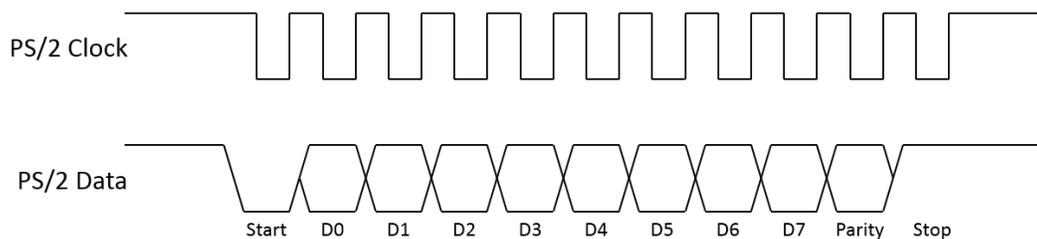


PS/2 Communication

This document briefly describes how PS/2 communication works when a device (keyboard or mouse) is transmitting packets to a host system (microcontroller). For further reference on PS/2 communication visit <http://www.computer-engineering.org>.

PS/2 Protocol

Mice and keyboards that use the PS/2 protocol use a two-wire serial bus (clock and data) to communicate with a host. Each packet sent from a mouse or keyboard consist of 11-bits that include a start bit, 8 data bits (LSB first), odd parity bit and stop bit. The figure below shows the transmission of a packet from a PS/2 device to the host (microcontroller)



The data line changes state while the clock line is high and data is valid while the clock is low. During the transmission both the clock and data signals are generated by the PS/2 device. Typical frequency of the clock signal is in the range 10-30 kHz.

In the EDI610 Hardware Platform both PS/2 clock and data signals are connected to the GPIO Device and the Keyboard Controller. For further details on this have a look at the datasheet of the hardware platform (found on the course web page).

Keyboard

The processor/encoder in the keyboard constantly monitors the status of all keys by scanning through them. Once it finds a key being pressed, held down or released it will send a packet (scan code) to the host (microcontroller), informing it the status of the keyboard.

There are two types of scan codes that can be sent from a PS/2 keyboard. A “make” code is sent if a key is pressed or held down and a “break” code is sent once a key is released. Every key is assigned a unique “make” and “break” code according to the keyboards scan code set (available on the course web page).

If a key is pressed and held down the key becomes typematic, meaning that the make code for this key is repeatedly sent until the key is released or another key is pressed.

Examples

If the 'A' key is pressed the make code for this key will be transmitting. Looking at the scan code sheet (found on the course web page) one sees that 0x1C should be received. If the key is held down for a short moment it becomes typematic and the same scan code, 0x1C, will be sent periodically as long as the key is held down. When the 'A' key is released the brake code 0xF0 0x1C is sent to the host. Note that this brake code is two byte, i.e. two packets will be sent to the host.

The figure below shows the data and clock signals during transmission of the make code of the 'A' key, 0x1C. Note that the data field is sent with LSB first. The parity is set to 0 so that the numbers of 1's in the frame (not counting the stop bit) is an odd number.

