**SPI Driver Basics: -**

1. **SPI Modes: -**

CPOL = 0 - > Idle state of SPI\_CLK is low

CPHA = 0 - > Data latched or shifted out on falling edge

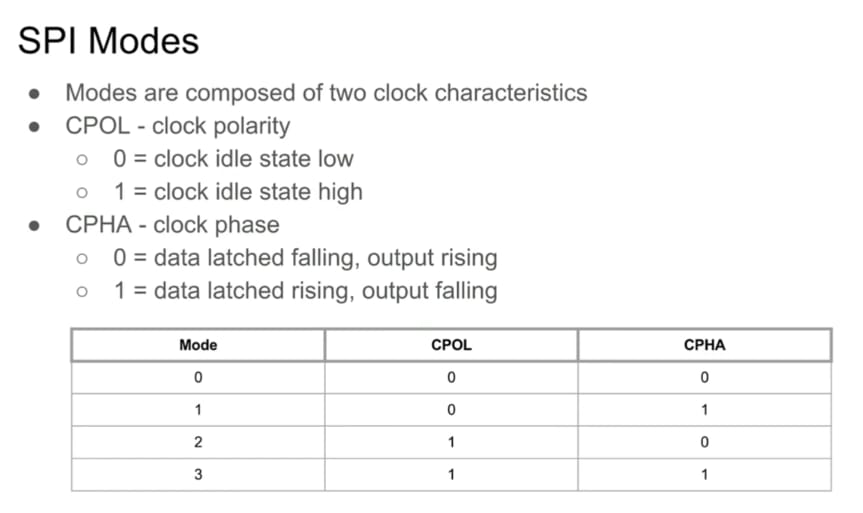


Figure – 1

**SPI Mode = 0: -**

In SPI Mode = 0, CPOL = 0 and CPHA = 0. So, idle state of clock is zero and since CPHA = 0, so data is latched or shifted out on falling edge and data is sampled or captured on rising edge of clock. It is shown in figure – 2 below.



Figure – 2: SPI\_MODE = 0

From figure – 2, it is clear that in SPI Mode = 0, data are latched or shifted out on falling edge and data are sampled or captured on clock’s rising edge.

**SPI Mode = 1: -**

In SPI Mode = 1, CPOL = 0 and CPHA = 1. So, idle state of clock is zero and since CPHA = 1, so data is latched or shifted out on rising edge and data is sampled or captured on falling edge of clock. It is shown in figure – 3 below.



Figure – 3: SPI\_MODE = 1

1. **Types of SPI: -**

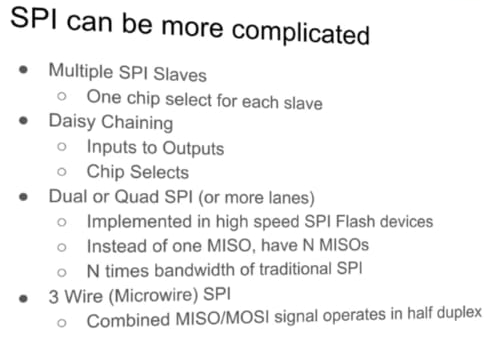


Figure – 2

1. **Linux SPI Driver: -**

There are two types of SPI driver –

1. SPI controller driver
2. SPI protocol driver

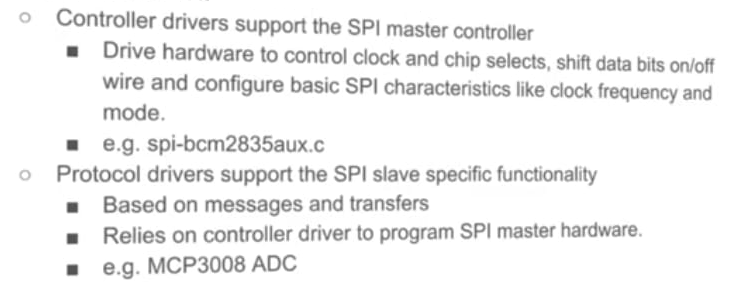


Figure – 3

1. **Linux SPI communication: -**

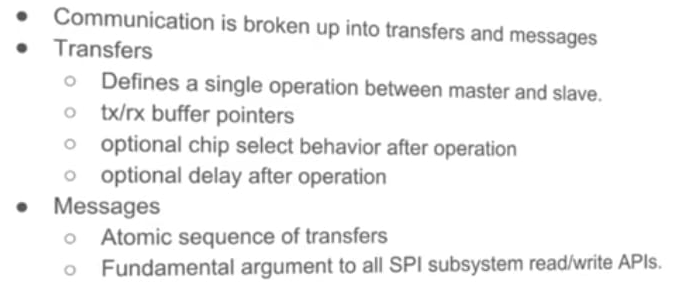


Figure – 4

struct spi\_message is basically argument to all SPI subsystem read/write APIs.

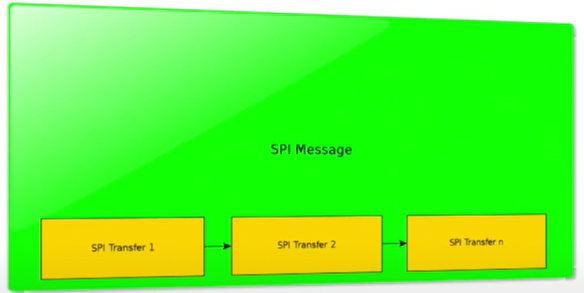


Figure – 5

1. **Adding a SPI device to a system: -**

**A picture containing text

Description automatically generated**

Figure - 6

1. **SPI device DT binding: -**

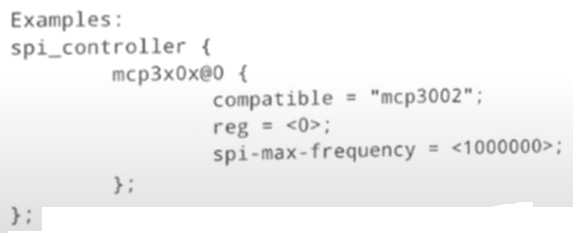
****

Figure – 7

1. **Adding SPI device using board file: -**

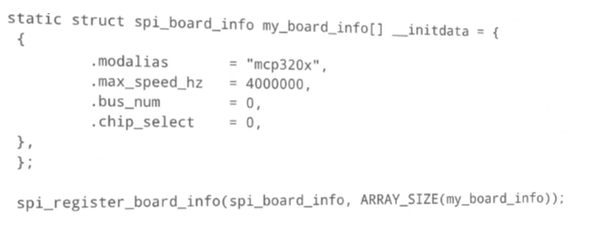
****

Figure - 8

1. **SPI protocol driver: -**

Follows standard driver model.

**Text

Description automatically generated**

Figure – 9

1. **SPI sub system kernel APIs: -**

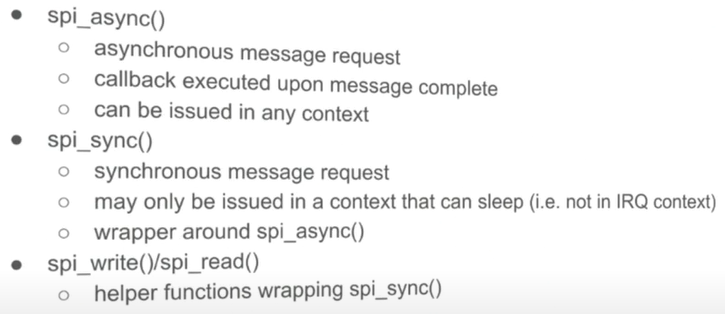
****

Figure - 10

**Graphical user interface, text, application, email

Description automatically generated**

Figure – 11

1. **SPI controller driver: -**

**Graphical user interface, text, application

Description automatically generated**

Figure – 12

transfer\_one model allows us to let the core support GPIO chip select.

1. **User space driver - spidev: -**

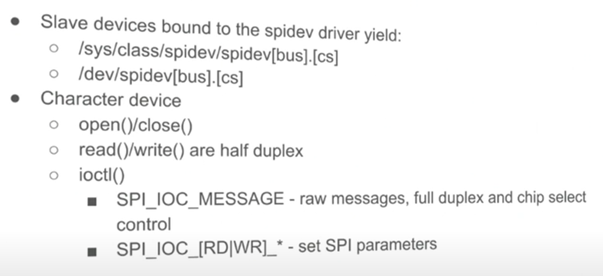
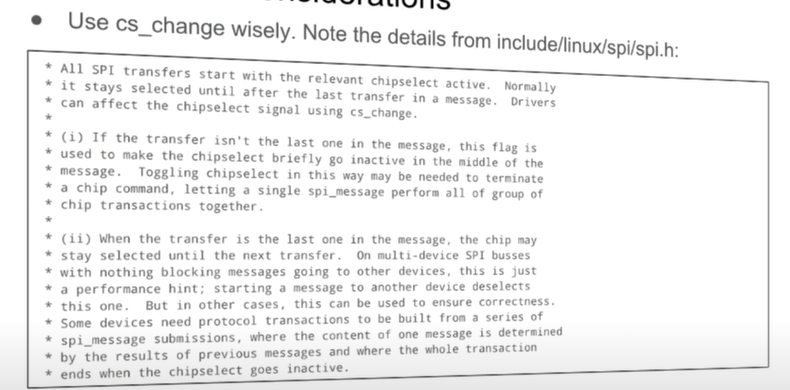


Figure – 13

SPI is inherently a full duplex bus.

1. **“spi\_transfer” cs\_change flag: -**

****

1. **Performance considerations: -**

Graphical user interface, text, application

Description automatically generated

1. **Performance tools: -**

**Graphical user interface, text

Description automatically generated**