

MPX-24794S Serial USB Card

SPI Master, I2C Master, Counter, GPIO through USB Interfaces

User's Guide

Version 1.10

© Taiwan Commate Computer Inc. 2012, 2013

TCC reserves the right to change the content without notify. Please check our Web site for the latest version of this documentation.

19F, No 94, Sec 1, Shintai 5th Road, Sijhih Dist.

New Taipei City 22102, Taiwan

Tel: +886-2-2696-3909

FAX: +886-2-2696-3911

email: tech@commell.com.tw

www: www.commell.com.tw
www.commell.com

Contents

1	Introduction.....	2
1.1	Features	3
1.1.1	Hardware.....	3
1.1.2	Firmware.....	3
1.1.3	Software.....	4
1.2	Block Diagram.....	4
2	Hardware.....	6
2.1	Card.....	6
2.1.1	Connectors and Pins Definition	6
2.2	Cables.....	9
2.2.1	OAL-24794S-CN1.....	12
2.2.2	OAL-24794S-CN2.....	14
2.2.3	OALUSB-H4-1 cable (option).....	15
2.2.4	OALUSB-H4 cable (option).....	16
2.2.5	OAL-24794S-ADP Cable (option).....	16
2.3	Connecting to The PC.....	19
2.3.1	Via Mini-PCie Slot.....	19
2.3.2	Via OALUSB-H4-1 Cable (Option).....	20
2.3.3	Via OALUSB-H4 Cable (Option).....	21
2.4	Optional GPIO Signal Isolation Boards.....	22
2.4.1	ADP-GPION4I4O5V (option).....	22
2.4.2	ADP-GPION8I5V (option).....	23
3	Device Drivers	24
3.1	Device Drivers Installation	24
3.1.1	Windows 2000	25
3.1.2	Windows XP	25
3.1.3	Windows Vista.....	26
3.1.4	Windows 7	26
3.1.5	General Procedures	26
4	References.....	34

Lists of Figures

Figure 1 MPX-24794S USB-Serial Card.....	2
Figure 2 Block Diagram.....	5
Figure 3 MPX-24794S Serial USB Card.....	6
Figure 4 MPX-24794S Connectors.....	7
Figure 5 OAL-24794S-CN1 photo.....	10
Figure 6 OAL-24794S-CN2 photo.....	11
Figure 7 OAL-24794S-ADP photo.....	12
Figure 8 OAL-24794S-CN1 Cable.....	13
Figure 9 OAL-24794S-CN2 Cable.....	14
Figure 10 OALUSB-H4-1 cable.....	15
Figure 11 OALUSB-H4 cable.....	16
Figure 12 OAL-24794S-ADP cable.....	17
Figure 13 Inserting to a standard Mini-PCIe slot.....	20
Figure 14 How to use OALUSB-H4-1 cable.....	21
Figure 15 How to use OALUSB-H4 cable.....	22
Figure 16 ADP-GPION4I4O5V.....	23
Figure 17 ADP-GPION8I5V.....	23
Figure 18 Device Driver files Organization.....	25
Figure 19 MPX-24794S vs. Device Manager.....	32
Figure 20 MPX-24794S Property Dialog.....	33

List of Tables



Table 1 CN_GPIO1 Pin Definitions.....	8
Table 2 CN_GPIO2 Pin Definitions.....	8
Table 3 J1 Connector pin-out definitions.....	8
Table 4 USB signals related to full-mini PCIe card.....	9
Table 5 CN_USB Pin Out Definitions.....	9
Table 6 OAL-24794S-CN1 cable mapping.....	14
Table 7 OAL-24794S-CN2 cable mapping.....	15
Table 8 P1 (2x6 header) mapping.....	17
Table 9 P2 (2x6 header) mapping.....	18
Table 10 All other pins mapping.....	18

Conventions

The numbers used in this manual.

Number	Description
Decimal	Decimal number will be noted just as normal numbers. For example, 3456.
Hexadecimal	Hexadecimal number will be noted in C-notation, the 0x prefix will be presented. For example, 0x3456.

Signs used in this manual.

Sign	Description
	Permanent damage. This sign indicates that permanent damage to the device and system might cause if not fully understood or followed. You should not start using the product before you have read this information.
	Information sign. This sign indicates that this information might be useful while you are using this product. This information might also help saving your time if you have read them.

Acronyms and Abbreviations

API	Application Programming Interface
AT24	Atmel AT24Cxxx I2C EEPROM
AT25	Atmel AT25xxx SPI EEPROM
CCP	Common Communication Protocol
CNTR	Counter
CNTR_EN	Counter Enable input pin
CNTR_CO	Counter Compare True output pin
CNTR_TO	Counter Terminal Count output pin
CSn#	Chip Select
EEPROM	Electrically Erasable Programmable Read-Only Memory
GPIO	General Purpose Input/Output
I2C Bus	Inter-Integrated Circuit Bus
I2CM	I2C Master
I2CmSCL	I2C master clock
I2CmSDA	I2C master data
LSB	Least Significant Byte
MHz	Megahertz (one million hertz)
MISO	Master In Slave Out
MOSI	Master Out Slave In
MSB	Most Significant Byte
PCIe	PCI Express
PWM	Pulse Width Module
SCLK	SPI Clock
SDK	Software Development Kit
SPI Bus	Serial Peripheral Interface Bus
SPIM	SPI Master
USB	Universal Serial Bus

1 Introduction

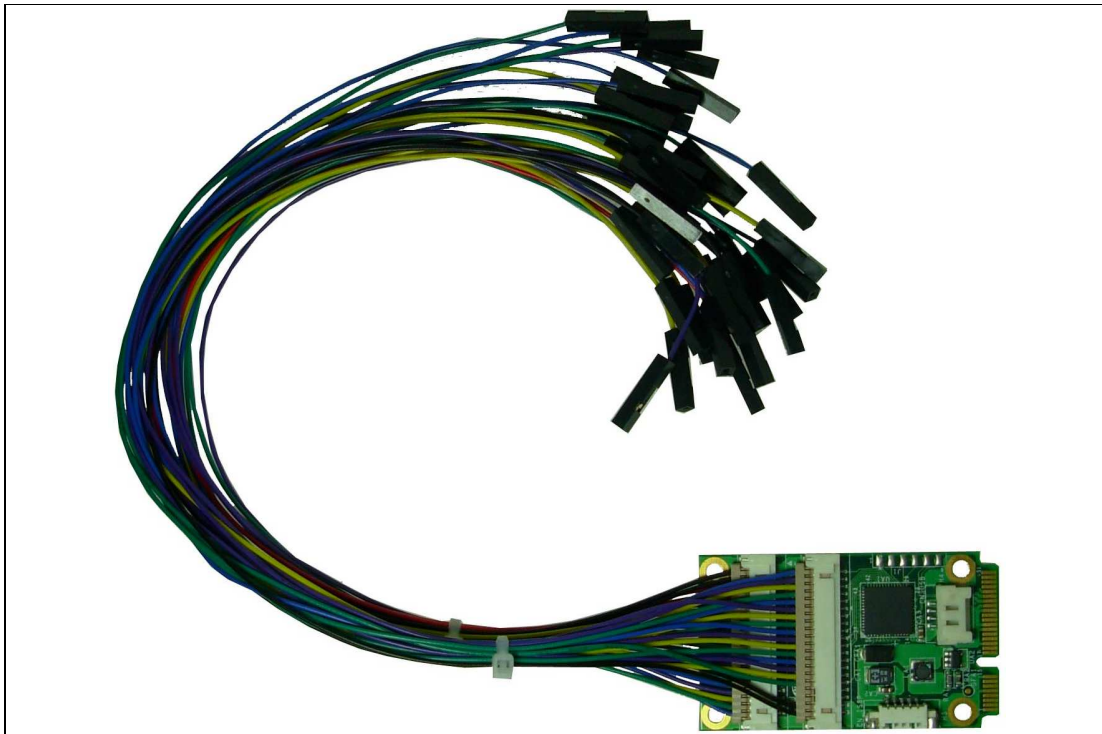


Figure 1 MPX-24794S USB-Serial Card

MPX-24794S Serial USB Card provides SPI master interface, I2C master interface, a 16-bit general purpose counter, and 16-bit GPIO interfaces via USB 2.0 full speed device connection. This card is in Mini-PCIe form factor and is using only the USB signaling portion of the standard Mini-PCIe interface.

This card is powered by a Cypress CY8C24794 micro-controller with 24 MHz system clock frequency. The USB is compliant to USB 2.0 full speed device. This card provides you a convenience way to connect your systems to those SPI slave devices, I2C slave devices, and devices that need GPIO interface. A 16-bit general counter with Enable pin input is also provided. A compare true pin out and terminal count pin out are also provided.

2.54mm pitch test pins are come with this card for your easy usage.

Device drivers for Microsoft Windows 2000, Windows XP (32-bit and 64-bit), Windows Vista (32-bit and 64-bit), and Windows 7 (32-bit and 64-bit) are supplied in the product CD.

The MPX-24794S firmware provides APIs for SPI master functions, I2C master functions, 16-bit counter functions, and GPIO functions to be used by the USB host side applications. USB host side applications communicate with MPX-24794S firmware via USB Bulk In and Bulk Out transactions. The Common Communication Protocol (CCP) is formatted within Bulk In and Bulk Out data. Please refer to the MPX-24794S Programmer's Guide for detail technical information.

1.1 Features

1.1.1 Hardware

The MPX-24794S Serial USB Card is based on Cypress CY8C24794-24LTXI System-on-Chip controller, which has the following features:

- M8C processor speeds up to 24 MHz
- Low power at high speed
- USB 2.0 compliant at full speed (12 Mbps)
- SPI Master module on Port 0
- SPI Master mode 0, 1, 2, 3 with 1 MHz clock frequency
- Selectable SPI setup time and hold time
- Connects up to five SPI slave devices (CS0#, CS1#, CS2#, CS3#, CS4#)
- Programmable 16-bit general purpose counter
- 16-bit Counter at 1 MHz clock rate
- 16-bit Counter with enable input pin
- 16-bit Counter with compare_true and terminal_count output pins
- I2C Master supports standard mode of 100 kbps data rate
- 8-bit I2C slave address with Read/Write bit on bit-0
- Programmable 16-bit GPIOs
- 8-bit GPIO on Port 3
- 8-bit GPIO on Port 4
- 25-mA sink, 10-mA source on all GPIOs
- Pull-up, pull-down, high Z, strong, or open-drain drive modes on all GPIOs
- Configurable interrupt on all GPIOs

1.1.2 Firmware

The MPX-24794S firmware supports the following features. Please refer to the MPX-24794S Programmer Reference for details.

- Optimized to run accurately and efficiently
- Bulk Out endpoint for commands sending
- Bulk In endpoint for responses receiving

- Interrupt In endpoint for checking certain status
- Implement SPI master services
- Implement I2C master services
- Implement 16-bit general purpose counter services
- Implement 16-bit general purpose input/out services

1.1.3 Software

The MPX-24794S provides the following software features. Please refer to the MPX-24794S Programmer's Reference for details.

- Devices drivers support Windows 2000, 32-/64-bit Windows XP, 32-/64-bit Windows Vista, and 32-/64-bit Windows 7.
- Cypress CyAPI.LIB library for C/C++ programming
- Cypress CyUSB.NET class library, CyUSB.DLL, for Microsoft Windows managed .NET programming. For example, Visual Basic, Visual C#, and JScript.
- Example Code in Microsoft Visual Studio 2010.

1.2 Block Diagram

The following Figure shows the block diagram of MPX24792S.

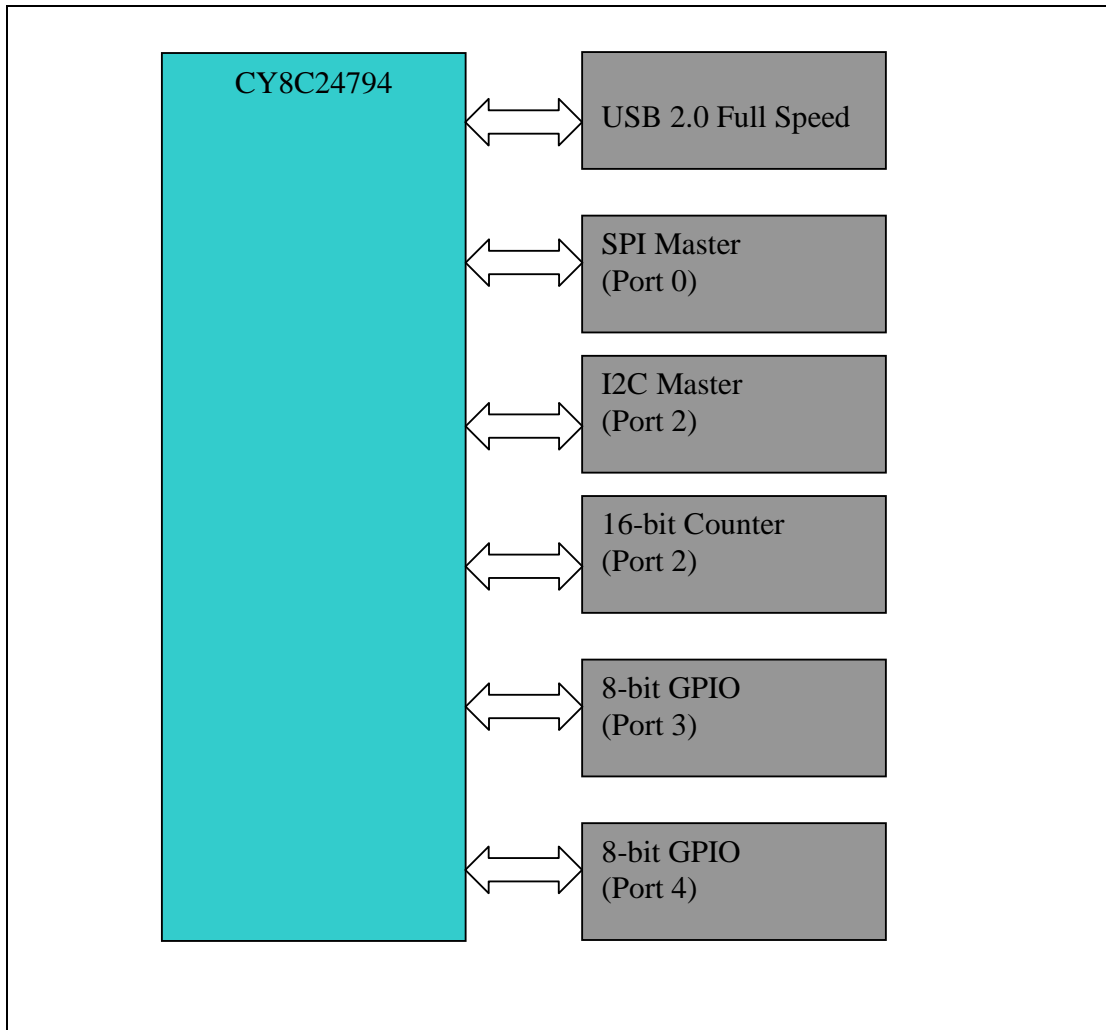


Figure 2 Block Diagram

2 Hardware

This chapter depicts the MPX-24794S Serial USB Card in hardware point of view. These cover the following topics:

- Card
- Cables

2.1 Card

The Cypress CY8C24794-24LXTI micro controller is the major component of the MPX-24794S Serial USB Card. This CY8C24794 is located at the UA1 position.

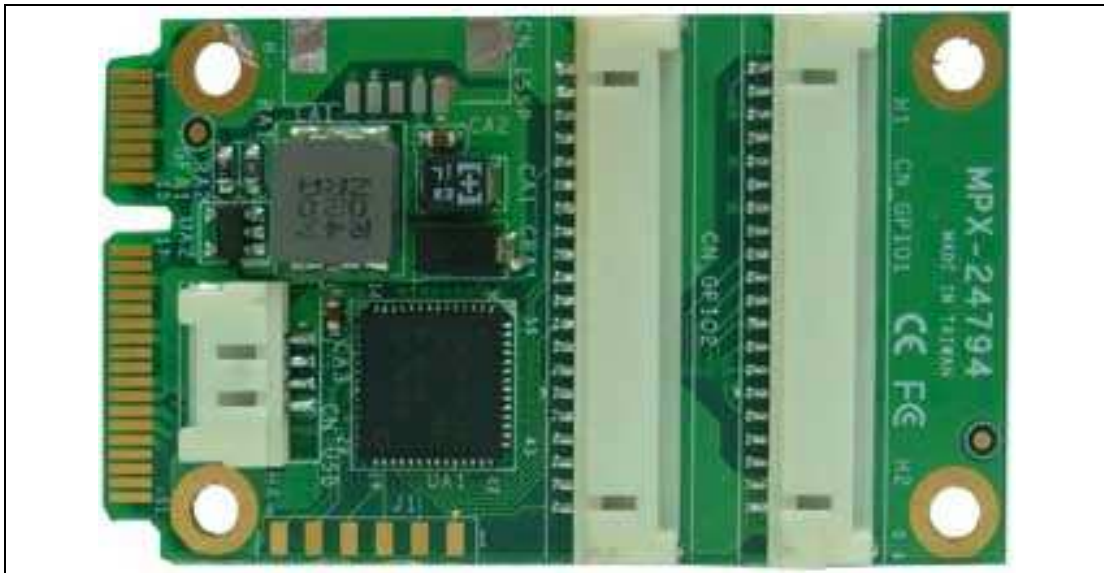


Figure 3 MPX-24794S Serial USB Card

2.1.1 Connectors and Pins Definition

The following figure shows the connectors on the MPX-24794S card.

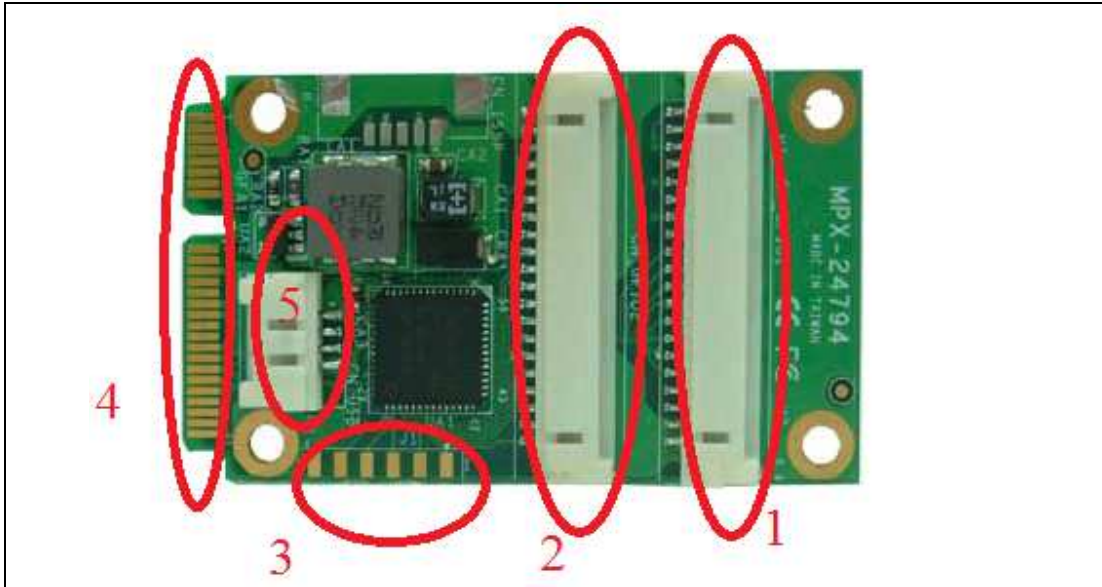


Figure 4 MPX-24794S Connectors

These five connectors are:

1. CN_GPIO1 – The connector that contains SPI master signals and SPI slaves chip select signals, I2C master SCL and SDA signals, as well as Counter signals.
2. CN_GPIO2 – All GPIO signals.
3. JP1 - Firmware update signals and others.
4. Mini-PCIe USB only signals – Plus this board into a Mini-PCIe slot will connect to a USB port of your motherboard.
5. CN_USB – An alternate way to connect to a USB port of your motherboard via connect OALUSB-H4-1 cable to this connector and its type A plug-in connector.

The following table shows the pin-out definitions of the CN_GPIO1 connector.

PIN	Description	PIN	Description
CN_GPIO1_1	GND	CN_GPIO1_11	CS3#
CN_GPIO1_2	GND	CN_GPIO1_12	CS4#
CN_GPIO1_3	PWR+5V	CN_GPIO1_13	CNTR_EN
CN_GPIO1_4	PWR+5V	CN_GPIO1_14	CNTR_CO
CN_GPIO1_5	MOSI	CN_GPIO1_15	Reserved
CN_GPIO1_6	MISO	CN_GPIO1_16	CNTR_TO
CN_GPIO1_7	SCLK	CN_GPIO1_17	Reserved

CN_GPIO1_8	CS0#	CN_GPIO1_18	I2CmSDA (4.7 K Ohm)
CN_GPIO1_9	CS1#	CN_GPIO1_19	Reserved
CN_GPIO1_10	CS2#	CN_GPIO1_20	I2CmSCL (4.7 K Ohm)

Table 1 CN_GPIO1 Pin Definitions

Note:

A pull-up 4.7 K Ohm resistor is installed on I2CmSDA line and I2CmSCL line respectively.

The following table shows the pin-out definitions of the CN_GPIO2 connector.

PIN	Description	PIN	Description
CN_GPIO2_1	Port_3_0	CN_GPIO2_11	Port_4_2
CN_GPIO2_2	Port_3_1	CN_GPIO2_12	Port_4_3
CN_GPIO2_3	Port_3_2	CN_GPIO2_13	Port_4_4
CN_GPIO2_4	Port_3_3	CN_GPIO2_14	Port_4_5
CN_GPIO2_5	Port_3_4	CN_GPIO2_15	Port_4_6
CN_GPIO2_6	Port_3_5	CN_GPIO2_16	Port_4_7
CN_GPIO2_7	Port_3_6	CN_GPIO2_17	N/C
CN_GPIO2_8	Port_3_7	CN_GPIO2_18	N/C
CN_GPIO2_9	Port_4_0	CN_GPIO2_19	GND
CN_GPIO2_10	Port_4_1	CN_GPIO2_20	GND

Table 2 CN_GPIO2 Pin Definitions

The following table shows the pin-out definitions of the JP1 connector.

PIN	Description
J1_1	Reserved
J1_2	Reserved
J1_3	Reserved
J1_4	Reserved
J1_5	Reserved
J1_6	Enter firmware update mode via grounding this pin

Table 3 J1 Connector pin-out definitions

The following table shows the USB portion pin-outs of the Mini-PCIe interface. Please be noted that power pins are not showed.

Pin	Name	Description
-----	------	-------------

38	USB_D+	Related to full-mini PCIe card
37	GND	Related to full-mini PCIe card
36	USB_D-	Related to full-mini PCIe card
35	GND	Related to full-mini PCIe card

Table 4 USB signals related to full-mini PCIe card

The following table shows the pin-out definitions of the CN_USB connector.

Pin	Name	Description
1	+5V	Red color
2	USB_D-	White color
3	USB_D+	Green color
4	GND	Black color

Table 5 CN_USB Pin Out Definitions

2.2 Cables

The following cables can be used with MPX-24794S card. Two of them are standard cables that come with the product. Others are optional.

- OAL-24794S-CN1 (standard)
- OAL-24794S-CN2 (standard)
- OALUSB-H4-1 (option)
- OAL-27494S-ADP (option)

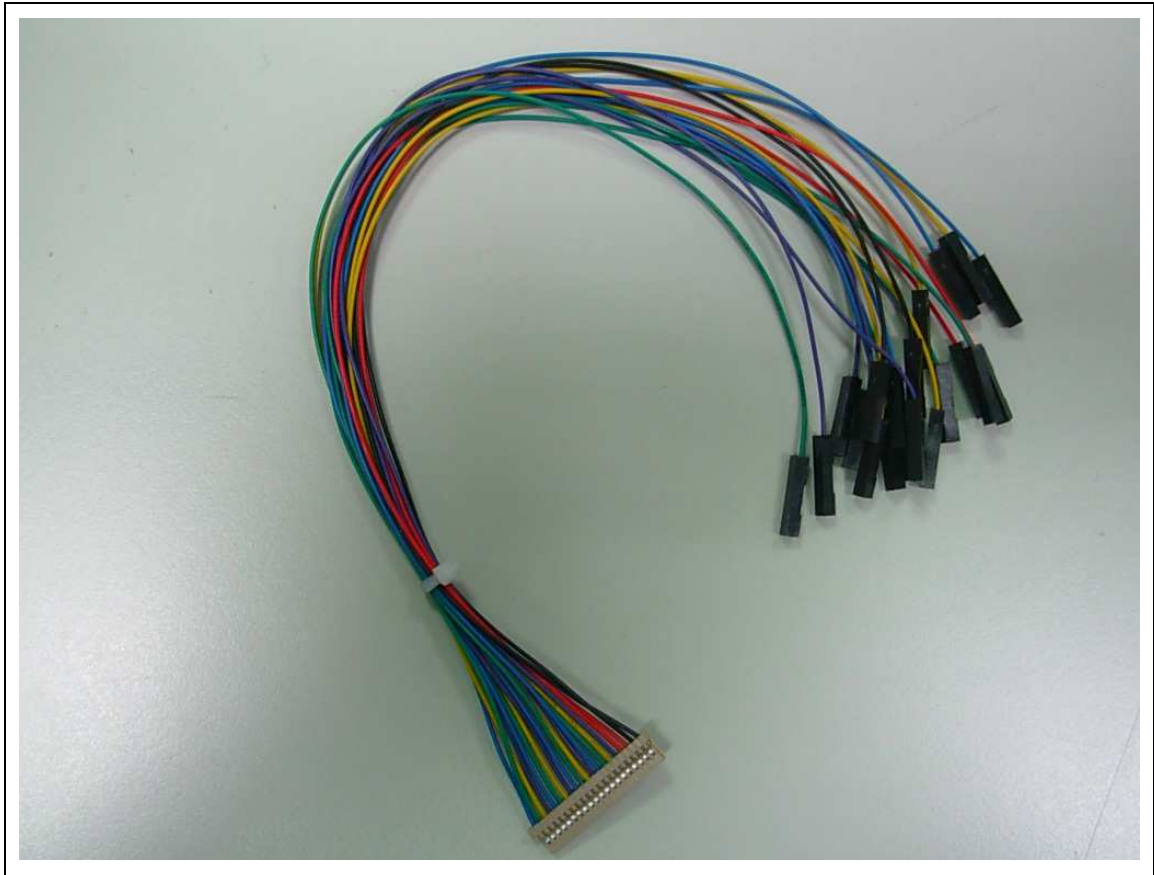


Figure 5 OAL-24794S-CN1 photo

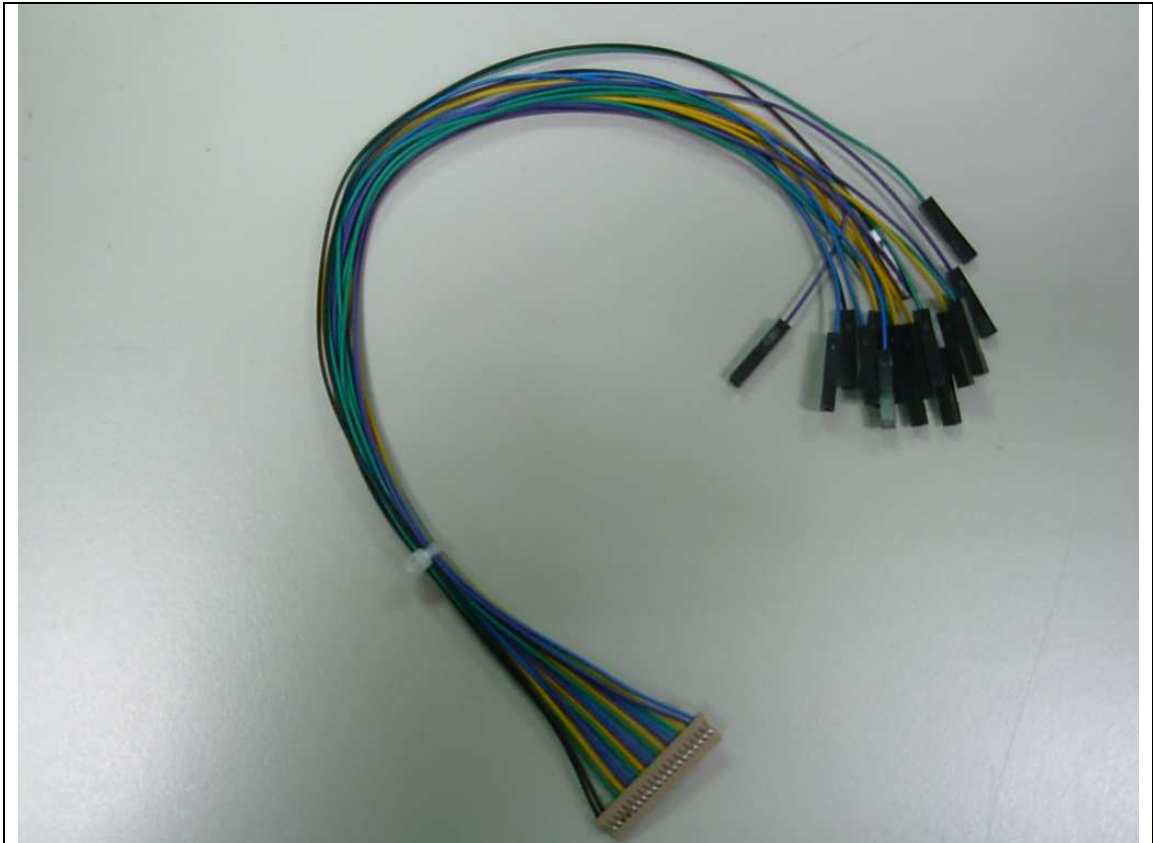


Figure 6 OAL-24794S-CN2 photo

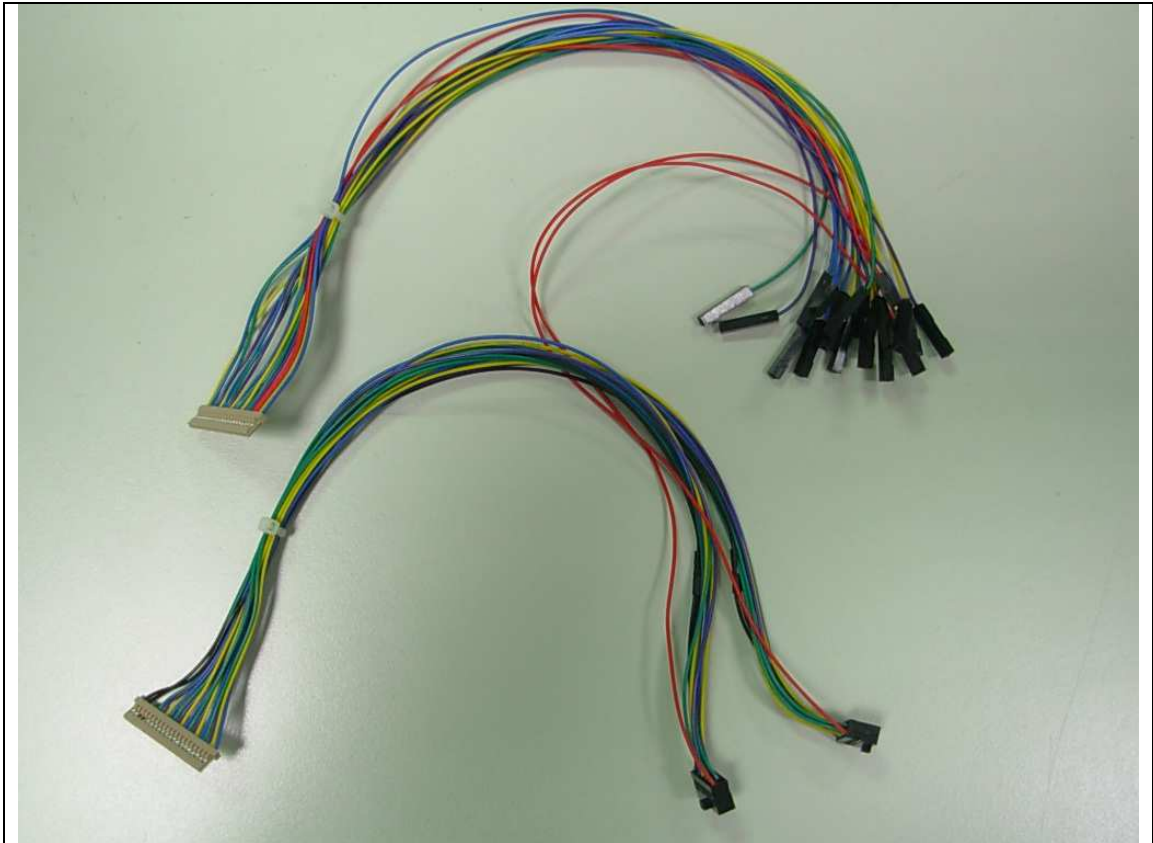


Figure 7 OAL-24794S-ADP photo

2.2.1 OAL-24794S-CN1

This cable is used to connect to the CN_GPIO1 connector.

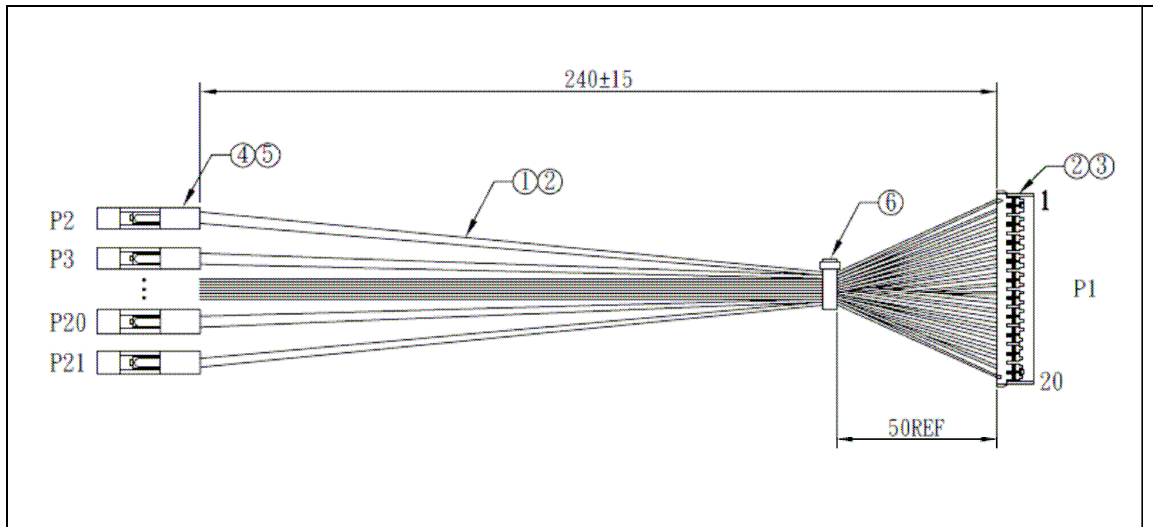


Figure 8 OAL-24794S-CN1 Cable

Item	Description
1	28AWG
2	28AWG
3	HOUSING PITCH: 1.25mm
5	HOUSING PITCH: 2.54mm

Connects the P1 side of the OAL-24794S-CN1 to the CN_GPIO1 connector of the MPX-24749S card.

The following table shows the mapping of this cable.

Pin	Color	P1 connector	CN_GPIO1 connector
P2	Black	P1_1	CN_GPIO1_1
P3	Black	P1_2	CN_GPIO1_2
P4	Red	P1_3	CN_GPIO1_3
P5	Red	P1_4	CN_GPIO1_4
P6	Purple	P1_5	CN_GPIO1_5
P7	Yellow	P1_6	CN_GPIO1_6
P8	Green	P1_7	CN_GPIO1_7
P9	Blue	P1_8	CN_GPIO1_8
P10	Purple	P1_9	CN_GPIO1_9
P11	Yellow	P1_10	CN_GPIO1_10
P12	Green	P1_11	CN_GPIO1_11
P13	Blue	P1_12	CN_GPIO1_12
P14	Purple	P1_13	CN_GPIO1_13
P15	Yellow	P1_14	CN_GPIO1_14
P16	Green	P1_15	CN_GPIO1_15

P17	Blue	P1_16	CN_GPIO1_16
P18	Purple	P1_17	CN_GPIO1_17
P19	Yellow	P1_18	CN_GPIO1_18
P20	Blue	P1_19	CN_GPIO1_19
P21	Green	P1_20	CN_GPIO1_20

Table 6 OAL-24794S-CN1 cable mapping

Please refer to the Connectors and Pins section for CN_GPIO2 signals.

2.2.2 OAL-24794S-CN2

This cable is used to connect to the CN_GPIO2 connector.

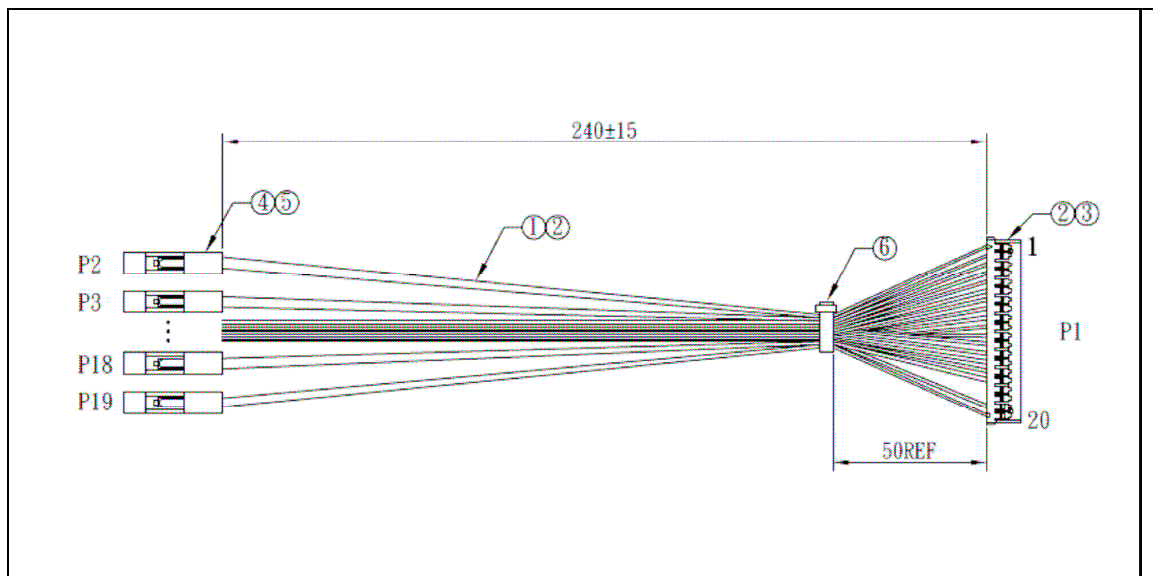


Figure 9 OAL-24794S-CN2 Cable

Item	Description
1	28AWG
2	28AWG
3	HOUSING PITCH: 1.25mm
5	HOUSING PITCH: 2.54mm

Connects the P1 side of the OAL-24794S-CN2 to the CN_GPIO2 connector of the MPX-24794S card.

The following table shows the mapping of this cable.

Pin	Color	P1 Plug	CN_GPIO2 connector
P2	Blue	P1_1	CN_GPIO2_1
P3	Purple	P1_2	CN_GPIO2_2
P4	Yellow	P1_3	CN_GPIO2_3
P5	Green	P1_4	CN_GPIO2_4
P6	Blue	P1_5	CN_GPIO2_5
P7	Purple	P1_6	CN_GPIO2_6
P8	Yellow	P1_7	CN_GPIO2_7
P9	Green	P1_8	CN_GPIO2_8
P10	Blue	P1_9	CN_GPIO2_9
P11	Purple	P1_10	CN_GPIO2_10
P12	Yellow	P1_11	CN_GPIO2_11
P13	Green	P1_12	CN_GPIO2_12
P14	Blue	P1_13	CN_GPIO2_13
P15	Purple	P1_14	CN_GPIO2_14
P16	Yellow	P1_15	CN_GPIO2_15
P17	Green	P1_16	CN_GPIO2_16
Blank	Not Connected	P1_17	CN_GPIO2_17
Blank	Not Connected	P1_18	CN_GPIO2_18
P18	Black	P1_19	CN_GPIO2_19
P19	Black	P1_20	CN_GPIO2_20

Table 7 OAL-24794S-CN2 cable mapping

Please refer to the Connectors and Pins section for the CN_GPIO2 signals.

2.2.3 OALUSB-H4-1 cable (option)

OALUSB-H4-1 cable is an alternate cable to connect the MPX-24794S card to one of the USB 2.0 port on your motherboard. OALUSB-H4-1 is a USB 2.0 Type A plug-in cable.

The following figure shows the cable description.

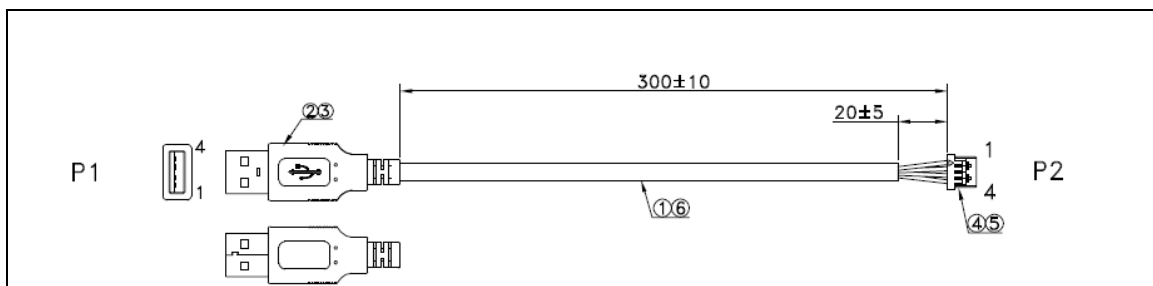


Figure 10 OALUSB-H4-1 cable

Connect the P2 to the CN_USB port of the MPX-24794S card. OALUSB-H4-1 cable is convenient for your development stage.

2.2.4 OALUSB-H4 cable (option)

OALUSB-H4 cable is another alternate cable to connect the MPX-24794S card to one of the USB 2.0 pin header on your motherboard.

The following figure shows the cable description.

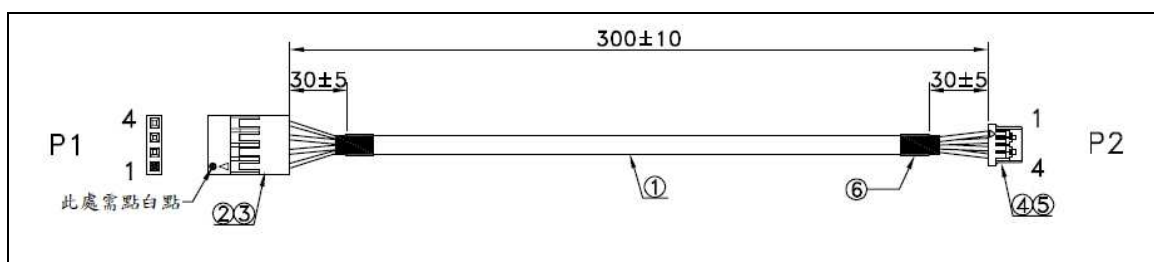


Figure 11 OALUSB-H4 cable

Connecting the P2 to the CN_USB port of the MPX-24794S card meanwhile connecting P1 to a USB 2.0 pin header of your target motherboard.

2.2.5 OAL-24794S-ADP Cable (option)

This cable is specific designed to connect MPX-24794S board to ADP-GPION4I4O5V and ADP-GPION8I5V Commell GPIO signaling isolation boards.

This cable is optional to the MXP-24794S card. The following figure shows the drawing of this cable.

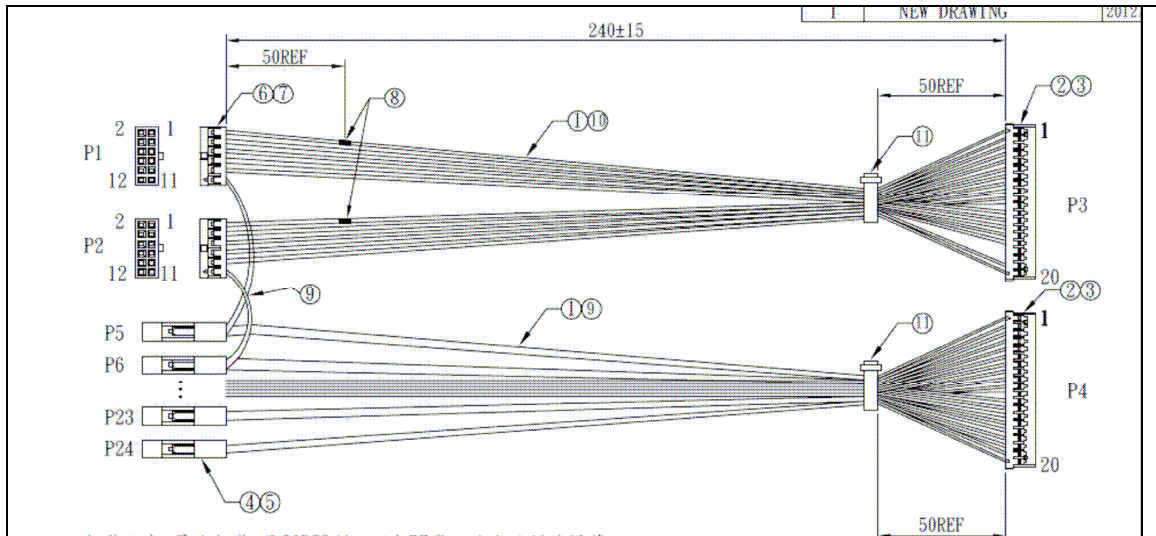


Figure 12 OAL-24794S-ADP cable

Item	Description
1,9,10	28AWG
2,3	HOUSING PITCH: 1.25mm
4,5	HOUSING PITCH: 2.54mm
6,7	HOUSING (2x6 headers) PITCH: 2.0mm

Connect P4 to the CN_GPIO1 connector of the MPX-24794S card. Connects P3 to the CN_GPIO2 connector of the MPX-24794S card.

The following tables show the mapping of all pins of this cable.

P1 connector	Color	P3 connector	CN_GPIO2 connector
P1_1 (GND)	Black	P3_19	CN_GPIO2_19
P1_2 (GND)	Black	P3_19	CN_GPIO2_19
P1_3	Blue	P3_1	CN_GPIO2_1
P1_4	Blue	P3_5	CN_GPIO2_5
P1_5	Yellow	P3_2	CN_GPIO2_2
P1_6	Yellow	P3_6	CN_GPIO2_6
P1_7	Purple	P3_3	CN_GPIO2_3
P1_8	Purple	P3_7	CN_GPIO2_7
P1_9	Green	P3_4	CN_GPIO2_4
P1_10	Green	P3_8	CN_GPIO2_8
P1_11 (+5V)	Red	P4_3 (PWR+5V)	CN_GPIO1_3 (PWR+5V)
P1_12	N/C	N/C	N/C

Table 8 P1 (2x6 header) mapping

P2 connector	Color	P3 connector	CN_GPIO2 connector
P2_1 (GND)	Black	P3_20	CN_GPIO2_20
P2_2 (GND)	Black	P3_20	CN_GPIO2_20
P2_3	Blue	P3_9	CN_GPIO2_9
P2_4	Blue	P3_13	CN_GPIO2_13
P2_5	Yellow	P3_10	CN_GPIO2_10
P2_6	Yellow	P3_14	CN_GPIO2_14
P2_7	Purple	P3_11	CN_GPIO2_11
P2_8	Purple	P3_15	CN_GPIO2_15
P2_9	Green	P3_12	CN_GPIO2_12
P2_10	Green	P3_16	CN_GPIO2_16
P2_11 (+5V)	Red	P4_4 (PWR+5V)	CN_GPIO1_4 (PWR+5V)
P2_12	N/C	N/C	N/C

Table 9 P2 (2x6 header) mapping

Pin	Color	P4 connector	CN_GPIO1 connector
P5	Blue	P4_1	CN_GPIO1_1
P6	Yellow	P4_2	CN_GPIO1_2
P7	Red	P4_3	CN_GPIO1_3
P8	Red	P4_4	CN_GPIO1_4
P9	Purple	P4_5	CN_GPIO1_5
P10	Green	P4_6	CN_GPIO1_6
P11	Blue	P4_7	CN_GPIO1_7
P12	Yellow	P4_8	CN_GPIO1_8
P13	Purple	P4_9	CN_GPIO1_9
P14	Green	P4_10	CN_GPIO1_10
P15	Blue	P4_11	CN_GPIO1_11
P16	Yellow	P4_12	CN_GPIO1_12
P17	Purple	P4_13	CN_GPIO1_13
P18	Green	P4_14	CN_GPIO1_14
P19	Blue	P4_15	CN_GPIO1_15
P20	Yellow	P4_16	CN_GPIO1_16
P21	Purple	P4_17	CN_GPIO1_17
P22	Green	P4_18	CN_GPIO1_18
P23	Blue	P4_19	CN_GPIO1_19
P24	Yellow	P4_20	CN_GPIO1_20

Table 10 All other pins mapping

2.3 Connecting to The PC

This section depicts how to connect the MPX-24794S card to a target platform, specifically a Microsoft Windows based PC. There are three ways that a MPX-24794S can be connecting to a PC but only one is allowed at a time.

- Through Mini-PCIe slot
- Through OALUSB-H4-1 cable
- Through OALUSB-H4 cable



Use only one connecting method of the above three methods to connect a MPX-24794S card to the target PC.

2.3.1 Via Mini-PCIe Slot

You can simply connect a MPX-24794S card to the target PC via inserting a MPX-24794S card into a standard Mini-PCIe slot. This is because a standard Mini-PCIe slot provides USB signals in its interface. Commell motherboards that feature Mini-PCIe slot(s) are compliant to industrial standard Mini-PCIe slot interface and therefore are good for MPX-24794S card. Please check your target board user's manual.

The following figure shows how to insert a MPX-24794S card into a standard Mini-PCIe slot of a motherboard.

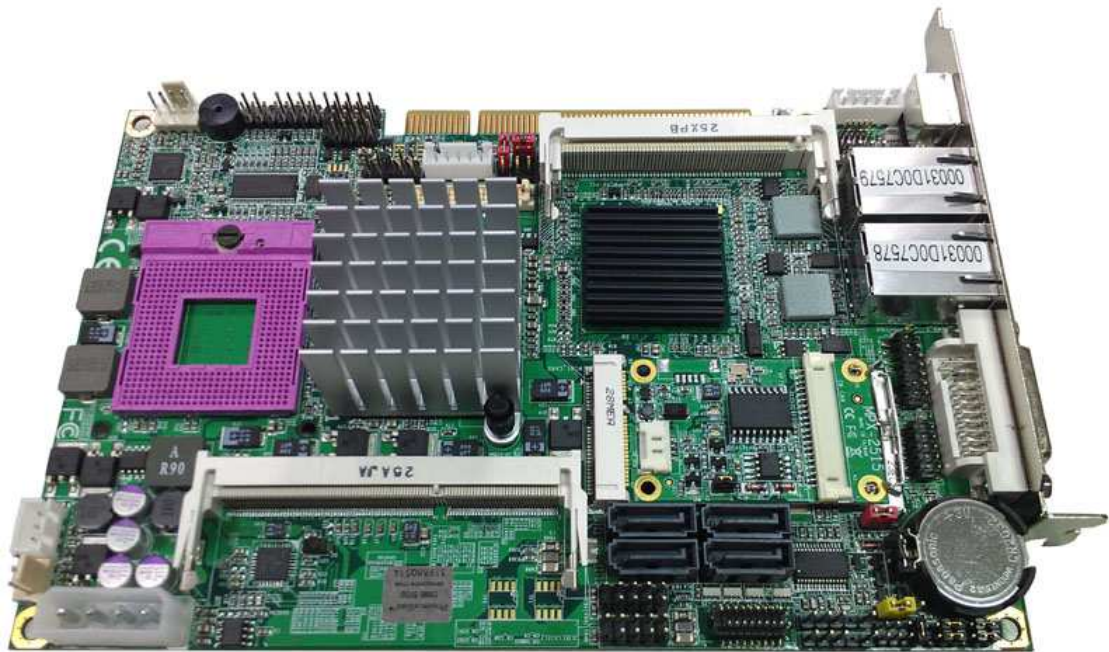


Figure 13 Inserting to a standard Mini-PCIe slot

2.3.2 Via OALUSB-H4-1 Cable (Option)

Another way to connect MPX-24794S card to your target PC is via OALUSB-H4-1 cable. One end of this cable connecting to the MPX-24794S and the other end connecting to a USB Type A receptacle of your target PC.

The following figure shows how to connect MPX-24794S card to your target PC via OALUSB-H4-1 cable.



Figure 14 How to use OALUSB-H4-1 cable

2.3.3 Via OALUSB-H4 Cable (Option)

Third way to connect a MPX-24794S card to your target PC is via OALUSB-H4 cable. This cable connects a MPX-24794S card to the target PC through USB pin header. Please check the user's manual of your motherboard to locate a right USB pin header.

The following figure shows how the OALUSB-H4 cable is connecting a MPX-24794S card to a target PC.



Figure 15 How to use OALUSB-H4 cable

2.4 Optional GPIO Signal Isolation Boards

In the real practical situations, cases are connecting signal isolation boards to MPX-24794S cards before connecting to those input and /or output devices. Both ADP-GPIO4I4O5V and ADP-GPION8I5V boards are designed for this purpose.

MPX-24794S card provides a convenient way to connect to the ADP-GPION4I4O5V and ADP-GPION8I5V signal isolation boards. The OAL-24794S-ADP cable is designed specially to connect to these two boards.

2.4.1 ADP-GPION4I4O5V (option)

ADP-GPION-4I4O5V is a signaling isolation board for Commell GPIO products. This board has four photo-couple input connectors and four relay output connectors. Four photo-couple diodes protect input lines from the damage caused by ElectroStatic Discharge (ESD) and other transients. Four relays feature high current contacts capability.

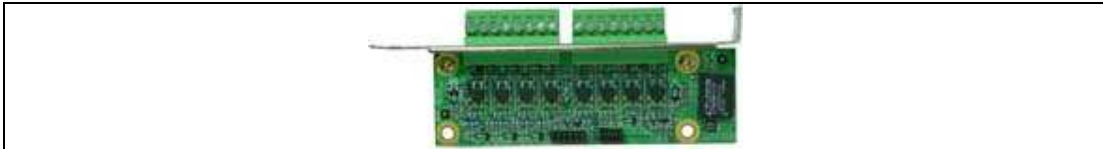


Figure 16 ADP-GPION4I4O5V

Use either P1 and/or P2 connector (2x6 header) of OAL-24794S-ADP cable to connect to one or two of this board.

2.4.2 ADP-GPION8I5V (option)

ADP-GPION8I5V is a signaling isolation board for Commell GPIO products. This board has eight photo-couple input connectors. Eight photo-couple diodes protect input lines from the damage caused by ElectroStatic Discharge (ESD) and other transients.

**Figure 17 ADP-GPION8I5V**

Use either P1 and/or P2 connector (2x6 header) of OAL-24794S-ADP cable to connect to one or two of this board.

3 Device Drivers

This chapter describes how to install the MPX-24794S Serial USB Card device drivers. A successful device driver installation is mandatory in order to make MPX-24794S card working properly.

MPX-24794S Card supports the following operating systems.

- Windows 2000 – Device driver files located in w2k\x86 folder.
- Windows XP 32-/64-bit versions – Device driver files located in wxp\x86 and wxp\x64 folder respectively.
- Windows Vista 32-/64-bit versions – Device driver files located in wlh\x86 and wlh\x64 folder respectively.
- Windows 7 32-/64-bit versions – Device driver files located in wlh\x86 and wlh\x64 folder respectively.

3.1 Device Drivers Installation

This section describes how to install the corresponding device driver to your target Windows operating systems.

The following figure shows the device driver files organization.

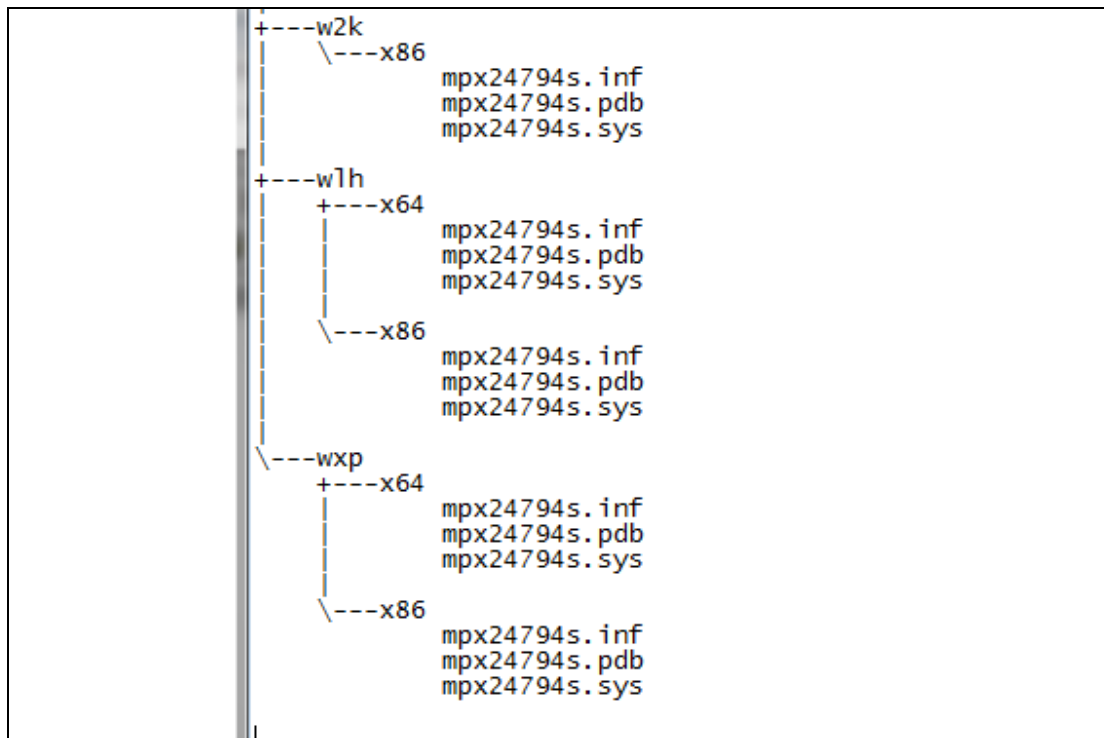


Figure 18 Device Driver files Organization

3.1.1 Windows 2000

MPX-24794S card device driver for Windows 2000 is supported. Follow these instructions to install the corresponding device driver for your operating system.

Direct your device driver installation wizard to the `.\w2k\x86` folder for the right device driver for Windows 2000.

3.1.2 Windows XP

MPX-24794S card device drivers for Windows XP 32-/64-bit versions are supported. Follow these instructions to install the corresponding device driver for your operating system.

Direct your device driver installation wizard to the `.\wxp\x86` if you are using the 32-bit Windows XP system; while the `.\wxp\x64` contains the device driver for your 64-bit Windows XP system.

3.1.3 Windows Vista

MPX-24794S card device drivers for Windows Vista 32-/64-bit versions are supported. Follow these instructions to install the corresponding device driver for your operating system.

Direct the installation wizard to the .\wlh\x32 for your 32-bit Windows Vista system. The .wlh\x64 contains the driver for your 64-bit Windows Vista system.

3.1.4 Windows 7

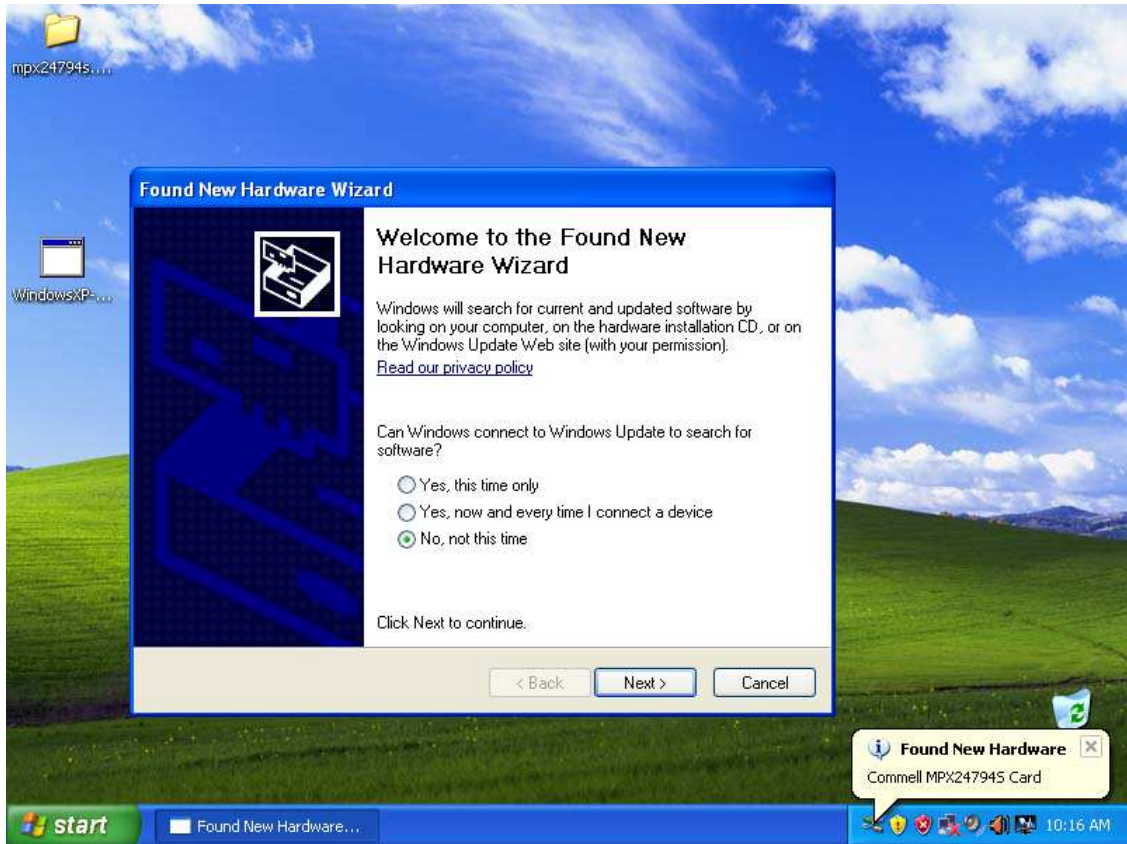
MPX-24794S card device drivers for Windows 7 32-/64-bit versions are supported. Follow these instructions to install the corresponding device driver for your operating system.

Direct the installation wizard to the .\wlh\x32 for your 32-bit Windows 7 system. Meanwhile, the .\wlh\x64 folder contain the device driver for your 64-bit Windows 7 system.

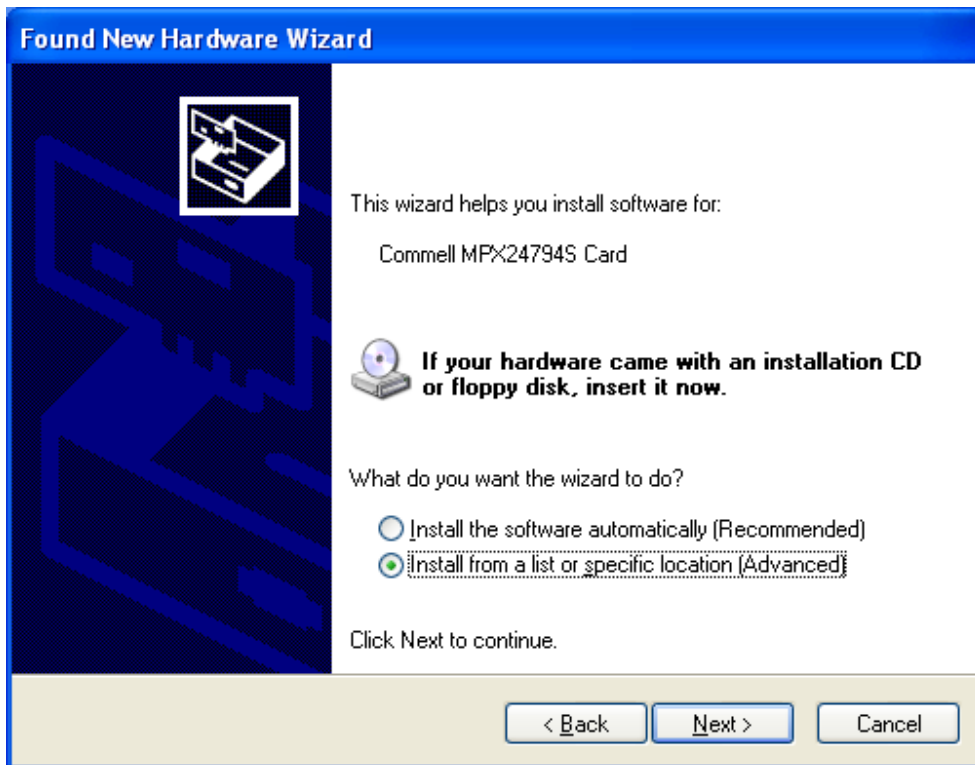
3.1.5 General Procedures

This section describes the general procedures while you are installing device driver for MPX-24794S Card on Microsoft Windows XP system. The procedures here are common and/or similar to all Microsoft Windows Systems.

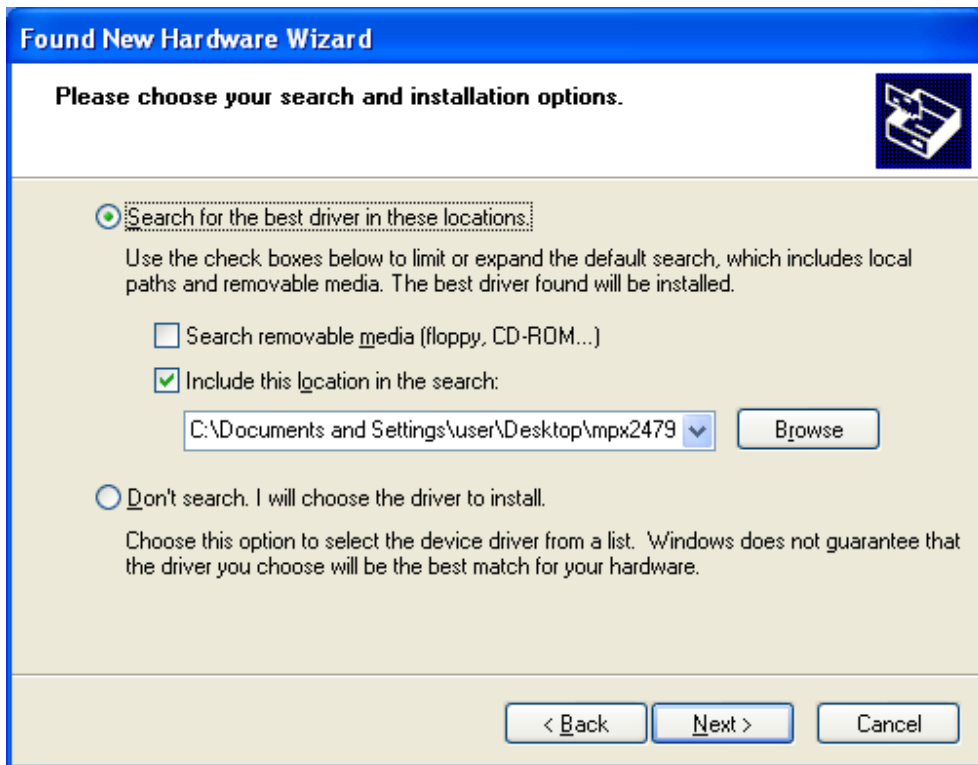
1. Insert the MPX-24794S card companion CD into the target system or copy its device driver folder to the target system.
2. Insert the MPX-24794S card into the system and then follow the Device Driver Setup Wizard.



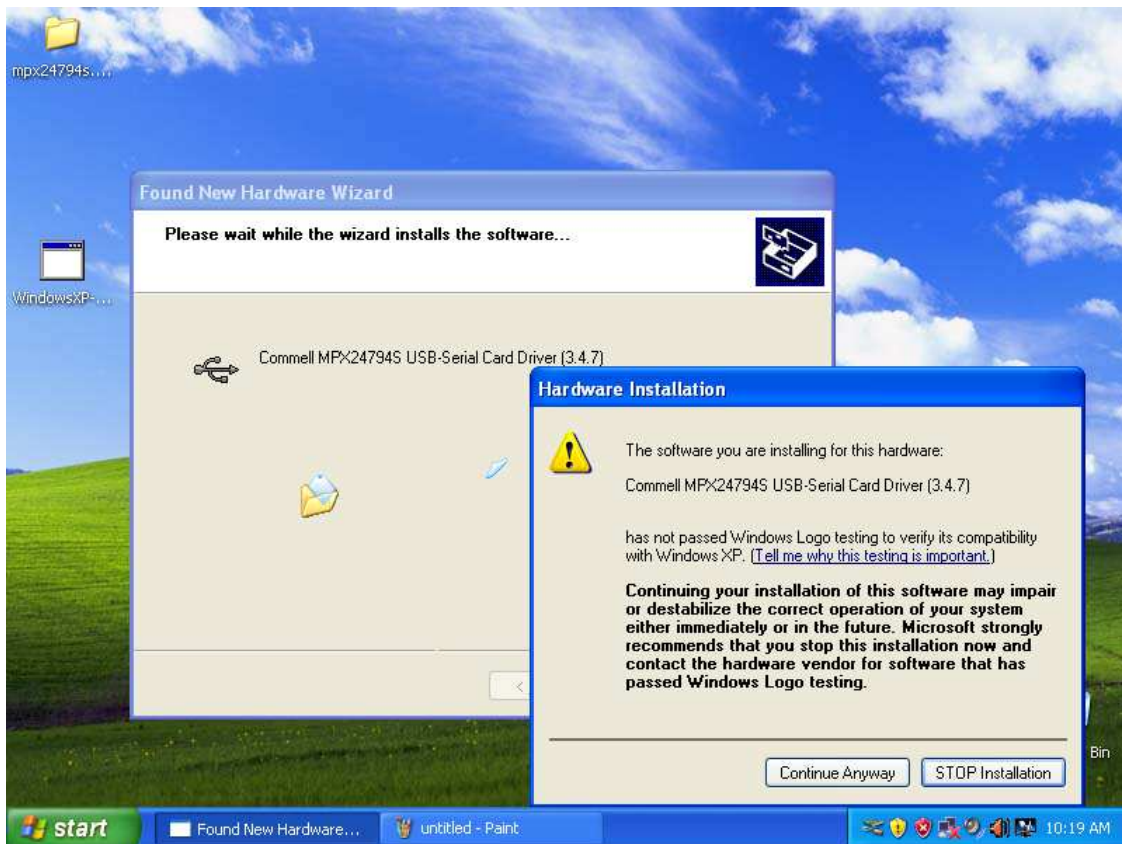
Select as in the screen shot and click on "Next >".



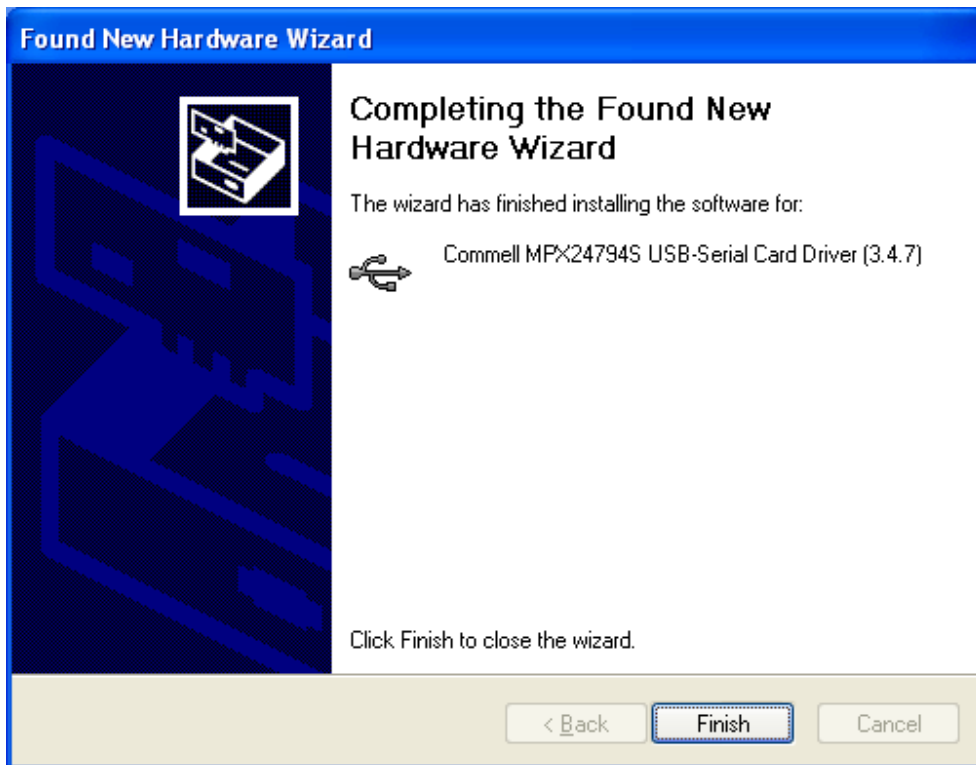
Select as in the screen shot and click on "Next >".



Select as in the screen shot and browse to the folder that contains appropriate to the target system.



Click on "Continue Anyway".



Click on "Finish" on the Completing dialog. This completes the device driver installation.

Launch the Device Manager to double check the device driver installation of MPX-24794S card. The "Commell MPX24794S USB-Serial Card Driver" is attaching to one of the Universal Serial Bus Controllers as shown in the following figure.

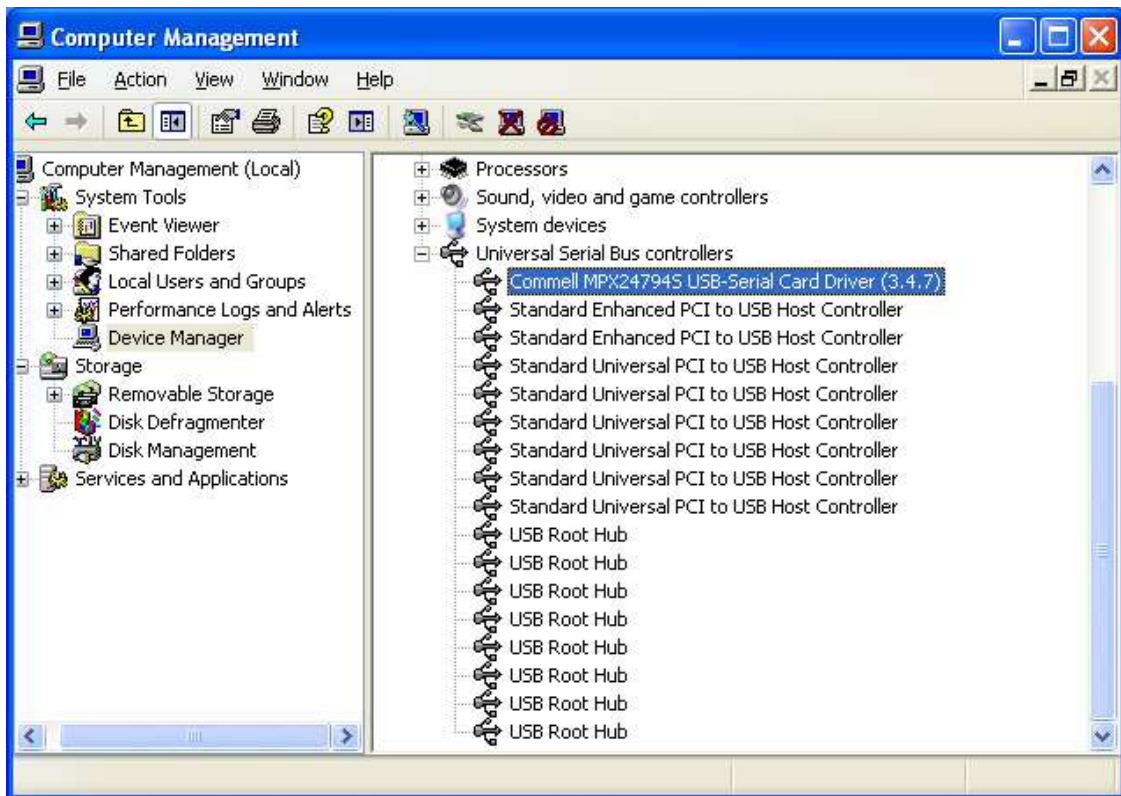


Figure 19 MPX-24794S vs. Device Manager

Right click on the MPX-24794S item and select "Property". The Property dialog appears with some technical information. The following figure shown this property dialog.

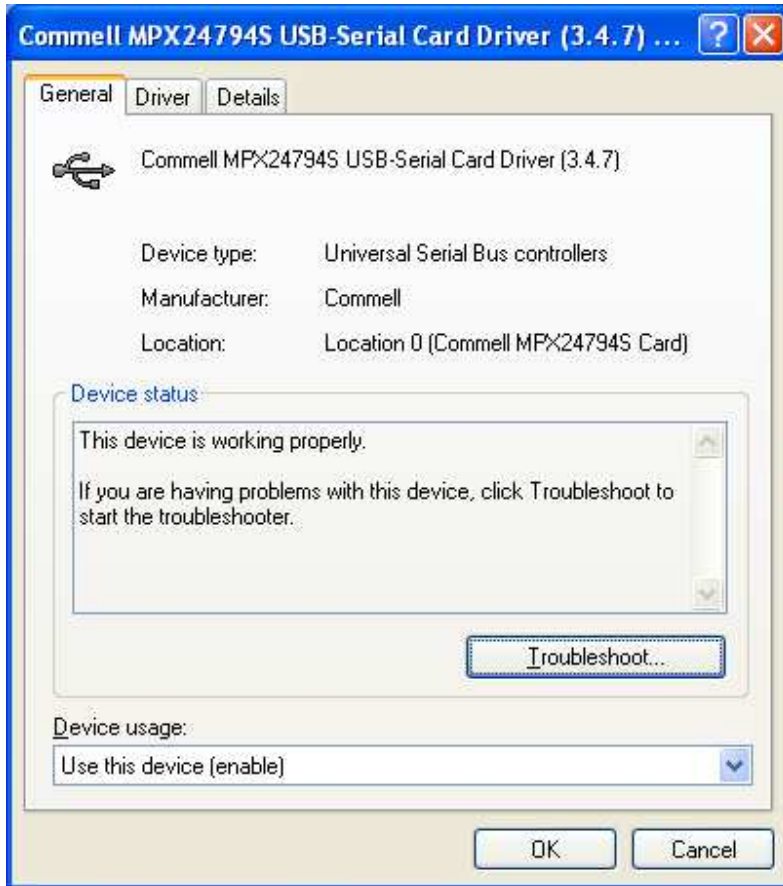


Figure 20 MPX-24794S Property Dialog

4 References

- [1] CY8C24794 PSoC Programmable System-on-Chip Datasheet, Document 38-12018 Rev. N, Cypress Semiconductor
- [2] PSoC Programmable System-on-Chip Technical Reference Manual, Document No. 001-14463 Rev. F, Cypress Semiconductor
- [3] Serial Peripheral Interface (SPI) Master User Module Datasheet 2.10, Cypress Document Number 001-65239, Cypress Semiconductor
- [4] I2C Master User Module Datasheet v1.4, Cypress Document Number 001-13564 Rev. H, Cypress Semiconductor
- [5] The I2C-Bus Specification, Version 2.1, January 2000, Philips Semiconductors.