FE18.1

USB 2.0 High Speed 4x4 Hub Controller

Product Brief

Introduction

Terminus FE18.1 High Speed 4x4 Hub is a USB 2.0 Hub Controller with 4 Upstream Facing Ports and 4 Downstream Facing Ports; designers can narrow it down to 2, 3, or 4 Upstream Facing Ports, and select one at a time (*Figure 1*).

In today's market, many implementations use multiple USB Hosts sharing the same set of USB devices. FE18.1 is designed to provide system designers with easy solutions for handling this scenario. The key advantages of FE18.1 are streamlined components and simplified PCB layout, which benefit the systems with enhanced signal quality and integrity.

FE18.1 is a highly integrated, high-quality, high-performance, low power consumption, yet low-cost USB 2.0 High Speed 4x4 Hub solution.

FE18.1 adopts Multiple Transaction Translator (MTT) architecture to explore the maximum possible throughput. Six non-periodic transaction buffers, instead of two, are used to minimize potential traffic jamming. The whole design is based on state-machine-control to reduce the response delay time; no microcontroller is used in this chip.

To guarantee high quality, the whole chip is covered by the Test Scan Chain – even on the high-speed (480MHz) modules – so that all the logic components can be fully tested before shipping. A Special Built-in Self-Test Mode is designed to exercise all high, full, and low speed Analog Front End (AFE) components on the packaging and testing stages as well.

Low power consumption is achieved by using the LPM (Link Power Management) feature and comprehensive power/clock control mechanism. Most parts of the chip will not be clocked unless needed.

FE18.1 supports Charging Downstream Ports as defined by USB-IF Battery Charging Specification. This feature can transform a USB Hub into a charging station – USB Charging Hub for Universal Charging Solution compliant battery-based portable devices.

The FE18.1 is suitable for using in a variety of applications. It can be used in the standalone KVM Switch, complicated multiple-USB Host system, or large KVM Switch of server rooms.

FEATURES

- Fully compliant with Universal Serial Bus Specification Revision 2.0 (USB 2.0);
  - 4 Upstream Facing Ports (UFP) support High-Speed (480MHz) and Full-Speed (12MHz) modes;
  - 4 Downstream Facing Ports (DFP) support High-Speed (480MHz), Full-Speed (12MHz), and Low-Speed (1.5MHz) modes;
- Compliant with Universal Charging Solution, and USB Battery Charging Specification 1.1/1.2;
- Integrated Portable Device detection circuitry for UCS supporting;
- USB Link Power Management (LPM) support;
- Integrated USB 2.0 Transceivers;
- Integrated upstream 1.5KΩ pull-up, downstream 15KΩ pull-down, and serial resisters;
- Integrated 5V to 3.3V and Core Power regulator.
- Integrated Power-On-Reset circuit;
- Integrated 12MHz Oscillator with feedback resister, and crystal load capacitor;
- Integrated 12MHz-to-480MHz Phase Lock Loop (PLL);
- *Multiple Transaction Translators* (MTT) –
  - One TT for each downstream port;
  - Alternate Interface 0 for Single-TT, and Alternate Interface 1 for Multiple-TT;
  - Each TT could handle 64 periodic Start-Split transactions, 32 periodic Complete-Split transactions, and 6 non-periodic transactions;
- Automatic self-power status monitoring;
  - Automatic re-enumeration when Self-Powered switching to Bus-Powered;
- Board configured options –
  - *Button* or *MCU Mode* select;
  - *Number of Upstream Ports;*
- Upstream Port Indicators support:
  - Four LED output pins; one pin for each upstream port status indicator;

PACKAGE

- 48-pin LQFP (body size: 7x7 mm)
- 48-pin QFN (body size: 5x5 mm)

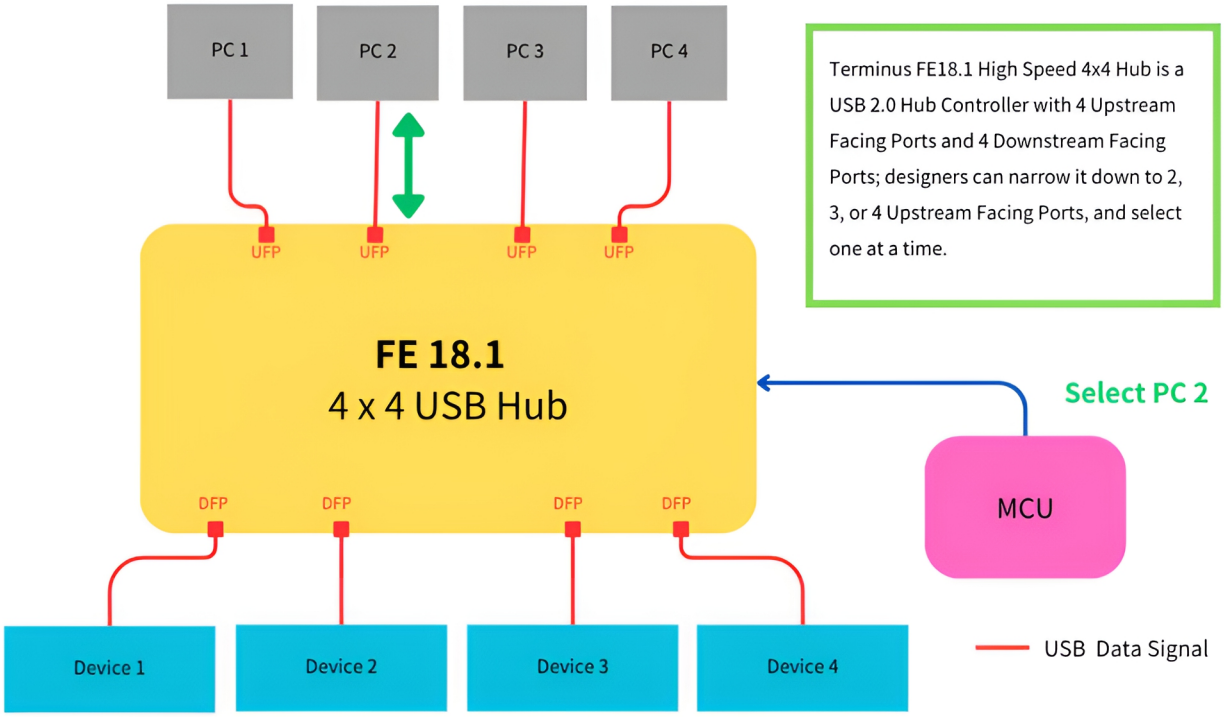

Fig. 1: Terminus FE18.1 High Speed 4x4 Hub

Terminus Technology Inc.
5F., No.9, Ln.130, Sec.3, Minsheng E.Rd.,
Songshan Dist., Taipei City, Taiwan
www.terminus-tech.com