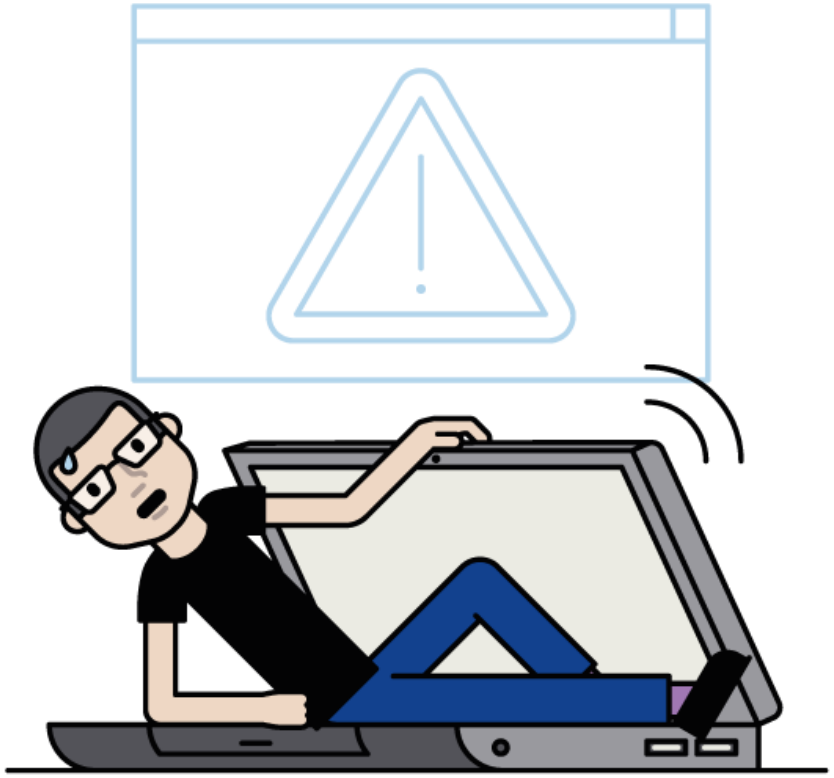
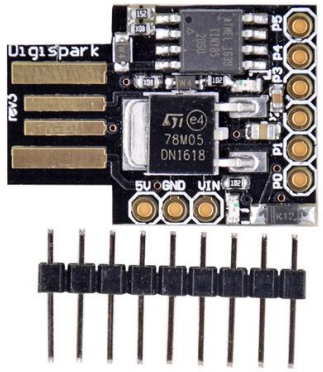
Duck Hunt (jugando a cazar patos)

Let's tweet !!

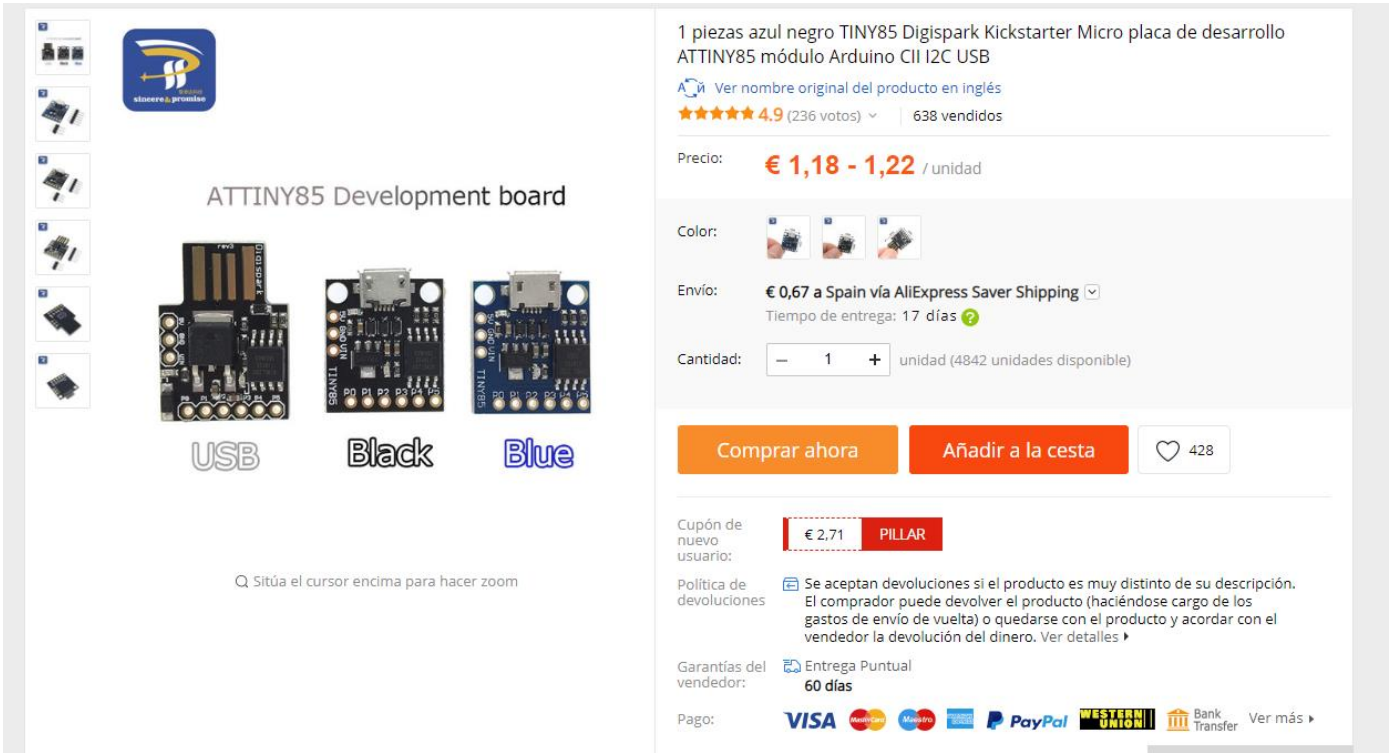
DISCLAIMER !!!

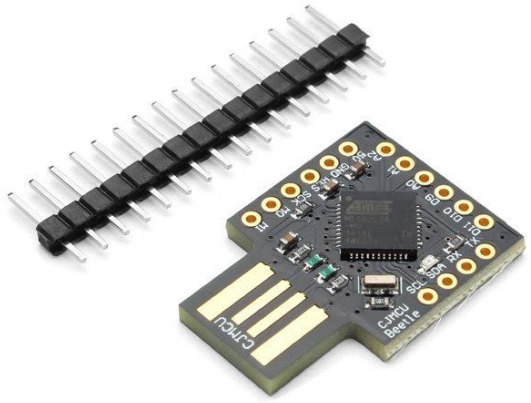


- La finalidad de esta charla es poner en su sitio los Bad USB
- Lo mostrado aquí a continuación es para "romper" patos
- Me hago responsable de los patos que bloqueéis
- HAZLO en tu casa

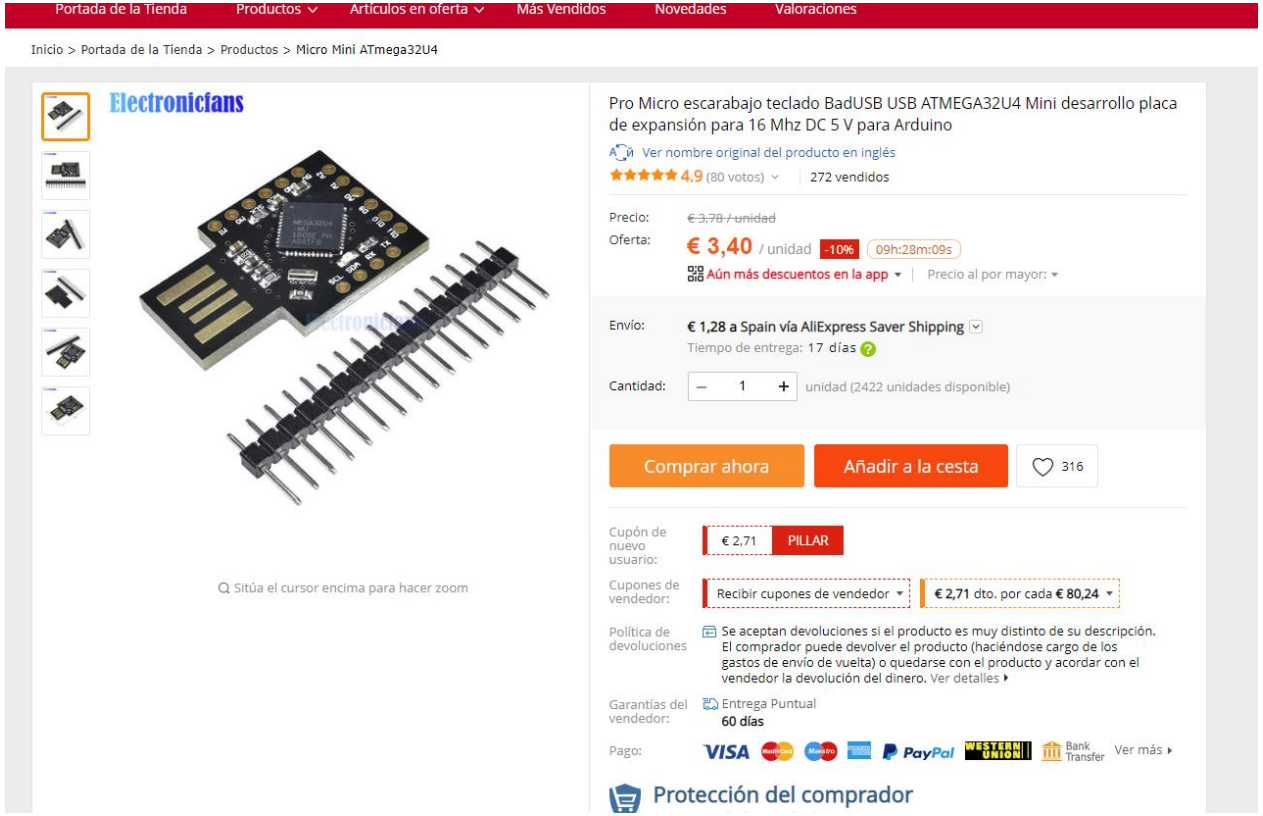

Digispark
78M05
DN1618
5V GND VIN

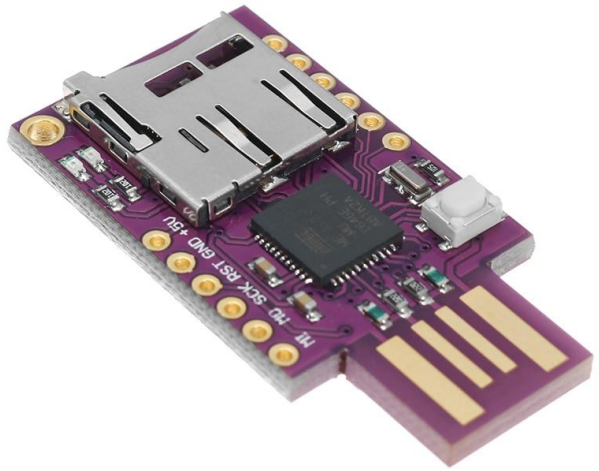
ATTiny85 – 2€


ATTINY85 Development board
USB
Black
Blue
Sitúa el cursor encima para hacer zoom
1 piezas azul negro TINY85 Digispark Kickstarter Micro placa de desarrollo ATTINY85 módulo Arduino CII I2C USB
Ver nombre original del producto en inglés
4,9 (236 votos)
638 vendidos
Precio:
€ 1,18 - 1,22 / unidad
Color:
Envío:
€ 0,67 a Spain vía AliExpress Saver Shipping
Tiempo de entrega: 17 días
Cantidad:
1
unidad (4842 unidades disponible)
Comprar ahora
Añadir a la cesta
428
Cupón de nuevo usuario:
€ 2,71
PILLAR
Política de devoluciones
Se aceptan devoluciones si el producto es muy distinto de su descripción. El comprador puede devolver el producto (haciéndose cargo de los gastos de envío de vuelta) o quedarse con el producto y acordar con el vendedor la devolución del dinero. Ver detalles
Garantías del vendedor:
Entrega Puntual
60 días
Pago:
Ver más

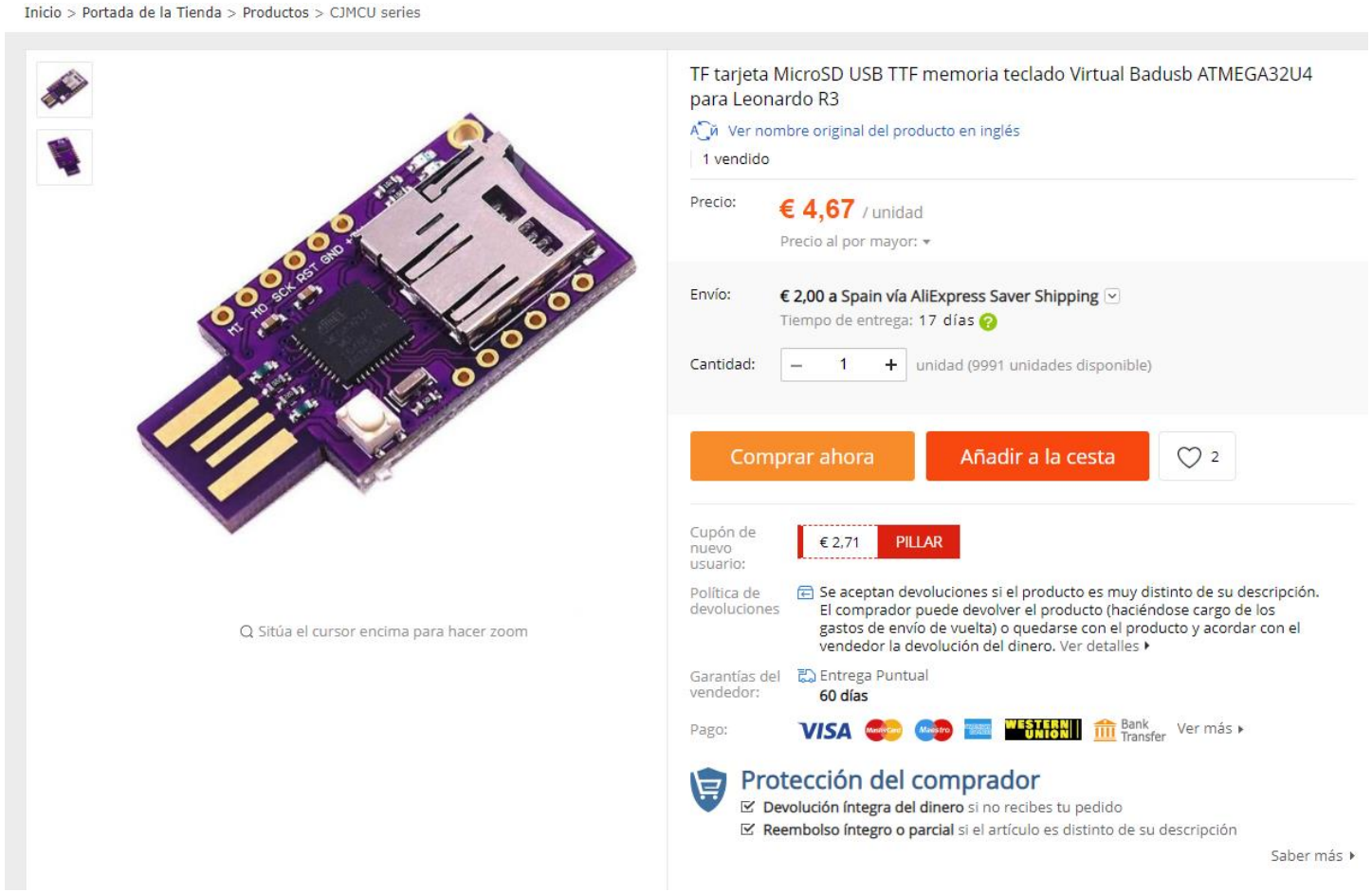


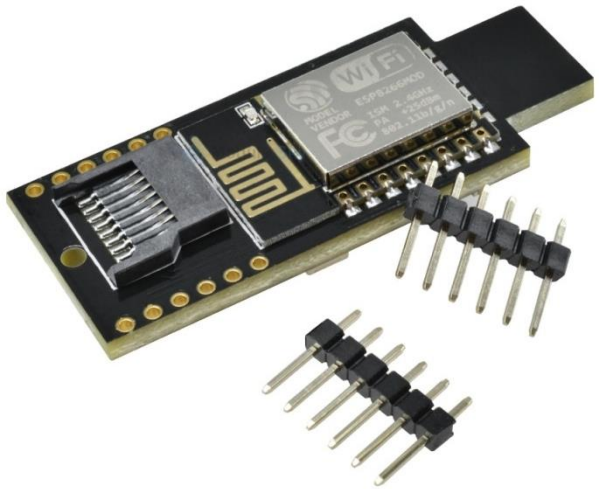
ATMEGA32U4 Mini – 4,70€



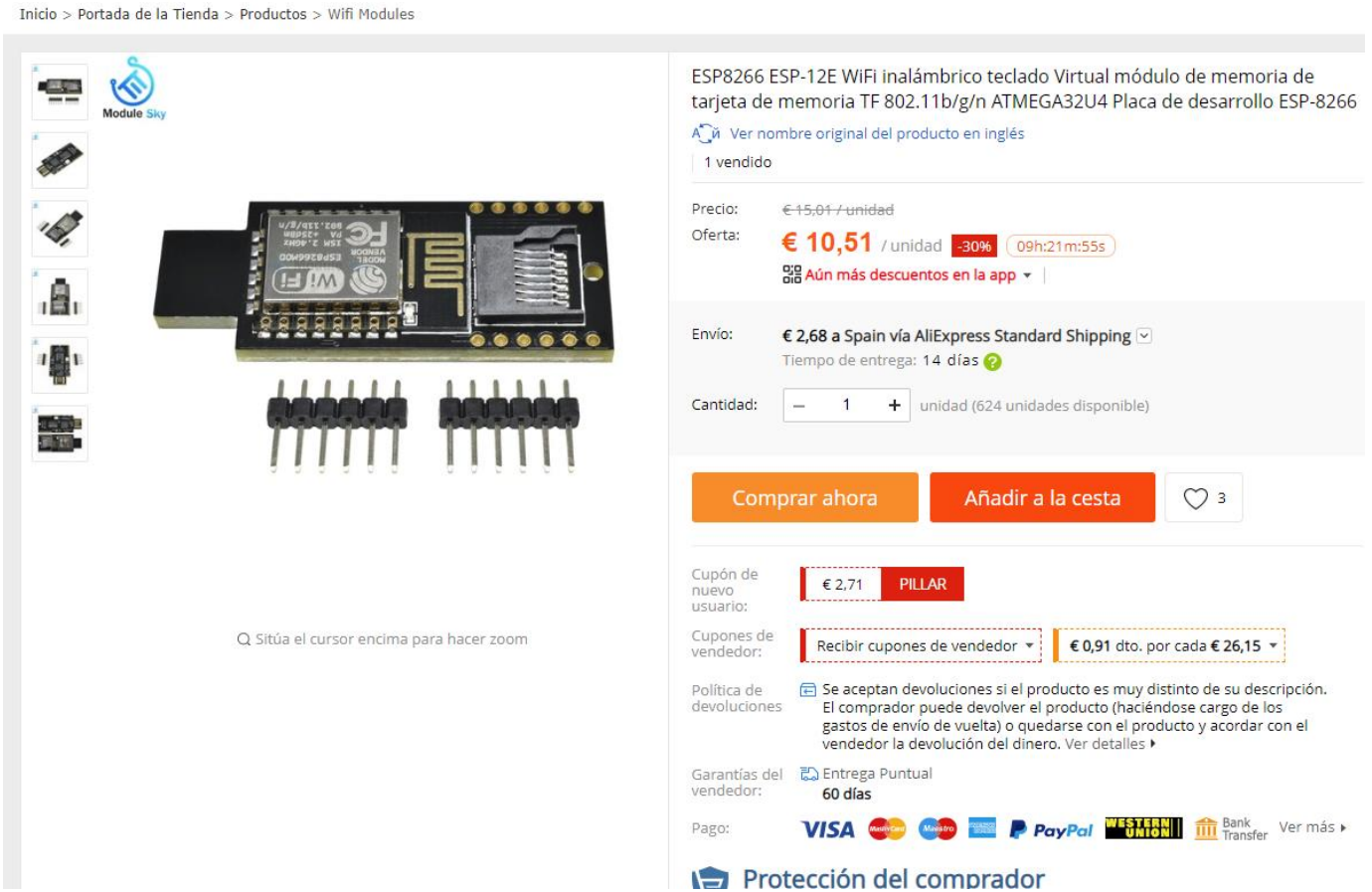


ATMEGA32U4 para Leonardo R3 – 6€

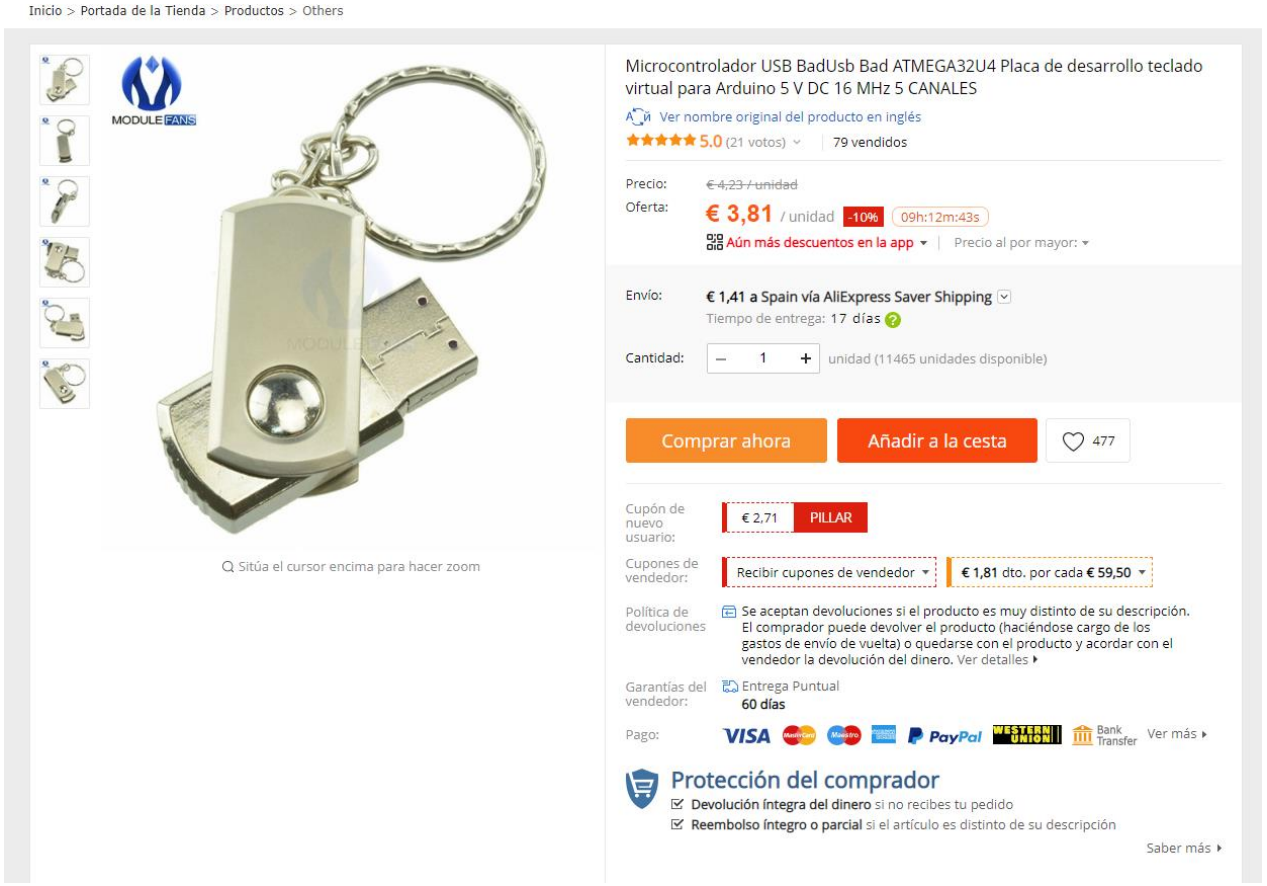


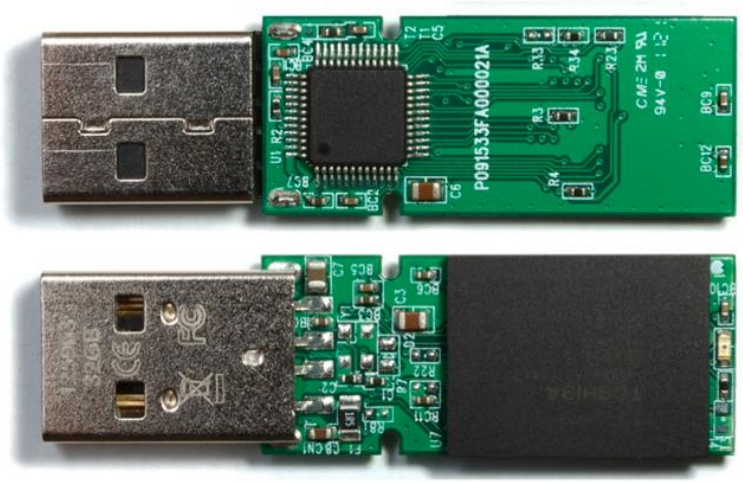


ESP8266 WiFi inalámbrico ATMEGA32U4 – 13€



BAD USB ATMEGA32U4 – 5,20€



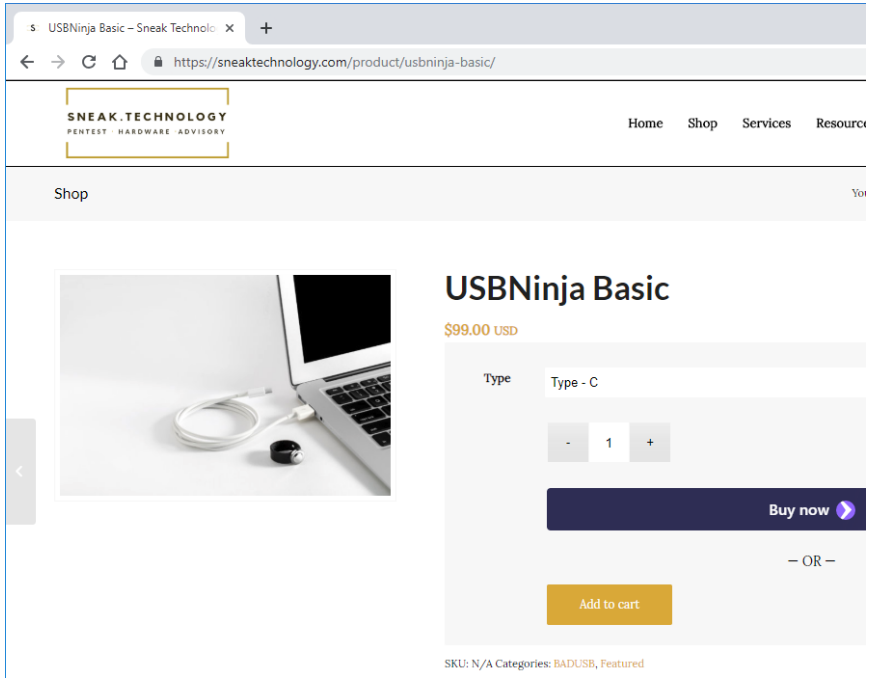


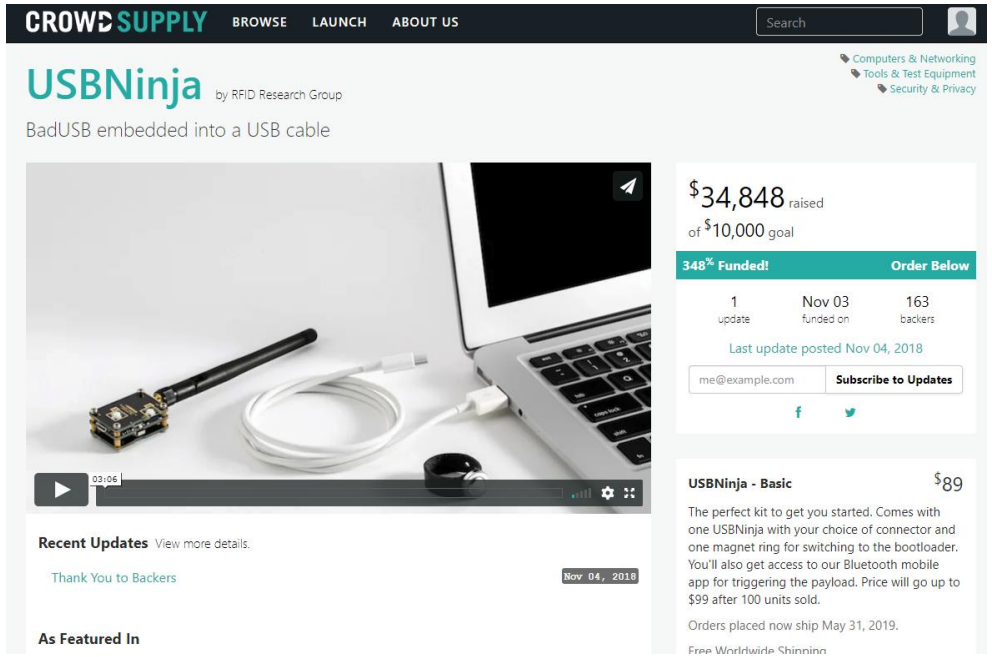
- Patriot 8GB Supersonic Xpress
- Kingston DataTraveler 3.0 T111 8GB
- Silicon power marvel M60 64GB
- Patriot Stellar 64 Gb Phison
- Toshiba TransMemory-MX USB 3.0 16GB
- Toshiba TransMemory-MX USB 3.0 8GB
- Kingston DataTraveler G4 64 GB
- Patriot PSF16GXPUSB Supersonic Xpress 16GB
- Silicon Power 32GB Blaze B30
- Kingston Digital 8GB USB 3.0 DataTraveler (DT100G3/8GB
- Verbatim STORE N GO 32GB USB 3.0
- Verbatim STORE N GO V3 8GB USB 3.0

PENDRIVE – PHISON 2251-03 (2303) – 5€

https://www.quora.com/Which-USB-drives-contain-Phison-2251-03-2303-controller-type

BADUSB Cable Harpoon – ¿?€

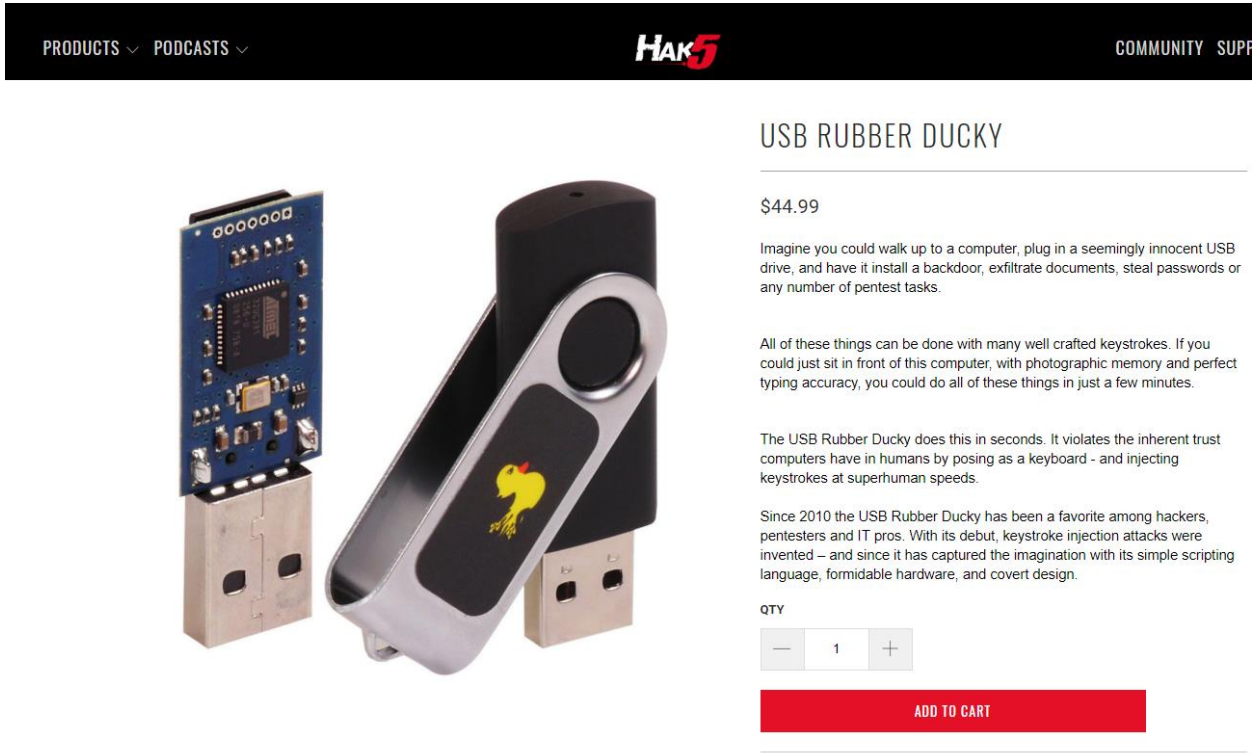




BADUSB Cable
USB NINJA
https://sneaktechnology.com/
89$ - 99$

Phoenix Ovipositor ATmega32U4 – ¿?€

Rubber Ducky HAK5 – $44.99



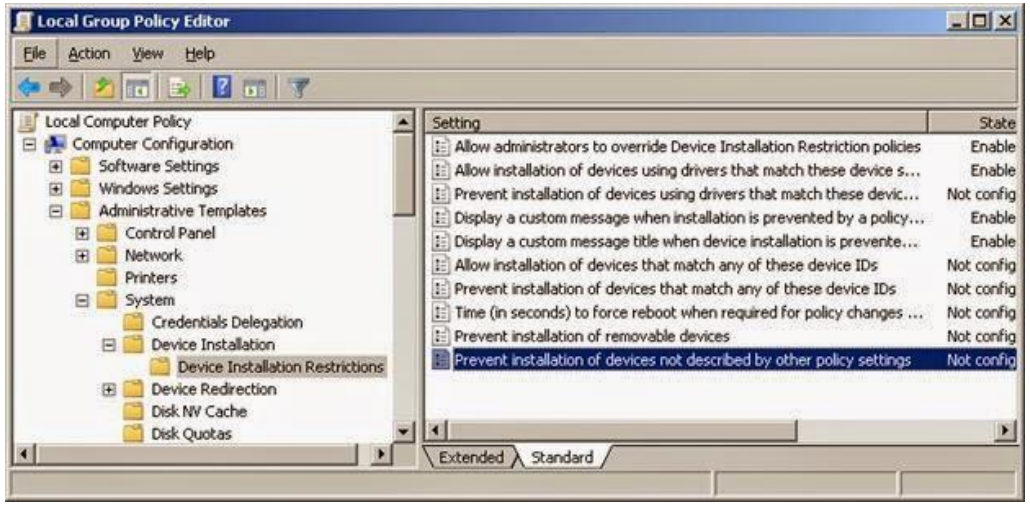

¡¡ENVIO GRATIS!!
AS SEEN ON TV
Pure Baking Soda
LLAMA YA

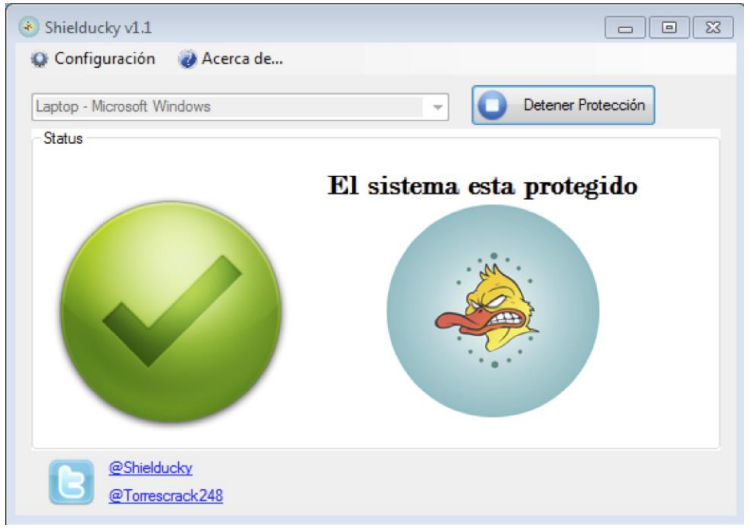
RED TEAM

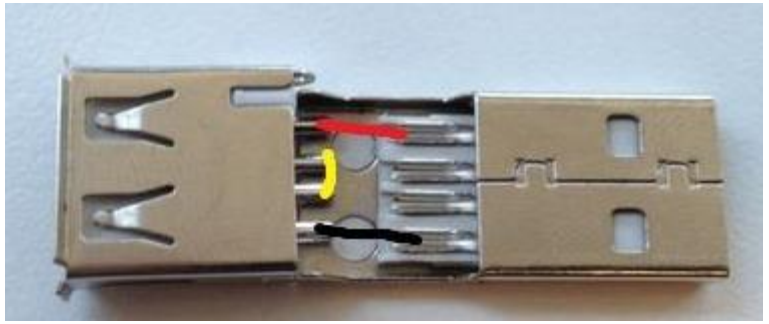
BLUE TEAM

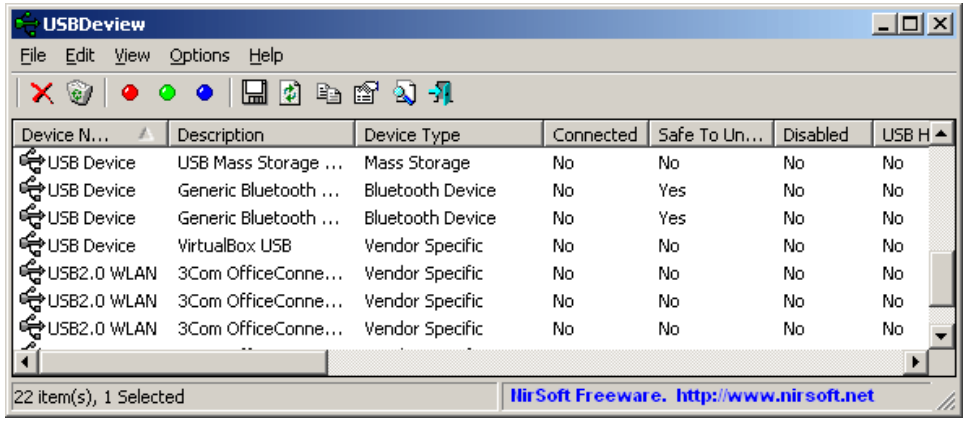
PROTECCIONES

- Patito Hunter de Miguel Ángel Arroyo
- Condom USB
- Políticas de Windows
- USBDeview
- Shielducky de Álex Torrecrack









Fuentes:

http://www.elladodelmal.com/2014/05/usb-rubber-ducky-un-teclado-malicioso.html

https://hacking-etico.com/2016/03/14/patito-hunter/

Plug&Play®

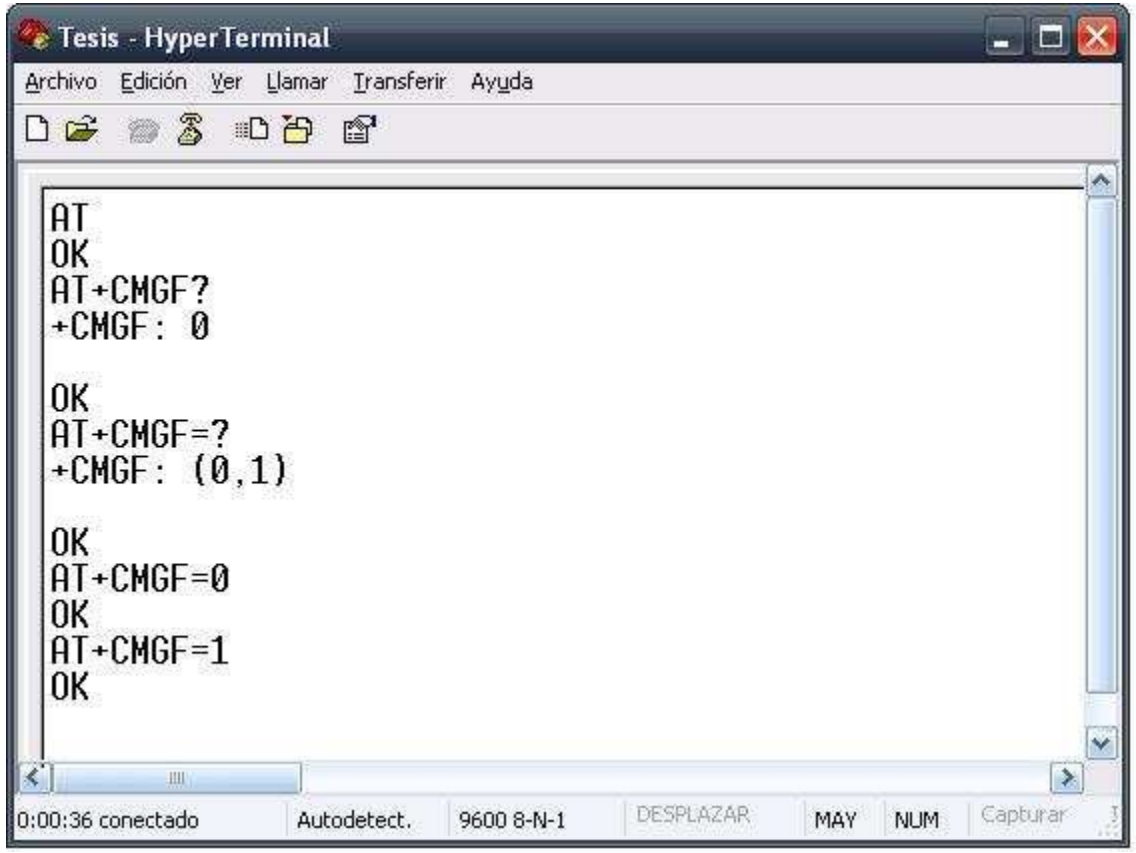
OPCIÓN 1

AMAZON - 8€

AMAZON 21€

OPCIÓN 2


U.S. Robotics
56K Message Modem


Tesis - HyperTerminal
Archivo Edición Ver Llamar Transferir Ayuda
AT
OK
AT+CMGF?
+CMGF: 0
OK
AT+CMGF=?
+CMGF: (0,1)
OK
AT+CMGF=0
OK
AT+CMGF=1
OK
0:00:36 conectado
Autodetect.
9600 8-N-1
DESPLAZAR
MAY
NUM
Capturar

EMAIL - KINGSTON

1 de 1 Es

Kingston Technology #3294899 VIEJO FEB-19 ×

Kingston Customer Service <customerservice@kingston.eu>
para informática

mar., 23 oct. 2018 16:28

inglés › español Traducir mensaje Desactivar para: inglés

Estimado Eloy,

Le agradecemos el interés mostrado por Kingston Technology y sus productos.

Con referencia a su solicitud, la información sobre los comandos AT que ha solicitado es una información solamente interna y no es una función que ofrezca Kingston. Estas unidades se han diseñado como dispositivos de almacenamiento. Lamentamos comunicarle que no vamos a poder ayudarles en esta ocasión.

No dude en contactarnos para cualquier otro tipo de información.

Un cordial saludo,
Jonathas Soares

Trataremos sus datos con respeto y sus detalles serán guardados y protegidos de forma segura. Puede encontrar más detalles en nuestra política de privacidad

EMAIL - TOSHIBA

Re: [TOSHIBA#2018102249006391] Contact form

Toshiba Memory Europe GmbH <support@toshiba-memory.com>
para contacto

No se muestran las imágenes. Mostrar las imágenes a continuación - Mostrar siemp

inglés > español Traducir mensaje

Dear valued customer,

Thank you for contacting the Toshiba Memory Europe GmbH.

We apologize for the long processing time. We had technical issues.

Our service is offered in english or german language only.

Please send your request in either one of those languages and we will be glad to be of ass

Thank you.

Best regards,

Percy König
Support Engineer

informática eloy <contacto@informaticaeloy.com>
para support

Hello Goodnight. I'm developing a study for the university, and
I would like to know the AT commands to communicate with a Toshiba pendrive
through UART. Thank you, your help will be very necessary.

Remitente notificado con
Mailtrack

Toshiba Memory Europe GmbH <support@toshiba-memory.com>
para informática

No se muestran las imágenes. Mostrar las imágenes a continuación - Mostrar siempre imágenes de support@toshiba-memory.com

inglés > español Traducir mensaje

Dear valued customer,

thank you for contacting the Toshiba Memory Europe GmbH.

For our consumer products,we can only provide the technical details provided on our website:

https://www.toshiba-memory.com/

Thank your for your understanding.

Best regards

Thorsten Freimann

EMAIL - SANDISK

Auto-Response By (Administrator) (0

Dear Eloy Villa,

We have escalated your case for adc
of further action within 24-48 busine
any additional questions.

Thank you
SanDisk® Global Customer Care

Response By Email (Sarah K.) (03/01/2019 05:23 PM)

Dear Mr. Villa,

I would like to thank you for contacting us.

I understand you would like to know some details about the Ultra USB 3.0 16GB as the AT Commands to communicate with a USB through UART.

I have to inform you that this information is not published for our retail products, this is considered engineering level information, and it is not available for sharing.

I want to inform you also that I had escalated your case to the higher level team in order to see if I can get this information for you, but unfortunately this information can be shared.

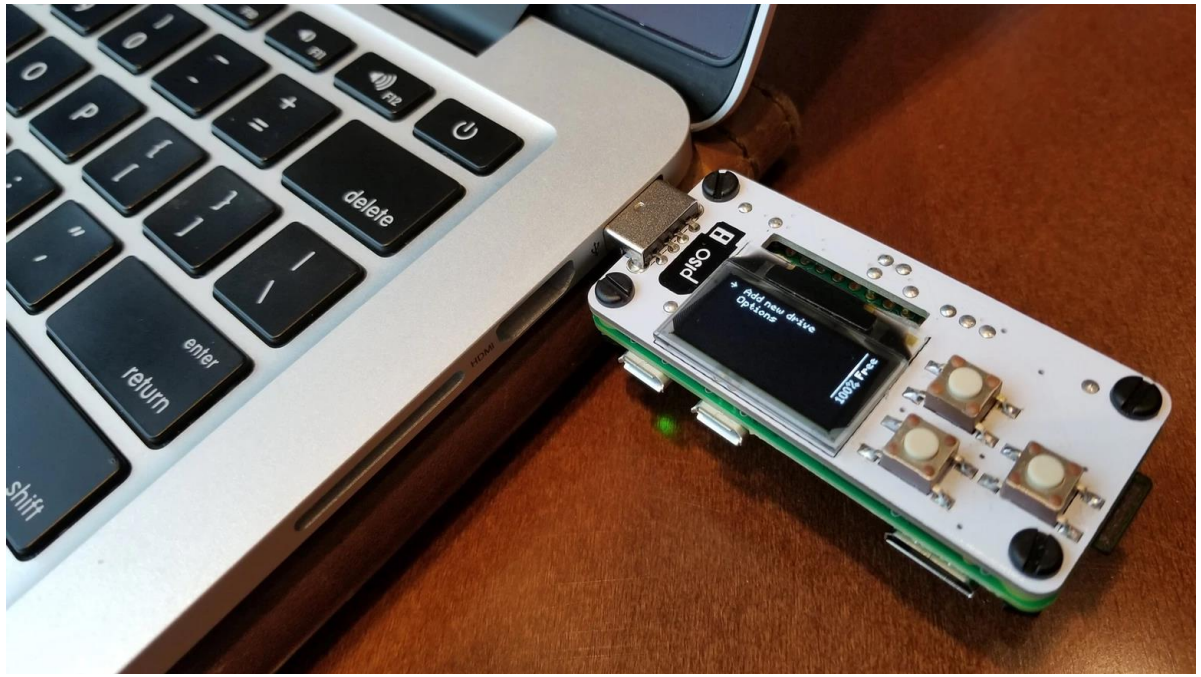
This is the page support in case you want to take a look to our articles:
USB page support

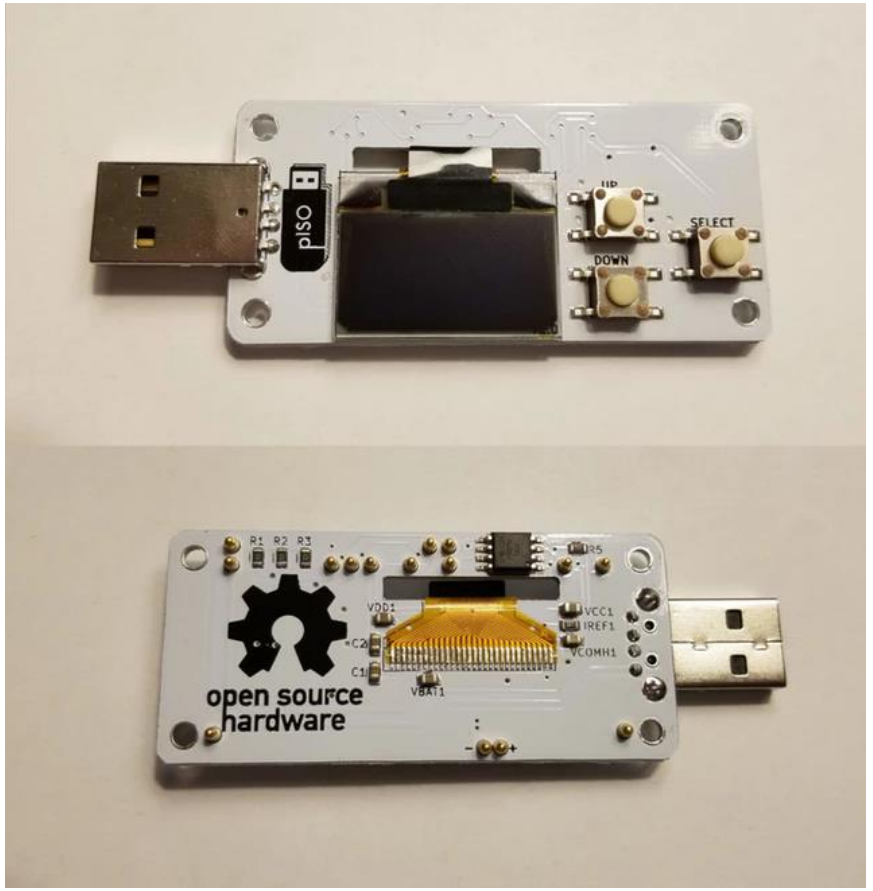
Click here to register your product online.

Para su información: Si lo prefiere, Ud. también puede comunicarse con nosotros en Español.

Date Created: 02/27/2019 12:22 PM

OPCIÓN 3





https://www.kickstarter.com/projects/178023282/piso-the-most-versatile-flash-drive-yet/posts?page=3

OPCIÓN 4

https://www.tme.eu
1070€ + IMPUESTOS

https://www.meilhaus.de
745€ + IMPUESTOS

OPCIÓN 4.2

Adafruit Beagle USB 12
https://thepihut.com
£370€ (430€) + IMPUESTOS

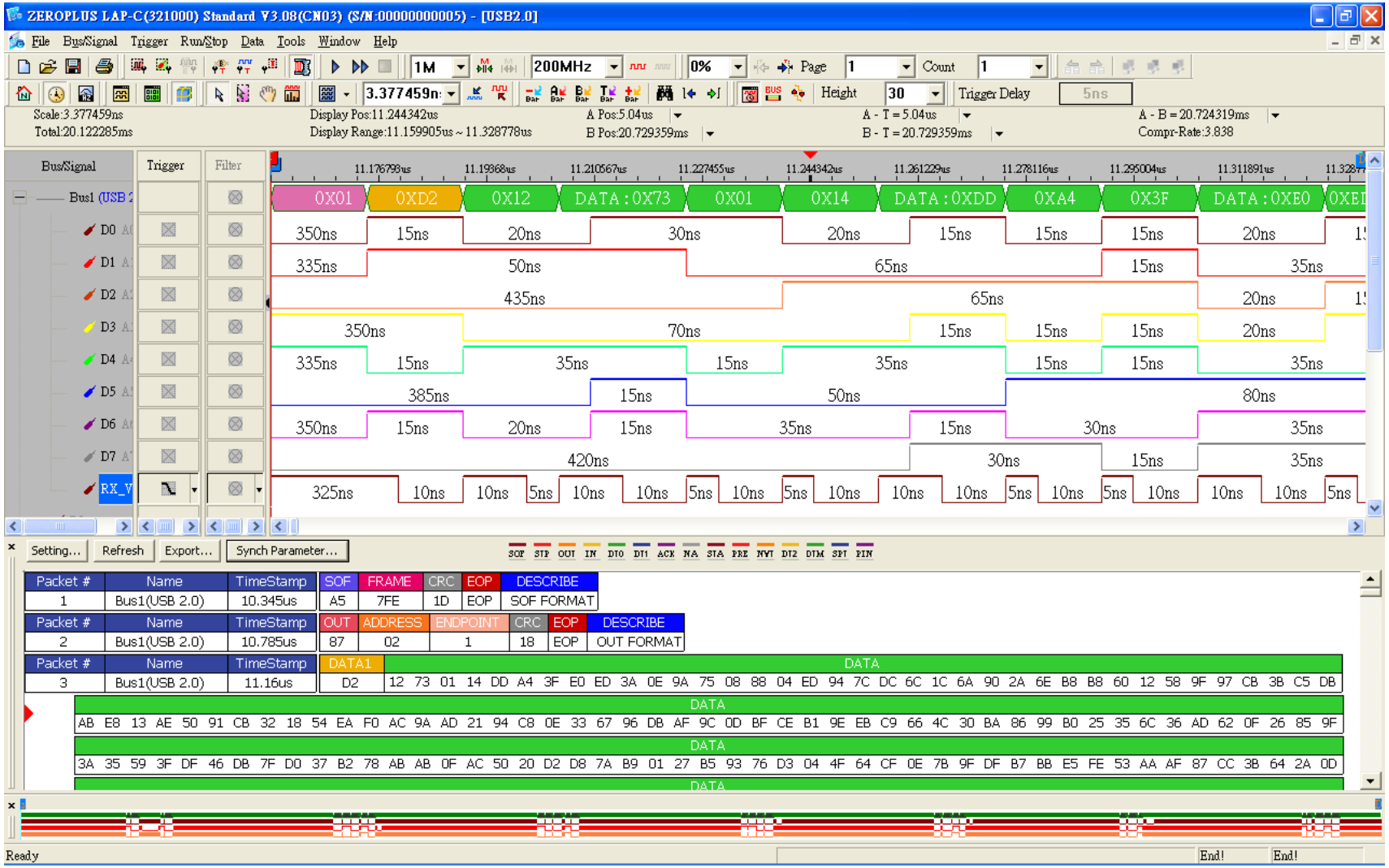
OPCIÓN 4.3

Aliexpress
140€

OPCIÓN 4.3.1

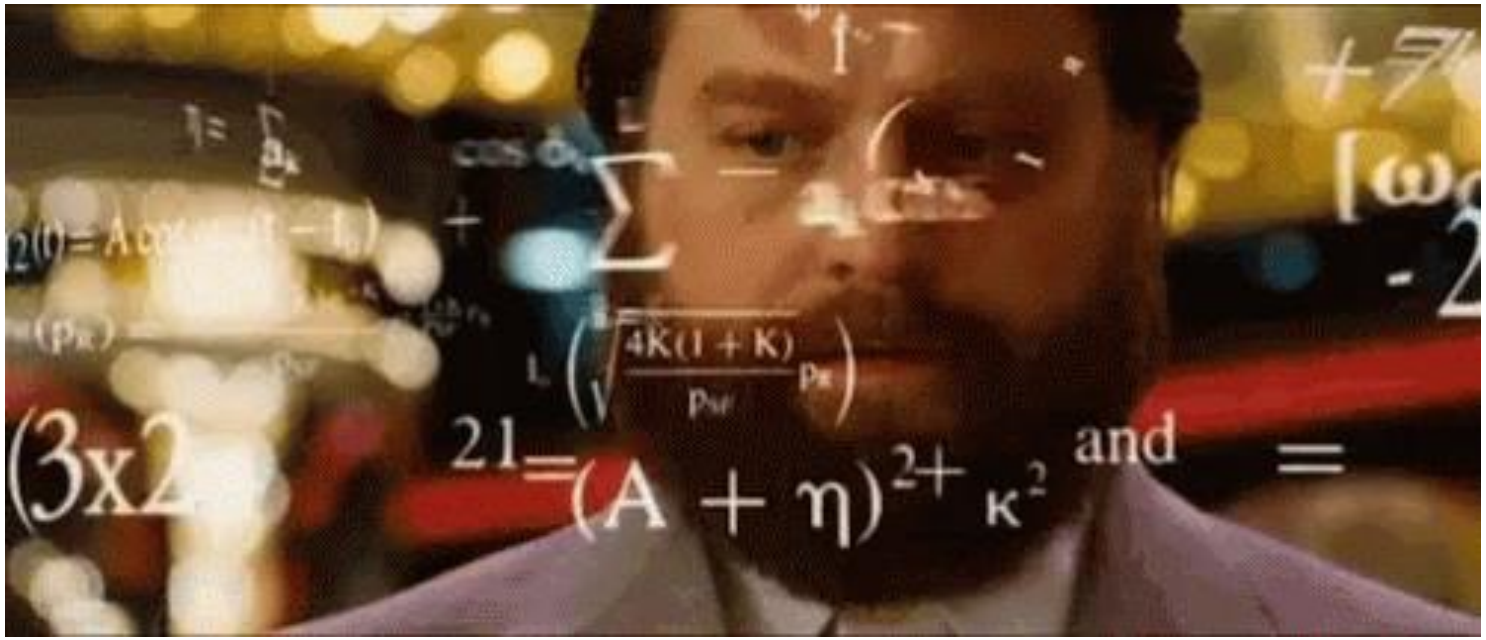
Amazon
13€

Pasa el ratón por encima de la imagen para ampliarla


ZEROPLUS LAP-C(321000) Standard V3.08(CN03) (S/N:00000000005) - [USB2.0]
File Bus/Signal Trigger Run/Stop Data Tools Window Help
Bus/Signal
Trigger
Filter
Bus1 (USB 2
D0
D1
D2
D3
D4
D5
D6
D7
RX_V
0X01
0XD2
0X12
DATA : 0X73
0X01
0X14
DATA : 0XDD
0XA4
0X3F
DATA : 0XE0
Setting...
Refresh
Export...
Synch Parameter...
Packet # Name TimeStamp SOF FRAME CRC EOP DESCRIBE
1 Bus1(USB 2.0) 10.345us A5 7FE 1D EOP SOF FORMAT
Packet # Name TimeStamp OUT ADDRESS ENDPOINT CRC EOP DESCRIBE
2 Bus1(USB 2.0) 10.785us 87 02 1 18 EOP OUT FORMAT
Packet # Name TimeStamp DATA1 DATA
3 Bus1(USB 2.0) 11.16us D2 12 73 01 14 DD A4 3F E0 ED 3A 0E 9A 75 08 88 04 ED 94 7C DC 6C 1C 6A 90 2A 6E B8 B8 60 12 58 9F 97 CB 3B C5 DB
DATA
AB E8 13 AE 50 91 CB 32 18 54 EA F0 AC 9A AD 21 94 C8 0E 33 67 96 DB AF 9C 0D BF CE B1 9E EB C9 66 4C 30 BA 86 99 B0 25 35 6C 36 AD 62 0F 26 85 9F
DATA
3A 35 59 3F DF 46 DB 7F D0 37 B2 78 AB AB 0F AC 50 20 D2 D8 7A B9 01 27 B5 93 76 D3 04 4F 64 CF 0E 7B 9F DF B7 BB E5 FE 53 AA AF 87 CC 3B 64 2A 0D
DATA
Ready


P.nbr. | Time (us) | Channel | Access Address | Adv PDU Type | Adv PDU Header (Type TxAdd RxAdd PDU-Length) | AdvA | AdvData | CRC | RSSI (dBm) | FCS
1 | +0 =0 | 0x25 | 0x8E89BED6 | ADV_IND | 0 0 0 36 | 0x0007802FAA29 | 02 01 06 1A FF 4C 00 02 15 E2 C5 6D B5 DF FB 48 D2 B0 60 D0 F5 A7 10 96 E0 00 00 00 00 C6 | 0xB7E630 | -34 | OK
2 | +94870 =94870 | 0x25 | 0x8E89BED6 | ADV_IND | 0 0 0 30 | 0x000B570C2BA8 | 02 01 06 02 0A 08 09 03 03 18 02 18 04 18 09 18 07 09 42 47 4D 31 31 31 | 0x22D91B | -47 | OK
3 | +16376 =111246 | 0x25 | 0x8E89BED6 | ADV_IND | 0 0 0 36 | 0x0007802FAA29 | 02 01 06 1A FF 4C 00 02 15 E2 C5 6D B5 DF FB 48 D2 B0 60 D0 F5 A7 10 96 E0 00 00 00 00 C6 | 0xB7E630 | -34 | OK
4 | +110622 =221868 | 0x25 | 0x8E89BED6 | ADV_IND | 0 0 0 36 | 0x0007802FAA29 | 02 01 06 1A FF 4C 00 02 15 E2 C5 6D B5 DF FB 48 D2 B0 60 D0 F5 A7 10 96 E0 00 00 00 00 C6 | 0xB7E630 | -34 | OK
5 | +119995 =341863 | 0x25 | 0x8E89BED6 | ADV_IND | 0 0 0 36 | 0x0007802FAA29 | 02 01 06 1A FF 4C 00 02 15 E2 C5 6D B5 DF FB 48 D2 B0 60 D0 F5 A7 10 96 E0 00 00 00 00 C6 | 0xB7E630 | -34 | OK
6 | +82005 =423868 | 0x25 | 0x8E89BED6 | ADV_IND | 0 0 0 21 | 0xC069CD40DE94 | 02 01 1A 0B FE 4C 00 09 06 03 02 C0 A8 1D C3 | 0xC9B2FF | -67 | FCS
7 | +35492 =459360 | 0x25 | 0x8E89BED6 | ADV_IND | 0 0 0 36 | 0x0007802FAA29 | 02 01 06 1A FF 4C 00 02 15 E2 C5 6D B5 DF FB 48 D2 B0 60 D0 F5 A7 10 96 E0 00 00 00 00 C6 | 0xB7E630 | -34 | OK
8 | +113121 =572481 | 0x25 | 0x8E89BED6 | ADV_IND | 0 0 0 36 | 0x0007802FAA29 | 02 01 06 1A FF 4C 00 02 15 E2 C5 6D B5 DF FB 48 D2 B0 60 D0 F5 A7 10 96 E0 00 00 00 00 C6 | 0xB7E630 | -34 | OK
9 | +33890 =606371 | 0x25 | 0x8E89BED6 | ADV_IND | 0 0 0 21 | 0xC869CD40DE94 | 02 01 1A 0B FF 4C 00 09 06 03 02 C0 A8 1D C3 | 0xC9B2FF | -66 | FCS
10 | +70482 =676853 | 0x25 | 0x8E89BED6 | ADV_IND | 0 0 0 36 | 0x0007802FAA29 | 02 01 06 1A FF 4C 00 02 15 E2 C5 6D B5 DF FB 48 D2 B0 60 D0 F5 A7 10 96 E0 00 00 00 00 C6 | 0xB7E630 | -34 | OK
11 | +101871 =778724 | 0x25 | 0x8E89BED6 | ADV_IND | 0 0 0 36 | 0x0007802FAA29 | 02 01 06 1A FF 4C 00 02 15 E2 C5 6D B5 DF FB 48 D2 B0 60 D0 F5 A7 10 96 E0 00 00 00 00 C6 | 0xB7E630 | -34 | OK
12 | +108747 =887471 | 0x25 | 0x8E89BED6 | ADV_IND | 0 0 0 36 | 0x0007802FAA29 | 02 01 06 1A FF 4C 00 02 15 E2 C5 6D B5 DF FB 48 D2 B0 60 D0 F5 A7 10 96 E0 00 00 00 00 C6 | 0xB7E630 | -34 | OK
13 | +87650 =975121 | 0x25 | 0x8E89BED6 | ADV_IND | 0 0 0 21 | 0xC869CD40DA94 | 02 01 1A 0B FF 4C 00 09 06 03 02 C0 A8 1D C3 | 0xC9B2FF | -65 | FCS
Capturing device | Radio Configuration | Select fields | Packet details | Address book | Display filter | Time line
Field Name:
Template:
Filter condition
First | And
Add
Remove | All
Apply filter
Filter management:
Add
Remove
Open
Save
Merge

Let's tweet !!

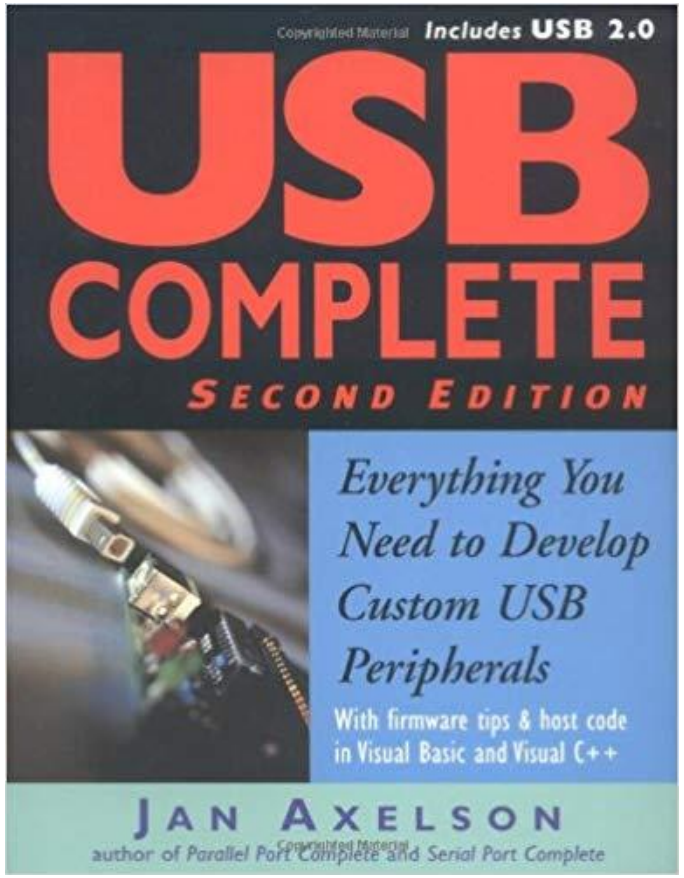


OPCIÓN 5 (beta)

¿Qué me falta? ¿En que fallo?

- Blockchain
- IA
- Cloud Computing
- Machine Learning
- Tor
- Deep Web
- 6G
- Fuga de talento

OPCIÓN 6

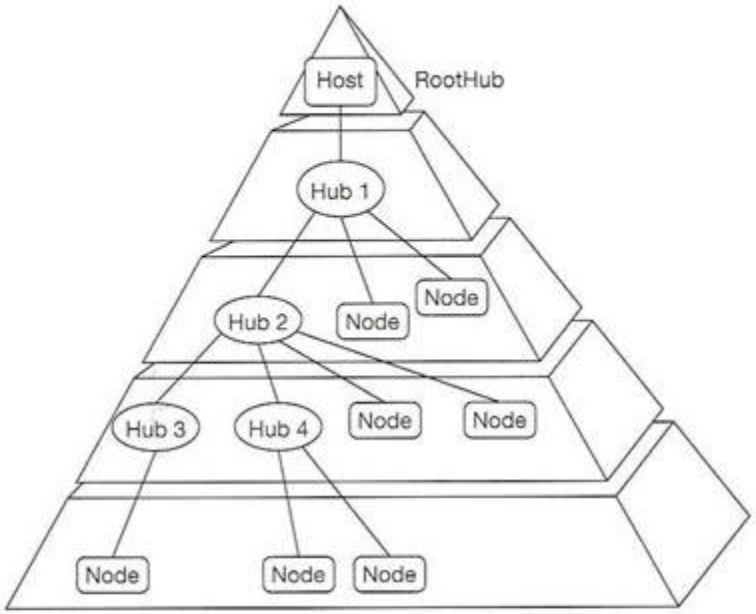


AMAZON
2ª mano
8€

- El USB (*Universal Serial Bus*) se creó para unificar la gran variedad de conectores serie que existían
  - Facilmente configurable
    - Permite la conexión en caliente (*plug and play*)
    - El SO detecta la conexión y desconexión de dispositivos
    - El SO identifica los dispositivos conectados y los configura
  - Facilmente ampliable
    - Pueden conectarse tipos muy distintos de dispositivos
      - Síncronos/asíncronos
      - Diferentes velocidades de transferencia
    - Se reduce el número de puertos necesarios
      - Hasta 127 dispositivos pueden conectarse en un mismo puerto
      - El propio puerto puede proporcionar alimentación a los dispositivos

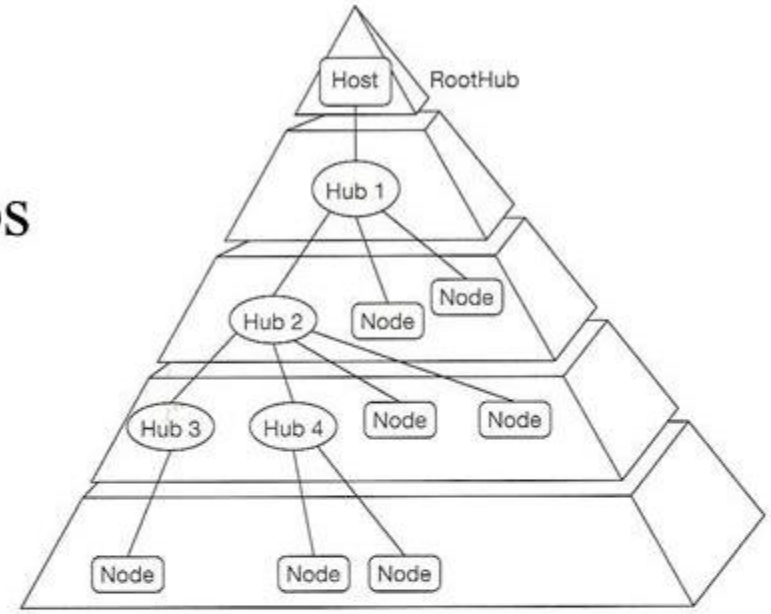
Fuente:
Oliverio J. Santana Jaria
Universidad de Las Palmas de G.C.

- El bus USB tiene una estructura estratificada con forma de árbol
  - La conexión de los dispositivos sigue un esquema encadenado (*hardware polling*)
  - La gestión del bus es centralizada y se realiza desde el controlador integrado en el computador (*host*)



  - Cada dispositivo USB tiene su propia dirección en el sistema
    - El controlador inicia todas las actividades y se comunica con el computador por medio de interrupciones
    - Ningún dispositivo USB puede iniciar una transacción por sí mismo para evitar sobrescribir datos presentes en el bus

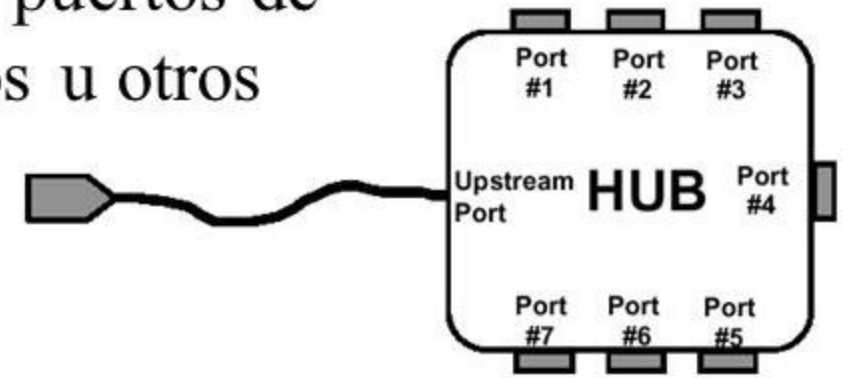
- El host también actúa como un distribuidor (*hub*) que permite la conexión de varios dispositivos USB (nodos)
  - Se reduce el número de conexiones necesarias
  - Se reduce la cantidad de recursos del computador ocupados (canales E/S, canales DMA, interrupciones…)



- Se pueden añadir hubs adicionales para ampliar la estructura del sistema y permitir la conexión de un mayor número de dispositivos (hasta 127)

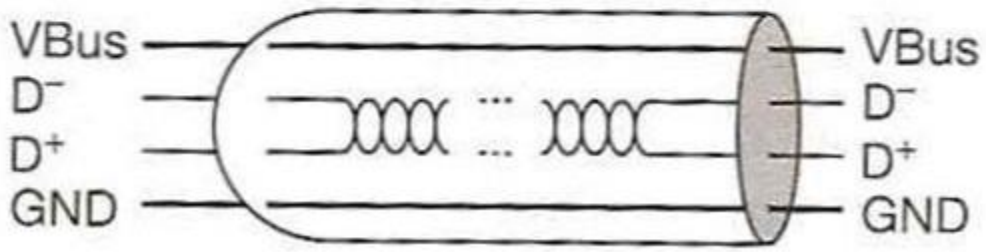
- La principal funcionalidad de un hub es extender el sistema proporcionando nuevos puertos de conexión

- Cada hub proporciona un puerto de conexión con el host (*upstream*) y varios puertos de conexión con dispositivos u otros hubs (*downstream*)



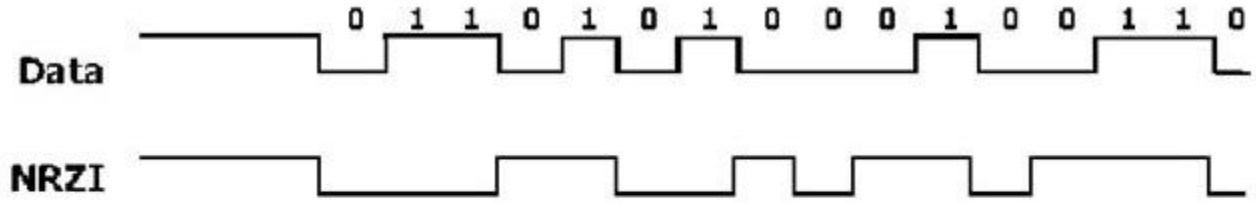
- Al igual que cualquier otro dispositivo USB, un hub debe ser configurado, recibiendo su propia dirección

- El cable USB contiene solo cuatro líneas
  - GND: tierra
  - VBus: alimentación (no es suficiente para algunos dispositivos)
  - D+ D–: líneas diferenciales de transmisión
- La longitud máxima del cable es de 5 metros y su ancho de banda máximo es 60 Mbytes (USB 2.0)



Pin 1	VBus	rojo
Pin 2	D–	blanco
Pin 3	D+	verde
Pin 4	GND	negro

- Los datos se transmiten en serie por las línea D+ D–
- No hay una señal de reloj
  - La sincronización se obtiene a partir de los propios datos utilizando condificación NRZI (*Non Return to Zero Inverted*)
    - Un uno se representa manteniendo el nivel de voltaje
    - Cada vez que aparece un cero se cambia la polaridad

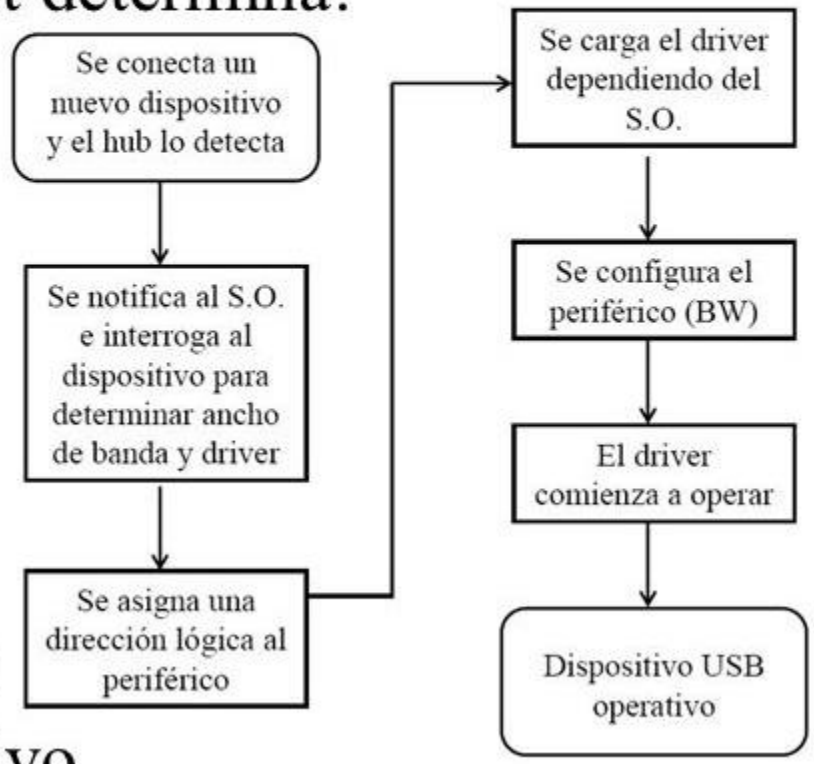


  - Si aparecen seis unos seguidos se inserta un cero (*bit-stuffing*) para forzar cambios de polaridad frecuentes y evitar, con ello, pérdidas de sincronización

- Las transferencias de datos se realizan estableciendo canales de comunicación virtuales (*pipes*)
  - Los canales son creados por el host
  - Cada canal ocupa parte del ancho de banda disponible

- Los canales terminan en un punto de final
  - Cada dispositivo puede soportar varios puntos de final y, por tanto, varios canales distintos
  - La prioridad de los dispositivos viene dada por la conexión en cadena

- Cuando se conecta un dispositivo, el canal de control por defecto se establece con el punto de final 0
- Durante la inicialización, el host determina:
  - El formato de datos que soporta el dispositivo conectado
  - El tipo de dispositivo y la dirección de la transferencia
  - Los requerimientos de frecuencia y latencia de bus
  - El ancho de banda necesario
  - El tamaño máximo de los paquetes
- Finalizado este proceso, el host asigna una dirección al dispositivo



- Las transmisiones se dividen en tramas de tiempo (*frame*)
- Durante las tramas se producen transacciones compuestas por paquetes
  - Existen tres tipos de paquetes:
    - Inicialización (*token*)
    - Datos (*data*)
    - Protocolo (*handshake*)
  - Cada paquete comienza con un campo de sincronización (SYNC) que maximiza el número de transiciones en la línea
  - El tipo de paquete se diferencia con un identificador (*PID*)

Token:

PID								8 bit	3 bit	5 bit
0	1	x	x	1	0	x	x	ADDR	ENDP	CRC5

Data:

PID								0- n bit	16 bit
0	0	x	x	1	1	x	x	DATA	CRC16

Handshake:

PID							
1	0	x	x	0	1	x	x

PID	Meaning	PID (Hex)	Type
STALL	Error	0x1e	Handshake packet
SETUP	Initialization	0x2d	Token packet
PRE	Preamble	x	Special packet, only for low-speed devices
DATA1	Data packet 1	0x4b	Data packet
NACK	Not Acknowledge	0x5a	Handshake packet
IN	Receive	x	Token packet
SOF	Start of Frame	0x5a	Token packet
DATA0	Data packet 0	0xc3	Data packet
ACK	Acknowledge	0xd2	Handshake packet
OUT	Send	0x1e	Token packet

- Podemos distinguir dos tipos distintos de canales

- Los canales de mensaje tienen un formato concreto
  - El esquema que siguen es: Petición – Dato – Estado
  - Cada petición debe ser completamente resuelta antes de pasar a la siguiente
  - Implican un movimiento de datos bidireccional
- Los canales de flujo (*stream*) no tienen un formato
  - Los datos se envían de forma secuencial
  - El movimiento de datos es unidireccional

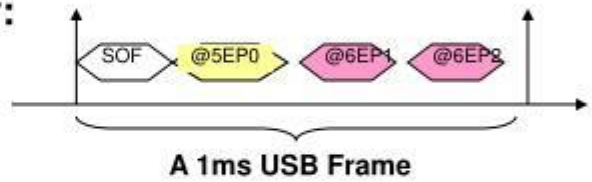
- Se definen 4 tipos posibles de transferencias

- Control (canal mensaje): utilizadas para configurar los dispositivos que se conectan
  - Se garantiza la correcta emisión/recepción de datos
  - No se garantiza la latencia o el ancho de banda
- Masivas (canal flujo): transferencias esporádicas de grandes cantidades de datos que pueden esperar (impresoras, escáners…)
  - Se garantiza la correcta emisión/recepción de datos
  - No se garantiza la latencia o el ancho de banda

- Por interrupciones (canal flujo): transferencias esporádicas de pocos datos que requieren atención inmediata (teclado, ratón…)
  - Se garantiza la correcta emisión/recepción de datos
  - Se garantiza la latencia y el ancho de banda
- Alta velocidad (canal flujo): grandes cantidades de información que se transmiten de forma continua (audio/video en tiempo real…)
  - No se garantiza la correcta emisión/recepción de datos
  - Se garantiza una latencia y un ancho de banda constante

USB transfer

- A device has several endpoints
- Each endpoint is assigned to a logical pipe with the host
- Each pipe is characterized by:
  - Device address
  - Endpoint number
  - Transfer type



- Transfer type:

Type	*Direction*	*Packets per frame*	*Max Packet Size*
Control	Bidir	Several	64 Bytes
Bulk	Unidir	Several	64 Bytes
Isochronous	Unidir	One	1024 Bytes
Interrupt	Unidir	One max	64 Bytes

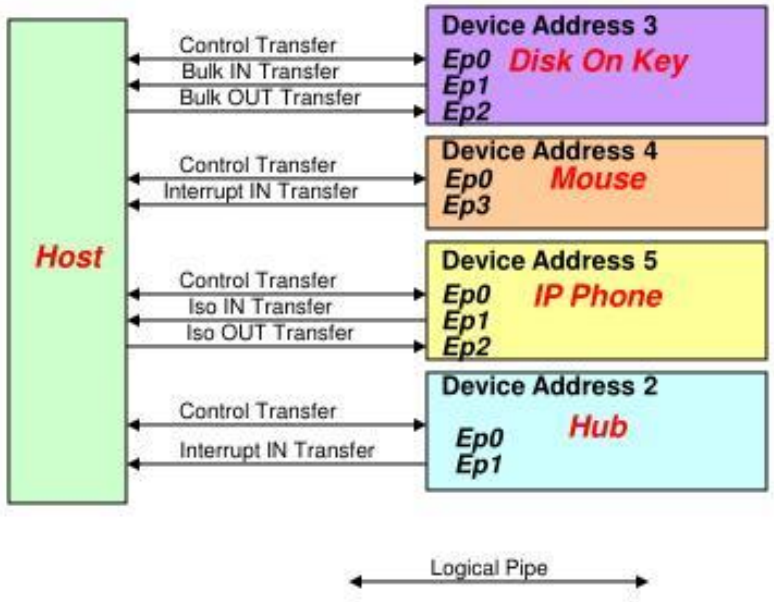
- Control: configuration/command/status type communication
- Bulk: large amounts of data at highly variable times
- Isochronous: constant-rate, error tolerant transfers
- Interrupt: send or receive data infrequently but with bounded service periods

ATMEL USB Tutorial

USB pipes

- Device address is affected by the host
- Endpoint configuration depends on the device implementation
- Time multiplexing of transfer is under host control

Transfer	F/S	Bulk	ADDR	ENDP	Bytes Transferred
20	S	OUT	2	1	31
21	S	IN	2	2	36
22	S	IN	2	2	13
23	S	OUT	2	1	31

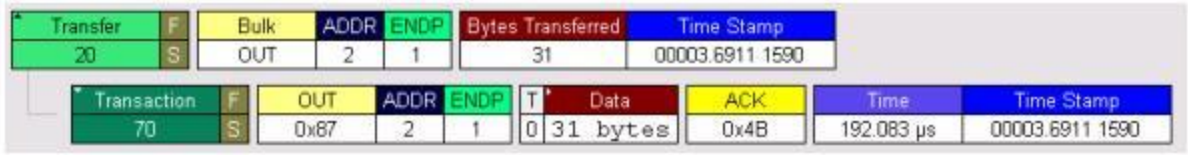


7

USB transactions

- A transfer is composed of one or several transactions
- Example of control transfer (several transactions)

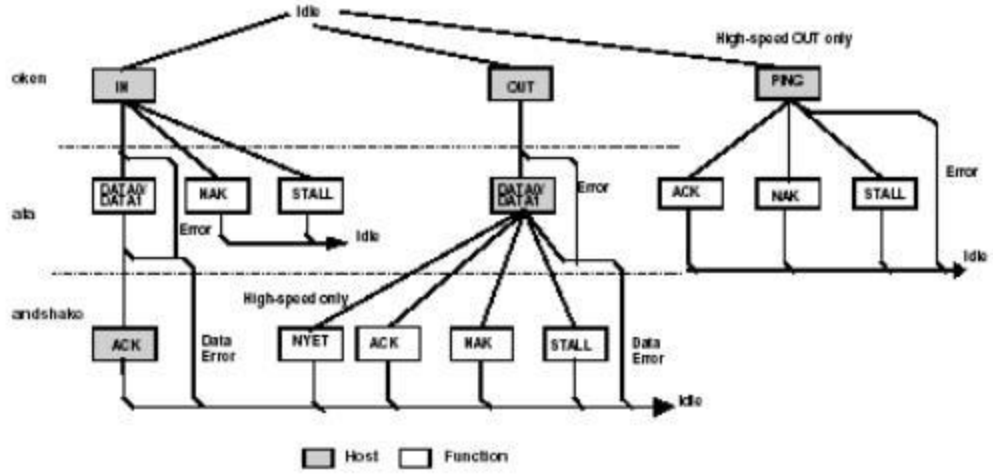
- Example of bulk transfer (one transaction)

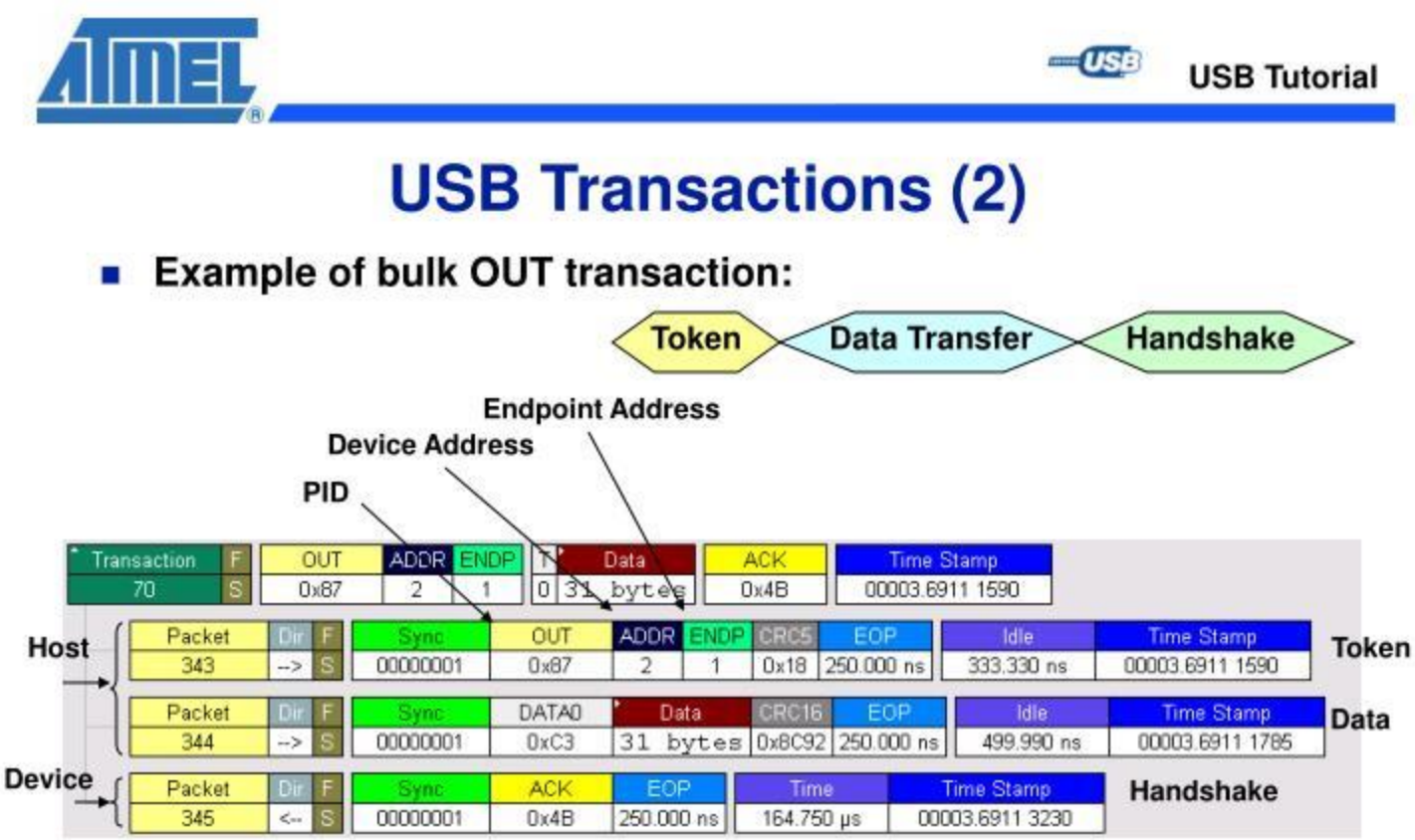


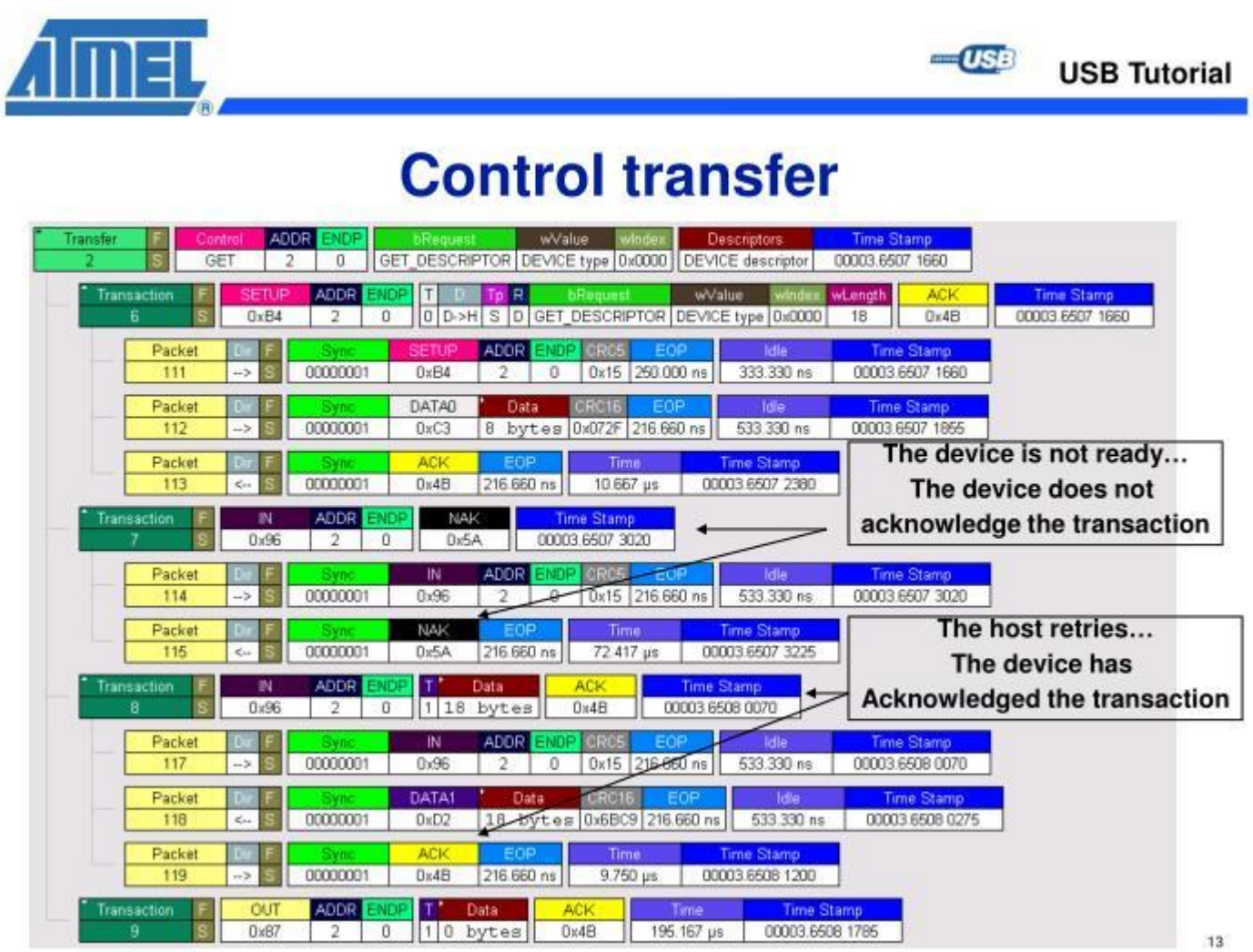
USB Transactions (1)

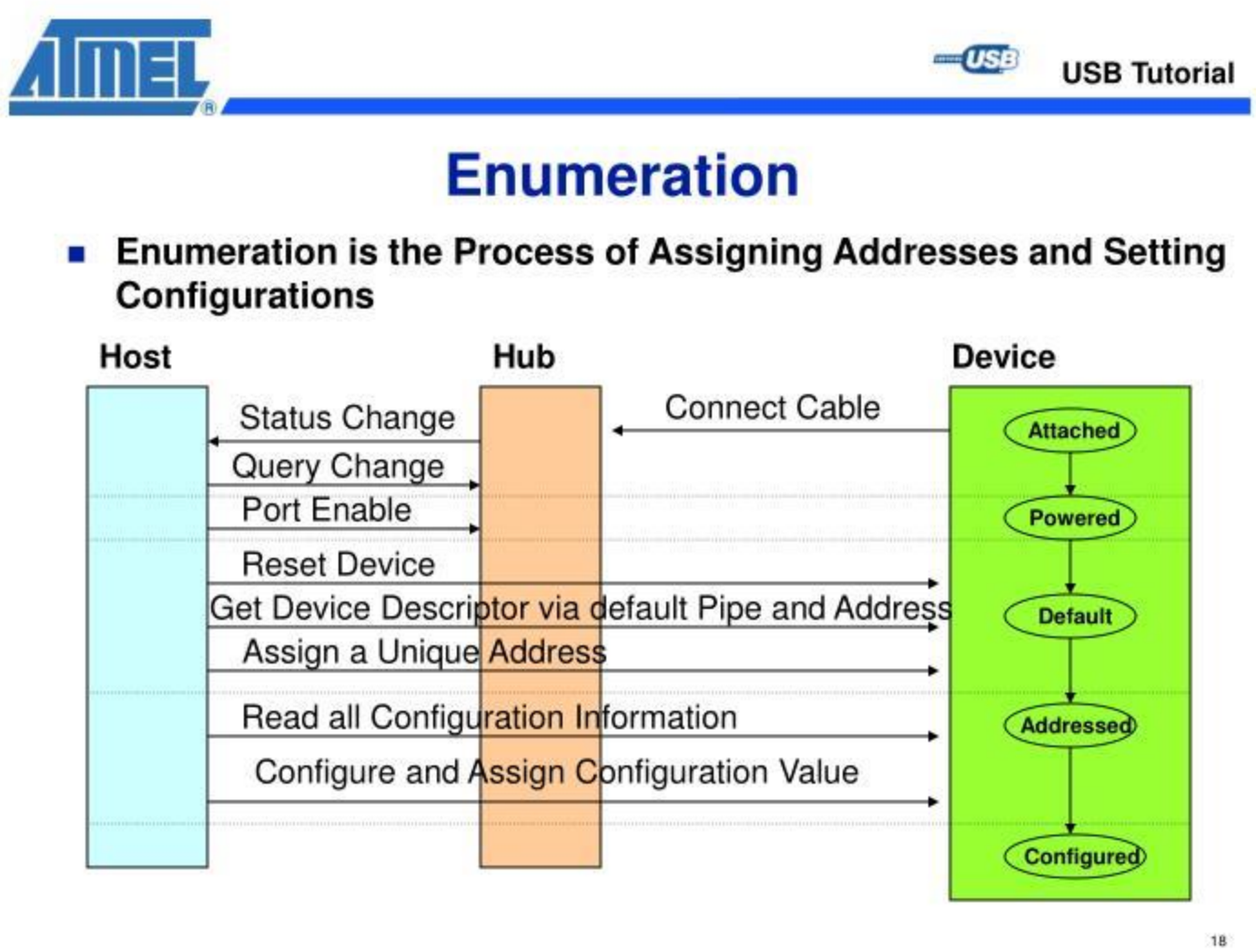
- **A transaction is made of 3 packets**
  - Token: device address, endpoint number, transfer type
  - Data : data to be sent
  - Handshake: acknowledge

- **Example of bulk transaction:**




USB Tutorial
USB Transactions (2)
Example of bulk OUT transaction:
Token
Data Transfer
Handshake
Endpoint Address
Device Address
PID
Transaction
70
OUT
0x87
ADDR
2
ENDP
1
Data
0 31 bytes
ACK
0x4B
Time Stamp
00003.6911 1590
Host
Device
Packet
343
Dir
-->
Sync
00000001
OUT
0x87
ADDR
2
ENDP
1
CRC5
0x18
EOP
250.000 ns
Idle
333.330 ns
Time Stamp
00003.6911 1590
Token
Packet
344
Dir
-->
Sync
00000001
DATA0
0xC3
Data
31 bytes
CRC16
0x8C92
EOP
250.000 ns
Idle
499.990 ns
Time Stamp
00003.6911 1785
Data
Packet
345
Dir
<--
Sync
00000001
ACK
0x4B
EOP
250.000 ns
Time
164.750 µs
Time Stamp
00003.6911 3230
Handshake
11


USB Tutorial
Control transfer
Transfer 2 | Control GET | ADDR 2 | ENDP 0 | bRequest GET_DESCRIPTOR | wValue DEVICE type | windex 0x0000 | Descriptors DEVICE descriptor | Time Stamp 00003.6507 1660
Transaction 6 | SETUP 0xB4 | ADDR 2 | ENDP 0 | T 0 | D D->H | Tp S | R D | bRequest GET_DESCRIPTOR | wValue DEVICE type | windex 0x0000 | wLength 18 | ACK 0x4B | Time Stamp 00003.6507 1660
Packet 111 --> S | Sync 00000001 | SETUP 0xB4 | ADDR 2 | ENDP 0 | CRC5 0x15 | EOP 250.000 ns | Idle 333.330 ns | Time Stamp 00003.6507 1660
Packet 112 --> S | Sync 00000001 | DATA0 0xC3 | Data 8 bytes | CRC16 0x072F | EOP 216.660 ns | Idle 533.330 ns | Time Stamp 00003.6507 1855
Packet 113 <-- S | Sync 00000001 | ACK 0x4B | EOP 216.660 ns | Time 10.667 µs | Time Stamp 00003.6507 2380
Transaction 7 | IN 0x96 | ADDR 2 | ENDP 0 | NAK 0x5A | Time Stamp 00003.6507 3020
Packet 114 --> S | Sync 00000001 | IN 0x96 | ADDR 2 | ENDP 0 | CRC5 0x15 | EOP 216.660 ns | Idle 533.330 ns | Time Stamp 00003.6507 3020
Packet 115 <-- S | Sync 00000001 | NAK 0x5A | EOP 216.660 ns | Time 72.417 µs | Time Stamp 00003.6507 3225
Transaction 8 | IN 0x96 | ADDR 2 | ENDP 0 | T 1 | Data 18 bytes | ACK 0x4B | Time Stamp 00003.6508 0070
Packet 117 --> S | Sync 00000001 | IN 0x96 | ADDR 2 | ENDP 0 | CRC5 0x15 | EOP 216.660 ns | Idle 533.330 ns | Time Stamp 00003.6508 0070
Packet 118 <-- S | Sync 00000001 | DATA1 0xD2 | Data 18 bytes | CRC16 0x6BC9 | EOP 216.660 ns | Idle 533.330 ns | Time Stamp 00003.6508 0275
Packet 119 --> S | Sync 00000001 | ACK 0x4B | EOP 216.660 ns | Time 9.750 µs | Time Stamp 00003.6508 1200
Transaction 9 | OUT 0x87 | ADDR 2 | ENDP 0 | T 1 | Data 0 bytes | ACK 0x4B | Time 195.167 µs | Time Stamp 00003.6508 1785
The device is not ready…
The device does not
acknowledge the transaction
The host retries…
The device has
Acknowledged the transaction
13


USB Tutorial
Enumeration
Enumeration is the Process of Assigning Addresses and Setting Configurations
Host
Hub
Device
Status Change
Connect Cable
Query Change
Port Enable
Reset Device
Get Device Descriptor via default Pipe and Address
Assign a Unique Address
Read all Configuration Information
Configure and Assign Configuration Value
Attached
Powered
Default
Addressed
Configured
18

USB Tutorial

Enumeration trace

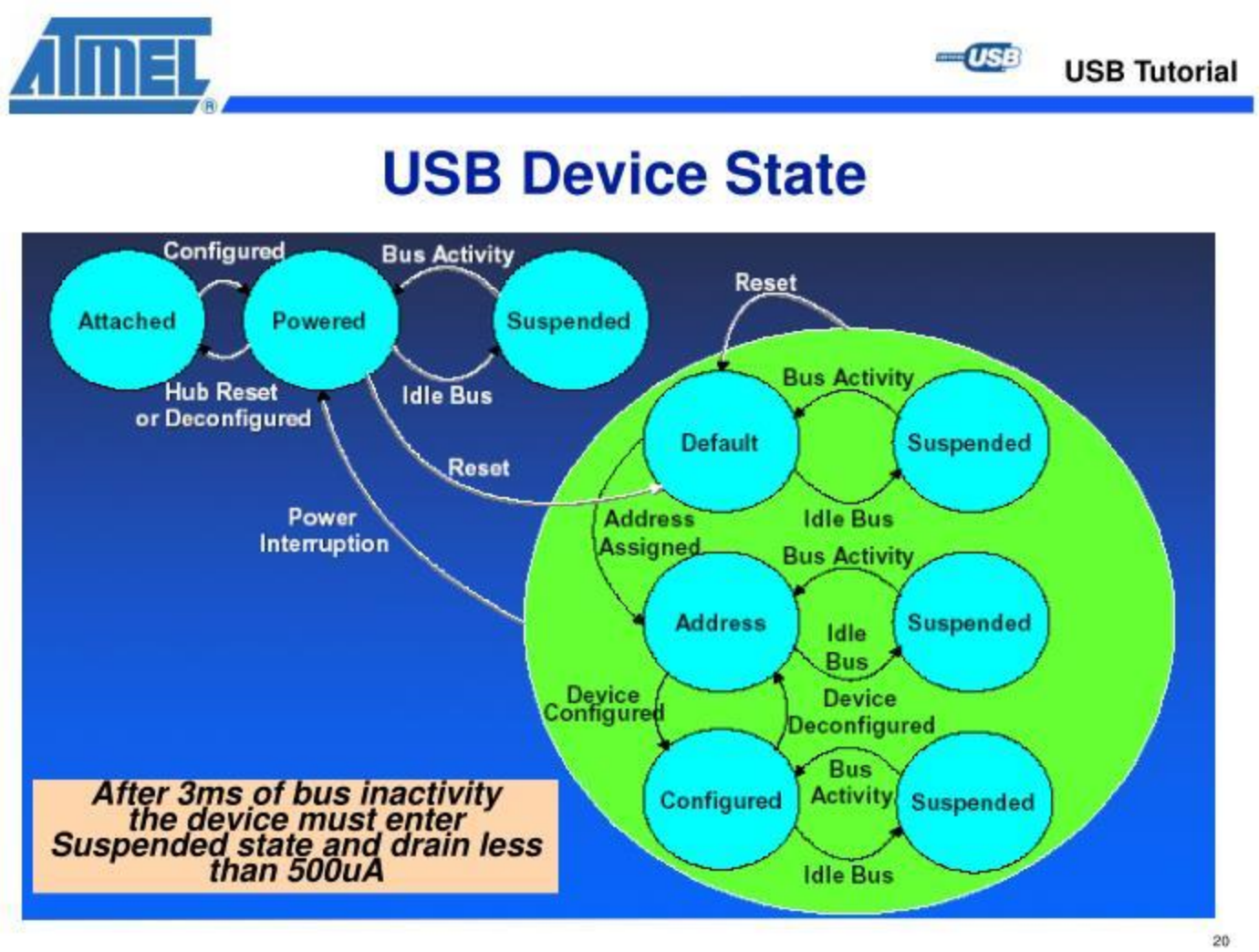
Reset								15.036 ms	Idle 1387	
Transfer 1	Control SET	ADDR 0	ENDP 0	bRequest SET_ADDRESS	wValue New address 3			Time 5.998 ms		
Transfer 2	Control GET	ADDR 3	ENDP 0	bRequest GET_DESCRIPTOR	wValue DEVICE type	wIndex 0x0000	Descriptors DEVICE descriptor	Time 5.999 ms		
Transfer 3	Control GET	ADDR 3	ENDP 0	bRequest GET_DESCRIPTOR	wValue CONFIGURATION type	wIndex 0x0000	Descriptors CONFIGURATION descriptor	Time 4.999 ms		
Transfer 4	Control GET	ADDR 3	ENDP 0	bRequest GET_DESCRIPTOR	wValue CONFIGURATION type	wIndex 0x0000	Descriptors 4 descriptors	Time 10.998 ms		
Transfer 5	Control GET	ADDR 3	ENDP 0	bRequest GET_DESCRIPTOR	wValue DEVICE type	wIndex 0x0000	Descriptors DEVICE descriptor	Time 6.999 ms		
Transfer 6	Control GET	ADDR 3	ENDP 0	bRequest GET_DESCRIPTOR	wValue CONFIGURATION type	wIndex 0x0000	Descriptors CONFIGURATION descriptor	Time 5.999 ms		
Transfer 7	Control GET	ADDR 3	ENDP 0	bRequest GET_DESCRIPTOR	wValue CONFIGURATION type	wIndex 0x0000	Descriptors 4 descriptors	Time 9.998 ms		
Transfer 8	Control SET	ADDR 3	ENDP 0	bRequest SET_CONFIGURATION	wValue New configuration 1			Time 2.999 ms		
Transfer 9	Control SET	ADDR 3	ENDP 0	bRequest 0x0A	wValue 0x0000	wIndex 0x0000	Time 2.999 ms			
Transfer 10	Control GET	ADDR 3	ENDP 0	bRequest GET_DESCRIPTOR	wValue Descriptor type 0x22, Index 0	wIndex 0x0000	Descriptors HID Report descriptor	Time 16.997 ms		
Transaction 57	IN 0x96	ADDR 3	ENDP 1	NAK 0x5A	Time 7.999 ms					

Default Address, default control endpoint

Enter Address State

Enter Configured State

19

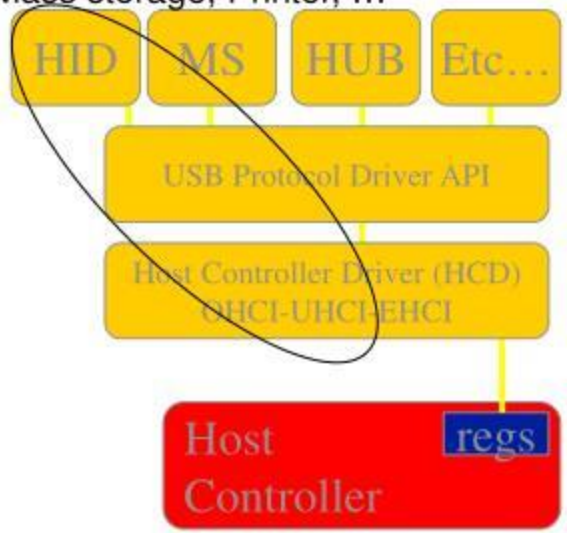

ATMEL
USB
USB Tutorial
USB Device State
Configured
Bus Activity
Attached
Powered
Suspended
Reset
Hub Reset
or Deconfigured
Idle Bus
Reset
Power
Interruption
Bus Activity
Default
Suspended
Address
Assigned
Idle Bus
Bus Activity
Address
Idle
Bus
Suspended
Device
Configured
Device
Deconfigured
Bus
Activity
Configured
Suspended
Idle Bus
After 3ms of bus inactivity
the device must enter
Suspended state and drain less
than 500uA
20

Host software architecture

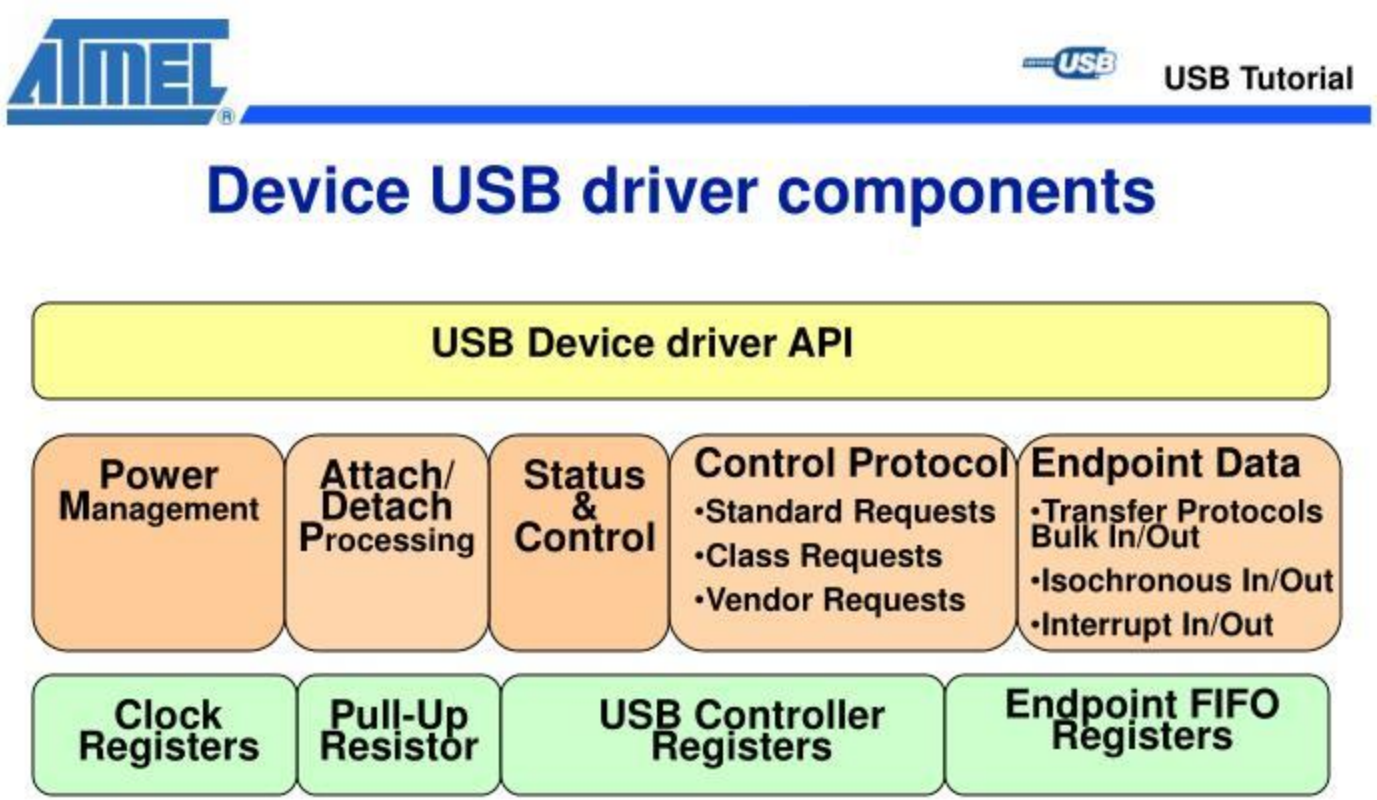
Linux and WIN CE provide

- ✓ OHCI/UHCI/EHCI HCD driver
- ✓ USBD Driver
- ✓ Main class drivers: Hub, HID, Mass storage, Printer, …

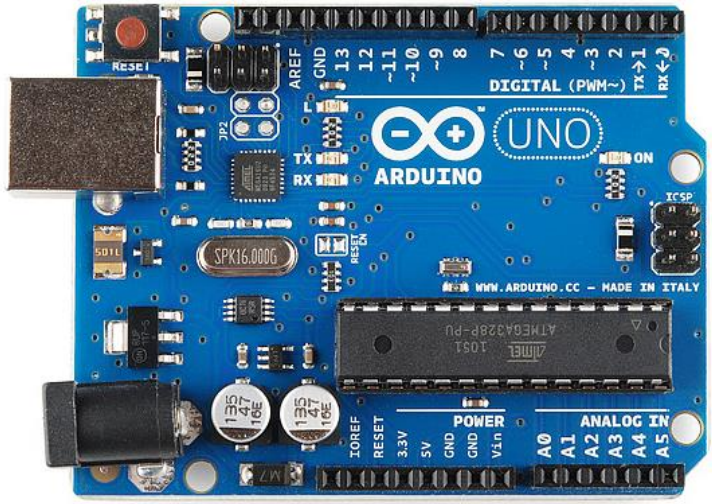
- **Symbian and RTOS does not provide USB host stack driver**
- **SW IPs providers are able to provide solutions for RTOS**
  - ✓Softconnex, Philog, …
  - ✓Expensive: (65k$ for a mass storage solution)
- **It is still possible to build a mini host from our full host:**
  - ✓the SW is only able to drive some kinds of devices



22

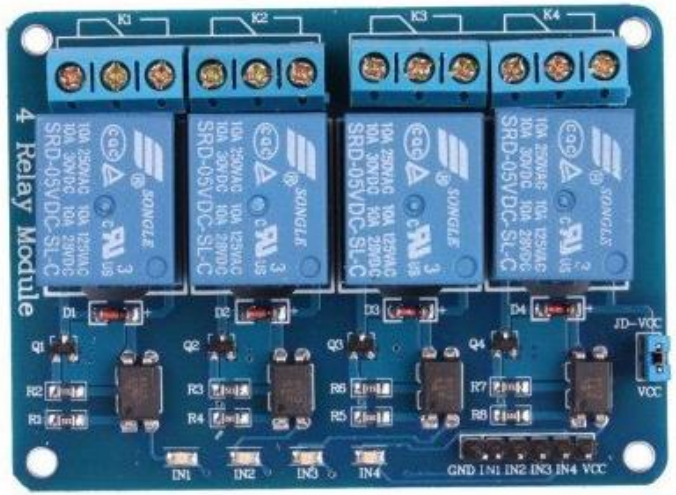

USB Tutorial
Device USB driver components
USB Device driver API
Power Management
Attach/ Detach Processing
Status & Control
Control Protocol
•Standard Requests
•Class Requests
•Vendor Requests
Endpoint Data
•Transfer Protocols Bulk In/Out
•Isochronous In/Out
•Interrupt In/Out
Clock Registers
Pull-Up Resistor
USB Controller Registers
Endpoint FIFO Registers
23

Arduino UNO



USB Host Shield

Relé Shield Arduino

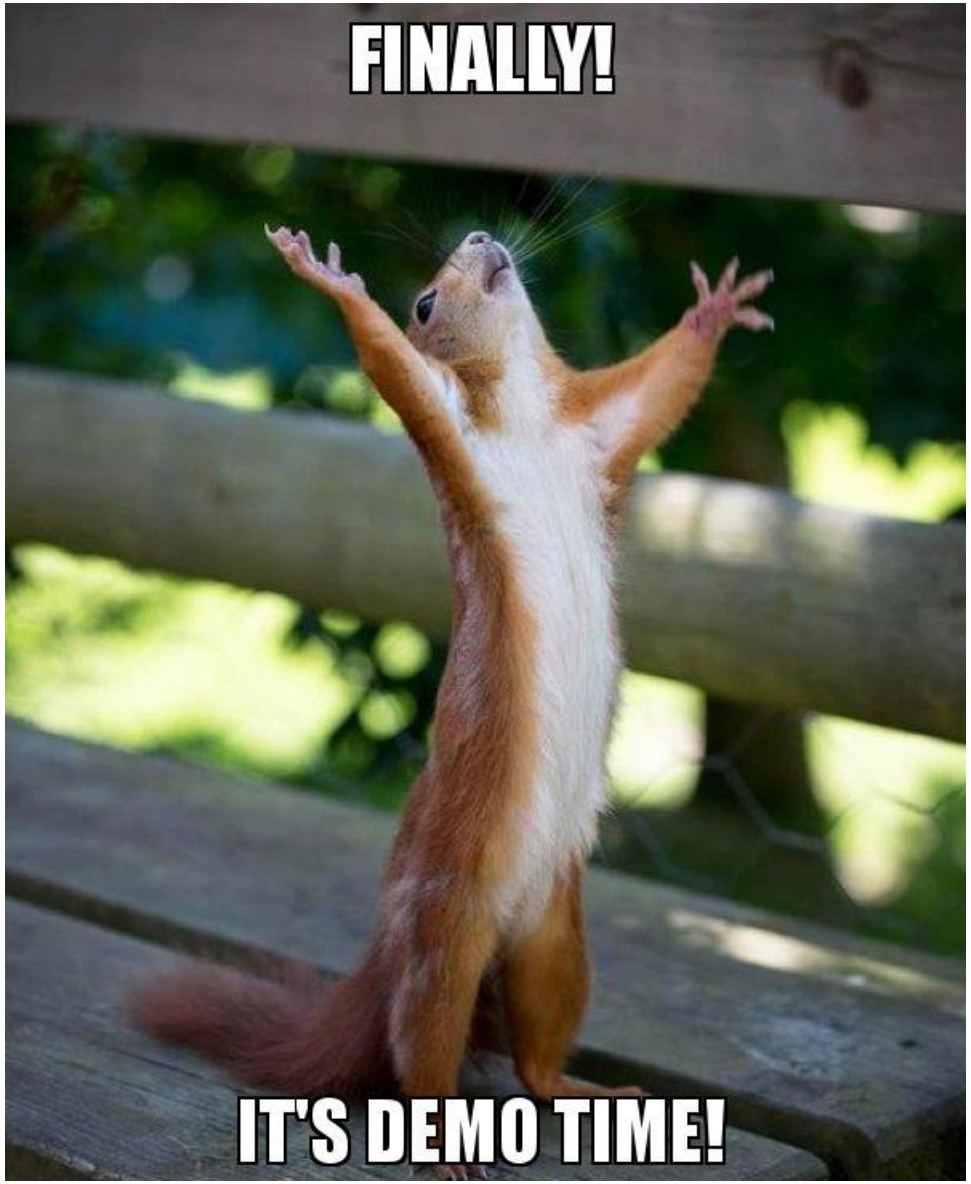


Host usb Shield mini

ESP8266

Módulo relés SSD

Let's tweet !!



Duck Hunt (jugando a cazar patos)

¡¡Muchas gracias!!

HACK &BEERS by #C0NPilar©

SOPHOS