

PL-2303HX Edition USB-to-Serial Bridge Controller Migration Guide Application Note

Introduction

This application note provides the latest important migration guidelines for PL-2303HX Edition USB-to-Serial Bridge Controller. Refer to this application note if you are migrating from PL-2303H to PL-2303HX or from an old version PL-2303HX to a newer HX chip revision.

PL-2303H and HX Chip Comparison Table

Following are the comparisons for PL-2303H and the current available PL-2303HX controllers:

	PL-2303H	PL-2303HX (Chip A)	PL-2303HX (Chip D)
Core Voltage	5V	3.3V	3.3V
Load mode	Set by pin	Set by EEPROM	Set by EEPROM
Tri-state	Set by pin	Set by EEPROM	Set by EEPROM
RS-232 VDD	5V ~ 3.3V	3.3V ~ 1.8V	3.3V ~ 1.8V
GPIO	No	2 pins	4 pins
Baud Rate setting	75 ~ 1.2M bps	75 ~ 6M bps	75 ~ 12M bps
Buffer Size	Non-configurable Upstream 256 bytes Downstream 256 bytes	Configurable Upstream 256/384 bytes Downstream 256/128 bytes	Configurable Upstream 256/384 bytes Downstream 256/128 bytes
Upstream buffer overflow detect	No	Yes	Yes
Flow Control (XON/XOFF)	By Software	By Hardware / Software	By Hardware / Software
Flow Control (RTS/CTS)	By Hardware	By Hardware	By Hardware
Serial number in EEPROM	No	Yes	Yes
Adjustable threshold for flow control	No	Yes	Yes
Serial interface (Data Bits)	5,6,7,8 or 16	5,6,7 or 8	5,6,7 or 8
NC Pins	No	Pin 8/19/24	Pin 8/24
Circuit	H Version	Compatible with H Version	Compatible with H Version
PKG	SSOP28	SSOP28	SSOP28 / QFN32
Product Cycle	Discontinued (EOL)	Available	Available

Upstream: From RS-232 to USB

Downstream: From USB to RS-232

PL-2303HX Chip Version Comparison Table

The table below shows the comparison for all available PL-2303HX chip revisions:

	PL-2303HX (Rev A)	PL-2303HX (Rev D)
Clock Source	External 12MHz crystal & Internal 4X PLL	Internal 96MHz clock generator
Initial Startup Device Configuration	External EEPROM	Internal OTPROM
Hardware Flow Control	RTS/CTS	RTS/CTS or DTR/DSR ¹
General Purpose IO	2 (GP0/1)	4 (GP0/1/2/3)
Pin Differences	Pin 13 → EE_CLK Pin 14 → EE_DATA Pin 19 → NC Pin 21 → GND Pin 25 → GND_A Pin 27 → OSC1 Pin 28 → OSC2	Pin 13 → GP3 Pin 14 → GP2 Pin 19 → RESET_N ² Pin 21 → NC Pin 25 → GND Pin 27 → NC Pin 28 → RESERVED
Product Cycle	Available	Available

¹ – To apply DTR/DSR hardware flow control, please contact Prolific FAE for support and information.

² – Starting from Chip Rev C or D, Pin 19 will be assigned as RESET pin. If PCB layout has NC for Pin 19, you can short Pin 19 to Pin 20.

PL-2303H to HX Hardware Design Migration

Following are the hardware design guidelines for migrating PL-2303H to current HX chips:

- Pin 4 of PL-2303HX cannot support 5V (Only 1.8 to 3.3V). Hardware migration is only possible if your design is 3.3V. Otherwise, you need to modify your PCB.
- Power mode is configured in EEPROM. The default mode for PL-2303HX is low power. If your PL-2303H design is high power mode, you need to add EEPROM to change the mode.
 - PL-2303HXD has an integrated EEPROM for OTP (One-Time-Programming) to configure the correct power mode.
- Refer also to PL-2303HX Schematic Diagram and Datasheet.

PL-2303HxD Hardware Design Migration

The latest PL-2303HxD is pin-to-pin compatible with the PCB layout of PL-2303H (3.3V) and previous PL-2303HX chip versions. However, note some differences:

- If the PCB layout was designed with Pin 19 as NC, you can short Pin 19 (RESET_N) to Pin 20 (VDD_5). Pin 19 is 5V tolerant. Otherwise, the PCB needs to be re-layout. See Figure-1 below.

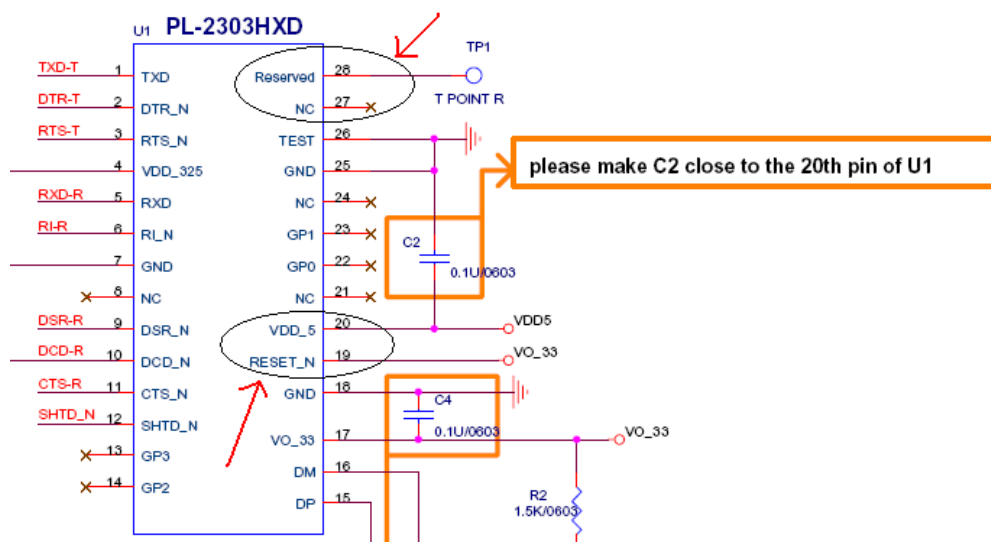


Figure-1: PL-2303HxD Schematic Diagram Reference

- PL-2303HxD already has an integrated clock generator so pin 27 is NC while pin 28 should be floating.
- For PL-2303HxD, you can remove the 0.1μF capacitor (C14 in PL-2303H schematic) and just use 10uF as 5V capacitor (C7 in PL-2303HxD schematic). See Figure-2 below.

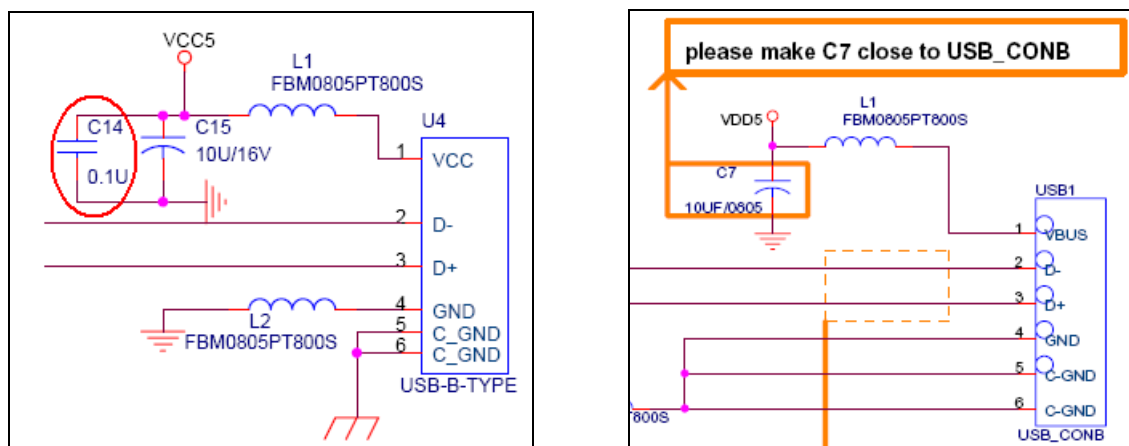


Figure-2: PL-2303H and PL-2303HxD Schematic Diagram (5V Capacitor) Comparison

Note: Refer to the latest PL-2303HxD Schematic Diagram and Datasheet from Prolific for more accurate information.

PL-2303 Software & Drivers Comparison Table

The table below shows the software comparison for all the PL-2303 chip edition series:

Chip Version	Windows Driver Versions
PL-2303H, PL-2303HX, PL-2303X	➤ 3.3.11.152 (for Windows Vista/7 32/64 OS)
	➤ 2.0.13.130 (for Windows 2K/XP 32/64 OS)
	➤ 2.0.0.19 (for Windows ME/98)
Note: All Windows drivers are compatible with all PL-2303H, PL-2303HX, and PL-2303X chip versions.	

Chip Version	Windows Driver Versions
PL-2303H, PL-2303HX, PL-2303X	➤ Mac OS 8 & 9 driver: v1.3.6 build 1
	➤ Mac OS X Universal Binary Driver v1.2.1r2 For Mac OS 10.1 and above for PowerPC based Mac For Mac OS 10.4.x and 10.5.x for PowerPC and Intel based Mac For Mac OS 10.6.x for Intel based Mac (32-bit only)
Note: All Mac OS drivers are compatible with all PL-2303H, PL-2303HX, and PL-2303X chip versions.	

Chip Version	Linux Driver Versions
PL-2303H, PL-2303HX, PL-2303X	No need to install drivers for following:
	➤ Linux Kernel 2.4.10 and above already includes built-in drivers for PL-2303H. ➤ Linux Kernel 2.4.31 and above already includes built-in drivers for PL-2303H, PL-2303XA/HXA and PL-2303HxD.
NOTE: Google Android OS is also based on Linux kernel so it also supports PL2303.	

Chip Version	Cable Test Program Version
PL-2303H, PL-2303HX, PL-2303X	2.2.1.1
Note: Cable Test program is one and the same for all PL-2303H, PL-2303HX, and PL-2303X controllers.	

Chip Version	EEPROM Writer Program Version
PL-2303H	2.0.0.0 (all-in-one version program)
PL-2303HX (Chip Rev A)	
PL-2303X	
PL-2303HX (Chip Rev D)	
Note: For PL-2303HX with OTPROM, it is required to attach the device to a 5V-to-6.5V USB port converter before writing data into OTPROM. Refer to the OTPROM Guidelines Section in the succeeding page.	
Note: For PL-2303HxD, it is required to install the <u>Windows 2K/XP driver v2.0.2.5</u> or above; or Windows ME/98 driver v2.0.0.19 when using the EEPROM Writer program.	

Note: Please contact Prolific FAE or support website for the latest driver version.

PL-2303HxD OTPROM Guidelines

When writing data into the internal OTPROM (One-Time Programming ROM) of PL-2303HxD, it is required to supply 6.5V to the device while executing the program. Prolific can provide 5V-to-6.5V USB port converters (see Figure-3) to customers during the chip sample evaluation stage. Prolific also can provide the schematic diagram for the USB port converter upon request if customers want to produce the converters themselves. Contact Prolific for more information.



Figure-3: USB 5V-to-6.5V Port Converter

How to run OTPROM for PL-2303HX:

1. Run the PL-2303 Windows Driver Setup program to install the device driver to the computer. Please make sure to install the latest Windows XP/2K driver version to run OTPROM. The OTPROM program only supports Windows XP/2K at the moment.
2. Plug the USB 5V-to-6.5V Port Converter into the USB port of the USB Hub or PC.
3. Plug the PL-2303HxD device to the Converter's A Type Receptacle Connector.
4. Windows will detect the PL-2303HX device and loads the pre-installed driver. Check Systems-Device Manager if COM Port number is properly designed. The COM port number assigned must not be over COM30.
5. Run the EEPROM Writer program to write configuration data into the OTPROM. The new version 2.0.0.0 can support and detect all PL-2303 chip versions. Please see screenshot figures next page.

PL-2303XA/HXA/HXD EEPROM Writer ver 2.0.0.0

Device Descriptor

Vendor ID (VID) 0x

Product ID (PID) 0x

Release No (BCD) 0x

☒ Serial Number (8 char)

0x

Only for PL2303HXD

☒ Product String Descriptor (30 char)

☐ Enable for RS422/RS485

Remains

Functions

Serial Port Output

☒ Disable output signal during suspend

☐ Set output signals to HIGH during suspend

USB Load Mode

☒ Light load (100mA)

☐ Heavy load (500mA)

Flow Control Setting

☒ No flow control

☐ H/W flow control

☐ S/W flow control (Xon/Xoff)

Shutdown Pin Mode

☐ Output HIGH

☒ Output LOW during suspend

☐ Output LOW

☐ Output HIGH during suspend

Wake Up Trigger PIN

☐ Wake Up Trigger on RXD

☐ Wake Up Trigger on DSR

☒ Wake Up Trigger on RI

☐ Wake Up Trigger on DCD

☐ Wake Up Trigger on CTS

Writer Default

Read EEPROM

Write EEPROM

Reset EEPROM

Exit

<<<<<< Clear

Please apply 6.5V to program EEPROM

Check Chip Version OK

Read EEPROM.....

The EEPROM isn't programmed yet!

Write EEPROM.....

Write EEPROM OK - Serial Number will add one

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