



FE2.1

USB 2.0 HIGH SPEED 7-PORT HUB CONTROLLER

Product Brief



INTRODUCTION

The FE2.1 is a highly integrated, high quality, high performance, low power consumption, yet low cost solution for USB 2.0 High Speed 7-Port Hub.

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

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

Low power consumption is achieved by using 0.18 μ m technology and comprehensive power/clock control mechanism. Most part of the chip will not be clocked unless needed.

FEATURES

- Low power consumption
 - 155 mA when seven downstream facing ports enabled in High-Speed mode;
 - 66 mA when one downstream facing port enabled in High-Speed mode;
- Fully compliant with Universal Serial Bus Specification Revision 2.0 (USB 2.0);
 - Upstream facing port supports High-Speed (480MHz) and Full-Speed (12MHz) modes;
 - 7 downstream facing ports support High-Speed (480MHz), Full-Speed (12MHz), and Low-Speed (1.5MHz) modes;
- Integrated USB 2.0 Transceivers;
- Integrated upstream 1.5K Ω pull-up, downstream 15K Ω pull-down, and serial resistors;
- Integrated 5V to 3.3V and 1.8V regulator.
- Integrated Power-On-Reset circuit;
- Integrated 12MHz Oscillator with feedback resistor 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 none-periodic transactions;

- Support self-power Mode only;
- Board configured options –
 - *Ganged or Individual Power Control Mode* select;
 - *Global, Multiple Gangs, or Individual Over-Current Protection Mode* select;
 - *Removable or Non-Removable Downstream Devices* configuration;
 - *Number of Downstream Ports*;
- EEPROM configured options –
 - *Vendor ID, Product ID, & Device Release Number*;
 - *Removable or Non-Removable Downstream Devices* configuration;
 - *Serial Number*; and
 - *Number of Downstream Ports*;
- Comprehensive status Indicators support:
 - Standard downstream port status indicators (Green and Amber LED control for each downstream port);
 - *Hub Active/Suspend* indicator LED.

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