10 Years of Open-Source Robotics

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V4L/DVB (8145a): USB Video Class driver

This driver supports video input devices compliant with the USB Video Class specification. This means lots of currently manufactured webcams, and probably most of the future ones.

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1 Introduction

This lesson will introduce the basics of asynchronous serial communications. Two serial protocols, RS-232 and RS-485, will be explained. Students will learn how to transfer data between a computer and the microcontroller using an RS-232 link.

2 Serial communications

In computer science, serial communication is a data transfer mechanism in which data is sent one bit at a time over a communication channel. This is in contrast with parallel communication where several bits (usually a multiple of 8) are transferred simultaneously.

While it may seem that serial links are inherently inferior to parallel links because they transmit less data during the same time frame, newer serial technologies allow much higher clock frequencies that lead to higher data rates than parallel links.

Serial links are usually easier and cheaper to implement than parallel links, as they involve less interconnections and can achieve similar or higher speeds.

2.1 Synchronization

Transmitters and receivers on a serial link need to be synchronized to communicate reliably. Synchronization can be achieved by sharing a common clock between the transmitter and receiver (synchronous transmission), or including synchronization information in the data stream (asynchronous transmission).

Synchronous transmissions offer a greater throughput but require either an out-of-band clock or an in-band clock coupled with a clock recovery device, making the system slightly more complex and the hardware more expensive when high data rates are required.

Most microcontrollers include serial communication controllers for common asynchronous protocols and short range synchronous protocols (such as I²C and SPI).