

USB302-RDK RevV User Manual

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1 Introduction

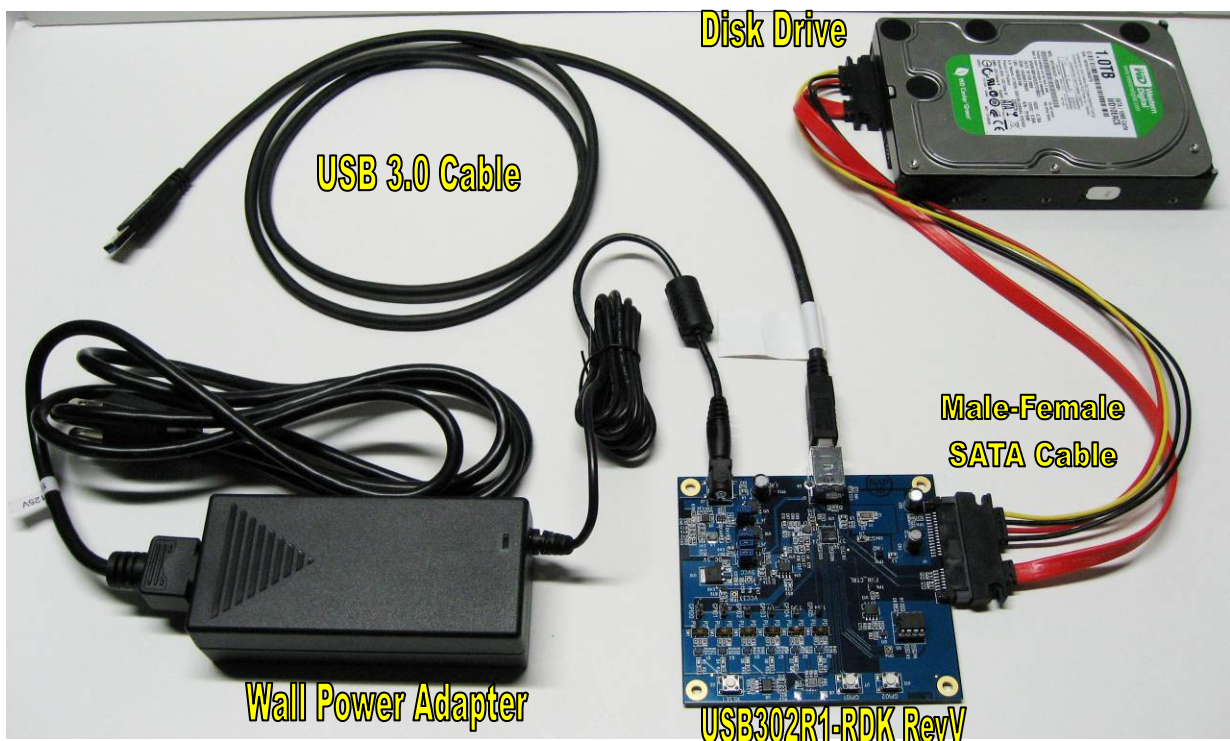
The USB302-RDK kit converts your SATA disk drive into a USB 3.0 mass storage device. The USB302-RDK supports the following features:

- Full, High, and SuperSpeed USB connections
- SATA 1.5/3.0 Gbps connections
- Standard USB Mass Storage Drivers(BOT)
- USB Attached SCSI (UAS) Protocol
- Firmware Updates over USB

2 Operation

2.1 System Overview

The system consists of a USB 3.0 Host, a USB 3.0 cable, USB302-RDK board, and a SATA-based disk drive.



2.2 Kit Contents

Included in the USB302-RDK are the following:

- 1x USB302-RDK Board
- 1x USB 3.0 Cable
- 1x Male-Female SATA Cable with power
- 1x 12V Wall Power Adapter

Not Included:

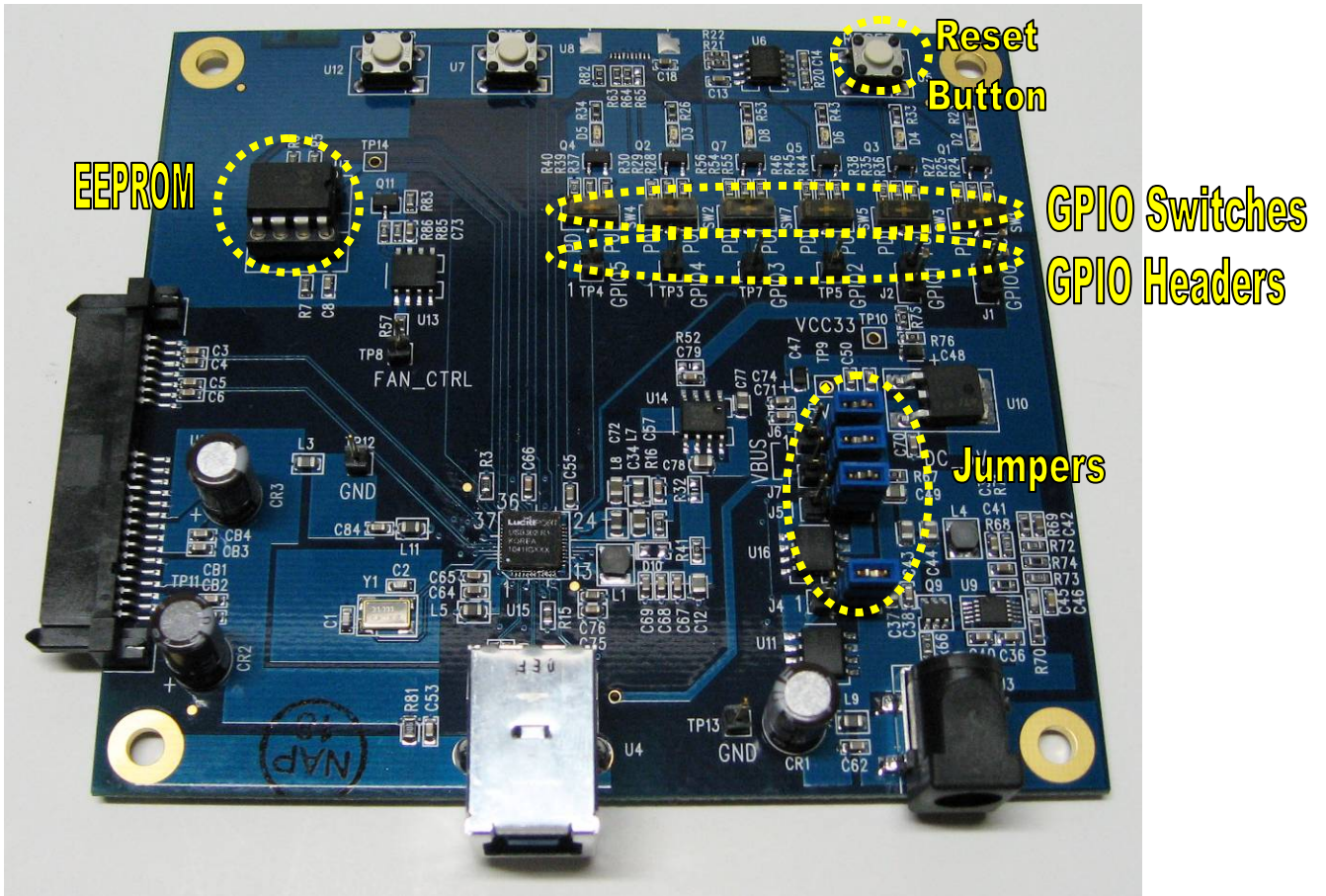
- SATA drive
- USB 3.0 xHCI host

2.3 Installation

There are no drivers, applications, firmware required for the USB302-RDK to operate. The only requirements that are needed are an xHCI host with the Windows standard mass storage class driver and a disk drive. Contact LucidPort for optional UAS drivers.

1. Attach a SATA-based disk drive to the SATA host port on the RDK board using the included Male-Female SATA Cable. Transparent RAID bridges will also work with the RDK. SATA-based optical drives will also work.
2. Plug in and connect the 12V wall power supply to the USB302-RDK. No additional power is needed for the USB302-RDK. By default, the board is configured for self power (not powered by the USB port).
3. Connect the USB3 cable between the USB302-RDK board and the USB 3.0 host. (USB 3.0 host (xHCI) drivers must have been previously installed.) Attaching to a USB 2.0 host will result in a Hi-Speed, rather than SuperSpeed, connection.
4. The USB302-RDK does not have a power switch. A push button reset (U5) on the RDK board resets the chip (not needed)

3 Board Settings



USB302 RevV RDK board

3.1 General Purpose I/O (GPIO) Switch Settings

The USB302 has six GPIO pins to control LEDs, push button operations, and more. Each GPIO is tied to an LED controlled by a 3-way switch for pull-up(PU), pull-down(PD), or floating. Table 1 defines the preprogrammed settings for the RDK board. These settings are not fixed and can be altered through the firmware.

GPIO#	0	1	2	3	4	5
LED#	D2	D4	D6	D8	D3	D5
LED Status at USB3 connection	OFF	OFF	ON	ON for 5 seconds	ON	ON
Description	Write protect switch (active high)	Push button #1 with soft power down when held	USB3 Connect LED	Fan Control (active high)	Power and Activity LED	SATA Power Control
Direction	Input	Input	Output	Output	Output	Output

Table 1: GPIO settings

GPIOs 2 through 5 can be used as a secondary SPI.

- GPIO2 – SPI Clock
- GPIO3 – Data In from SPI device
- GPIO4 – Data Out to SPI device
- GPIO5 – SPI Chip Select

Push-button switches are connected to GPIO1 and GPIO2. GPIO0 and GPIO1 are connected to a serial port header (Tx/Rx), but is not enabled in release firmware. Test header pins for GPIO2-5 are marked on the RDK as TP3, TP4, TP5, TP7.

3.2 Jumper Settings

The USB302-RDK provides both self and bus powered operation. Self powered devices use the supplied power adapter. Bus powered devices get all their power directly through the USB cable. USB 3.0 allows bus powered devices to draw up to 900 mA (at 5V). Make sure your USB 3.0 host is configured correctly before attempting to draw this much current.

Jumper Settings	J4	J5	J6	J7
Self Powered (5V or 12V drives)	2-3	2-3	2-3	2-3
Bus Powered (5V drives only)	2-3	2-3	1-2	1-2

Table 2: Jumper settings for power supply options

While the USB302 is designed for both bus and self powered operation, both board and firmware changes are required to make the USB302-RDK fully compliant to the USB-IF's bus power requirements.

3.4 Board Design

The USB302-RDK RevV has many components that can be removed such as LEDs, power on reset circuitry, and the optional 1V regulator. Please refer to the schematics and BOM list in the design kit.

4 Firmware

The USB302-RDK automatically enumerates as a standard USB mass storage device (even if no drive is connected).

LucidPort provides both 1 click firmware update through USB and mass production update capabilities. GPIO settings, vendor id, and device descriptors can all be modified during firmware upgrade. The serial number can be automatically incremented, or taken from the drive itself. Please refer to LucidPort's firmware README file.

The current firmware automatically enumerates as a standard USB mass storage device at Full, High, or SuperSpeed. GPIO3 turns on when connected at SuperSpeed. GPIO4 turns on when connected to USB. It blinks at 6 Hz on SATA activity. It turns off when

disconnected. GPIO5 automatically controls power to the SATA drive – turning it off when the PC is asleep.

Contact LucidPort for UASP firmware.

5 Conclusion

The USB302-RDK provides a simple yet powerful testing and development environment in which to build a SuperSpeed USB hard disk. Contact the LucidPort support (support@lucidport.com) with questions or concerns.