USB 3.0 Host Controller

Features

- **Small in size 80x60x12 mm**
- **Low power: ~1.5-1.75 W**
- **USB 3.0 over fiber optic extension**
- **Two Remote USB 3.0 Root Hubs**
- **Remote connection 2.5 GT/s or 5.0 GT/s**
- **Fiber optic cable lengths:**
  250m MM 2.5GT/s
  100m MM 5.0GT/s
- **Optical isolation**
- **Host processor and OS independent**
- **SFP transceiver with LC connectors**
- **RoHS compliant**
- **Works with Adnaco products**
- **Complies with Universal Serial Bus 3.0 Specification, and Intel's eXtensible Host Controller Interface (xHCI).**

Overview

The Adnaco-R1USB30 is a remote standard-USB 3.0 host controller which can operate at distances up to 100 m and more (depending on transceivers and cable) from the location of your computer. Powered by Adnaco PCIe over-fiber-optic technology, the R1USB30 is designed to suit many applications with the USB host interface. The R1USB30 provides 2 USB Root Hub Ports compliant with the USB 3.0 specification. All USB ports can handle the following interfaces:

- Super-Speed (5.0 Gb/s)
- High-Speed (480 Mbps)
- Full-Speed (12 Mbps)
- Low-Speed (1.5 Mbps)

The R1USB30 is connected to a host computer equipped with the Adnaco-H1A card, by a fiber optic cable.

SuperSpeed USB is backward compatible with USB 2.0 devices and capable of operating with USB 2.0 platforms. The R1USB30 works with all USB systems, peripherals and does not require any additional software.

Adnaco PCI Express over fiber optic technology

PC-centric, data-intensive embedded system applications place demanding requirements on high-performance I/O interconnect bus architectures. For "inside the PC" communications, the most commonly used buses for commercial and embedded applications have been PCI and PCIe types. Adnaco Technology, with its breakthrough Adnaco PCI Express fiber optic solution, brings the PCI and PCIe buses out of the PC and extends them over fiber optic cable up to 1 km. The unique feature of this technology is its transparent access to remote PCI/PCIe devices without compromising performance. Even at long distances, they appear as local devices to the host PC. Installation is simple and requires no additional drivers for the remote PCI/PCIe devices.

Applications

- Professional Audio Equipment
- Computer bus expansion
- Industrial: wide temperature range
- Medical: complete isolation
- Military: COTS – Radar, Sonar
- NAS: remote and secure data storage
- Data Acquisition: modular instruments
- USB extensions

Figure 1 Adnaco-R1USB30 block diagram

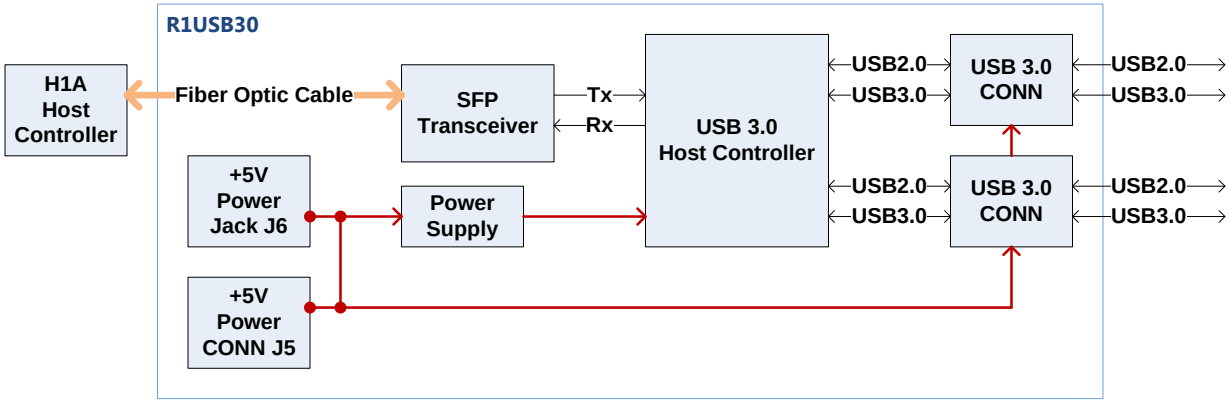
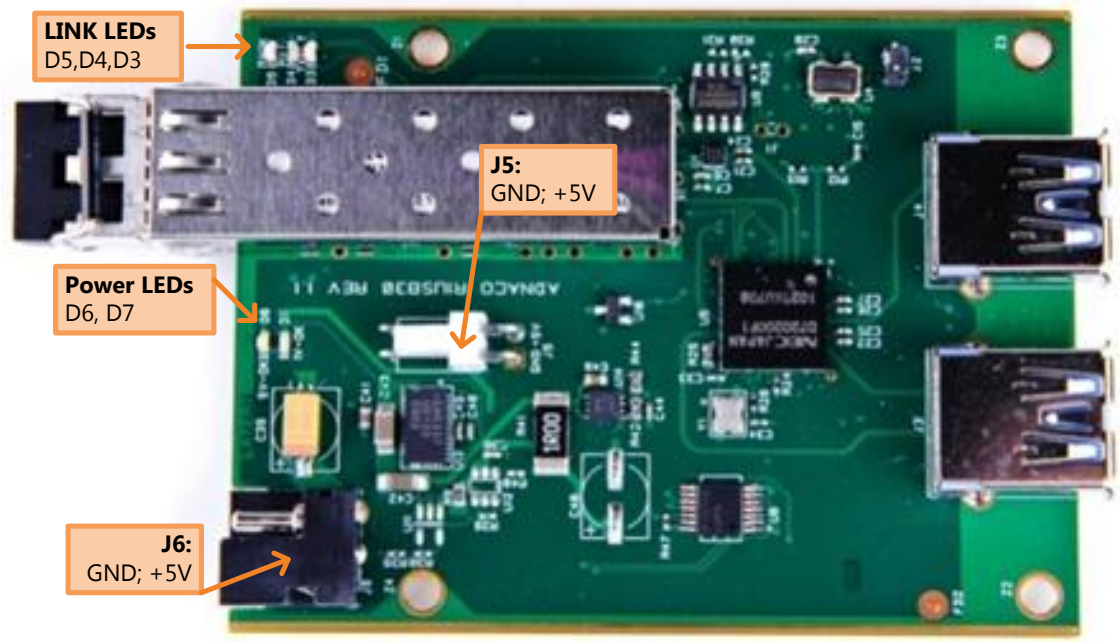


Figure 2 Adnaco-R1USB30B OEM Version (R1USB30B-01) - TUSB7320 Host Controller



Specifications: Adnaco-R1USB30B USB 3.0 Host Controller:

Product Name	**Adnaco-R1USB30B (based on TUSB7320)**
Specification Compliance	USB 3.0 r1.0, xHCI r0.96 PCIe Base r2.0, backward compatible with PCIe Base r1.1 and 1.0a
Number of USB 3.0 Root Hubs	2
Communication	Supports PCIe Gen1 (2.5GT/s) and Gen2 (5.0GT/s)
Software	Transparent to software applications and drivers
Computer interface	PCIe x1 using the Adnaco-H1A card
Power Dissipation	5V DC@ 0.35A maximum for R1USB30 itself. Shared with user's USB devices.
Power Requirements	5V ±10%, minimum current 0.35A + user's bus powered USB devices
Operating Environment	Temperature: 0°C to +70° C Relative humidity: 10 to 90%, non-condensing
Regulatory Compliance	FCC class B, ICES-003 class B, EN 55022 class B, EN 55024, RoHS compliant
Physical Dimensions	L=80 mm (without SFP) x W=60 mm x H=12mm without SFP
Physical Dimensions (with case)	71.7 mm (2.85") x87.0 mm (3.94") x 19.0 mm (0.75") (100 mm including SFP transceiver)
Mechanical	4x PCB mounting holes size 2 for applications without an enclosure : Mechanical drawings are available upon request

Transceiver and Cable Information:

Transceiver	TR1: LC connectors, 850 nm VCSEL – SFP MSA compatible
	TR2: LC connectors, 1300nm – SFP MSA compatible
Fiber Optic Cable	LC-LC, Multi-mode, 50/125 µm Length: 2m to 150m at data rate 2.5Gb/s 2m to 50m at data rate 5.0Gb/s
	LC-LC, Multi-mode, 62.5/125 µm Length: 2m to 100m at data rate 2.5Gb/s 2m to 50m at data rate 5.0Gb/s
	LC-LC, Single-mode, 9/125 µm Length: 100+ m

Compatibility matrix:

Device	R1BP1	R1BP1A	R1BP1B	RA3	R1USB30A	R1USB30B
H1A	NO	YES	YES	YES	YES	YES
H1	YES	YES	YES	YES	NO	NO

Related Documents and Ordering Information:
Click here to download the latest Adnaco-R1USB30 data sheet.
Click here to download other related documentation.
Click here to download price list and ordering guide.

Table 1 R1USB30B Ordering Information

Part Number	Description
R1USB30B-00	Assembled R1USB30B board; SFP transceiver is not included
R1USB30B-01	R1USB30B-00 plus TR1 (fiber optic MM transceiver)
R1USB30B-03	R1USB30B-01 in case, plus PS1 (+5V/3.2A)

Table 2 Accessories

Accessories	Description
PS1	5V/3.2A AC/DC power supply
TR1	Multi-mode SFP Transceiver, LC connectors, 850 nm VCSEL – SFP MSA compatible
TR2	Single-mode SFP Transceiver LC connectors, 1300nm – SFP MSA compatible

Figure 3 PS1 AC/DC 5V Power Supply and Adnaco-R1USB30B with enclosure

LEDs Description

Figure 4 Adnaco-R1USB30B LEDs Location

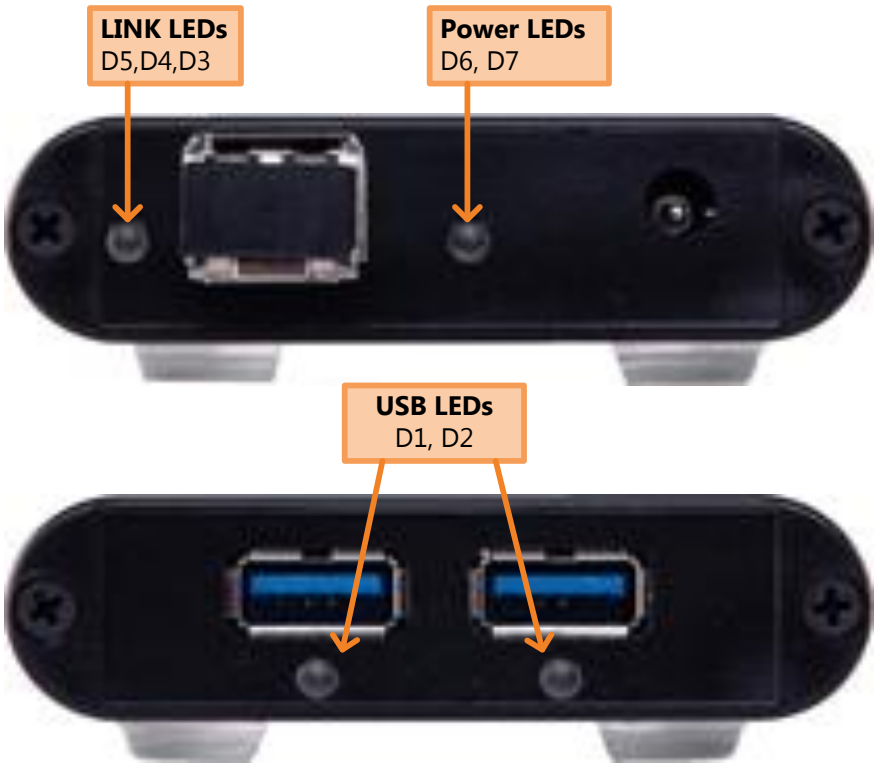


Table 3 LEDs Status Description

LED	Description
LINK LEDs	
Red D3	Fiber Optic Transmitter has failed
Red D4	Fiber Optic Receiver has failed
Green D5	Fiber Optic Receiver is OK
Power LEDs	
Green D6	Internal +5V is OK
Green D7	Internal 1.0 V is OK
USB LEDs	
Green D1	USB Port #1 is powered and enumerated
Geern D2	USB Port #2 is powered and enumerated

Adnaco-S3B System Power-On/Off Sequence

There is no special condition for power on/off sequence for your computer and the Adnaco-R1USB30 from an electrical point of view, **but to operate properly, the Adnaco-R1USB30 must be powered on first**, because the BIOS needs to configure the PCI and PCIe components properly before the operating system boots.
USB Ports of the Adnaco-R1USB30 fully support USB Hot Plug and Play specifications **and user's USB devices can be powered On/Off in any sequence.**

Recommended Power On/Off Sequence

Power-On Sequence

Power on the Adnaco-R1USB30.

Power on the host computer.

Power-On Sequence Rationale: The host computer BIOS and OS assume all PCI/PCIe cards are available for first code execution following power-up.

Power-Off Sequence

Power off the host computer.

Power off the Adnaco-R1USB30.

Power-Off Sequence Rationale: OS and Drivers assume all PCI/PCIe cards are always available from power-on to power-off.
Note: Disconnection of the Fiber Optic Link with the System powered on will require a Power-Off/On sequence to resume operation.

Host Side - Computer Hardware Installation

To install the Adnaco-H1A card please follow up section 8 (System Installation) of the Adnaco PCI Express Over Fiber Optic Systems User's Guide.