UM11806

PTN3222CUK-EVB demo board user manual

Rev. 1 — 25 May 2022 User manual

Document information

Information	Content
Keywords	PTN3222CUK, eUSB2, eUSB2 repeater, eUSB2 redrive, PTN3222CUK demo board
Abstract	This user manual describes the PTN3222CUK-EVB demo board in detail, along with the setup instruction to allow the user to quickly set up the board for validation.

Revision history

Rev	Date	Description
v.1	20220525	initial version

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1 Introduction

PTN3222CUK is a one-port eUSB2 to USB2 redriver IC that performs translation between eUSB2 and USB2 signaling schemes. It is meant to be used in systems that have an eUSB2 interface on one side and a USB2 interface on the other side. It supports host-role only, device-role only or dual-role repeater function.

PTN3222CUK implements repeater mode (eUSB2 to USB2 redriver) and it supports Link Power management features. PTN3222CUK is targeted to be USB2 compliant and eUSB2 conformant. It supports all three speeds/data rates: low speed (1.5 Mbps), full speed (12 Mbps) and high speed (480 Mbps).

This document is intended to help a user quickly set up, configure and operate the PTN3222CUK-EVB evaluation board in the user's hardware platform. The user manual is applicable to both evaluation boards.

2 Getting ready

Working with the PTN3222CUK-EVB evaluation board requires the kit contents, additional hardware, and a Windows PC workstation with installed software.

2.1 Kit contents

The PTN3222CUK-EVB kit includes:

- Assembled and tested evaluation board in an antistatic bag
- Quick Start Guide

3 Finding kit resources and information on the NXP web site

NXP Semiconductors provides online resources for this evaluation board and its supported device(s) on https://www.nxp.com/.

The information page for the PTN3222CUK-EVB evaluation board is at http://www.nxp.com/PTN3222CUK-EVB. The information page provides overview information,documentation, software and tools, parametrics, ordering information and a Getting Started tab. The Getting Started tab provides quick-reference information applicable to using the PTN3222CUK-EVB evaluation board, including the downloadable assets referenced in this document.

4 Getting to know the hardware

4.1 Kit featured components

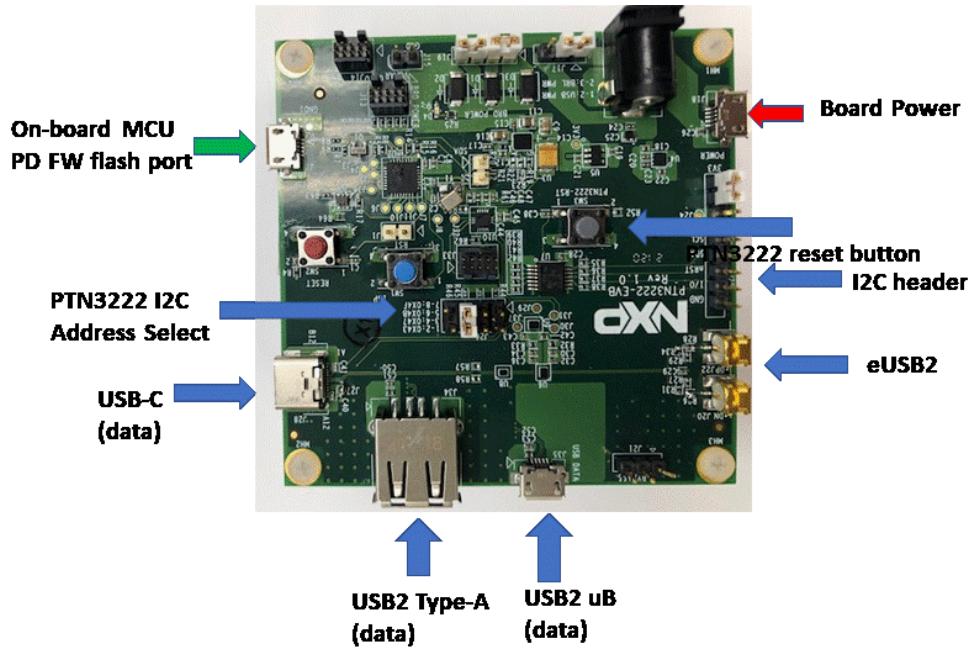

Figure 1. PTN3222CUK-EVB demo board

4.2 Block diagram

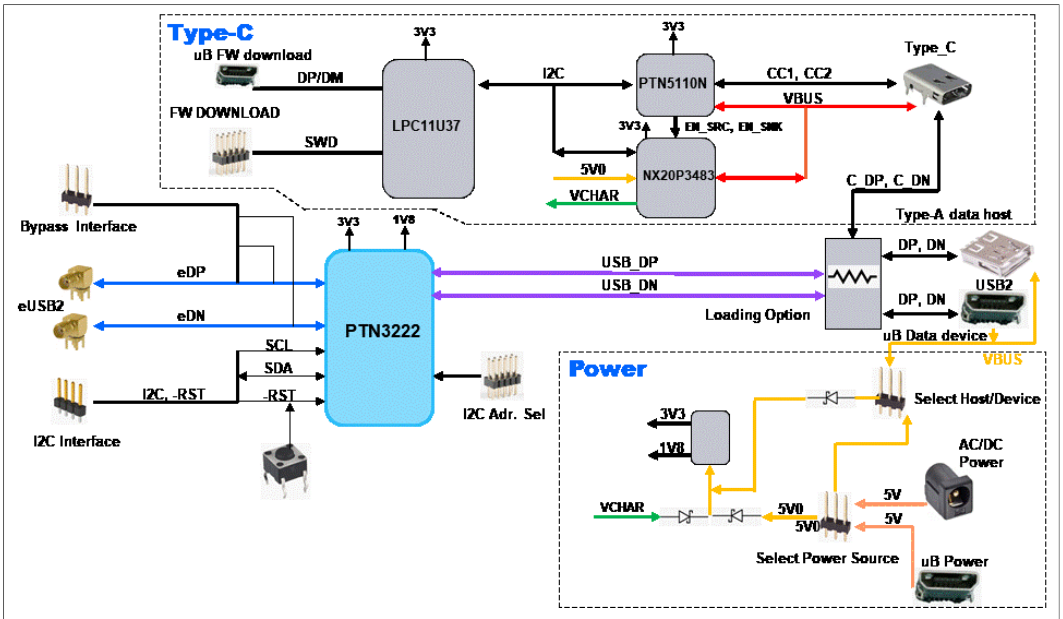

Figure 2. PTN3222CUK-EVB demo board block diagram

4.2.1 eUSB2 to USB2 connector routing

USB2 differential signals can be hardwired via a pair of 0 ohm resistors to type C connector, standard A connector or uB connector. To prevent PCB trace stubs from

introducing signal integrity issues, one USB2 connector should be selected via the pair of 0 ohm resistors.

As factory default, USB2 signals are routed to the type C connector, but they can be routed to standard A or uB connector as well by stuffing the proper 0 ohm resistor pair.

PTN3222 eUSB2 signals are routed to a pair of SMP connectors as shown in Figure 3 as eUSB2 interface to eUSB2 host or peripheral.

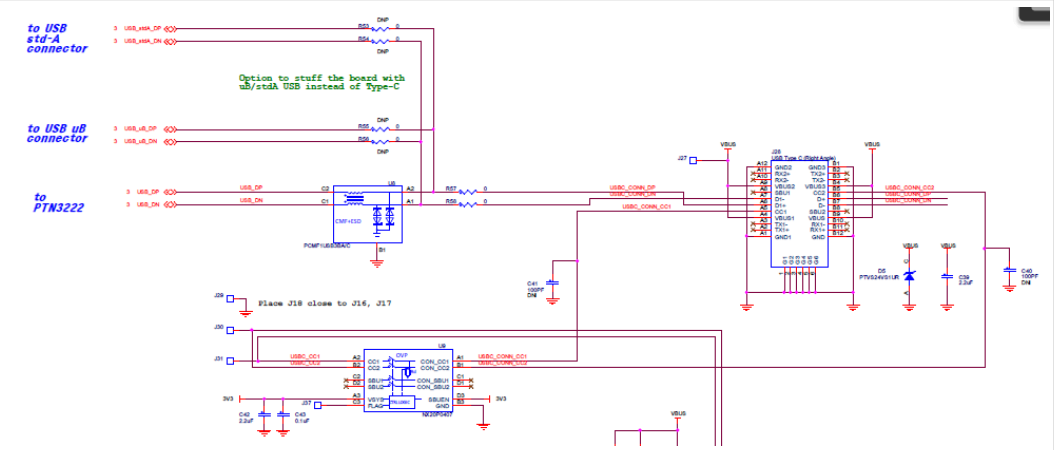

Figure 3. USB2 connector selection

4.3 Board power

The PTN3222CUK-EVB can be configured to support eUSB2 host or eUSB2 device mode via port configuration command or via I^2C. The demo board can be configured via jumpers to be powered from the DC barrel (5 V, 1 A or more), from a uB connector or from the type C connector, the factory default.

In host mode, the board can be selected to provide 5 V to the USB connectors, the type C connector. In device mode, the board can be selected to be powered from the uB connector.

The board power configurations are shown in Figure 4.

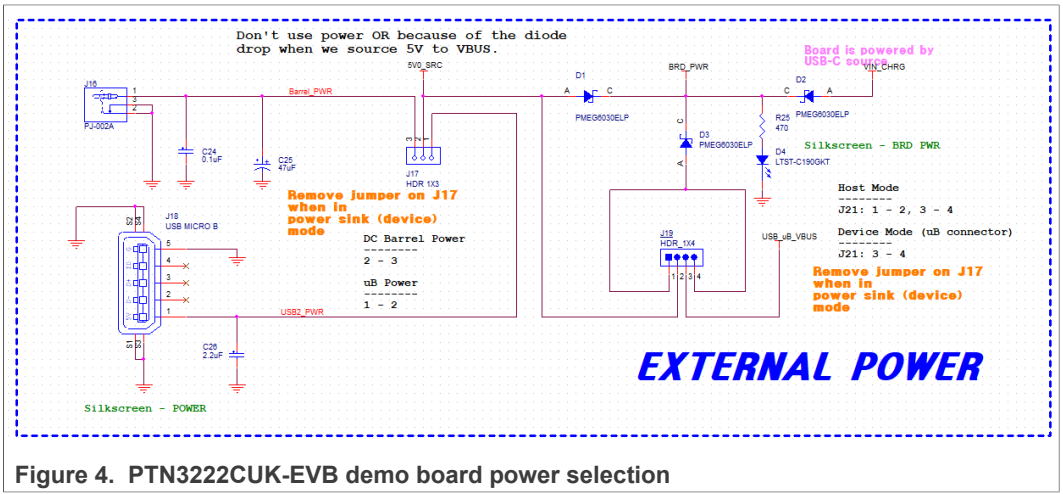

Figure 4. PTN3222CUK-EVB demo board power selection

4.4 I²C host interface and 3V3 level shifter

J25 is the host I²C interface that allows the host to control PTN3222CUK via I²C bus. There is an onboard level shifter to shift 3V3 I²C bus on the host side to 1V8 I²C comparable level on the PTN3222CUK side. If the I²C voltage level on the host side is from 1V2 to 1V8, then the onboard level shifter can be removed and bypassed with R48-R51.

PTN3222CUK can be hardwired to one of four I²C target addresses: 0x43, 0x47, 0x4B and 0x4F, and J26 is used for PTN3222CUK I²C target address selection. If the I²C target address is selected after PTN3222CUK has been powered up, PTN3222CUK must be power recycled or reset for the new I²C address to take effect.

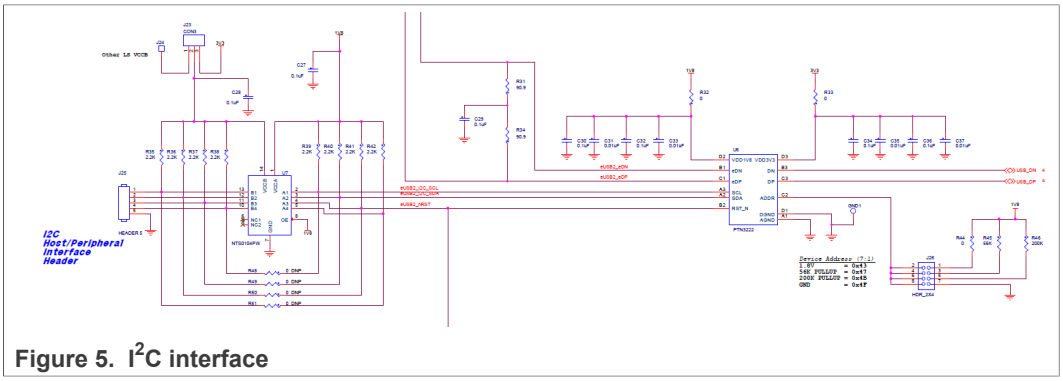

Figure 5. I²C interface

4.5 Schematic, board layout and bill of materials

The schematic, board layout and bill of materials for the PTN3222CUK-EVB evaluation board are available at http://www.nxp.com/PTN3222CUK.

5 Board Layout

The layout of this board follows the general layout guidelines in AN13462[1]. This is a separate application note and should be used as reference and guidelines to layout PCB traces, design PCB trace impedance, placing of decoupling capacitors, etc.

6 Abbreviations

Acronym	Description
IC	integrated circuit
MCU	microcontroller unit
PCB	printed-circuit board
SMP	switch mode power supply
USB	universal serial bus

7 References

[1] **PTN3222 layout guidelines** —PTN3222 is a 1-port eUSB2 to USB2 redriver IC that performs translation between eUSB2 and USB2 signaling schemes. https://www.nxp.com/docs/en/application-note/AN13462.pdf

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