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1 PS2 Joypad

This section documents the development of a VHDL interface to a PS2 (PlayStation2) Joypad.

1.1 Introduction

1.2 Design discussion

1.3 Design constraints

1.4 Features

1.5 Design implementation

Figure 1: Pinout of the Sony Playstation Joypad

In figure 1 the PlayStation connector is visualized. The following enumeration describes the individual pins:

1. *DATA*: The data signal is used to receive data from the joypad. The signal is a 8 bit serial signal and synchronous to the falling edge of *CLOCK*. The *DATA* signal should be sampled on the rising edge of *Clock* to allow settling time.

2. *CMD*: The cmd signal is used to transmit commands to the joypad. Commands are 8 bit serial signals synchronous with the CLOCK signal. The CMD signal should be toggled on the falling edge of CLOCK. It is sampled by the joypad on the rising edge of CLOCK.

3. *Motor*: 9V for Joypads with ”force feedback”. Can be left unconnected if force feedback is unnecessary.

4. *GND*: Ground.

5. *VCC*: Supply voltage. The joypad will function at 5 or 3 volt.

6. *ATT*: This pin enables transmission with the joypad. You get the joypads attention by setting ATT to 0.

7. *CLOCK*: The CLOCK is a signal from PSX into the joypad. DATA and CMD are synchronized with this signal.

8. This pin is unconnected.

9. *ACK*: The joypad will acknowledge after transmitting or receiving 8 bits. ACK is active low.

1.5.1 PS2 Protocol

DATA and CMD are 8 bit serial signals with LSB first. Both signals should be toggled by the transmitting device at falling edge of the CLOCK. At rising edge of the CLOCK the signals should be read by the receiving device. The joypad will pull ACK low for at least one clock tick after receiving a command from the PSX. If no ACK is signaled the PSX assumes that no joypad is present.

To read the data of a joypad ATT is first pulled low and a start command 0x01 is send to the joypad on CMD. The joypad will reply with it's ID. We currently know of 5 devices and their ID's, see table 1.5.1. While the joypad are sending an ID on DATA the PSX will request data by send 0x42 on CMD. From this point the PSX will pull CMD high. The joypad will signal "here comes data" by transmitting 0x5A followed by 2 to 6 8-bit data signals. The size of data depends on the type of joypad(ID). See the table 1.5.1.

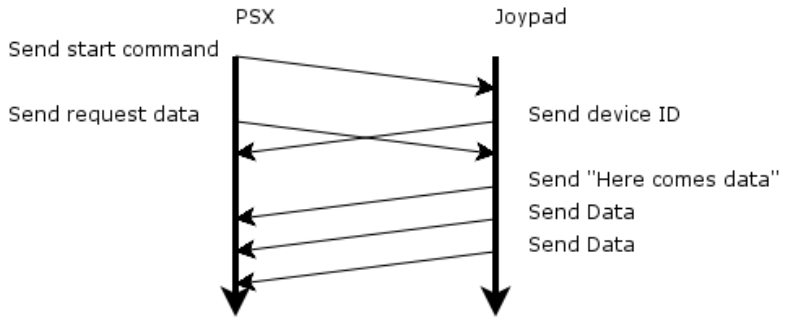
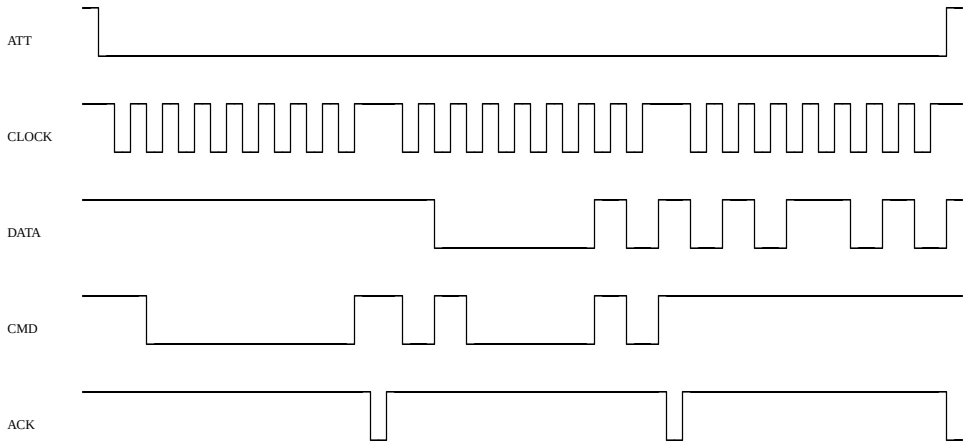


Figure 2: Reading data from a joypad



ID	Joypad type
0x41	standard Digital Pad
0x23	Negcon
0x73	Analogue controller in red mode
0x53	Analogue controller in green mode
0x12	PSX Mouse