Základy počítačov: prednáška č.11

1

Skúška

Riadny termín

~~18. 12. 2024 – CPU~~

21. 12. 2024 – CPU
11:00 – 14:00

Opravný termín

18. 1. 2024 v CPU
11:00 – 14:00

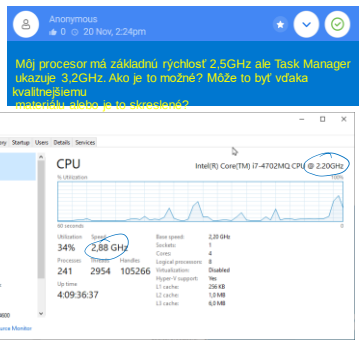
Pred skúškou
pokusná písomka v AISe

Po skúške
hodnotenie predmetu – dotazník

2

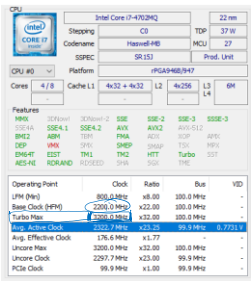
3

Q&A



4

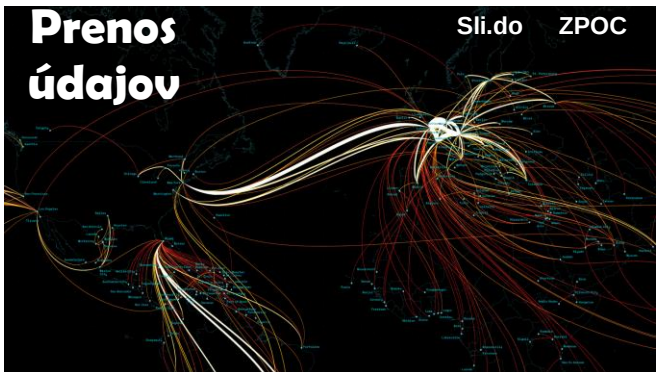
Q&A



CPU-Z

https://answers.microsoft.com/en-us/windows/forum/all/task-manager-shows-cpu-speed-that-is-higher-than/4a3ad9a8-fba2-4dcb-8155-0502d475b78c

5



6

Prenos údajov

Rýchlosť

Synchronizácia

Formát a kódovanie správ

Spoľahlivosť

Protokol

7

Prenos údajov

Príjemca je pomalý, nestíha

Príjemca je obsadený

Príjemca nefunguje – nezdržuj a odpoj

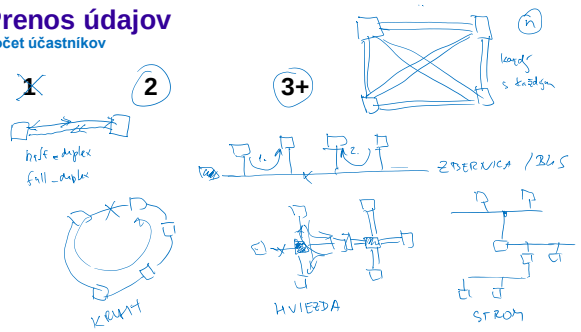
Príjemca nestihol začiatok

Príjemcovi nedorazila správna správa (ako to vie?)

8

Prenos údajov

Počet účastníkov



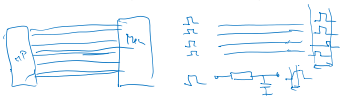
9

Prenos údajov

Rýchlosť: tvar prenášaných údajov

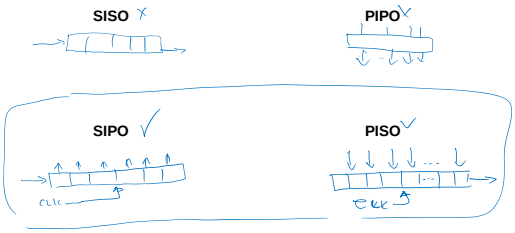
Sériové – **Informácia sa prenáša bit po bite.**

Paralelné – v jednom cykle zbernice sa prenáša **viacbitové slovo** (8, 16, 32, 64 - bitov).



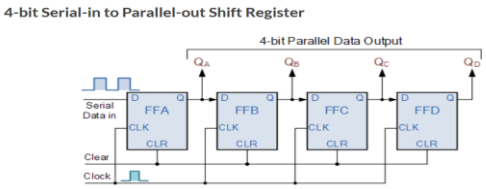
10

Sériovo – paralelné prevodníky



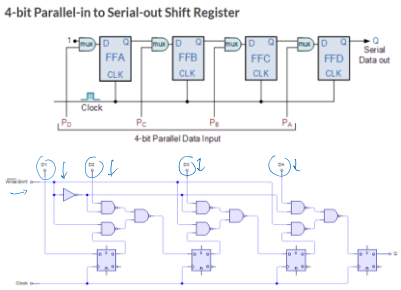
11

Serial – Parallell



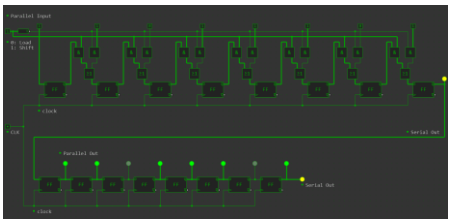
12

Parallell – Serial



13

Parallell – Serial



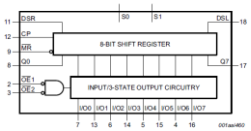
https://simulator.io/board/malHgISZkn/1

14

74HC299

8-bit universal shift register; 3-state

Rev. 4 — 26 February 2016 Product data sheet



6. Functional description

Table 3. Function table[1]

Input				Response
MR	S1	S0	CP	
L	X	X	X	asynchronous reset; Q0 to Q7 = LOW
H	H	H	↑	parallel load; I/On → Qn
H	L	H	↑	shift right; DSR → Q0, Q0 → Q1, etc.
H	H	L	↑	shift left; DSL → Q7, Q7 → Q6, etc.
H	L	L	X	hold

[1] H = HIGH voltage level;

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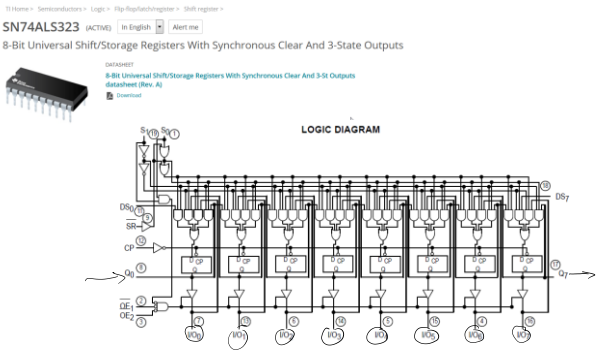

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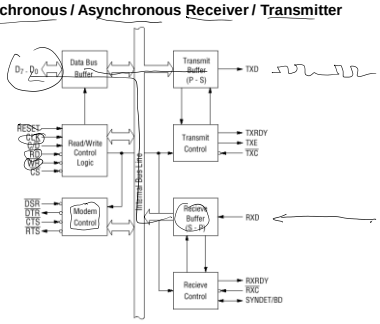
I8521 – USART

Universal Synchronous / Asynchronous Receiver / Transmitter



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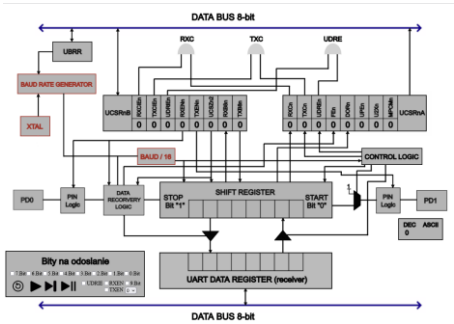

https://senzor.robotika.sk/mmp/anim/

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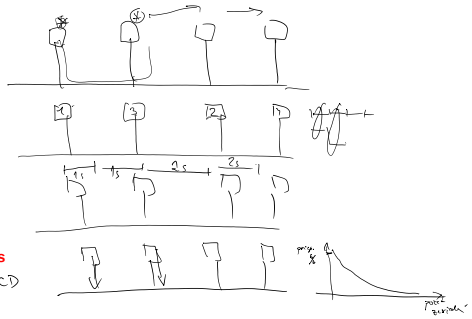
Zbernice
Arbitrácia

1. Token
2. Priority
3. Time slots
4. Random access

CSMA/CD



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Zbernice
Synchronizácia prenosu

Synchrónne:
- **prenos je synchronizovaný hodinovým signálom**
- **rýchlejšie ako asynchronné.**
  Vhodné pre zariadenia pracujúce na rovnakej frekvencii

Asynchrónne:
- **prenos je riadený jednostranne, napr. vysielačom.**
- **handshaking („výzva" – „odpoveď").**
  Pomalšie, ale umožňujú spojiť zariadenia pracujúce na rôznych frekvenciách.

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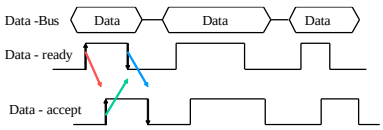
Zbernice
Synchronizácia prenosu

Handshaking



Asynchronné časovanie zbernice - handshaking

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Zbernice
Rýchlosť prenosu údajov

Počet prenesených bitov za jednotku času [bit/s; bps]

Gbps
Mbps

Modulačná rýchlosť – Baud rate. [Baud - Bd]
Baud rate – počet zmien úrovne signálu za sekundu.

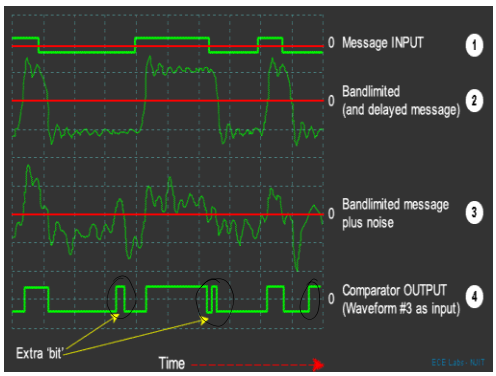
Pre dvojstavovú moduláciu platí:
Prenosová rýchlosť [bps]= Baud rate [Bd]

Štandardne používané rýchlosti sú:
(50, 110, 300, 600, 1200)
2 400, 4 800, **9 600**, 14 400, 19 200, 28 800,
38 400, 57 600, 76 800, 115 200 Bd

9600 Bd

Dlžka vedenia: 15 m (2500 pF pri 19 200 Bd)

22



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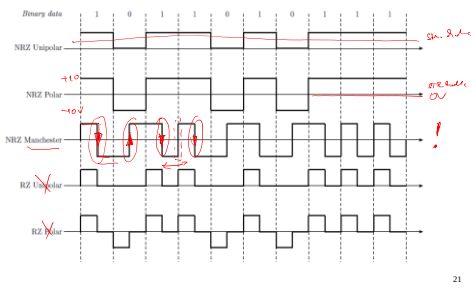
Kódovanie



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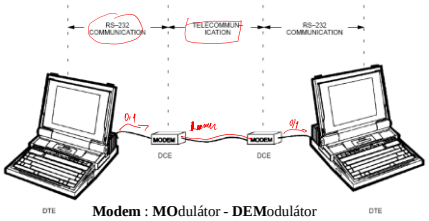
RS-232 alebo V.24 interface

Základné pojmy definované touto normou:

DTE (Data Terminal Equipment - *Koncové dátové zariadenie*) je počítač, resp. terminál

DCE (Data Communications Equipment – *Zariadenie dátovej komunikácie*) napr. modem, zapisovač.



Modem : **MO**dulátor - **DEM**odulátor

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RS-232

Prenos dátových a riadiacich signálov:
- dáta v negatívnej logike (0: high; 1: low)
- riadiace signály v pozitívnej logike (1: high; 0: low)

Iné názvy: signál log. 0 - "Space" a
signál log. 1: - "Mark".

data	control signal	level	voltage range
'0'	'1'	high	+3 to +15 volts
'1'	'0'	low	-3 to -15 volts

Obmedzenie podľa RS232 F: du/dt = 30V/µs;
Dĺžka vedenia: < 2500 pF

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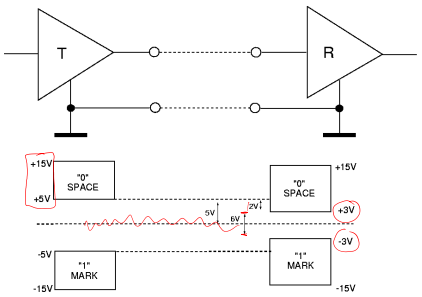
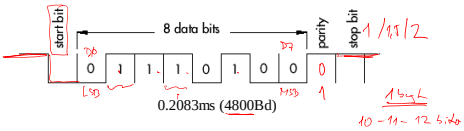
26

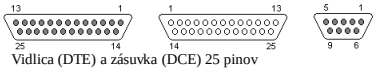


27

RS232 – V.24



Vysielač a prijímač musia byť konfigurované rovnako – musia mať rovnaké konfiguračné parametre:
- Prenosová rýchlosť - Baud rate (medzi 50 až 19.2 kbit/s),
- parita (bezparity, párna alebo nepárna parita) a
- počet stop bitov (1, 1.5 alebo 2).



Vidlica (DTE) a zásuvka (DCE) 25 pinov

25

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RS232 – V.24

Received Data a Transmitted Data (RxD, TxD)
S, **b0**, **b1**,**b2**, … (PP,NP,BP), **P** (1.5P, 2P)

Request to Send (RTS): „DTE chce vysielať"
Clear to Send (CTS): „DCE môže prijať a ďalej poslať"

Data Set Ready (DSR): „DCE je pripojené k linke"
Data Carrier Detect (DCD):„DCE zachytilo nosnú frekv. Signál OK"
Data Terminal Ready (DTR): „DTE (počítač)je pripravený"

Ring Indicator (RI): „DCE indikuje vyzváňací signál"

GND Cable Shield (GND): Tienenie, ochranná zem

26

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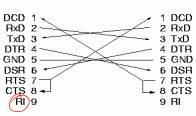
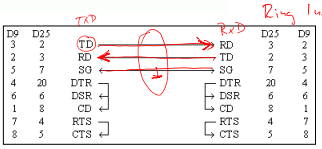
Nulový modem (DTE - DTE) priame prepojenie dvoch počítačov



Data **T**erminal **R**eady
Data **S**et **R**eady
Data **C**arrier **D**etect

Request **T**o **S**end
Clear **T**o **S**end
Ring **I**ndicator



Tri vodiče: TxD, RxD, GND

27

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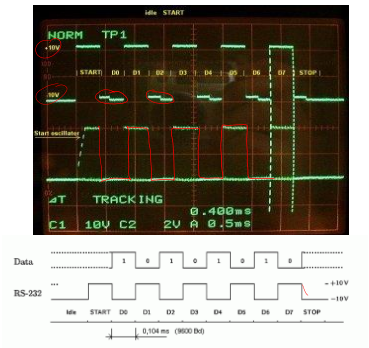

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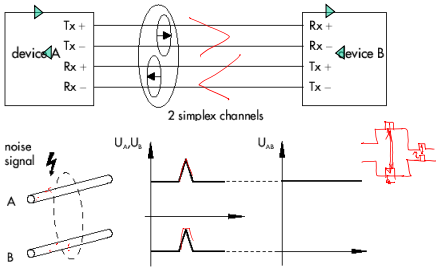
RS-422

RS 422 - symetrické vedenie (1 vysielač- 10 prijímačov) <10Mbps; ,1200m



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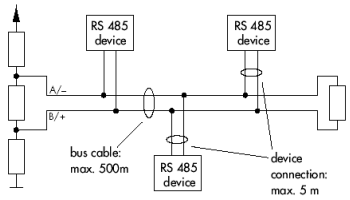
RS-485

CAN

RS 485 interface – až 32 zariadení
9600 bps – 1,2km



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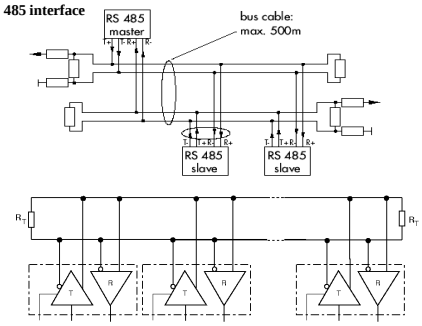
RS 485 interface



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Tab. 2.1 Porovnávacia tabuľka [TI1997].

Parameter	RS – 232 - E	RS – 423 - A	RS – 422 - A	RS – 485
	CCITT V.24+V.28	CCITT V.10 (X.26)	CCITT V.11 (X.27)	ISO 8482
Vedenie	nesymetrické	nesymetrické	symetrické	symetrické
Konfigurácia	1 Vysielač 1 Prijímač	1 Vysielač 10 Prijímačov	1 Vysielač 10 Prijímačov	32 Vysielačov 32 Prijímačov
Max. dĺžka [m]	15	1200	1200	1200
Max. rýchlosť [Kbps]	20	100	10 000	10 000
Výstupné napätia [V]	± 5 ÷ 15	± 3,6 ÷ 6	± 2 ÷ 5	± 1,5 ÷ 5
Vstupná citlivosť [V]	± 3	± 0,2	± 0,2	± 0,2
Impedancia ved. [Ω]	3k ÷ 7k	Min 450	Min 100	Min 60
Max. napätie [V]	± 25	± 6	± 6	± 12
Vstupný odpor [Ω]	3 ÷ 7	4	4	12

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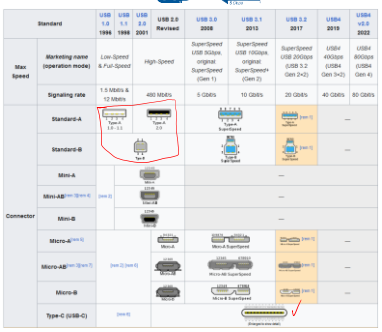
USB



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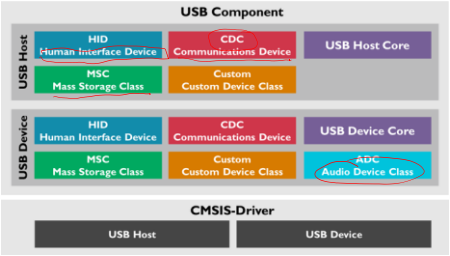
USB



33

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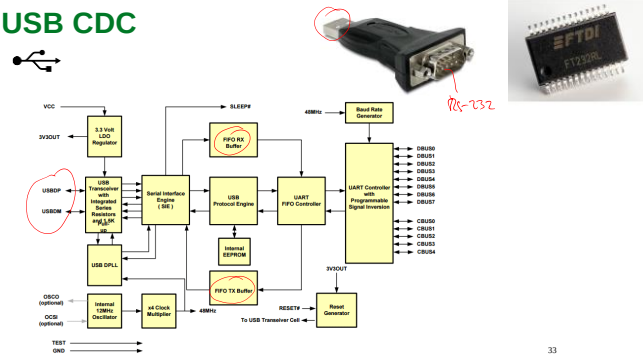
USB CDC



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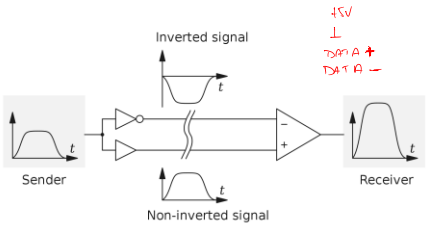
USB – Universal Serial Bus



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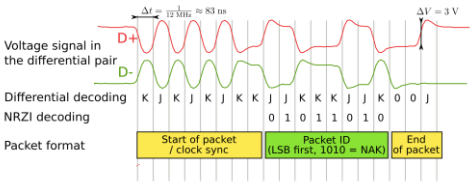
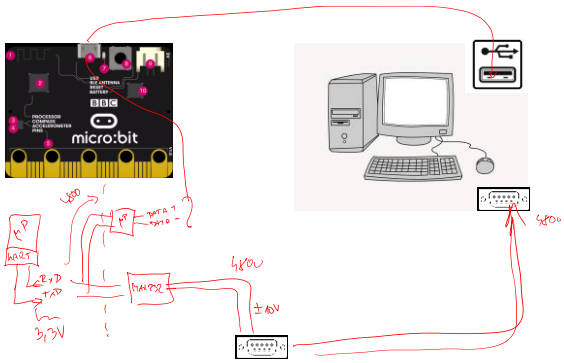
USB – Universal Serial Bus



33

40



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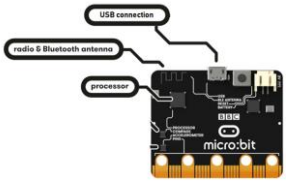
Cvičenia: komunikácia

- A) metalická
- B) bezdrôtová



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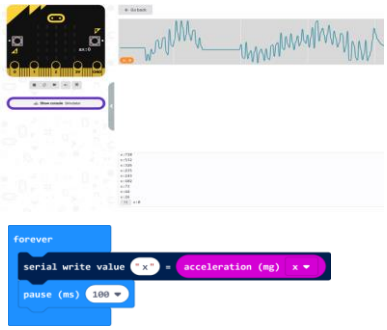
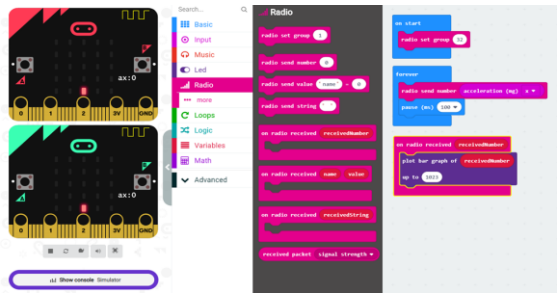


	A	B
1	time (source1)	x
2	81.49	542
3	81.612	500
4	81.741	-175
5	81.865	53
6	81.987	621
7	82.114	-474
8	82.235	-475
9	82.357	241
10	82.485	82
11	82.606	-383
12	82.729	-468
13	82.857	255
14	82.979	-58
15	83.101	-451
16	83.229	-236
17	83.351	281
18	83.473	-491

43



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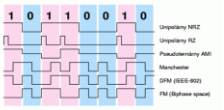
Domáca úloha

Samostatne naštudovať text 2. kapitoly (spolu 16 strán)



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Zhrnutie

- Topológia **zbernica, hviezda, kruh, strom**
- Arbitrácia zbernice **time slot, token, priority, random**
- Sériový / Paralelný a Synchrónny vs. Asynchrónny prenos
- Prevodník SIPO a PISO
- UART a RS-232 **rýchlosť (Bd), data, parita, stop-bit**
- Nesymetrický **(RS-232)** / Symetrický **(RS-485)** prenos
- Zbernica USB

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