

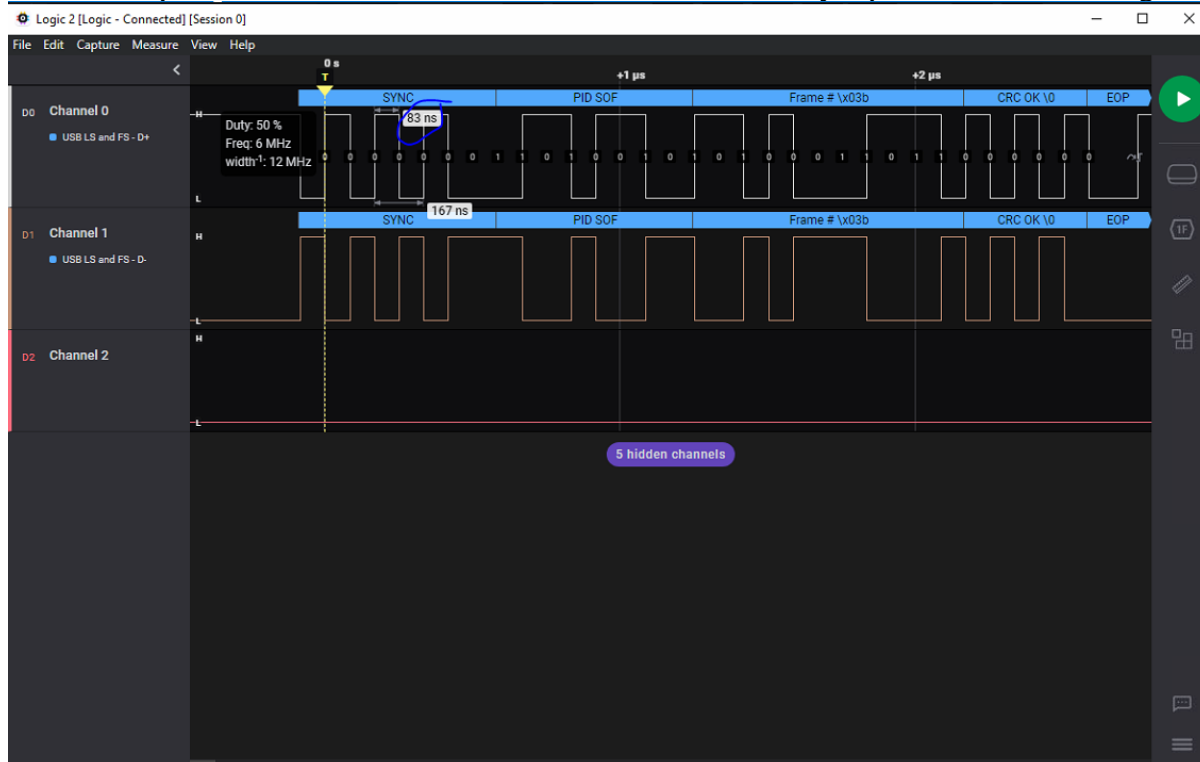
STM32 USB

-The Stm32 USB supports both High speed and full speed USB, but the ST board HW is limited to the full speed.

The USB speeds limitations are:

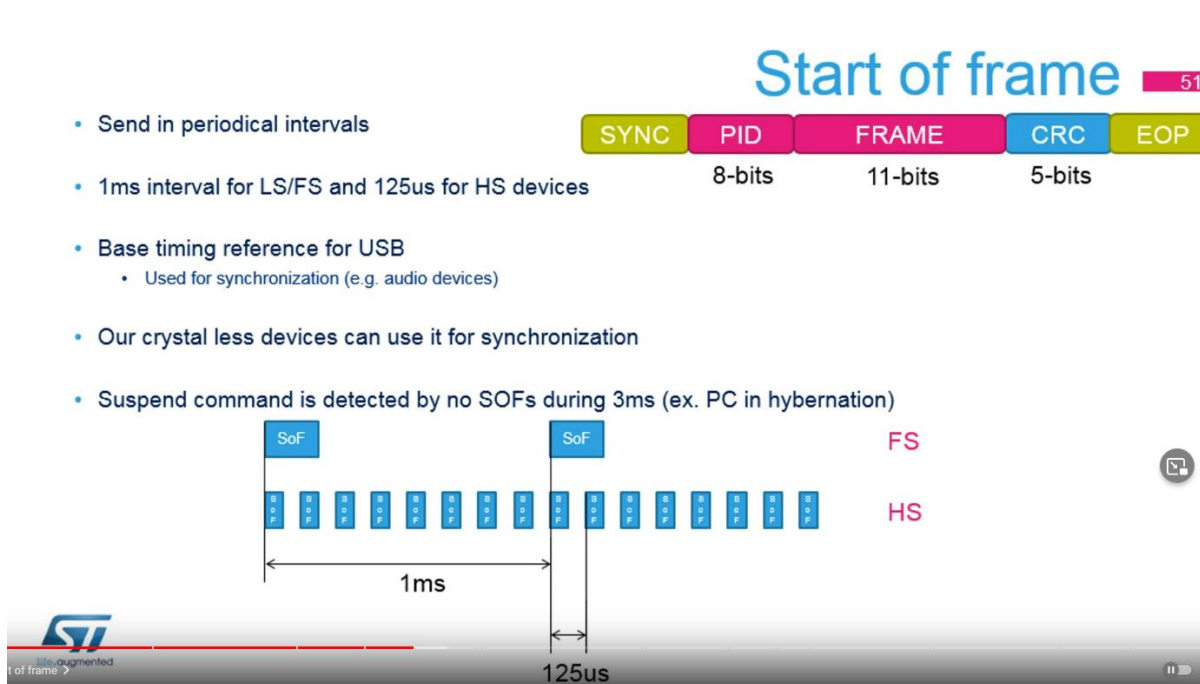
Mode ^[1]	Abbrev.	Gross data rate	Introduced in
Low speed	LS	1.5 Mbit/s (187.5 KB/s)	USB 1.0
Full speed	FS	12 Mbit/s (1.5 MB/s)	USB 1.0
High speed; also, Hi-speed	HS	480 Mbit/s (60 MB/s)	USB 2.0
SuperSpeed	SS	5 Gbit/s (625 MB/s)	USB 3.0
SuperSpeed+	SS+	10 Gbit/s (1.25 GB/s)	USB 3.1
SuperSpeed+	SS+	20 Gbit/s (2.5 GB/s)	USB 3.2

-But these speeds are different from the data rate transfer, it only represents the bit timing.



-The device transfers of data are driven by host so that the host start the frame by sending “SOF” packet which is sent every 1 millisecond in full speed.

<https://www.youtube.com/watch?v=DJiWi5aJA44&t=333s>



-There are many types of transfer for USB, the virtual comports class in SMT32CubeMX using the bulk transfer.

000915: Bulk or Interrupt Transfer (UP), 2022-10-27 14:36:13.4576157 +0.0019798. (1. Device: STM32 Virtual ComPort (Virtual COM Port)) Status: 0x00000000
Pipe Handle: 0x63688af0 (Endpoint Address: 0x81)
Get 0x100 bytes from the device

000917: Bulk or Interrupt Transfer (UP), 2022-10-27 14:36:13.4596118 +0.0019762. (1. Device: STM32 Virtual ComPort (Virtual COM Port)) Status: 0x00000000
Pipe Handle: 0x63688af0 (Endpoint Address: 0x81)
Get 0x100 bytes from the device

000919: Bulk or Interrupt Transfer (UP), 2022-10-27 14:36:13.4616132 +0.0019815. (1. Device: STM32 Virtual ComPort (Virtual COM Port)) Status: 0x00000000
Pipe Handle: 0x63688af0 (Endpoint Address: 0x81)
Get 0x100 bytes from the device

000921: Bulk or Interrupt Transfer (UP), 2022-10-27 14:36:13.4636150 +0.0019819. (1. Device: STM32 Virtual ComPort (Virtual COM Port)) Status: 0x00000000
Pipe Handle: 0x63688af0 (Endpoint Address: 0x81)
Get 0x100 bytes from the device

000923: Bulk or Interrupt Transfer (UP), 2022-10-27 14:36:13.4655710 +0.0019361. (1. Device: STM32 Virtual ComPort (Virtual COM Port)) Status: 0x00000000
Pipe Handle: 0x63688af0 (Endpoint Address: 0x81)
Get 0x100 bytes from the device

000925: Bulk or Interrupt Transfer (UP), 2022-10-27 14:36:13.4676126 +0.0020153. (1. Device: STM32 Virtual ComPort (Virtual COM Port)) Status: 0x00000000
Pipe Handle: 0x63688af0 (Endpoint Address: 0x81)
Get 0x100 bytes from the device

000927: Bulk or Interrupt Transfer (UP), 2022-10-27 14:36:13.4696142 +0.0019816. (1. Device: STM32 Virtual ComPort (Virtual COM Port)) Status: 0x00000000
Pipe Handle: 0x63688af0 (Endpoint Address: 0x81)
Get 0x100 bytes from the device

000929: Bulk or Interrupt Transfer (UP), 2022-10-27 14:36:13.4716131 +0.0019789. (1. Device: STM32 Virtual ComPort (Virtual COM Port)) Status: 0x00000000
Pipe Handle: 0x63688af0 (Endpoint Address: 0x81)
Get 0x100 bytes from the device

000931: Bulk or Interrupt Transfer (UP), 2022-10-27 14:36:13.4736151 +0.0019820. (1. Device: STM32 Virtual ComPort (Virtual COM Port)) Status: 0x00000000
Pipe Handle: 0x63688af0 (Endpoint Address: 0x81)
Get 0x100 bytes from the device

000933: Bulk or Interrupt Transfer (UP), 2022-10-27 14:36:13.4755949 +0.0019598. (1. Device: STM32 Virtual ComPort (Virtual COM Port)) Status: 0x00000000
Pipe Handle: 0x63688af0 (Endpoint Address: 0x81)
Get 0x100 bytes from the device

000935: Bulk or Interrupt Transfer (UP), 2022-10-27 14:36:13.4776131 +0.0019980. (1. Device: STM32 Virtual ComPort (Virtual COM Port)) Status: 0x00000000
Pipe Handle: 0x63688af0 (Endpoint Address: 0x81)
Get 0x100 bytes from the device

Hint

Pipe Information (Handle 0x63688af0, Endpoint address 0x81)
Maximum packet size: 0x100
Endpoint address: 0x81
Interval: 0x0
Transfer Type: Bulk
Maximum transfer size: 0xffffffff

Close

As show, from the screen shot from “Device monitoring studio” software, the transfer type is bulk transfer, the packet size is limited to 64 k bytes/sec.

-The virtual comports in pc also has limitations of 230400 bytes/sec, check [https://learn.microsoft.com/en-us/previous-versions/windows/embedded/dd187599\(v=msdn.10\)?redirectedfrom=MSDN](https://learn.microsoft.com/en-us/previous-versions/windows/embedded/dd187599(v=msdn.10)?redirectedfrom=MSDN)

- PC usb max speed for USB 2.0 is 60 Mbytes/sec.

The conclusion of using stm32 USB in full speed mode, it that the max data transfer speed is 88 Kbytes per sec, STM32H723 nucleo board doesnot support the OTG HS external PHY for the microcontroller. So we must use another dev board.

