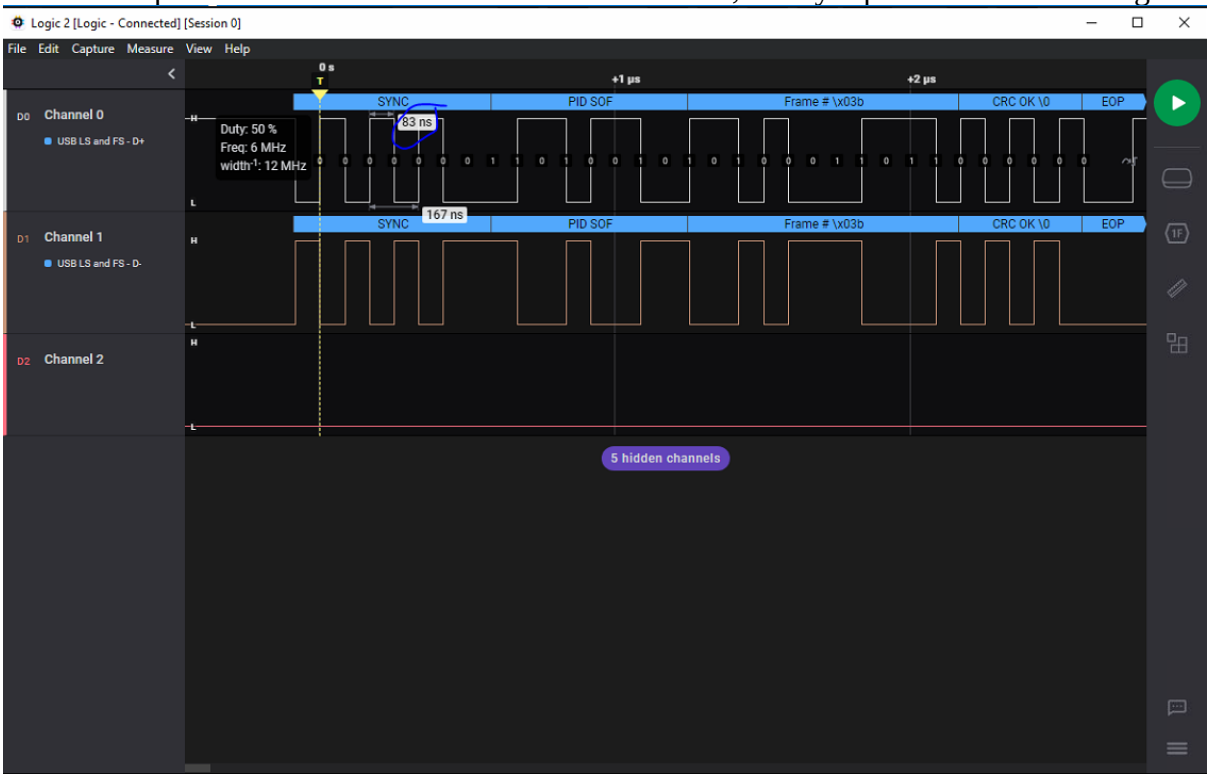
# STM32 USB

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

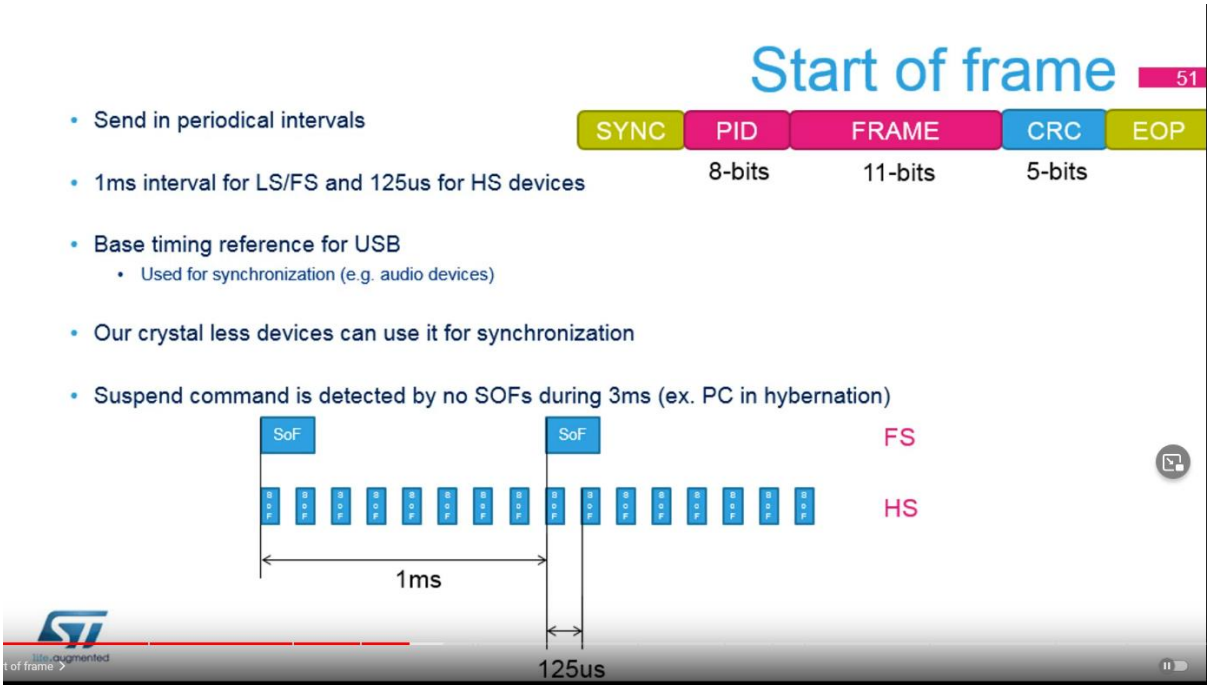
The USB speeds limitations are:

| 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 |

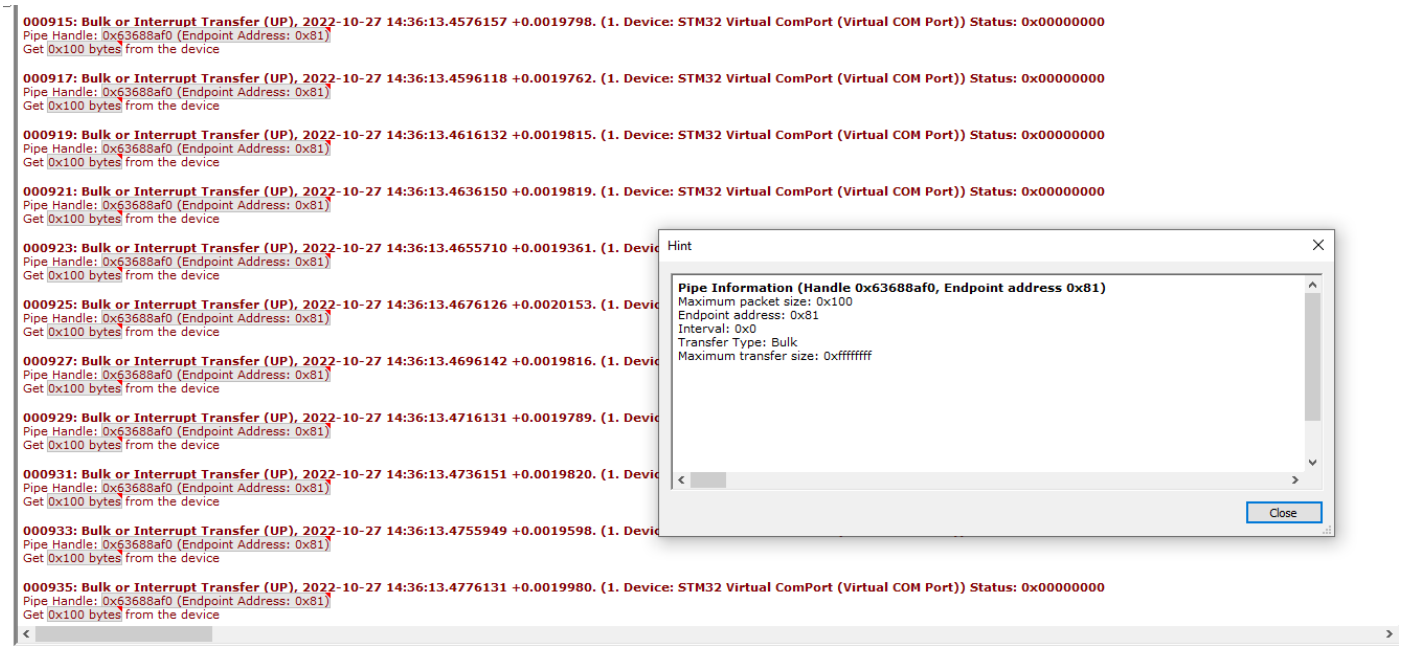
-But these speeds are different from the data rate transfer, it only represents the bit timing.



-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 comport class in SMT32CubeMX using the bulk transfer.




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 comport 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
- 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.**