Providing manufacturers with a simple solution for integrating a Universal Serial Bus (USB) hub into their applications with minimum design risk and engineering effort, these highly integrated (USB) hub devices are fully compliant with the USB Specification Revision 1.1 and feature a configurable number of downstream ports.

ISP112x stand-alone USB hub devices

The ISP1122 is available in both through-hole package (SDIP-32) and surface-mount (SO-32).

Features

- **High performance USB hub device with integrated hub repeater, hub controller, Serial Interface Engine (SIE), data transceivers and 3.3 V voltage regulator**
- **Complies with "Universal Serial Bus Specification Rev. 1.1" and ACPI™, OnNow™ and USB power management requirements**
- **Configurable from 2 to 5 downstream ports with automatic speed detection (ISP1121 supports up to 4 downstream ports)**
- **Supports bus-powered, hybrid-powered and self-powered application**
- **Individual or global power switching for downstream ports**
- **Individual or ganged port overcurrent protection with built-in sense circuits (ganged protection only on ISP1121)**
- **6 MHz crystal oscillator with on-chip PLL for low EMI**
- **Visual USB traffic monitoring (GoodLink™) for hub and downstream ports**
- **I²C-bus interface to read vendor ID, product ID and configuration bits from external EEPROM**
- **Operation over the extended USB bus voltage range (4.0 to 5.5 V)**
- **Operating temperature range -40 to +85 °C**
- **8 kV in-circuit ESD protection for lower cost of external components**
- **Available in SDIP and SO packages (ISP1122, 32-pin; ISP1121, 20-pin)**

Description

The ISP112x stand-alone Universal Serial Bus (USB) hub devices feature an integrated Serial Interface Engine (SIE), hub repeater, hub controller, USB data transceivers and a 3.3 V voltage regulator. Compliant with USB Specification Rev. 1.1, they have a configurable number of downstream ports, ranging from 2 to 5 on the ISP1122 and from 2 to 4 on the ISP1121, which can be used to connect low or full-speed USB peripherals.

The integrated Philips Serial Interface Engine (SIE) implements the full USB protocol layer and is completely hardwired for speed, requiring no firmware intervention. Its functions include: synchronization pattern recognition, parallel/serial conversion, bit (de)stuffing, CRC checking/generation, Packet IDentifier (PID) verification/generation, address recognition, handshake evaluation/generation.

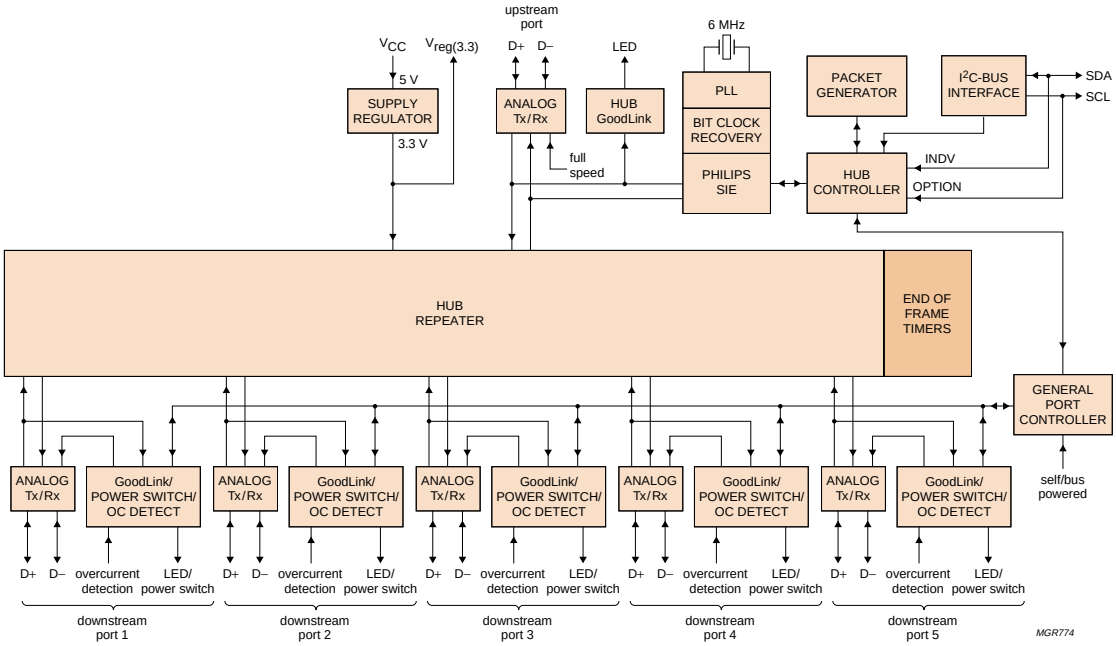
The ISP112x requires only a single supply voltage, with an internal 3.3 V regulator providing the supply voltage for the analog USB data transceivers. These interface directly to the USB cables through external termination resistors and are capable of transmitting and receiving serial data at both 'full-speed' (12 Mbits/s) and 'low-speed' (1.5 Mbits/s) data rates. Slew rates are adjusted according to the speed of the connected device, as specified in the USB Specification Rev. 1.1.

They can operate in bus-powered, self-powered or hybrid-powered modes. When using bus-powered operation a downstream port cannot supply more than 100 mA to a peripheral. In self-powered operation an external 5 V supply is used to power the downstream ports, allowing a maximum current consumption of 500 mA per port. In the hybrid-powered mode, the hub functions are powered by the upstream power supply (VBUS), while the downstream ports are powered by the local power supply.

Built-in overcurrent sense inputs provide overcurrent protection for the downstream ports, eliminating the need for external special-function overcurrent sensing and port power switching devices. All ports on the ISP1122 (including upstream) have GoodLink™ indicator outputs for easy visual monitoring of USB traffic. The ISP1121 features GoodLink™ on its upstream port only.

Low power consumption in 'suspend' mode allows easy design of equipment compliant with ACPI™, OnNow™ and USB power management requirements. A serial I²C-bus interface is provided for reading vendor ID, product ID and configuration bits from external EEPROM. An integrated 6 to 48 MHz clock multiplier Phase-Locked Loop (PLL) allows for the use of low-cost 6 MHz crystals, allowing significant cost savings in system design, reduced design risk and easy implementation of advanced USB functionality in PC peripherals.

ISP112x stand-alone USB hub devices



Philips Semiconductors – a worldwide company

Argentina: see South America
Australia: Tel. +61 2 9805 4455 Fax. +61 2 9805 4466
Austria: Tel. +43 1 60 101 1248, Fax. +43 1 60 101 1210
Belarus: Tel. +375 172 20 0733, Fax. +375 172 20 0773
Belgium: see The Netherlands
Brazil: see South America
Bulgaria: Tel. +359 2 68 9211, Fax. +359 2 68 9102
Canada: Tel. +1 800 234 7381, Fax. +1 800 943 0087
China/Hong Kong: Tel. +852 2319 7888, Fax. +852 2319 7700
Colombia: see South America
Czech Republic: see Austria
Denmark: Tel. +45 33 29 3333, Fax. +45 33 29 3905
Finland: Tel. +358 9 615 800, Fax. +358 9 6158 0920
France: Tel. +33 1 4099 6161, Fax. +33 1 4099 6427
Germany: Tel. +49 40 2353 60, Fax. +49 40 2353 6300
Hungary: see Austria
India: Tel. +91 22 493 8541, Fax. +91 22 493 0966
Indonesia: Tel. +62 21 794 0040 ext. 2501, Fax. +62 21 794 0080
Ireland: Tel. +353 1 7640 000, Fax. +353 1 7640 200
Israel: Tel. +972 3 645 0444, Fax. +972 3 649 1007
Italy: Tel. +39 02 67 52 2531, Fax. +39 02 67 52 2557
Japan: Tel. +81 3 3740 5130, Fax. +81 3 3740 5057
Korea: Tel. +82 2 709 1412, Fax. +82 2 709 1415
Malaysia: Tel. +60 3 750 5214, Fax. +60 3 757 4880
Mexico: Tel. +9-5 800 234 7381, Fax. +9-5 800 943 0087
Middle East: see Italy
Netherlands: Tel. +31 40 27 82785, Fax. +31 40 27 88399
New Zealand: Tel. +64 9 849 4160, Fax. +64 9 849 7811
Norway: Tel. +47 22 74 8000, Fax. +47 22 74 8341
Pakistan: see Singapore
Philippines: Tel. +63 2 816 6380, Fax. +63 2 817 3474
Poland: Tel. +48 22 612 2831, Fax. +48 22 612 2327
Portugal: see Spain
Romania: see Italy
Russia: Tel. +7 095 755 6918, Fax. +7 095 755 6919
Singapore: Tel. +65 350 2538, Fax. +65 251 6500
Slovakia: see Austria
Slovenia: see Italy
South Africa: Tel. +27 11 471 5401, Fax. +27 11 471 5398
South America: Tel. +55 11 821 2333, Fax. +55 11 821 2382
Spain: Tel. +34 93 301 6312, Fax. +34 93 301 4107
Sweden: Tel. +46 8 5985 2000, Fax. +46 8 5985 2745
Switzerland: Tel. +41 1 488 2741, Fax. +41 1 488 3263
Taiwan: Tel. +886 2 2134 2886, Fax. +886 2 2134 2874
Thailand: Tel. +66 2 745 4090, Fax. +66 2 398 0793
Turkey: Tel. +90 216 522 1500, Fax. +90 216 522 1813
Ukraine: Tel. +380 44 264 2776, Fax. +380 44 268 0461
United Kingdom: Tel. +44 181 730 5000, Fax. +44 181 754 8421
United States: Tel. +1 800 234 7381, Fax. +1 800 943 0087
Uruguay: see South America
Vietnam: see Singapore
Yugoslavia: Tel. +381 11 62 5344, Fax. +381 11 63 5777

For all other countries apply to: Philips Semiconductors, International Marketing & Sales Communications, Building BE-p, P.O. Box 218, 5600 MD EINDHOVEN, The Netherlands, Fax. +31 40 27 24825

Internet: http://www.semiconductors.philips.com

Printed in USA

Date of release: May 1999

Document order number: 9397 750 05996