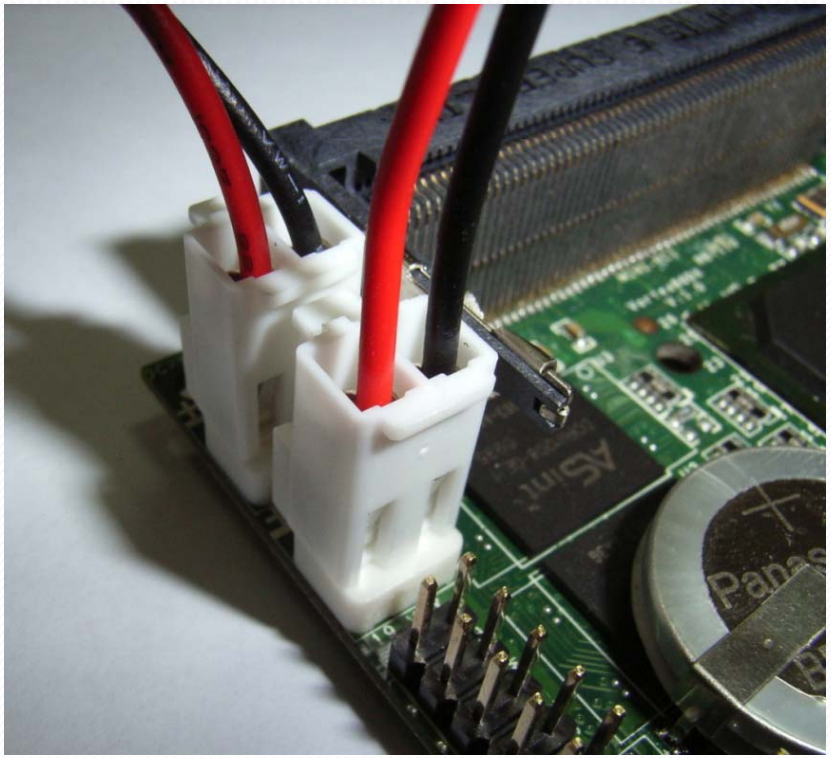
Power connector

- DC 6V- 24V (for system board)

Pin #	Signal Name
1	Vxx
2	GND

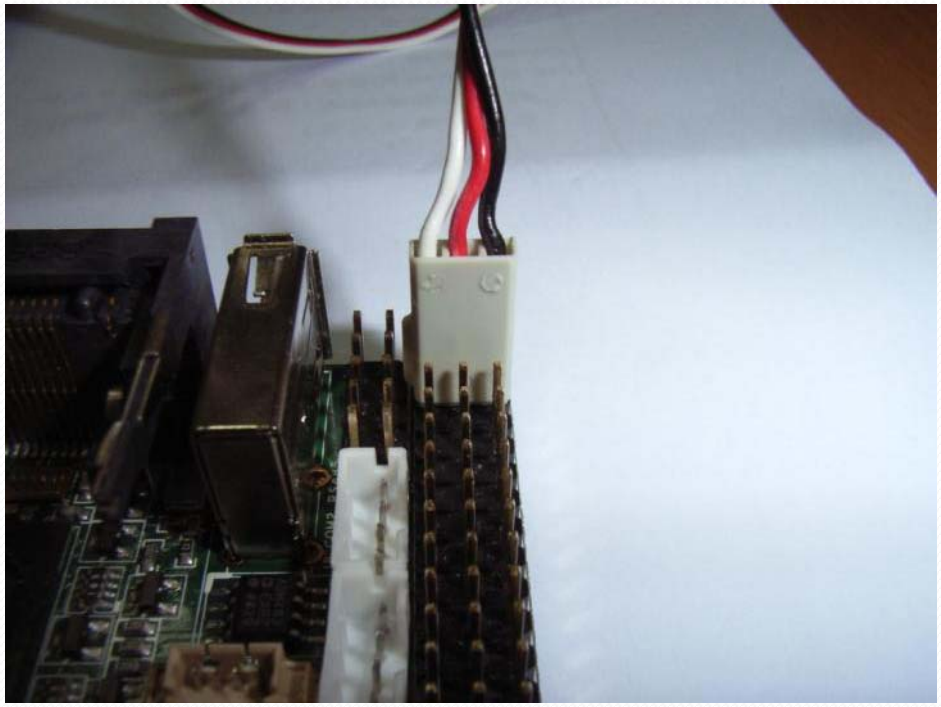
- DC 6V- 24V (for PWM servo)

Pin #	Signal Name
1	Vxx
2	GND



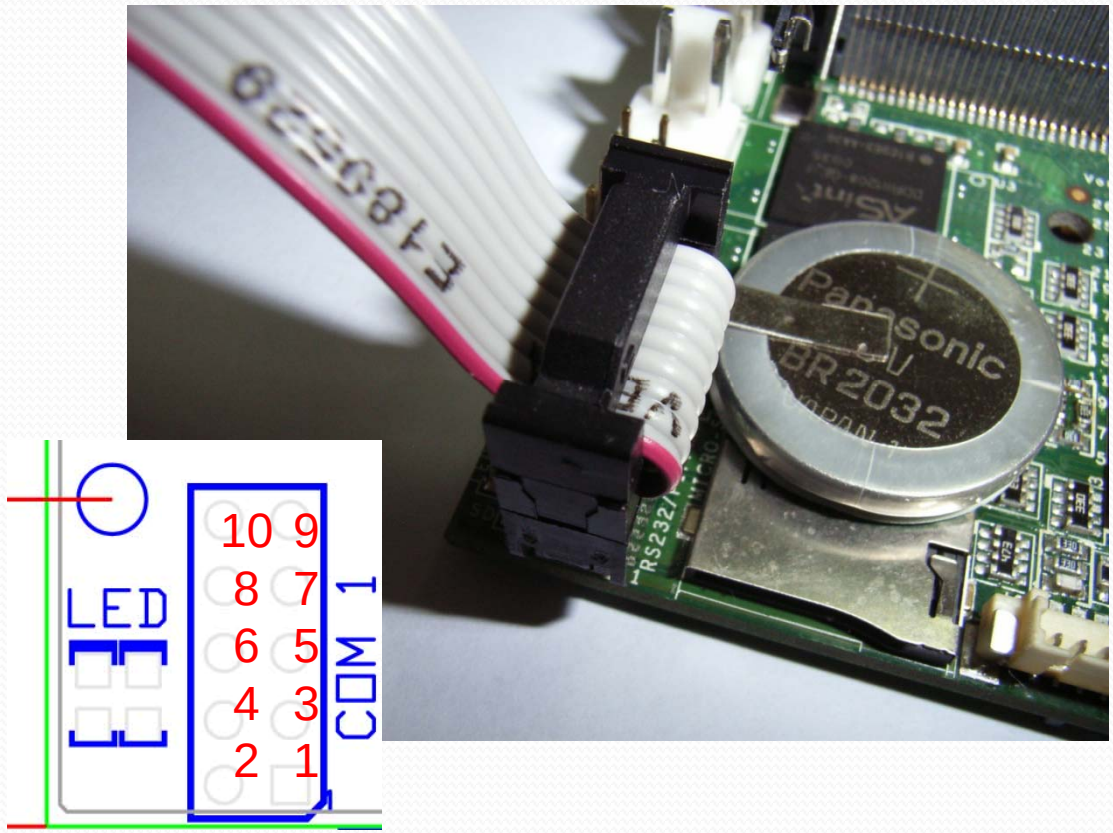
PWM 16Ch

Pin #	Signal Name	Pin #	Signal Name	Pin #	Signal Name
1	GND	2	Vxx	3	GPXX



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	NC



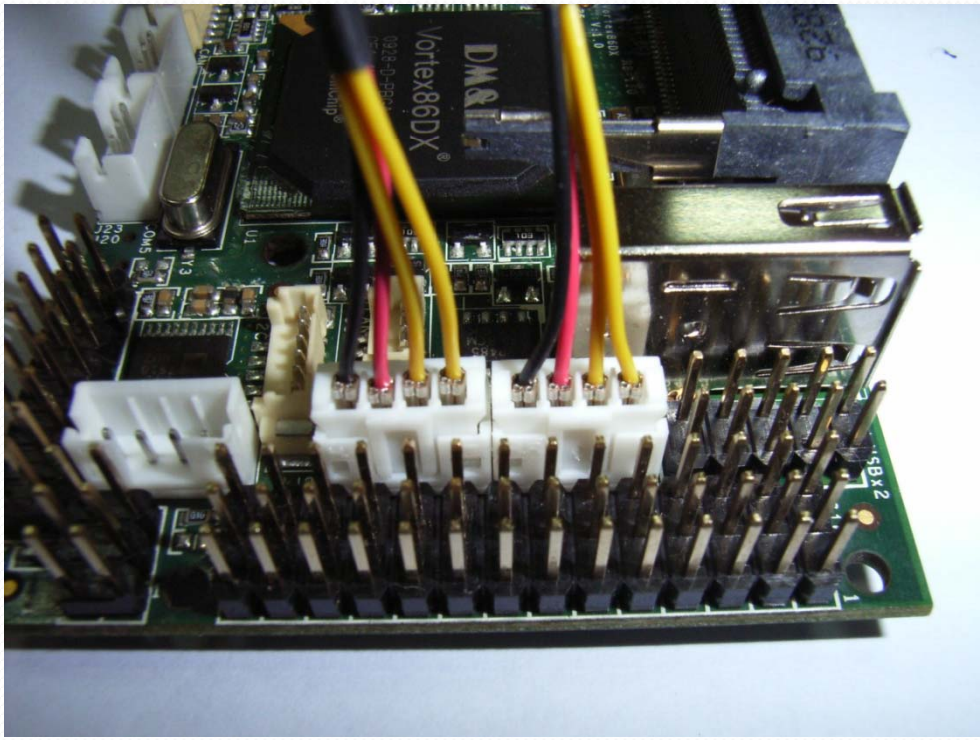
RS-485 & Full Duplex TTL Serial

COM 2 RS-485

Pin #	Signal Name	Pin #	Signal Name
1	GND	2	Vxx
3	RS-485+	4	RS-485-

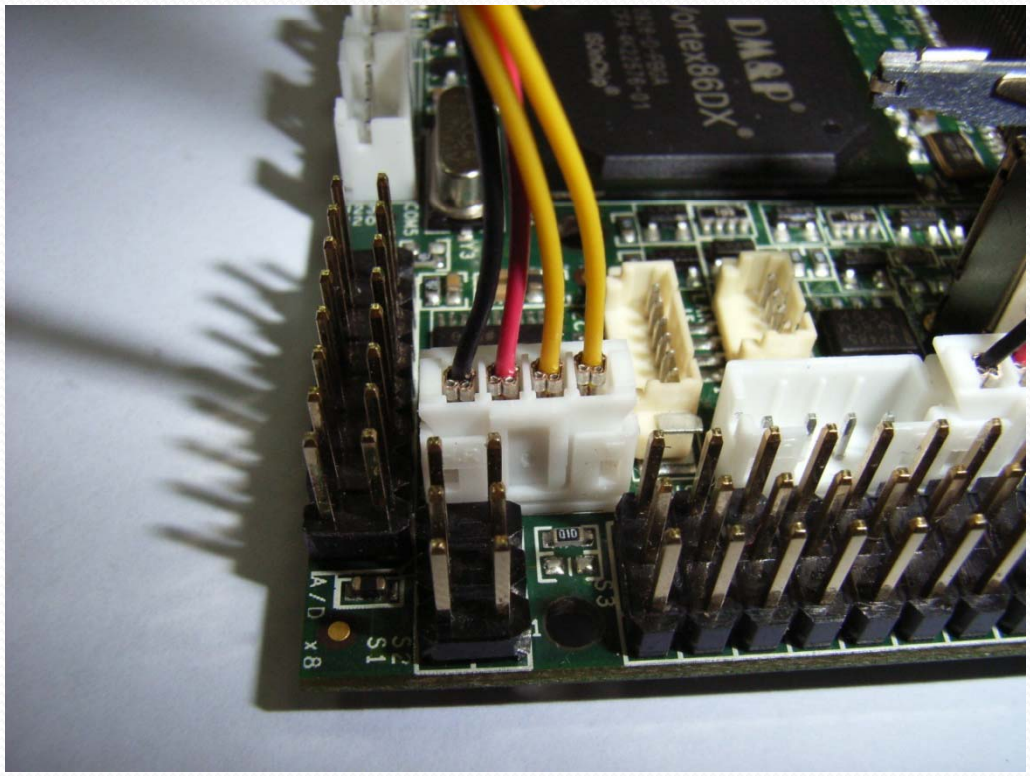
COM 3 TTL Serial

Pin #	Signal Name	Pin #	Signal Name
1	GND	2	Vxx
3	TXD3	4	RXD3



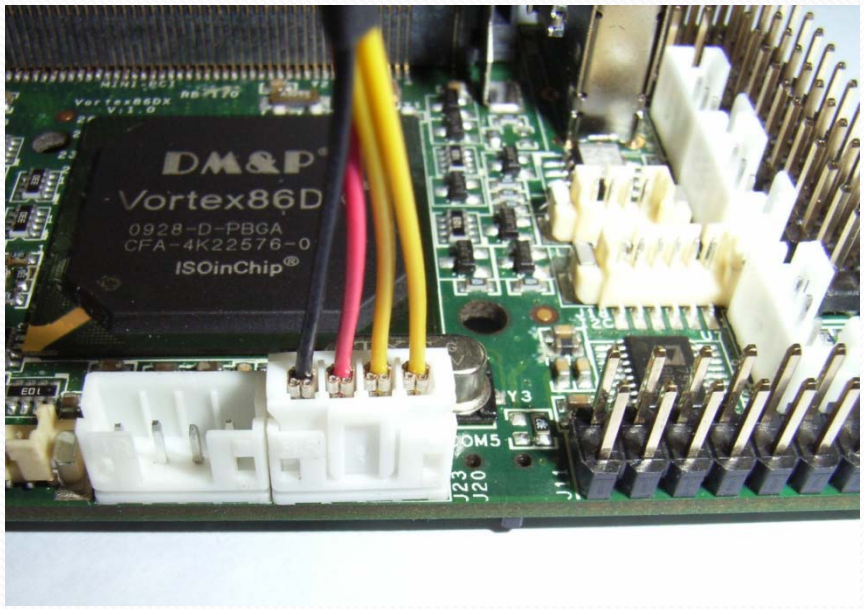
COM 4 Full Duplex TTL

Pin #	Signal Name	Pin #	Signal Name
1	GND	2	Vxx
3	TXD4	4	RXD4



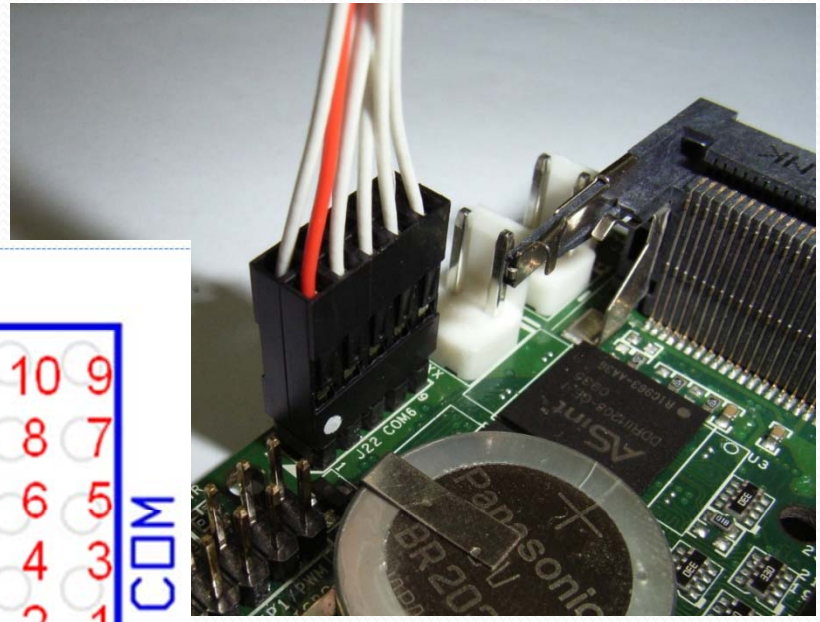
COM 5 Hi-Speed serial

Pin #	Signal Name	Pin #	Signal Name
1	GND	2	Vxx
3	TXD5	4	RXD5



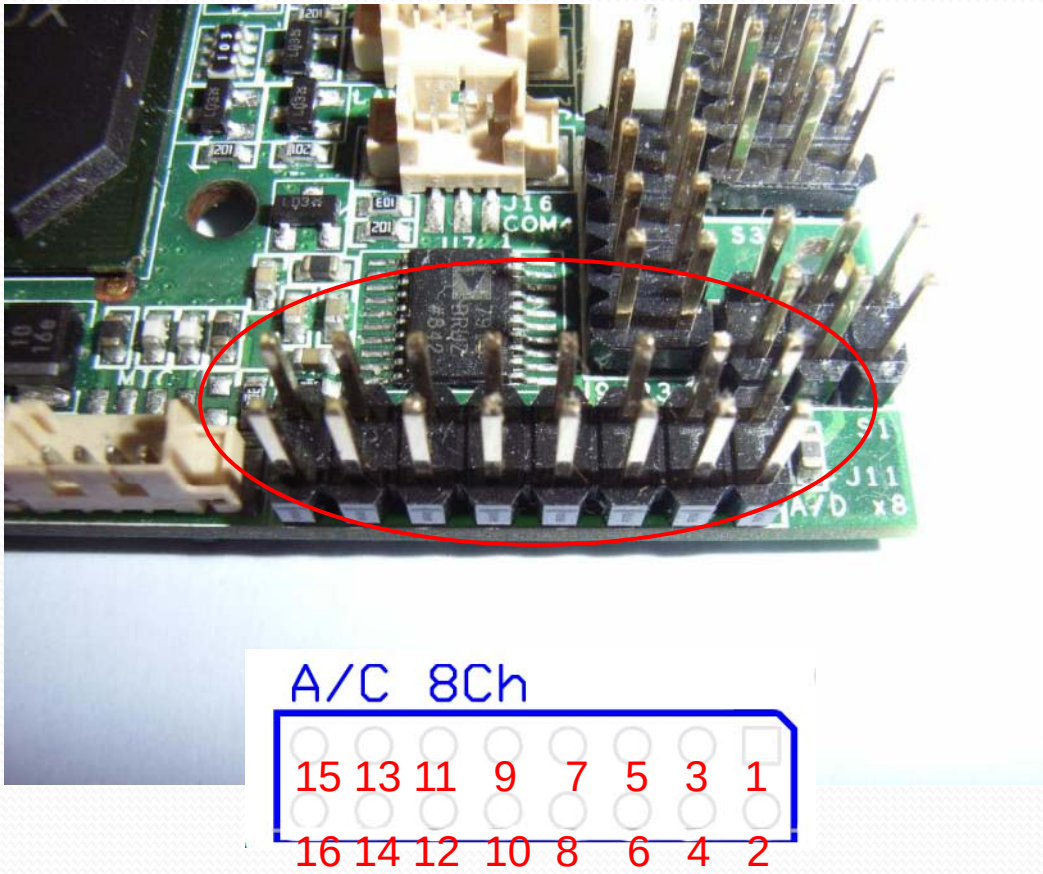
COM 6 Hi-Speed serial

Pin #	Signal Name	Pin #	Signal Name
1	DCD6	2	RXD6
3	TXD6	4	DTR6
5	GND	6	DSR6
7	RTS6	8	CTS6
9	RI6	10	TXDEN6



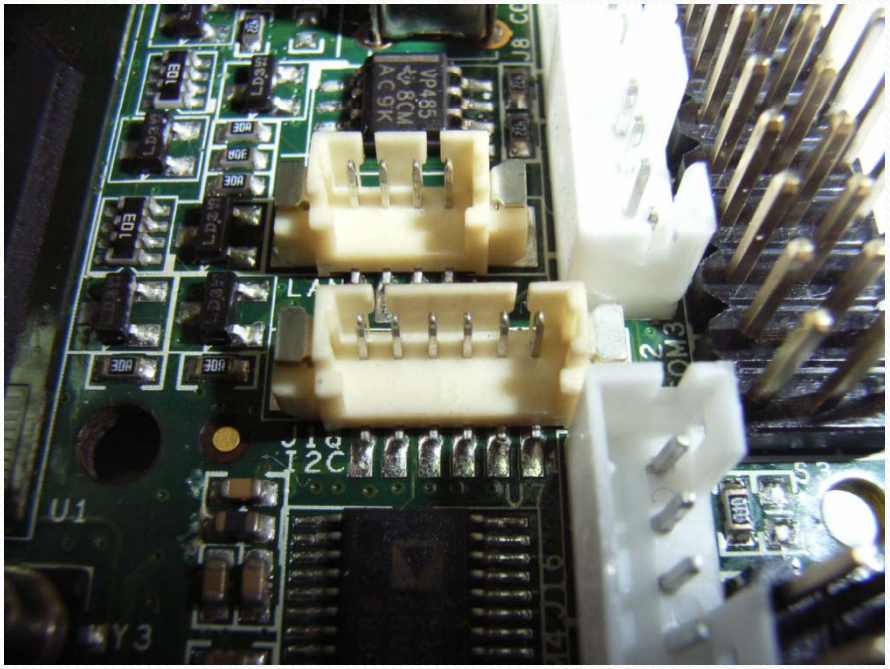
A/D 8 Ch

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



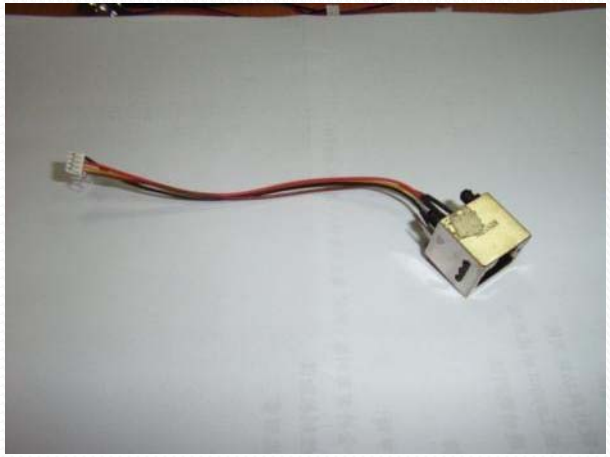
I²C

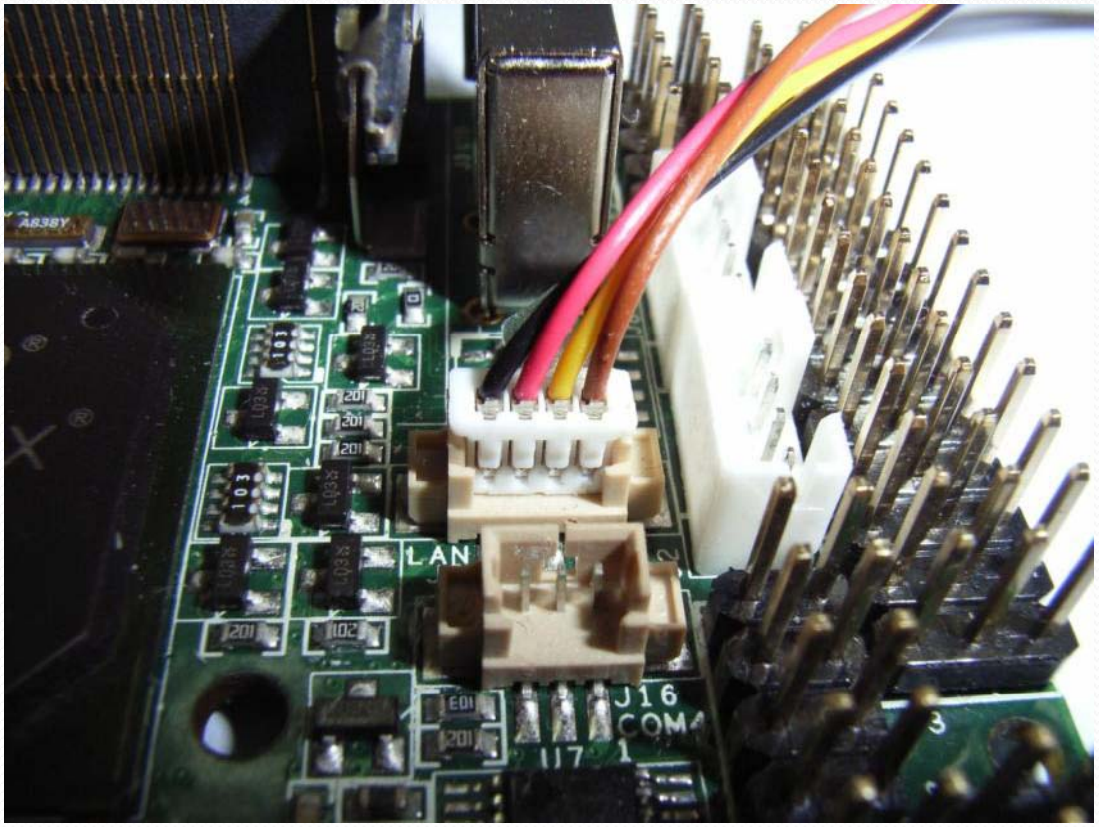
Pin #	Signal Name	Pin #	Signal Name
1	Vcc	2	GND
3	SCL	4	SDA
5	Reset	6	3.3V out



LAN connector

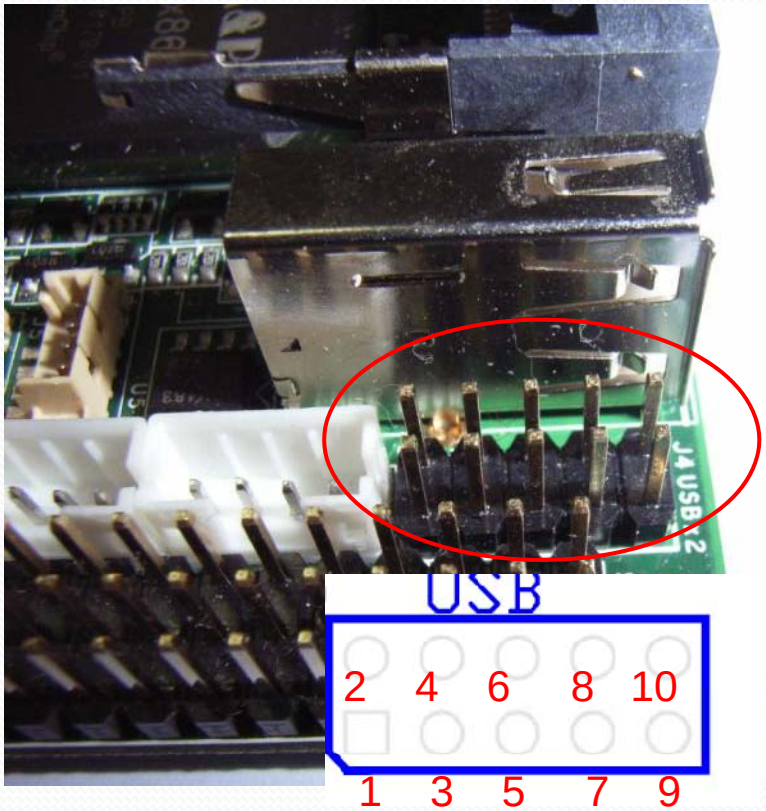
Pin #	Signal Name	Pin #	Signal Name
1	LAN-TX+	2	LAN-TX-
3	LAN-RX+	4	LAN-RX-





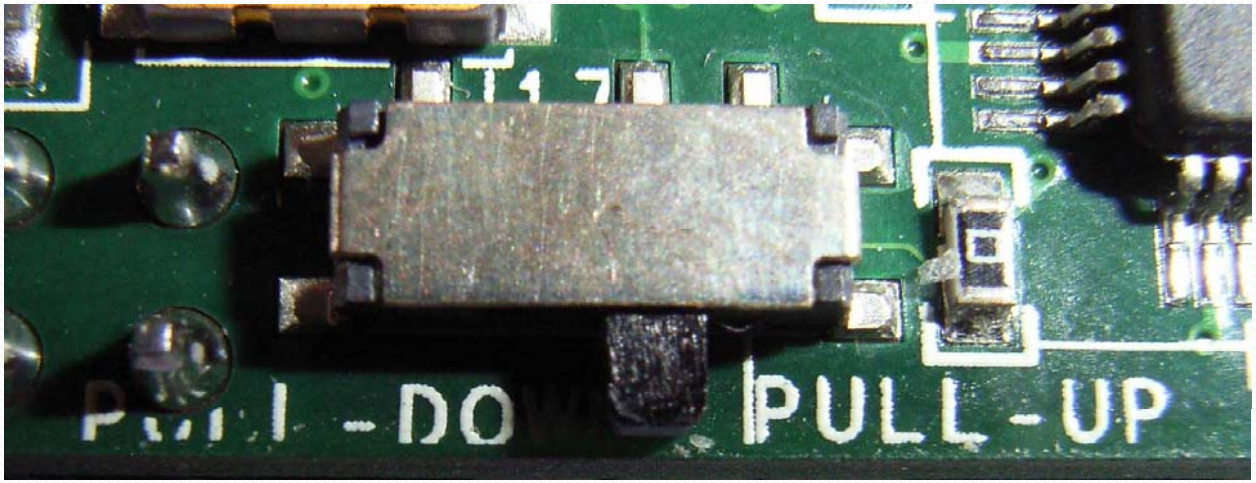
USB

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



PWM Initial pull up/down switch

Pin #	Signal Name	Pin #	Signal Name
1	PWM init Pull UP	2	PWM init Pull Down



PWM Initial pull up/down switch

- GPIO36 OUT 0: disable pull-up/pull-down switch (PWM always pull-up)
  GPIO36 OUT 1: enable pull-up/pull-down switch (PWM always pull-up or pull-down according to the switch)

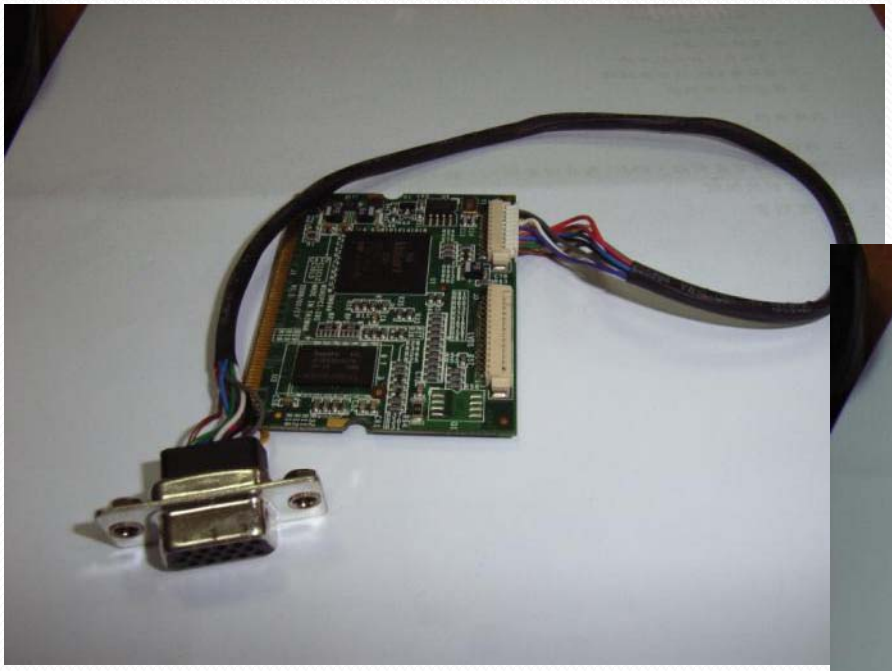
  PWM pull-down at boot is required by some RC servos, such as KONDO's KRS motors. If your RC servos don't need this, keep the switch on "pull-up".

  Note: if PWM is pulled-down, you will not be able to output PWM signal anymore. So to ensure that all PWM are pulled-down at boot and that they can output signal after boot, you need the following setting in BIOS:

  1. switch the pull-up/pull-down switch to "pull-down" so that all PWM are pulled-down at boot (GPIO36 outputs 1 by default when power-on).
  2. set GPIO36 OUT 0 in BIOS to disable the pull-up/pull-down switch after boot.
  3. set GPIO00-07, GPIO10-17, GPIO20-27 all OUT 0 in BIOS to ensure that all PWM remain to output 0 after boot.

ACCESSORY

Mini VGA Card

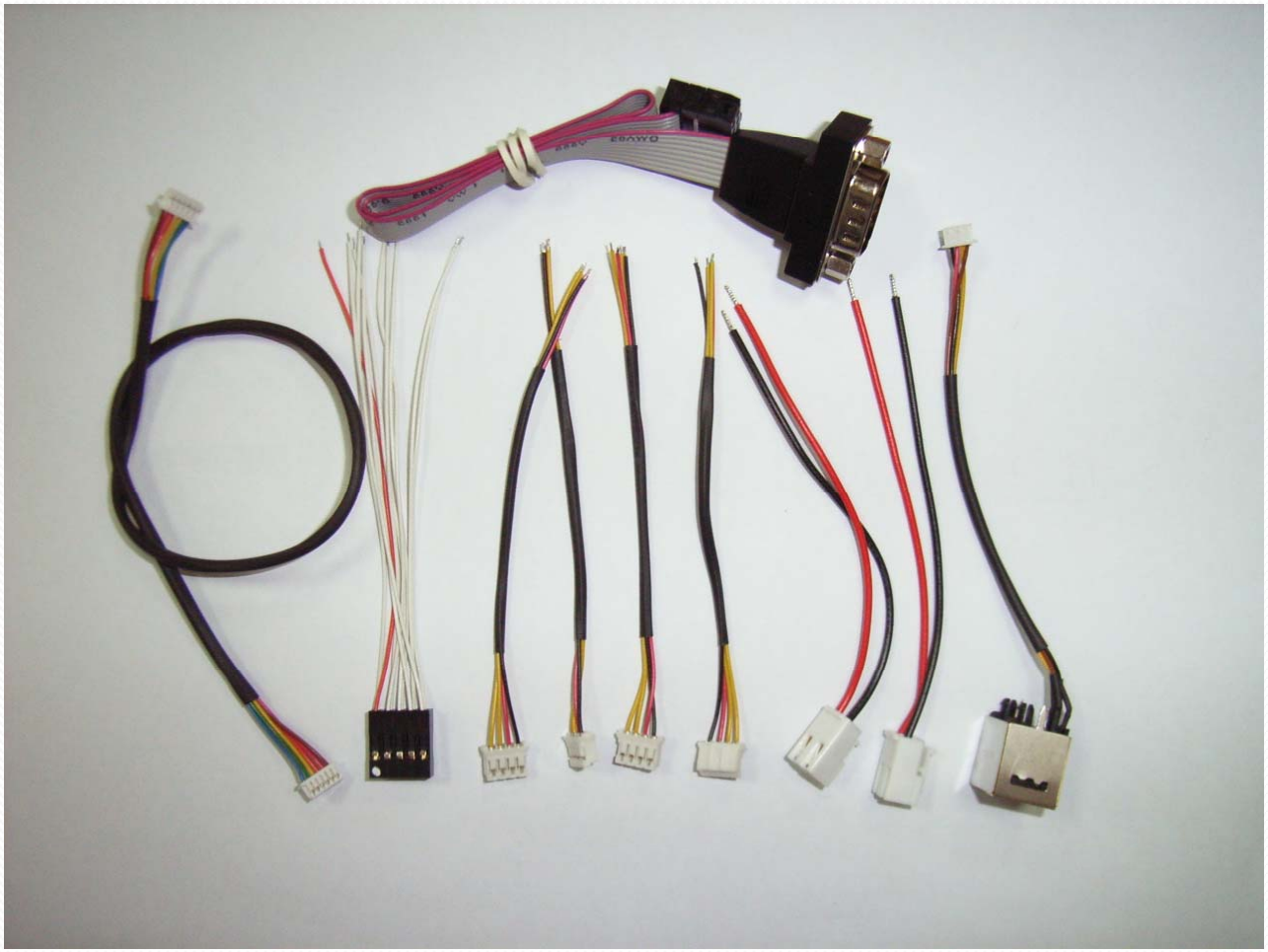


- Volari Z9S VGA Chipset with 32MB DDR2
- Up to 1600 x 1200 @16M Color
- Support Windows 98/2000/XP, Linux

Mini PCI Wireless Card

- VIA VT6655 Chipset
- 802.11b/g

RoBoard RB-110 Cable set



The heart of Robotics

THANK YOU

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