

NuWa

Technical Manual

(Version 1.0A)

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1. Introduction

1.1 Overview

The NuWa is an All-In-One RISC base CPU Board using the Intel PXA255 XScale® RISC microprocessor. The NuWa is designed for high performance, low power and Fan-Less. 因為此特性, 他的應用非常的廣泛. 例如: PDA, Set-Top Box, Gateway, PLC, Window Base Terminal, Hand Held Device. Mobile or IP Phone, Thin Client...

NuWa Serial Boards Selection Guide

Model	NuWa-430	NuWa-450	NuWa-470
Processor	Intel PXA255 400 MHz		
SDRAM	64 MB		
Flash	32 MB Flash for Image / 8 MB Flash for Registry		
SRAM	N/A	N/A	512 KB
EEPROM	N/A	N/A	128 KB
Unique Serial Number	64 Bits Factory-Lasered Serial Number		
Watch Dog Timer	271 ns to 1165 seconds		
JTAG and Debug	Pin Header for debug and update firmware		
PCMCIA	N/A	Type I/II	
Compact Flash	Type I/II		
MMC/SD	Pin Header		
VGA Port	N/A	1024x768 @ 16bpp	
LCD Interface	TFT / STN, 640x480 @ 16bpp		
Touch Interface	Built in 4-wired touch controller		
Serial Ports	RS-232 x1, RS485 x 1		
Additional Serial Ports	N/A	4-wired RS-232 x3 2-wired TTL RS-232 x1 2	
IrDA Capability	Pin Header for IR Module		
Blue Tooth	Pin Header for Blue Tooth Module		
Network	10/100 x1	10/100 x1	10/100 x2
CAN Bus	N/A	N/A	1
USB Host	2	2	4
USB Client	1		
Audio	Line In / Line Out / MIC		
Expansion Interface	ICP DAS I/O Slot		

1.2 NuWa Features

Microprocessor

- Intel® XScale® PXA255 32 Bits Processor

- Clock rates up to 400 MHz

Cache

- 32KB Data Cache and 32KB Instruction Cache
- 2KB Mini Data Cache and 2KB Mini Instruction Cache

System Memory

- Up to 64 MB 3.3V SDRAM
- Up to 32MB Flash for Boot Loader and OS Image
- Up to 8MB Flash for Registry

Compact Flash

- Type I/II Compact Flash socket @ 3.3V
- Support Memory and I/O device

PCMCIA

- Type II PCMCIA Flash socket @ 3.3V
- Support Memory and I/O device

Network Support

- DAVIDCOM DM9000 10/100 MB Fast Ethernet Controller
- RJ45 Connector.

Display

MQ-200: CRT

- MQ-200 2D Graphics Controller
- Display Resolution up to 1024x768
- Built in 2MB video memory

XScale: LCD

- Single- or Dual- Panel Display
- Recommended Display Resolution of 640x480
- Up to 65535 colors in Active Color Mode

USB Host

- Phillip ISP1160 USB Host Controller
- USB Specification Rev. 1.1

USB Client

- PXA255 Processor USB Device Controller

Audio

- AC'97 CODEC (16Bits)
- Support Line-In, Line-Out and MIC-In
- 250mW per Channel amplified out

Touch Screen

- DMC9000 Touch Screen Controller
- Support 4-Wired, Resistive Type Touch Screen

CAN Bus

- SJA1000 CAN Bus Controller

Serial Ports

- Provide RS232/485 serial ports
- Full function , 2-Wired , 4-Wired and TTL Level support

Blue Tooth Support

- Baud rate is programmable up to 921 Kbps

IrDA Support

- Baud rate is programmable up to 239Kbps

Real Time Clock

- Dallas DS1302 Real Time Clock

Watch Dog Timer

- PXA255 Internal Watch Dog Timer
- Programmable timeout periods from 271 ns to 1165 seconds

Unique Serial ID

- Provides 64 bits factory-lasered unique Serial ID

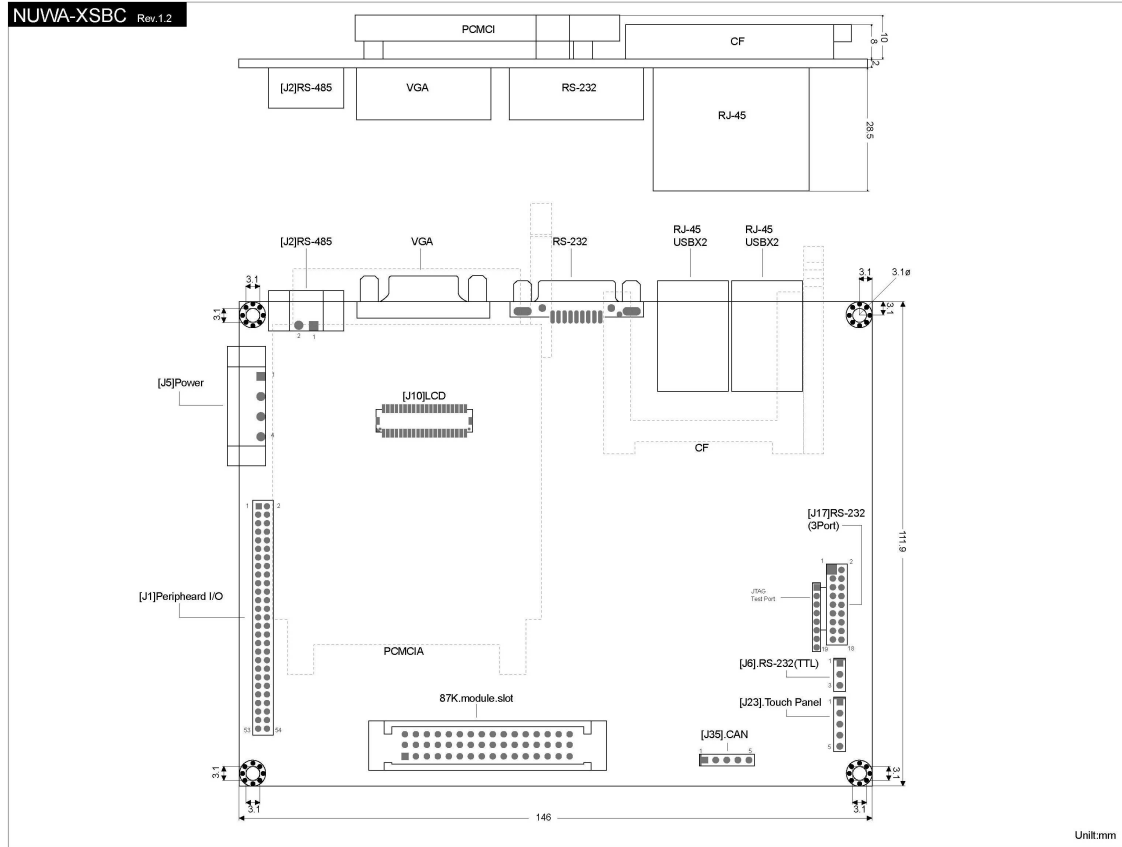
Expansion Interface

- ICPDAS I8000 Serial I/O Modules Support
- 8 Bits Data Width
- 256 bytes memory space
- Interrupt Mode Support
- TX/RX Support

Power Supply

- 5V main power
- 12V used for Inverter of LCD

1.3 Placement



2. **Quick Start**

The following steps guide user how to install NuWa quickly.

Step 1: Connecting Power Source

The NuWa main power source is +5V. +12 used for LCD inverter only.

J5	Signal
Pin 1	VCC +5V
Pin 2	GND
Pin 3	Frame GND
Pin 4	VCC +12V

Step 2: Connecting Display

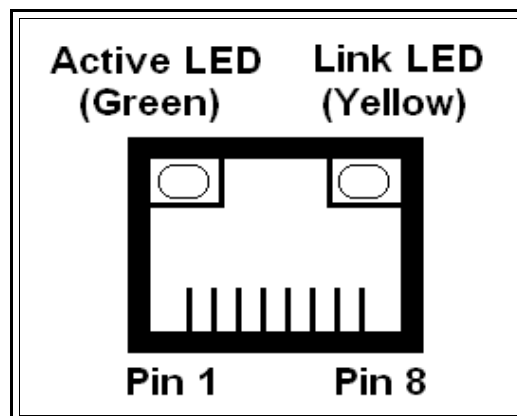
NuWa provide a standard female 15 Pins D-SUB type connector (J7) to connect analog CRT display.

J7	Signal	J7	Signal
Pin 1	RED	Pin 9	VCC 5V
Pin 2	GREEN	Pin 10	GND
Pin 3	BLUE	Pin 11	N.C
Pin 4	N.C	Pin 12	N.C
Pin 5	GND	Pin 13	H. Sync
Pin 6	GND	Pin 14	V. Sync
Pin 7	GND	Pin 15	N.C
Pin 8	GND		

Step 3: Connecting Ethernet

NuWa provides RJ-45 8 Pins type 10/100 Base Fast Ethernet port to connect or control world wide I/O device or Database on J3 and J4 upper side. There are 2 LEDs to indicate Ethernet status.

J3/J4 LAN	Signal
Pin 1	TPT+
Pin 2	TPT-
Pin 3	TPR+
Pin 4	LAN_GND
Pin 5	LAN_GND
Pin 6	TPR-
Pin 7	LAN_GND
Pin 8	LAN_GND



Step 4: Connecting USB HID Device

The **H**uman **I**nterface **D**evice is a kind of USB class device such as Keyboard and Mouse. User can use these USB devices to control NuWa.

Step 5: Inserting Compact Flash Memory Card

Install your own Application programs or data to Compact Flash if needed.

Step 6: Plugging I8000 Serial I/O Device

NuWa provide 1 slot of expansion bus to plug I8000 serial I/O device on J25. The I8000 serial I/O devices provide variety functions including Digital I/O 、 Analog I/O 、 Motion control 、 Counter 、 RS-232/422/485 ...

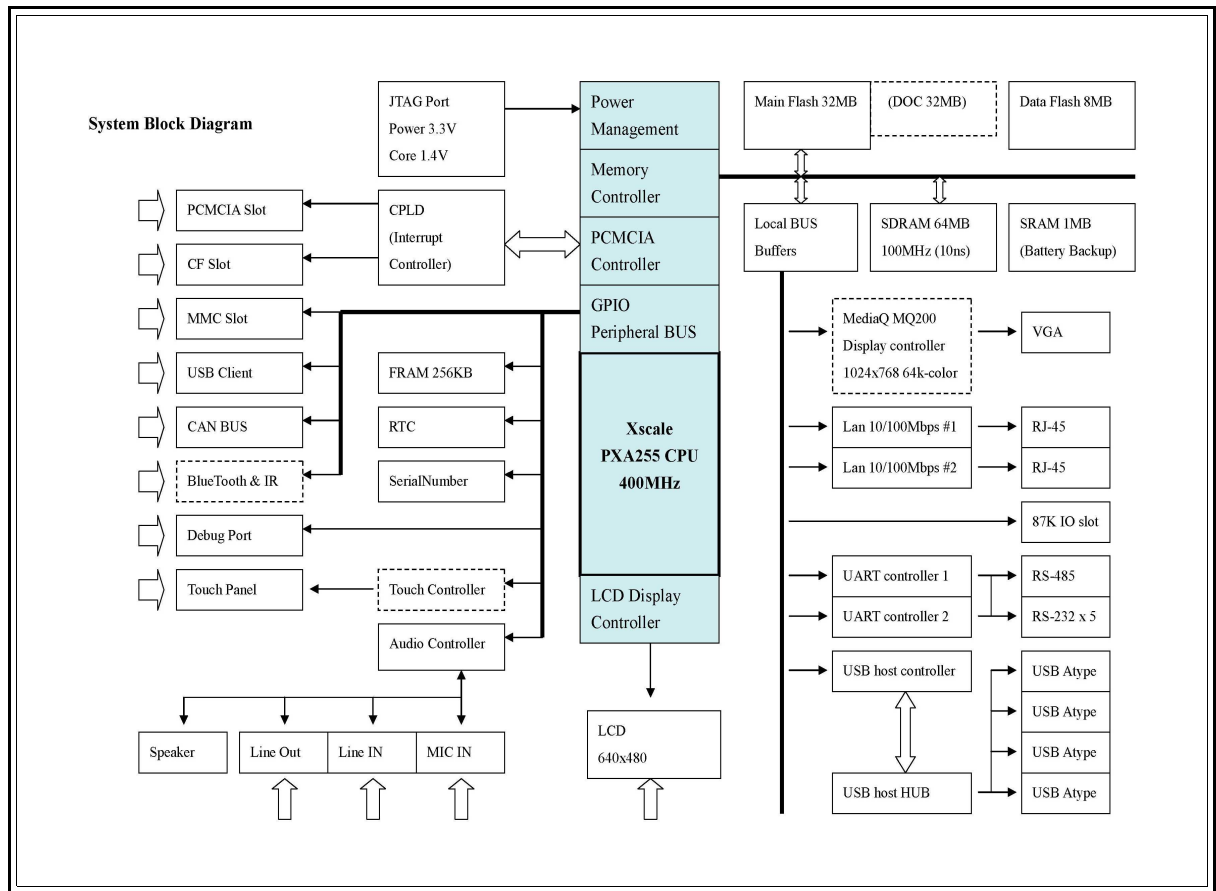
Step 7: Overall Review

Please overall review to make sure all steps are correct before turn the system on.

3. *Hardware Description*

The following section provides a detail description of the feature provided by NuWa. These sections include the jumper setting, connectors and pin outs.

3.1 *Block Diagram*



3.2 Hardware Description

3.2.1 Microprocessor

NuWa is an All-In-One RISC (ARM 5TE) base CPU board using Intel PXA255 RISC microprocessor. The PXA255 is a low power and high integrated system on a chip design based on the Intel® XScale™ micro architecture. The PXA255 built in 32KByte instruction cache, 32KByte Data cache, 2KByte Mini data cache and 2KByte Mini instruction cache. The PXA255 default run mode frequency is 400 MHz and the system memory frequency is 100 MHz.

3.2.2 Real Time Clock

NuWa built in a Dallas DS1302 RTC. It has 31 bytes SRAM to save seconds, minutes, hours, day, data, months and year information. Operation System loads RTC information to setup system clock when system power on. NuWa has an external Battery to keep DS1302 information when system power off.

3.2.3 Watch Dog Timer

The PXA255 contains a watch dog timer, OSMR3, which can be used to protect against erroneous software or hardware fail. Timeout periods can be adjusted from 271 ns to 1165 seconds.

3.2.4 Unique Serial ID

NuWa provides 64 bits factory-lasered, read-only Unique ID. The Unique Serial ID like a software key. Programmer can use it to identify your system.

3.2.5 PCMCIA

PCMCIA is managed by PXA255 and CPLD core logic. The NuWa is fitted with a Type I /II PCMCIA socket mounted on the board. It supports 3.3 V Type I and II Memory and IO device. The NuWa support hot swap changeover of the cards and notification of card insert

3.2.6 Compact Flash

Compact Flash (CF) controlled by PXA255 and CPLD core logic. The NuWa is fitted with a Type I /II Compact Flash socket mounted on the board. It supports 3.3 V Type I and II Compact Flash Memory and IO device. The CF card provides removable storage in a wide variety of capacities. Normally, CF card store user application programs. The NuWa support hot swap changeover of the cards and notification of card insert.

3.2.7 Multi Media / Secure Digital Memory Card

This interface allow user to use a Multi Media Card (MMC) or Secure Digital (SD) Memory Card.

3.2.8 Network

NuWa built in DAVICOM DM9000 10/100 BT Fast Ethernet controller. The controller provides an embedded PHY and MAC, complies with IEEE 802.3x flow control for full duplex specification. Configuration data and MAC information are stored in an external EEPROM. It provides 2 LED to indicate Ethernet status. Yellow LED indicates link status, Green LED indicates of transceiver status.

3.2.9 Display

NuWa provides two display interfaces, CRT and LCD.

PXA255 microprocessor built in a LCD controller. It supports both passive (SNT) and active (TFT) flat panel display with maximum supported resolution of 640x480x16-bit/pxel. PXA255 have 2 dedicated DMA channels allow the LCD controller to support single and dual panel display.

Standard NuWa platform built in a MediqQ MQ-200 2D embedded graphics controller. NuWa provide a standard 15 pins, D-SUB type VGA connector. MQ-200 built in 2MB video memory. Display resolutions up to 1024x768, pixel depths up to 32 bits per pixel.

3.2.10 USB Host

NuWa built in a Philips ISP1160 USB Host controller. It has been designed to support the Open Host Controller Interface (OHCI). The USB Host controller complies with USB Specification Rev. 1.1. Support data transfer at full speed (12 MBit/s) and low speed (1.5 MBit/s). The HID (Human Interface Device), ext. keyboard and mouse, Mass Storage device are supported. The Each USB Host port provided 100 mA to 500 mA depend on client device. NuWa has power protection function. If the USB voltage is short circuited or more the 500 mA is drawn from either port, NuWa turns off the power of USB Port and automatically protects the devices and system.

3.2.11 USB Client

This function allows the NuWa to appear as a client device to USB host such as desktop. This port support full USB connection speed (12MBit/sec). Insert and removal of host computer or hub will cause an interrupt.

3.2.12 Audio

NuWa built in an AC'97 Audio codec. There are three audio interfaces supported on NuWa: stereo microphone input, line in and amp line out. The amplified line out is suitable for driving an 8Ω load with a maximum power output of 250mW per channel.

3.2.13 Touch Screen Controller

NuWa built in an embedded touch screen controller, DMC9000. It supports analog 4 wired resistive touch screens. The Pin 5 (GND) is not necessary to connect if your touch screen do not used.

3.2.14 Controller Area Network (CAN)

Controller Area Network (CAN) is a protocol developed for the automotives industry that is increasingly being used in industrial and automation applications. The maximum transfer speed is 1Mbps. The CAN bus is managed by SJA1000 on NuWa platform.

3.2.15 Blue Tooth

The PXA255 microprocessor built in a Blue Tooth communication port. This port allow user to connect a Blue Tooth module. Or set this port as a 4-wired RS-232. These signals are TTL level.

3.2.16 IrDA

The PXA255 built in an IrDA communication port. This port allow user to connect an IrDA transceiver for IrDA communication. Or set this port as a 2-wired RS-232. These signals are TTL level.

3.2.17 Expansion I/O Bus

The NuWa provide an expansion I/O Bus to Add-On ICPDAS 8K serial I/O modules, such as Digital In/Out, Analog In/Out, Motion Control, and Communication Modules. It support interrupt mode.

3.3 Connector and Jumper Description

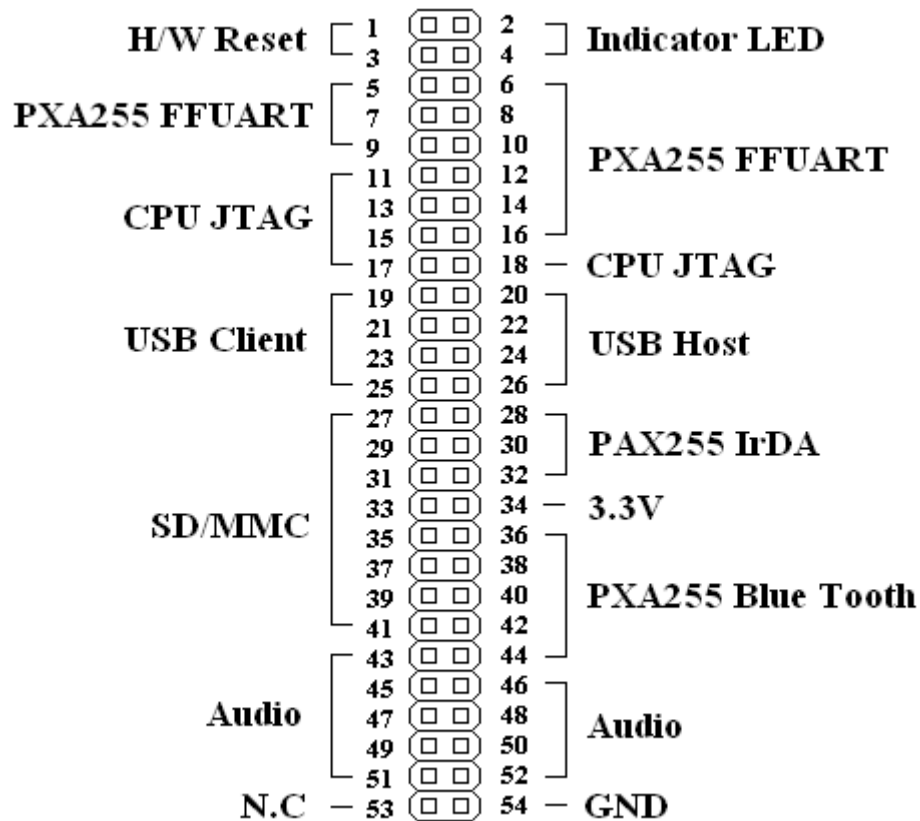
This section describes the pin outs of connectors and jumpers.

Connectors and Jumpers Summary Table

Name	Function
J1	Peripheral I/O Connector
J2	RS-485
J3	LAN2, USB Host Port 3, 4
J4	LAN1, USB Host Port 1, 2
J5	Power Connector
J6	TTL Level RS-232
J7	VGA Interface (From MQ200)
J10	LCD Interface
J16	CPLD JTAG Port
J17	RS-232
J23	Touch Screen Connector
J25	Extension Bus
J27	Compact Flash Socket
J31	PCMAIA Socket
J35	CAN Bus Connector
J36	Operating Mode.

3.3.1 J1 – Peripheral I/O

The connector J1 is a multi-functions I/O connector. The illustration shows these functions as blow.



3.3.1.1 J1: Reset

This signal will issue a hardware reset to CPU and system peripherals. Boot-loader cleans the contents of SDRAM after reset, and re-loads the operating system to SDRAM. Then jump to SDRAM running operating system.

J1	Signal
Pin 1	Reset In
Pin 3	GND

3.3.1.2 J1: Indicator LED

The indicator LED is controlled by software. The GPIO_27 set to low

(LED off) during boot loader running stage. The GPIO_27 is set to high (LED on) during the normal operating mode. When the system going to suspend mode, GPIO_27 則以 1Hz 的頻率閃爍. 當系統回復到 normal operating mode 時, GPIO_27 is set to high (LED On).

J1	Signal
Pin 2	GPIO_27
Pin 4	GND

3.3.1.3 J1: PXA255 Full Function UART

The Full function UART baud rate is programmable up to 230 Kbps. This port is used for debug function in default. It will send message out after power on. The debug port baud rate is 38400 bps.

J1	Signal
Pin 5	RTS
Pin 6	CTS
Pin 7	DTR
Pin 8	DCD
Pin 9	RI
Pin 10	DSR
Pin 12	TXD
Pin 14	RXD
Pin 16	GND

3.3.1.4 J1: CPU JTAG

The JTAG port is used during manufacturing to program boot loader to flash. User can use the JTAG port to access and control PXA255 CPU.

J1	Signal
Pin 11	TCK
Pin 13	TDI
Pin 15	TMS
Pin 17	TDO
Pin 18	GND

3.3.1.5 J1: USB Client

The USBC VCC In is power supplied form host computer.

J1	Signal
Pin 19	USBC VCC In
Pin 21	USBC_D-
Pin 23	USBC_D+
Pin 25	GND

3.3.1.6 J1: USB Host

J1	Signal
Pin 20	VCC 5V
Pin 22	D-
Pin 24	D+
Pin 26	GND

3.3.1.7 J1: PXA255 IrDA

J1	Signal
Pin 28	IR_RXD
Pin 30	ID_TXD
Pin 32	GND

3.3.1.8 J1: PXA255 Blue Tooth

J1	Signal
Pin 36	BT_RTS
Pin 38	BT_CTS
Pin 40	BT_TXD
Pin 42	BT_RXD
Pin 44	GND

3.3.1.9 J1: MMC/SD Card

J1	Signal
Pin 27	VCC 3.3V
Pin 29	GND
Pin 31	Write Protect
Pin 33	Card Detect
Pin 35	CMD
Pin 37	DAT
Pin 39	CK
Pin 41	CS

3.3.1.10 J1: Audio Interface

J1	Signal
Pin 43	Audio GND
Pin 45	MIC In Left
Pin 46	MIC In Right
Pin 47	Line In Right
Pin 49	Line In Left
Pin 51	Audio GND
Pin 48	Line Out Right
Pin 50	Line Out Left
Pin 52	Audio GND

3.3.2 J2: RS485

The NuWa support 1 channel of 2-wired RS485 with 16 bytes FIFO. This RS485 is a half-duplex interface that provides combined TXD and RXD signals. RS485 supports up to 32 transmitters and receivers on a single network. The maximum cable length is 4000 ft.

J2	Signal
Pin 1	RS485_D+
Pin 2	RS485_D-

3.3.3 J3, J4: USB Host

J3/J4 USB	Signal
Pin 1	VCC 5V
Pin 2	D-
Pin 3	D+
Pin 4	GND

3.3.4 J3, J4: Ethernet

J3/J4 LAN	Signal
Pin 1	TPT+
Pin 2	TPT-
Pin 3	TPR+
Pin 4	LAN_GND
Pin 5	LAN_GND
Pin 6	TPR-
Pin 7	LAN_GND
Pin 8	LAN_GND

3.3.5 J5: Power Connector

The NuWa main power source is 5V. It means NuWa can work just only single 5V input. The voltage input 12V is reserved for LCD back light used.

J5	Signal
Pin 1	VCC 12V
Pin 2	VCC 5V
Pin 3	GND
Pin 4	Frame GND

3.3.6 J6: RS232 (COM6)

This function is provided by U57 (Ti 16C754) channel 1. The baud rate is programmable up to 230 Kbps. These signals are TTL Level.

J6	Signal
Pin 1	TXD
Pin 2	RXT
Pin 3	GND

3.3.7 J7: VGA Interface

J7	Signal	J7	Signal
Pin 1	RED	Pin 9	VCC 5V
Pin 2	GREEN	Pin 10	GND

Pin 3	BLUE	Pin 11	N.C
Pin 4	N.C	Pin 12	N.C
Pin 5	GND	Pin 13	H. Sync
Pin 6	GND	Pin 14	V. Sync
Pin 7	GND	Pin 15	N.C
Pin 8	GND		

3.3.8 J10: VGA Interface

J10	Signal	J10	Signal
Pin 1	VCC 5V	Pin 2	VCC 12V
Pin 3	VCC 5V	Pin 4	VCC 12V
Pin 5	VCC 5V	Pin 6	GND
Pin 7	GND	Pin 8	VCC 3.3V
Pin 9	VCC 3.3V	Pin 10	Blue D0
Pin 11	Blue D1	Pin 12	Blue D2
Pin 13	Blue D3	Pin 14	Blue D4
Pin 15	GND	Pin 16	GND
Pin 17	Green D0	Pin 18	Green D1
Pin 19	Green D2	Pin 20	Green D3
Pin 21	Green D4	Pin 22	Green D5
Pin 23	GND	Pin 24	GND
Pin 25	Red D1	Pin 26	Red D0
Pin 27	Red D3	Pin 28	Red D2
Pin 29	GND	Pin 30	Red D4
Pin 31	LP	Pin 32	GND
Pin 33	LP-	Pin 34	LBIAS
Pin 35	GND	Pin 36	LFCLK
Pin 37	FLM	Pin 38	LLCLK
Pin 39	FLM-	Pin 40	GND

3.3.9 J16: CPLD JTAG

The NuWa has is a complex programmable logic device (CPLD) that contain control logic for the platform. This JTAG port is used during manufacturing to program control logic to CPLD.

J16	Signal
Pin 1	VCC 3.3V
Pin 2	M4_TDO
Pin 3	M4_TDI
Pin 4	M4_EN

Pin 5	M4_RST
Pin 6	M4_TMS
Pin 7	GND
Pin 8	M4_TCK

3.3.10 J17: RS232

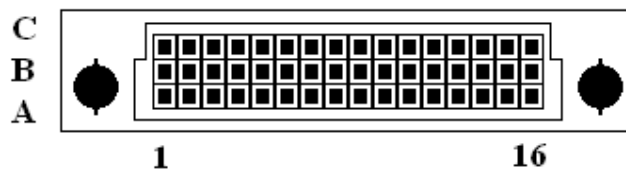
This function is provided by U57 (Ti 16C754) channel 2 to 4. The baud rate is programmable up to 230 Kbps.

J17	Signal	J17	Signal
Pin 1	TXD_7	Pin 2	RXD_7
Pin 3	RTS_7	Pin 4	CTS_7
Pin 5	DTR_7	Pin 6	DSR_7
Pin 7	CD_7	Pin 8	RI_7
Pin 9	GND	Pin 10	GND
Pin 11	TXD_8	Pin 12	TXD_9
Pin 13	RXD_8	Pin 14	RXD_9
Pin 15	RTS_8	Pin 16	RTS_9
Pin 17	CTS_8	Pin 18	CTS_9

3.3.11 J23: Touch Screen

J23	Signal
Pin 1	IY+
Pin 2	IX-
Pin 3	IY-
Pin 4	IX+
Pin 5	GND

3.3.12 J25: Expansion I/O Bus Connector



J25	Signal	J25	Signal	J25	Signal
Pin 1A	GND	Pin 1B	GND	Pin 1C	GND
Pin 2A	VCC 5V	Pin 2B	VCC 5V	Pin 2C	VCC 5V
Pin 3A	RST-	Pin 3B	N.C	Pin 3C	READY
Pin 4A	RTS+	Pin 4B	N.C	Pin 4C	N.C
Pin 5A	N.C	Pin 5B	SPI_CS	Pin 5C	INTR
Pin 6A	BP_INS	Pin 6B	SPI_CK	Pin 6C	BP_WE
Pin 7A	BP_TXD	Pin 7B	SPI_DI	Pin 7C	BP_OE
Pin 8A	BP_RTD	Pin 8B	SPI_DO	Pin 8C	BP_CS
Pin 9A	BP_A8	Pin 9B	SCL	Pin 9C	BP_D7
Pin 10A	BP_A7	Pin 10B	SDA	Pin 10C	BP_D6
Pin 11A	BP_A6	Pin 11B	TMR	Pin 11C	BP_D5
Pin 12A	BP_A5	Pin 12B	INITS5	Pin 12C	BP_D4
Pin 13A	BP_A4	Pin 13B	INITS4	Pin 13C	BP_D3
Pin 14A	BP_A3	Pin 14B	INITS3	Pin 14C	BP_D2
Pin 15A	BP_A2	Pin 15B	INITS2	Pin 15C	BP_D1
Pin 16A	BP_A1	Pin 16A	INITS1	Pin 16C	BP_D0

3.3.13 J27: Compact Flash Socket

J27	Signal	J27	Signal
Pin 1	GND	Pin 26	Card Detect 1
Pin 2	Data 3	Pin 27	Data 11
Pin 3	Data 4	Pin 28	Data 12
Pin 4	Data 5	Pin 29	Data 13
Pin 5	Data 6	Pin 30	Data 14
Pin 6	Data 7	Pin 31	Data 15
Pin 7	CE1-	Pin 32	CE2-
Pin 8	Address 10	Pin 33	VS1-
Pin 9	OE-	Pin 34	IOR-
Pin 10	Address 9	Pin 35	IOW-
Pin 11	Address 8	Pin 36	WE-
Pin 12	Address 7	Pin 37	INTR
Pin 13	CF VCC 3.3V	Pin 38	CF VCC 3.3V
Pin 14	Address 6	Pin 39	N.C
Pin 15	Address 5	Pin 40	VS2-
Pin 16	Address 4	Pin 41	Reset
Pin 17	Address 3	Pin 42	WAIT-
Pin 18	Address 2	Pin 43	N.C
Pin 19	Address 1	Pin 44	REG-
Pin 20	Address 0	Pin 45	BVD2-
Pin 21	Data 0	Pin 46	BVD1-
Pin 22	Data 1	Pin 47	Data 8
Pin 23	Data 2	Pin 48	Data 9
Pin 24	IOCS16	Pin 49	Data 10
Pin 25	Card Detect 2	Pin 50	GND

3.3.14 J31: PCMCIA Socket

J31	Signal	J31	Signal
Pin 1	GND	Pin 35	GND
Pin 2	Data 3	Pin 36	Card Detect 1
Pin 3	Data 4	Pin 37	Data 11
Pin 4	Data 5	Pin 38	Data 12
Pin 5	Data 6	Pin 39	Data 13
Pin 6	Data 7	Pin 40	Data 14
Pin 7	CE1-	Pin 41	Data 15
Pin 8	Address 10	Pin 42	CE2-
Pin 9	OE-	Pin 43	N.C
Pin 10	Address 11	Pin 44	IOR-
Pin 11	Address 9	Pin 45	IOW-
Pin 12	Address 8	Pin 46	Address 17
Pin 13	Address 13	Pin 47	Address 18
Pin 14	Address 14	Pin 48	Address 19
Pin 15	WE-	Pin 49	Address 20
Pin 16	INTR	Pin 50	Address 21
Pin 17	VCC 3.3V	Pin 51	VCC 3.3V
Pin 18	VCC 3.3V	Pin 52	VCC 3.3V
Pin 19	Address 16	Pin 53	Address 22
Pin 20	Address 15	Pin 54	Address 23
Pin 21	Address 12	Pin 55	Address 24
Pin 22	Address 7	Pin 56	Address 25
Pin 23	Address 6	Pin 57	N.C
Pin 24	Address 5	Pin 58	Reset
Pin 25	Address 4	Pin 59	WAIT-
Pin 26	Address 3	Pin 60	N.C
Pin 27	Address 2	Pin 61	REG-
Pin 28	Address 1	Pin 62	BVD1-
Pin 29	Address 0	Pin 63	BVD2-
Pin 30	Data 0	Pin 64	Data 8
Pin 31	Data 1	Pin 65	Data 9
Pin 32	Data 2	Pin 66	Data 10
Pin 33	IOCS16-	Pin 67	Card Detect 2
Pin 34	GND	Pin 68	GND

3.3.15 J35: Controller Area Network (CAN)

J35	Signal
Pin 1	CAN-
Pin 2	CAN+

Pin 3	CAN+
Pin 4	CAN GND
Pin 5	Frame GND

3.3.16 J36: Operating Mode Selection

During boot loader running stage, it will check this jumper to determine operating mode. This jumper is short pin 2 and 3 in normal operating mode. When user short pin 1 and 2, boot loader will ask host computer to download OS image to NuWa.

J36	Signal
Short 1-2	Download Mode
Short 2-3	Normal Mode
Open	Normal Mode

3.4 GPIO Define

The following table summarizes the use of PXA255 GPIO pins, their direction, active level, alternate function and reset state.

PXA255 GPIO Define

GPIO No.	Function Description	Alternate Setting	Direction Setting	Active Level	Pull H/L
0	N/A	--	--	--	High
1	N/A	--	--	--	High
2	Interrupt Group from CPLD	00	Input	High	Low
3	EEPROM IO	00	Bi-Direction	--	High
4	EEPROM / DS1302 CLK	00	Output	--	High
5	MMC Write Protection	00	Output	Low	High
6	MMC Clock	01	Output	--	--
7	48 MHz Clock	01	Output	--	--
8	MMC CS	01	Output	High	--
9	MMC Card Detect	00	Input	Low	High
10	EEPROM CS	00	Output	Low	High
11	USB Wakeup Event	00	Output	High	Low
12	32 KHz Clock	01	Output	--	--
13	LCD On	00	Output	High	High
14	N/A	--	--	--	Low
15	nCS1 for Flash	10	Output	Low	High
16	PWM0	10	Output	--	High
17	N/A	--	--	--	High
18	RDY	01	Input	Low	High
19	DACK for ISP1160	00	Output	Low	High
20	DREQ for ISP1160	01	Input	High	--
21	PCMAIC RDY	00	Input	High	High
22	Compact Flash RDY	00	Input	High	Low
23	SPI CLK	00	Output	--	Low
24	SPI CS	00	Output	Low	High
25	SPI Data Out	00	Output	--	High
26	SPI Data In	00	Input	--	High
27	Indicator LED	00	Output	--	Low
28	AC97 Bit Clock	01	Output	--	High
29	AC97 SDATA In	01	Input	--	--
30	AC97 SDATA Out	10	Output	--	High
31	AC97 Sync	10	Output	Low	High
32	N/A	--	--	--	--
33	nCS5 for I/O	10	Output	Low	High
34	FF_RXD	01	Input	--	--
35	FF_CTS	01	Input	--	--

36	FF_DCD	01	Input	--	--
37	FF_DSR	01	Input	--	--
38	FF_RI	01	Input	--	--
39	FF_TXD	10	Output	--	--
40	FF_DTR	10	Output	--	--
41	FF_RTS	10	Output	--	--
42	BT_RXD	01	Input	--	--
43	BT_TXD	10	Output	--	--
44	BT_CTS	01	Input	--	--
45	BT_RTS	10	Output	--	--
46	IR_RXD	01	Input	--	--
47	IX_TXD	10	Output	--	--
48	PCMCIA nPOE	10	Output	Low	--
49	PCMCIA nPWE	10	Output	Low	--
50	PCMCIA nPIOR	10	Output	Low	--
51	PCMCIA nPIOW	10	Output	Low	--
52	PCMCIA nPCE[1]	10	Output	Low	--
53	PCMCIA nPCE[2]	10	Output	Low	--
54	PCMCIA PSKTSEL	10	Output	--	--
55	PCMCIA nPREG	10	Output	Low	--
56	PCMCIA nPWAIT	01	Input	Low	High
57	PCMCIA nPIOIS16	01	Input	Low	High
58	LCD D0	10	Output	--	--
59	LCD D1	10	Output	--	--
60	LCD D2	10	Output	--	--
61	LCD D3	10	Output	--	--
62	LCD D4	10	Output	--	--
63	LCD D5	10	Output	--	--
64	LCD D6	10	Output	--	--
65	LCD D7	10	Output	--	--
66	LCD D8	10	Output	--	--
67	LCD D9	10	Output	--	--
68	LCD D10	10	Output	--	--
69	LCD D11	10	Output	--	--
70	LCD D12	10	Output	--	--
71	LCD D13	10	Output	--	--
72	LCD D14	10	Output	--	--
73	LCD D15	01	Output	--	--
74	LCD Frame Clock	10	Output	--	--
75	LCD Line Clock	10	Output	--	--
76	LCD Pixel Clock	10	Output	--	--
77	LCD AC Bias	10	Output	High	--
78	nCS2	10	Output	Low	High
79	nCS3	10	Output	Low	High
80	nCS4	10	Output	Low	High
81	PCMCIA Reset	00	Output	High	Low
82	Compact Flash Reset	00	Output	High	Low

83	Unique ID SDIO	00	Bi-Direction	--	High
84	RTC CS	00	Output	Low	High

3.5 Memory Mapping

Address	CS#	Bus Width	Function
0000,0000 – 01FF,FFFF	CS0	32-bit	Flash memory 32 Mbytes
0400,0000 – 040F,FFFF	CS1	16-bit	Data Flash memory 8 Mbytes
0800,0000 – 080F,FFFF	CS2	32-bit	SRAM 1 Mbytes
0C00,0000 – 0C00,0100	CS3	32-bit	DM9000 LAN1
0C20,0000 – 0C20,0100	CS3	32-bit	DM9000 LAN2
0C40,0000 – 0DFF,FFFF	CS3	32-bit	CPLD
1000,0000 – 101F,FFFF	CS4	32-bit	MQ200
1400,0000 – 1400,01FF	CS5	8-bit	87K IO Slot
1420,0000 – 1420,0010	CS5	16-bit	ISP1160
1440,0000 – 1440,000F	CS5	8-bit	UART 1 RS-232
1460,0000 – 1460,000F	CS5	8-bit	UART 2 RS-485
1480,0000 – 1480,000F	CS5	8-bit	UART 3 RS-232
14A0,0000 – 14A0,000F	CS5	8-bit	UART 4 RS-232
14C0,0000 – 14C0,000F	CS5	8-bit	UART 5 RS-232
14E0,0000 – 14E0,000F	CS5	8-bit	UART 6 RS-232
1500,0000 – 1500,000F	CS5	8-bit	UART 7 RS-232
1520,0000 – 1520,000F	CS5	8-bit	UART 8 RS-232
1560,0000 – 1560,0000	CS5	8-bit	CAN Bus controller
2000,0000 – 2FFF,FFFF	Slot 0	8,16 bit	PCMCIA
3000,0000 – 3FFF,FFFF	Slot 1	8,16 bit	CF card
4000,0000 – 43FF,FFFF	--	32-bit	Peripherals Registers
4400,0000 – 47FF,FFFF	--	32-bit	LCD Registers
4800,0000 – 4BFF,FFFF	--	32-bit	Memory Control Registers
A000,0000 – A3FF,FFF	SDCS0	32-bit	SDRAM 64Mbytes

3.6 **CPLD Define**

The NuWa has a complex programmable logic device (CPLD) that contains control logic for the platform. The description as below:

Address (Hex)	Access	Function	Detail
0C400000	Read	INTR Group 1 Status	Bit 0: USB Host Bit 1: DOC Bit 2: CAN Bit 3: LAN1 Bit 4: LAN2 Bit 5: USB Host Suspend
	Write	INTR Group 1 Setting	Bit[x] = 1= Enable INTR
0C800000	Read	INTR Group 2 Status	Bit 0: UART_1 Bit 1: UART_2 Bit 2: UART_3 Bit 3: UART_4 Bit 4: UART_5 Bit 5: UART_6 Bit 6: UART_7 Bit 7: UART_8
	Write	INTR Group 2 Setting	Bit[x] = 1= Enable INTR
0CC00000	Read	INTR Group 3 Status	Bit 0: PCMCIA over current Bit 1: CF over current Bit 2: Expansion Bus Bit 3: N/A Bit 4: PCMCIA Insert Bit 5: PCMCIA Remove Bit 6: Compact Insert Bit 7: Compact Remove
	Write	INTR Group 3 Setting	Bit[x] = 1= Enable INTR

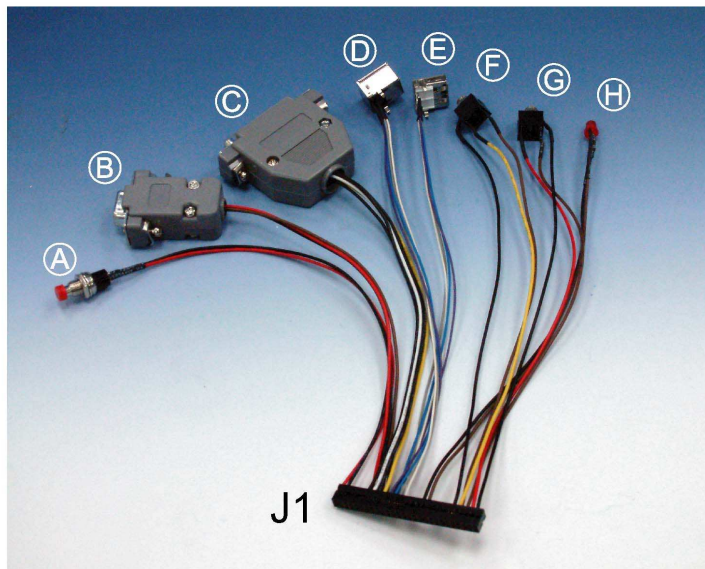
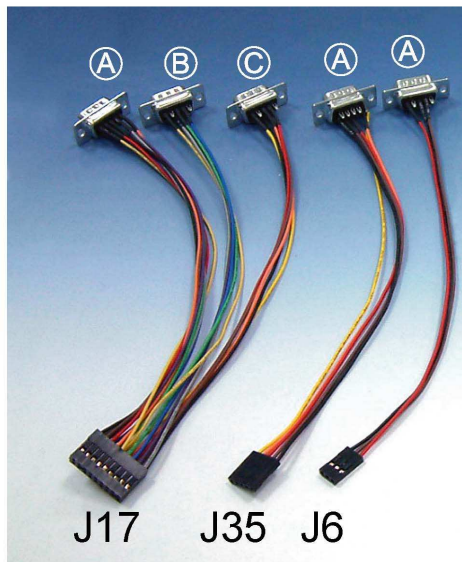
0D000000	Read	Version ID	Bit 0: Version ID Data 0 Bit 1: Version ID Data 1 Bit 2: Version ID Data 2 Bit 3: Version ID Data 3 Bit 4: User Define Data 0 Bit 5: User Define Data 1 Bit 6: User Define Data 2 Bit 7: User Define Data 3
	Write	User Define	User Define

Appendix A – Accessories

A.1 Cables

NuWa provides 4 cables for user to connect I/O device. There are:

1. Peripheral I/O Cable (Connected to J1)
2. TTL Level RS-232 Cable (Connected to J6)
3. RS-232 Cable (Connected to J17)
4. CAN Bus Cable (Connected to J35)



A.1.1 Peripheral I/O Cable (Connected to J1)

Item	Function	Pin Out Mapping	Connector Type
A	Reset	J1/1 (GND) J1/3 (RST)	Push Button
B	Debug Port	J1/12 → B/2 (TXD) J1/14 → B/3 (RXD) J1/16 → B/5 (GND)	Female D-SUB 9 Pins
C	JTAG Port	J1/11 → C/2 (TCK) J1/13 → C/3 (TDI) J1/15 → C/4 (TMS) J1/17 → C/11 (TDO) J1/18 → C/14 (GND)	Female D-SUB 25 Pins
D	USB Client	J1/19 → D/1 (VIN) J1/21 → D/2 (D-) J1/23 → D/3 (D+) J1/25 → D/4 (GND)	USB B Type
E	USB Host	J1/20 → E/1 (VCC) J1/22 → E/2 (D-) J1/24 → E/3 (D+) J1/26 → E/4 (GND)	USB A Type
F	MIC IN	J1/43 (AGND) J1/45 (Left Channel) J1/46 (Right Channel)	Audio Jack
G	Line Out	J1/48 (Right Channel) J1/50 (Left Channel) J1/52 (AGND)	Audio Jack
H	Power LED	J1/32 (VCC) J1/34 (GND)	Red LED

A.1.2 TTL Level RS-232 Cable (Connected to J6)

Item	Function	Pin Out Mapping	Connector Type
A	TTL RS-232	J6/1→A/3 (TXD)	Male D-SUB 9 Pins
		J6/2→A/2 (RXD)	
		J6/3→A/5 (GND)	

A.1.3 RS-232 Cable (Connected to J17)

Item	Function	Pin Out Mapping	Connector Type
A	Full Function RS-232	J17/1→A/3 (TXD)	Male D-SUB 9 Pins
		J17/2→A/2 (RXD)	
		J17/3→A/7 (RTS)	
		J17/4→A/6 (DSR)	
		J17/5→A/4 (DTR)	
		J17/6→A/8 (CTS)	
		J17/7→A/1 (DCD)	
		J17/8→A/9 (RI)	
		J17/9→A/5 (GND)	
B	4 Wired RS-232	J17/10→B/5 (GND)	Male D-SUB 9 Pins
		J17/12→B/3 (TXD)	
		J17/14→B/2 (RXD)	
		J17/16→B/7 (RTS)	
C	4 Wired RS-232	J17/18→B/8 (CTS)	Male D-SUB 9 Pins
		J17/9→C/5 (GND)	
		J17/11→C/3 (TXD)	
		J17/13→C/2 (RXD)	
		J17/15→C/7 (RTS)	
		J17/17→C/8 (CTS)	

A.1.4 CAN Bus Cable (Connected to J35)

Item	Function	Pin Out Mapping	Connector Type
A	CAN Bus	J35/1→A/1 (CANL) J35/2→A/2 (CANH) J35/3→A/3 (CANH with 100 Ω) J35/4→A/4 (CAN GND) J35/4→A/5 (Frame GND)	Male D-SUB 9 Pins

A.2 Shipping CD

All NuWa related Documentations such as Technical Manual、Windows CE.NET SDK、User's Manual、Windows CE.NET BSP and NUWA_UTILITY are included on shipping CD.

The contents of CD list as below:

Technical Manual\NuWa_Tech.DOC

Windows CE.NET\BSP\WUWA35E_20050309.MSI

Windows CE.NET\BSP\BSP_INSTALLATION.DOC

Windows CE.NET\WUWA UTILITY\WUWASDK.DLL

Windows CE.NET\WUWA UTILITY\WUWAUTILITY.EXE

Windows CE.NET\WUWA UTILITY\WUWAUTILITY_USERS_GUIDE.DOC

Windows CE.NET\SDK\WUWASDK.MSI

Windows CE.NET\SDK\WUWASDK.DOC

Appendix B – Environmental characteristics

Parameter	MIN	TYP	MAX	Units	Condition
Operating Temperature	0	25	65	°C	
Storage Temperature	-20	25	75	°C	
Normal Mode Current	1000	1500	2000	mA	5V
Suspend Mode Current	500	750	1000	mA	5V