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. If you are a new customer, please refer to PL-2303X Edition product brochure and datasheet.

PL-2303H and HX Chip Comparison Table

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

	PL-2303H	PL-2303HXA	PL-2303HXD
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

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PL-2303HX Chip Version Comparison Table

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

	PL-2303HX (Rev A)	PL-2303HX (Rev B)	PL-2303HX (Rev C)	PL-2303HX (Rev D)
Clock Source	External 12MHz crystal & Internal 4X PLL	External 12MHz crystal & Internal 4X PLL	Internal 48MHz clock generator	Internal 96MHz clock generator
Initial Startup Device Configuration	External EEPROM	Internal OTPROM	Internal OTPROM	Internal OTPROM
Hardware Flow Control	RTS/CTS	RTS/CTS	RTS/CTS or DTR/DSR[1]	RTS/CTS or DTR/DSR[1]
General Purpose IO	2 (GP0/1)	4 (GP0/1/2/3)	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 → NC Pin 21 → GND Pin 25 → GND_A Pin 27 → OSC1 Pin 28 → OSC2	Pin 13 → NC Pin 14 → NC Pin 19 → RESET_N[2] Pin 21 → GND Pin 25 → NC Pin 27 → NC Pin 28 → NC	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**	**Discontinued (EOL)**	**Discontinued (EOL)**	**Available**

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

[2] – Starting from Chip Rev C, 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.
  - Note: PL-2303HXD chip has an integrated EEPROM for OTP (One-Time-Programming) to configure the correct power mode.
- Refer also to PL-2303HX Schematic Diagram and Datasheet.

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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.

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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	3.3.0.1 (for Windows Vista)
	2.0.2.8 (for Windows 2K/XP)
	2.0.0.19 (for Windows ME/98)
Note: All drivers (for Windows 98, ME, 2000, XP, Vista, WinCE, Mac, Linux OS) are compatible with all PL-2303H, PL-2303HX, and PL-2303X chip versions. **Note:** Please contact Prolific FAE or support website for the latest driver version.	

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	1.0.0.3
PL-2303HX (Chip Rev A, B, C)	
PL-2303X	
PL-2303HX (Chip Rev D)	1.0.0.5
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 Windows 2K/XP driver **v2.0.2.5** or above; or Windows ME/98 driver v2.0.0.19 when using the EEPROM Writer program.	

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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-2303HXD:

1. Run the PL-2303HXD 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.
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-2303HXD device and loads the pre-installed driver.
5. Run the EEPROM Writer program to write configuration data into the OTPROM. Please note that the PL-2303HXD is using a newer version (1.0.0.5) for the EEPROM Writer program (see figures next page).

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