

# Making money with Project Fugu

building a cash register  
with web technologies



Hi, my name is  
Niels Leenheer

The logo for salonhub features two overlapping squares on the left: an orange square on top and a green square on the bottom. To the right of these squares, the word "salonhub" is written in a clean, black, lowercase sans-serif font.

salonhub



Not a real hairstylist



Not even  
connected to  
power



Just a random  
expired  
bank card



Not a real  
customer



Inbox

Salonhub at Google I/O Connect - Hi Niels,

Inbox

Salonhub at Google I/O Connect - Hi Niels,

# Project Fugu



# Window Management

WebHID

WebBluetooth

Project Fugu

WebUSB

WebSerial

Oh, and could we do it in 4 weeks..

Two weeks later..

Employee: **Stefan**

Womans Cut & Steam Mask	€ 95,00
<b>Elvive Multivitamines 2-in-1 Shampoo 250 ml</b>	<b>€ 5,39</b>
<b>Total</b>	<b>€ 100,39</b>

Card Cash

Discount Points

Product

Studio Line Remix Haarwax 150 ml	€ 6,29
Studio Line Invisi Fix 24h Gel 150 ml	€ 5,79
<b>Elvive Multivitamines 2-in-1 Shampoo 250 ml</b>	<b>€ 5,39</b>
Studio Line Invisi Fix Clean Sculpting Paste 75 ml	€ 4,29

Price: 5,39

Amount: 1 - +

Employee: Stefan

Womans Cut & Steam Mask	€ 95,00
<b>Elvive Multivitamines 2-in-1 Shampoo 250 ml</b>	<b>€ 5,39</b>
Total	€ 100,39

Card Cash

Discount Points

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Studio Line Invisi Fix Clean Sculpting Paste 75 ml	€ 4,29

Price: 5,39

Amount: 1





Payment solutions

Web

Eats  
Angular classic games

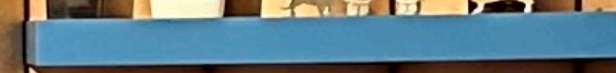
JiveCity

Cloud

# Connect







Demo

# Building a cash register with web technologies

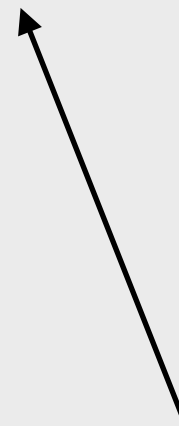


# Receipt printer



```
let device = await navigator.usb.requestDevice({  
  filters: [ { vendorId: 0x04b8 } ]  
});
```

Seiko Epson Corp.

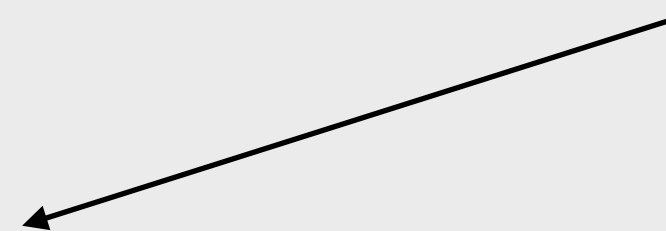




```
let device = await navigator.usb.requestDevice({  
  filters: { vendorId: 0x04b8 }  
});
```

```
await device.open();  
await device.claimInterface(0);  
await device.transferOut(1, payload);
```

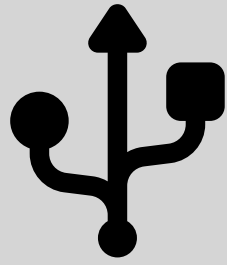
Interface



Endpoint

Endpoint? Inter...what?

# USB device enumeration explained, the TL;DR version



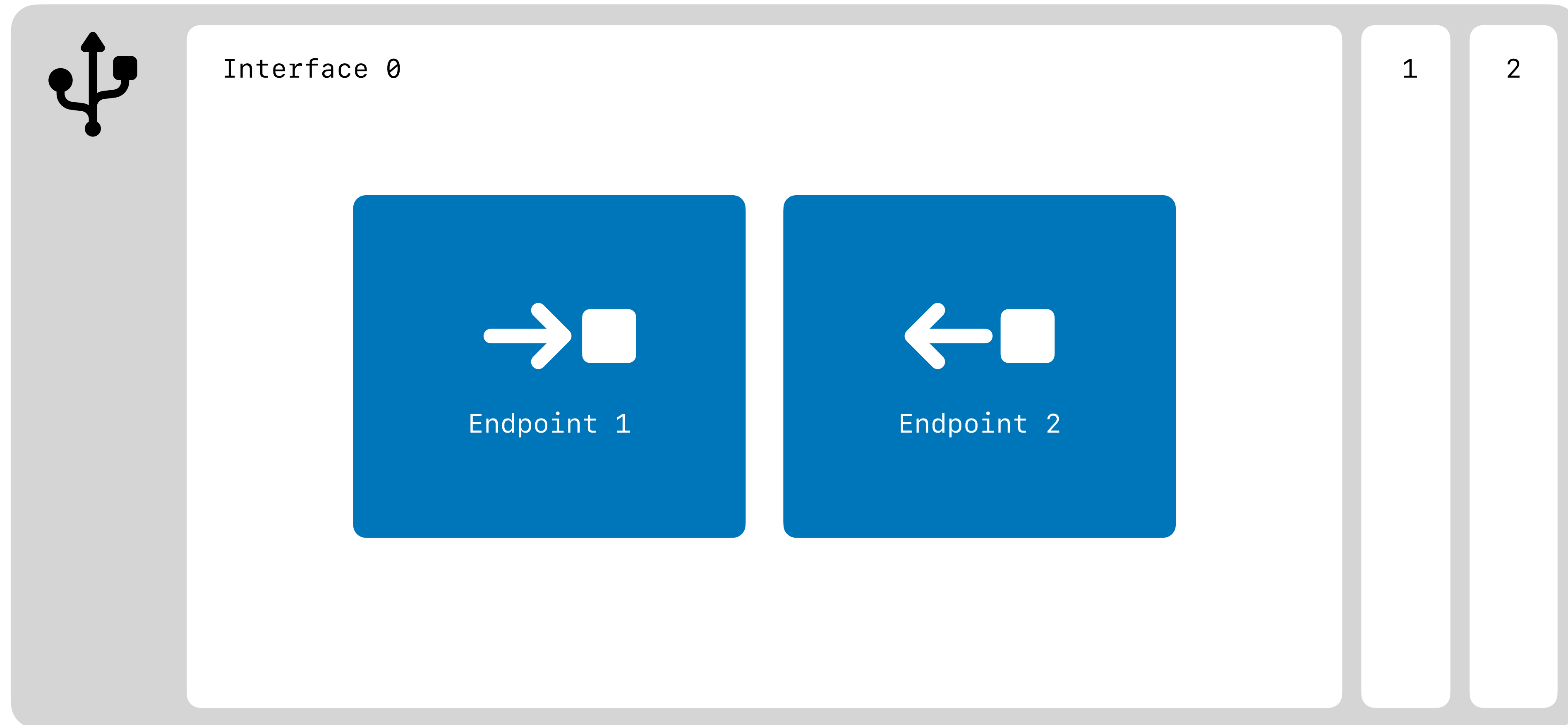
Interface 0



# USB device enumeration explained, the TL;DR version



# USB device enumeration explained, the TL;DR version





```
let device = await navigator.usb.requestDevice({  
  filters: { vendorId: 0x04b8 }  
});
```

```
await device.open();  
await device.claimInterface(0);  
await device.transferOut(1, payload);
```

Project Fugu allows us to talk to receipt printers,  
but we still need to learn their language

Welcome to  
**HalfStack Vienna**

Gutentag Österreich!

Welcome to  
HalfStack Vienna  
Gutentag österreich!

```
const root = ReactDOM.createRoot(document.getElementById('root'));
const element = <div>
  <div>Welcome to</div>
  <div style={{font-weight: "bold"}}>HalfStack Vienna</div>
  <div></div>
  <div>Gutentag Österreich!</div>
</div>;

root.render(element);
```

Welcome to `<br>`

`<b>`HalfStack Vienna`</b>``<br>`

`<br>`

Gutentag Österreich!

Epson TM-930



\*\*\*\*\*  
YOUR RECEIPT Thank You  
Call again  
\*\*\*\*\*  
No. 6022  
SALE  
0030 21210 03001 05111  
1234567 CHOCOLATE 2.50  
1234569 SUGAR 2.75  
1.75

897418  
Served by PALL 25/08/90  
1 V.S.O.P  
2  
(DINNER)  
\*\*\*\*\* SALE SLIP \*\*\*\*\*  
2 2.40 4.80

(\*)+/- /0123456789:;<=>?@ABCDE  
(\*)+/- /0123456789:;<=>?@ABCDE  
(\*)+/- /0123456789:;<=>?@ABCDE  
BCDEF  
DEF

1 SOUP OF BRY  
2 STEAK ON STEAK  
3 MIX SALAD  
4 FRUIT SANDY  
FOOD 1.10  
6.50  
1.40  
1.50  
SUBTOTAL 21.15  
CASH 21.15  
12SEP'90#008000255353 1125.R 10.50



## ascii

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	.A	.B	.C	.D	.E	.F
0.	NUL	SOH	STX	ETX	EOT	ENQ	ACK	BEL	BS	HT	LF	VT	FF	CR	SO	SI
1.	DLE	DC1	DC2	DC3	DC4	NAK	SYN	ETB	CAN	EM	SUB	ESC	FS	GS	RS	US
2.		!	"	#	\$	%	&	'	(	)	*	+	,	-	.	/
3.	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
4.	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5.	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
6.	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7.	p	q	r	s	t	u	v	w	x	y	z	{		}	~	DEL

ascii

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	.A	.B	.C	.D	.E	.F
0.	NUL	SOH	STX	ETX	EOT	ENQ	ACK	BEL	BS	HT	LF	VT	FF	CR	SO	SI
1.	DLE	DC1	DC2	DC3	DC4	NAK	SYN	ETB	CAN	EM	SUB	ESC	FS	GS	RS	US
2.		!	"	#	\$	%	&	'	( )	*	+	,	-	.	/	
3.	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
4.	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5.	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
6.	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7.	p	q	r	s	t	u	v	w	x	y	z	{		}	~	DEL

Welcome to <sup>0A</sup>  
LF

HalfStack Vienna <sup>0A</sup>  
LF

<sup>0A</sup>  
LF

Gutentag Österreich! <sup>0A</sup>  
LF

ascii

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	.A	.B	.C	.D	.E	.F
0.	NUL	SOH	STX	ETX	EOT	ENQ	ACK	BEL	BS	HT	LF	VT	FF	CR	SO	SI
1.	DLE	DC1	DC2	DC3	DC4	NAK	SYN	ETB	CAN	EM	SUB	ESC	FS	GS	RS	US
2.		!	"	#	\$	%	&	'	(	)	*	+	,	-	.	/
3.	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
4.	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5.	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
6.	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7.	p	q	r	s	t	u	v	w	x	y	z	{		}	~	DEL

Welcome to <sup>0A</sup>  
LF

<sup>1B 45 01</sup> ESC E 1 HalfStack Vienna <sup>1B 45 00</sup> ESC E 0 <sup>0A</sup> LF

<sup>0A</sup>  
LF

Gutentag Osterreich! <sup>0A</sup>  
LF

## Text formatting

ESC	E	n	Emphasis
ESC	4	n	Italic
ESC	-	n	Underline
GS	!	n	Size
GS	B	n	Reverse print
ESC	M	n	Font

## Images and barcodes

GS	k	m	n	...	Barcode			
GS	(	k	pL	pH	cn	fn	...	QR code
ESC	*	m	nL	nH	...	Image		

## Layout

ESC	a	n	Text alignment
-----	---	---	----------------

Welcome to <sup>0A</sup>  
LF

<sup>1B 45 01</sup>  
ESC E 1 HalfStack Vienna <sup>1B 45 00</sup> ESC E 0 <sup>0A</sup> LF

<sup>0A</sup>  
LF

Gutentag Osterreich! <sup>0A</sup>  
LF

<sup>1D 56 00</sup>  
GS V 0

<sup>1B 40</sup>  
**ESC** **@** Welcome to <sup>0A</sup>  
**LF**

<sup>1B 45 01</sup>  
**ESC** **E** **1** HalfStack Vienna <sup>1B 45 00</sup> **ESC** **E** **0** <sup>0A</sup>  
**LF**

<sup>0A</sup>  
**LF**

Gutentag Osterreich! <sup>0A</sup>  
**LF**

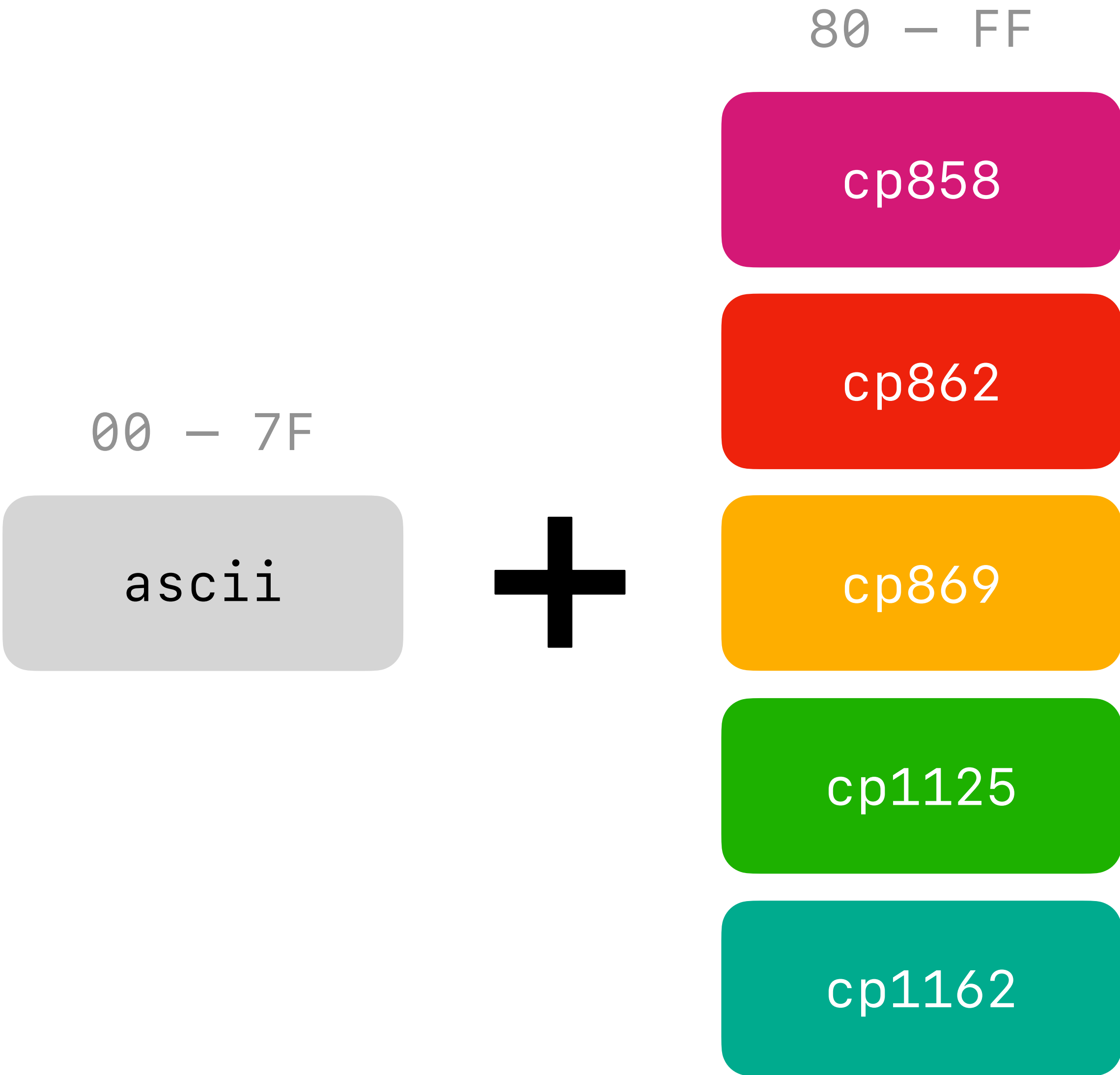
<sup>1D 56 00</sup>  
**GS** **V** **0**



# Internationalisation before Unicode

## ascii

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	.A	.B	.C	.D	.E	.F
0.	NUL	SOH	STX	ETX	EOT	ENQ	ACK	BEL	BS	HT	LF	VT	FF	CR	SO	SI
1.	DLE	DC1	DC2	DC3	DC4	NAK	SYN	ETB	CAN	EM	SUB	ESC	FS	GS	RS	US
2.		!	"	#	\$	%	&	'	(	)	*	+	,	-	.	/
3.	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
4.	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5.	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
6.	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7.	p	q	r	s	t	u	v	w	x	y	z	{		}	~	DEL



cp858

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	.A	.B	.C	.D	.E	.F
8.	Ç	ü	é	â	ä	à	å	ç	ê	ë	è	ï	î	ì	Ä	Å
9.	É	æ	Æ	ô	ö	ò	û	ù	ÿ	Ö	Ü	ø	£	Ø	×	f
A.	á	í	ó	ú	ñ	Ñ	ª	º	¿	®	¬	½	¼	¡	«	»
B.	■	■	■		┴	Á	Â	À	©	┼		┐	┌	¢	¥	└
C.	L	┴	┬	┬	—	+	ã	Ã	└	┐	┼	┬	┼	—	+	⌘
D.	ď	Đ	Ê	Ë	È	€	í	î	ï	└	┐	■	■	!	ì	■
E.	Ó	β	Ô	Ò	õ	Õ	μ	þ	Ɔ	Ú	Û	Ù	ý	Ý	-	'
F.	SHY	±	=	¾	¶	§	÷	,	°	¨	.	1	3	2	■	NBSP

cp862

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	.A	.B	.C	.D	.E	.F
8.	א	ב	ג	ד	ה	ו	ז	ח	ט	י	ך	כ	ל	ם	מ	ן
9.	נ	ס	ע	ף	פ	ץ	צ	ק	ר	ש	ת	¢	£	¥	₪	f
A.	á	í	ó	ú	ñ	Ñ	ª	º	¿	®	¬	½	¼	¡	«	»
B.					┌	Á	Â	À	©	⊥		└	┘	¢	¥	¬
C.	L	┌	┐	└	—	+	ã	Ã	└	┘	⊥	⊥	└	—	⊥	⊥
D.	⊥	⊥	⊥	└	└	┘	┘	⊥	⊥	└	└	■	■	■	■	■
E.	α	β	Γ	π	Σ	σ	μ	τ	Φ	Θ	Ω	δ	∞	φ	ε	∩
F.	≡	±	≥	≤	∫	J	÷	≈	◦	•	•	√	n	²	■	NBSP

cp869

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	.A	.B	.C	.D	.E	.F
8.							À	€	·	¬	¡	'	'	Έ	—	Ή
9.	ı	ï	Ό			Υ	ÿ	©	Ω	²	³	ά	£	έ	ή	ί
A.	ï	ï	ό	ύ	Α	Β	Γ	Δ	Ε	Ζ	Η	½	Θ	Ι	«	»
B.					⊥	Κ	Λ	Μ	Ν	⊥		⊥	⊥	≡	Ο	⊥
C.	L	⊥	⊥	⊥	—	+	Π	Ρ	⊥	⊥	⊥	⊥	⊥	⊥	⊥	Σ
D.	Τ	Υ	Φ	Χ	Ψ	Ω	α	β	γ	⊥	⊥			δ	ε	
E.	ζ	η	θ	ι	κ	λ	μ	ν	ξ	ο	π	ρ	σ	ς	τ	'
F.	SHY	±	υ	φ	χ	ξ	ψ	“	◦	¨	ω	ü	ÿ	ώ		NBSP

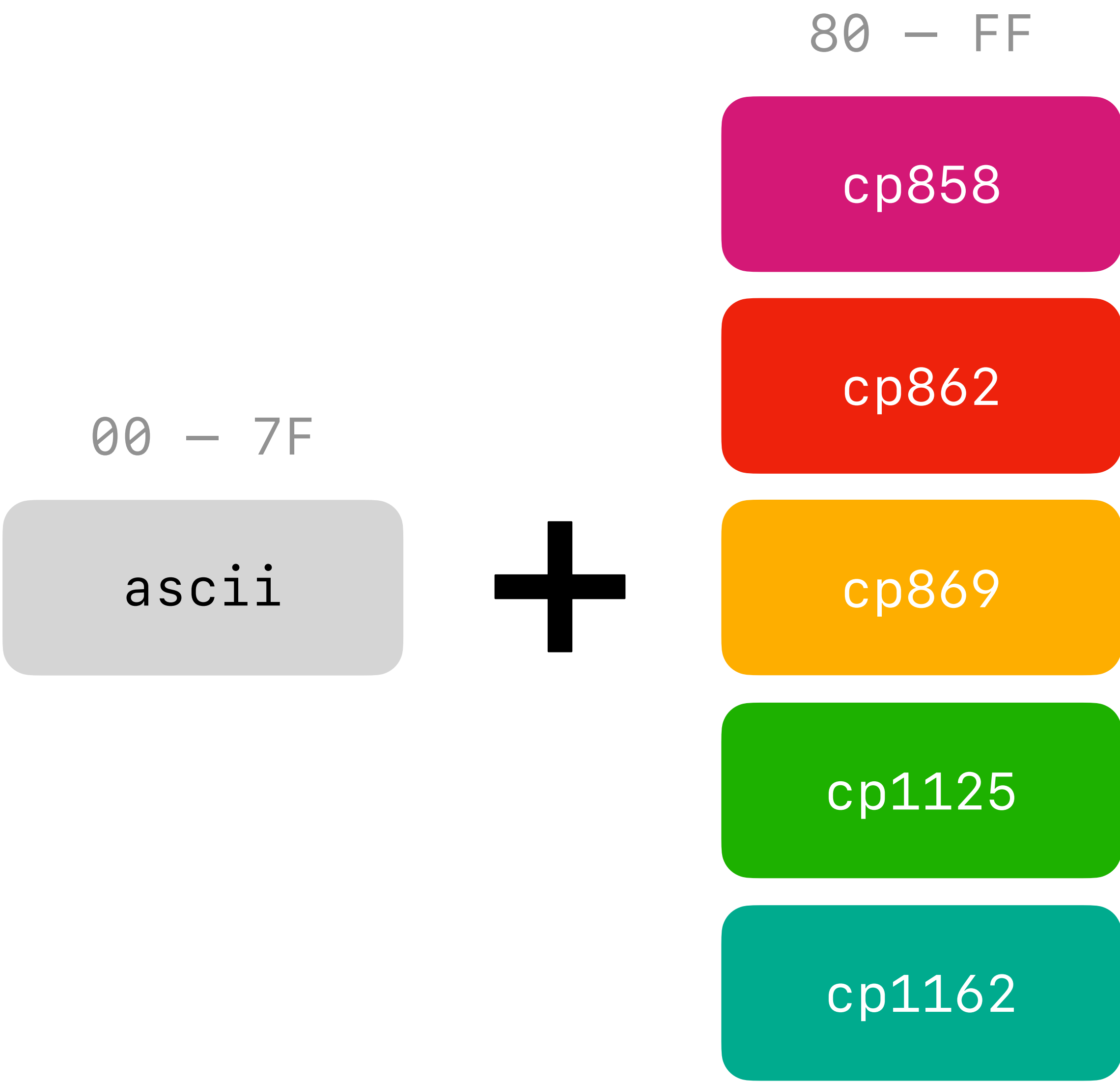
cp1125

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	.A	.B	.C	.D	.E	.F
8.	А	Б	В	Г	Д	Е	Ж	З	И	Й	К	Л	М	Н	О	П
9.	Р	С	Т	У	Ф	Х	Ц	Ч	Ш	Щ	Ъ	Ы	Ь	Э	Ю	Я
A.	а	б	в	г	д	е	ж	з	и	й	к	л	м	н	о	п
B.					┌	┐	└	┘	┙	┚		└	┘	┙	┚	└
C.	└	┌	┐	└	—	+	┐	└	└	┘	┐	└	┘	┐	┘	┐
D.	┐	┘	└	└	┘	┐	┘	┐	┘	┐	┘	■	■	■	■	■
E.	р	с	т	у	ф	х	ц	ч	ш	щ	ъ	ы	ь	э	ю	я
F.	Ё	ё	Г	г	Є	є	І	і	Ї	ї	·	√	Nº	Ɱ	■	NBSP

cp1162

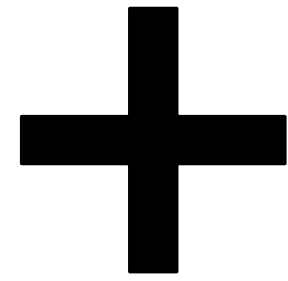
	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	.A	.B	.C	.D	.E	.F
8.	€					...										
9.		'	'	"	"	.	-	—								
A.	̀	ก	ข	ช	ค	ค	ฃ	ง	จ	ฉ	ช	ช	ฅ	ญ	ฎ	ฏ
B.	ฐ	ท	ฒ	ณ	ด	ต	ถ	ท	ธ	น	บ	ป	ผ	ฝ	พ	ฟ
C.	ภ	ม	ย	ร	ฤ	ล	ภ	ว	ศ	ษ	ส	ห	ฬ	อ	ฮ	ฯ
D.	๕	ั	า	ำ	ิ	ี	ึ	ุ	ู	ุ	็	๋	้	๊	๋	฿
E.	เ	แ	โ	ใ	ไ	า	ฯ	ั	็	๋	็	้	๊	๋	็	๐
F.	๐	๑	๒	๓	๔	๕	๖	๗	๘	๙	ฯ	☛	¢	└	┆	NBSP





00 - 7F

ascii



cp437	cp860	cp1119	cp3841	rk1048
cp720	cp861	cp1125	cp3843	windows1250
cp737	cp862	cp1162	cp3844	windows1251
cp775	cp863	cp2001	cp3845	windows1252
cp850	cp864	cp3001	cp3846	windows1253
cp851	cp865	cp3002	cp3847	windows1254
cp852	cp866	cp3011	cp3848	windows1255
cp853	cp869	cp3012	iso88591	windows1256
cp855	cp874	cp3021	iso88592	windows1257
cp857	cp1098	cp3041	iso88597	windows1258
cp858	cp1118	cp3840	iso885915	

<sup>1B 40</sup> ESC <sup>1B 74</sup> @ <sup>ESC t n=cp858</sup> Welcome to <sup>0A</sup> LF

<sup>1B 45 01</sup> ESC E 1 HalfStack Vienna <sup>1B 45 00</sup> ESC E 0 <sup>0A</sup> LF

<sup>0A</sup> LF

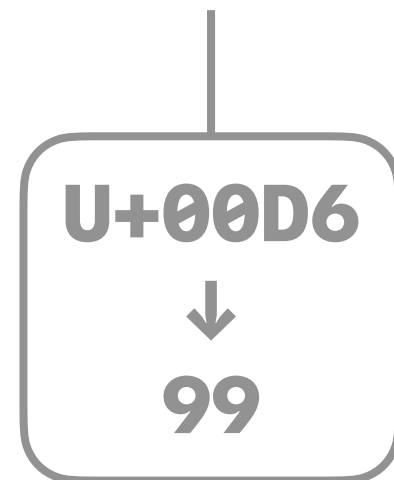
Gutentag Österreich! <sup>0A</sup> LF

<sup>1D 56 00</sup> GS V 0

<sup>1B 40</sup> ESC <sup>1B 74</sup> @ ESC t n=cp858 Welcome to <sup>0A</sup> LF  
<sup>1B 45 01</sup> ESC E 1 HalfStack Vienna <sup>1B 45 00</sup> ESC E 0 <sup>0A</sup> LF  
<sup>0A</sup> LF

Gutentag Österreich! <sup>0A</sup> LF

<sup>1D 56 00</sup> GS V 0



# CodepageEncoder

<https://github.com/NielsLeenheer/CodepageEncoder>



```
import CodepageEncoder from 'codepage-encoder';  
CodepageEncoder.encode('ξεσκεπάζω την ψυχοφθόρα βδελυγμία', 'cp869');
```

```
Uint8Array(33) [  
  232, 222, 236, 228, 222, 234, 155,  
  224, 250,  32, 238, 225, 231,  32,  
  246, 242, 244, 233, 243, 226, 162,  
  235, 214,  32, 215, 221, 222, 229,  
  242, 216, 230, 159, 214
```



Epson TM-88IV

00	cp437	03	cp860	2b	cp1119		35	rk1048	
20	cp720	23	cp861	2c	cp1125		2d	windows1250	
0e	cp737	24	cp862				2e	windows1251	
21	cp775	04	cp863				10	windows1252	
02	cp850	25	cp864				2f	windows1253	
0b	cp851	05	cp865				30	windows1254	
12	cp852	11	cp866				31	windows1255	
0c	cp853	26	cp869				32	windows1256	
22	cp855					27	iso88592	33	windows1257
0d	cp857	29	cp1098			0f	iso88597	34	windows1258
13	cp858	2a	cp1118			28	iso885915		



Bixolon SRP-350III

00	cp437	03	cp860			
		04	cp863			
02	cp850					
0b	cp851	05	cp865			
13	cp858					



Zjiang ZJ-5805

00	cp437	03	cp860	44	cp1119				
5d	cp720	38	cp861			4c	cp3843	48	windows1250
40	cp737	3e	cp862			4d	cp3844	49	windows1251
5f	cp775	04	cp863	53	cp2001	4e	cp3845	10	windows1252
02	cp850	3f	cp864	54	cp3001	4f	cp3846	5a	windows1253
41	cp851	05	cp865	55	cp3002	50	cp3847	5b	windows1254
12	cp852	11	cp866	56	cp3011	51	cp3848	20	windows1255
		42	cp869	57	cp3012			5c	windows1256
3c	cp855			58	cp3021				
3d	cp857			59	cp3041			5e	windows1258
13	cp858	45	cp1118	4a	cp3840				





Citizen CTS-310II

00	cp437	03	cp860			
		04	cp863			
02	cp850	28	cp864			10 windows1252
		05	cp865			
12	cp852	11	cp866			
08	cp857					
13	cp858					



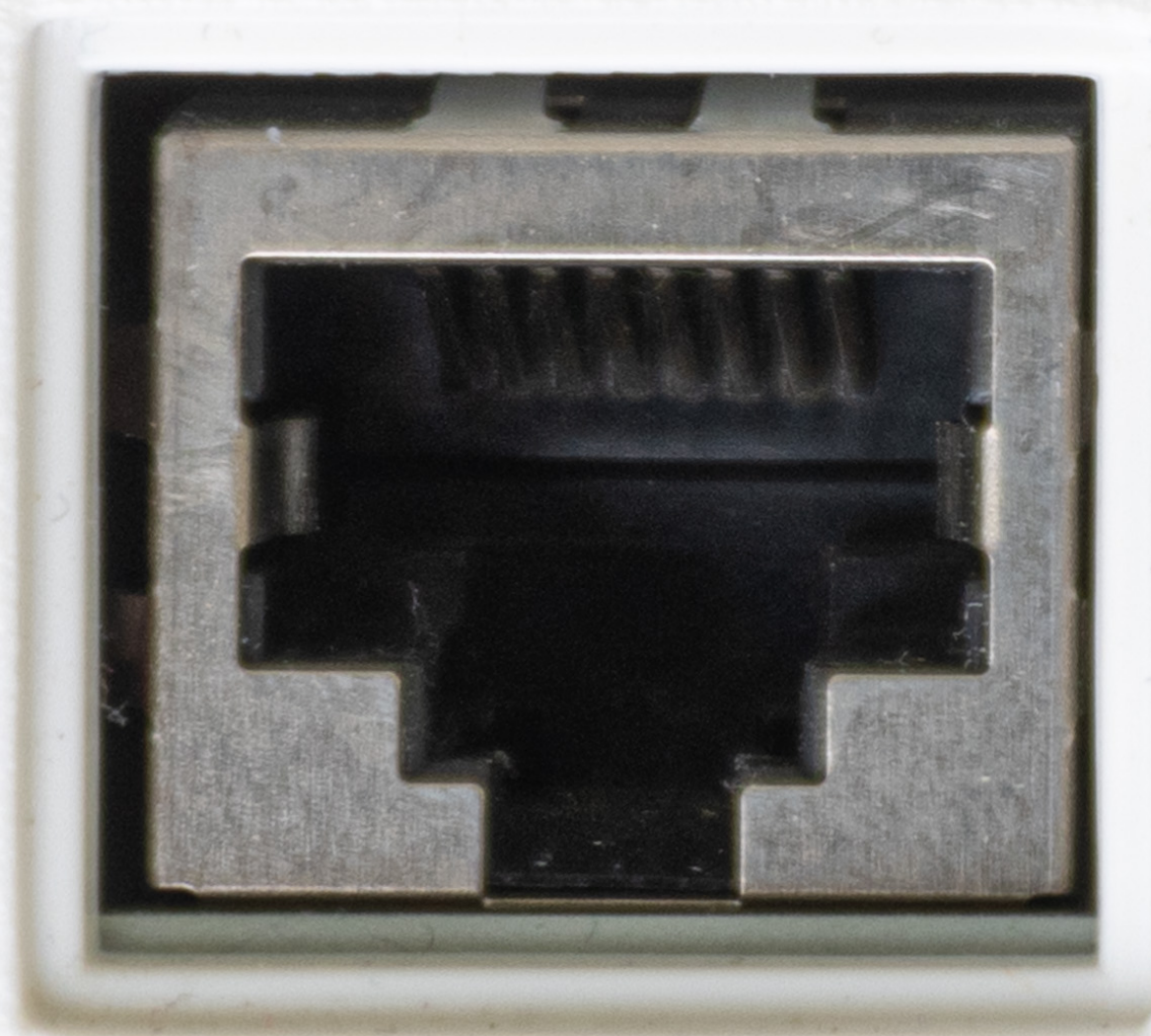
# Cash drawer

Send a pulse  
to the DK port

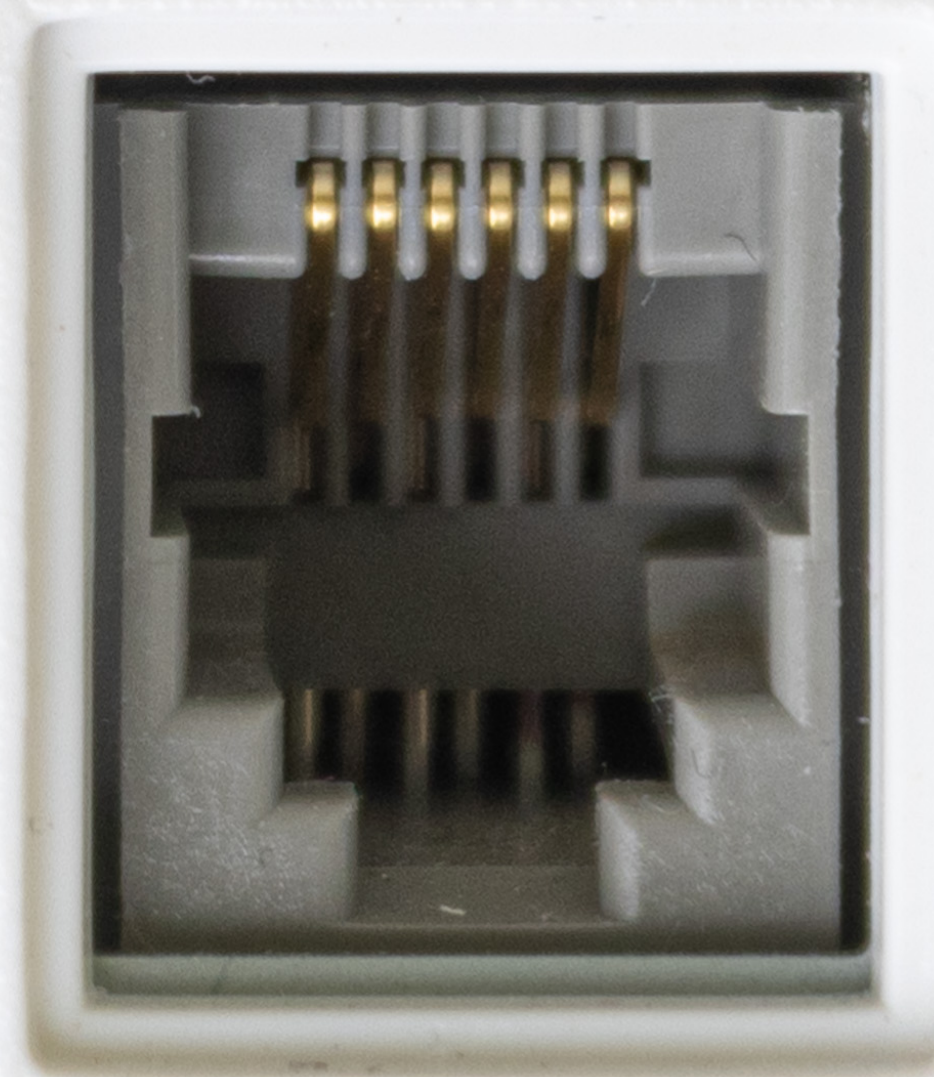
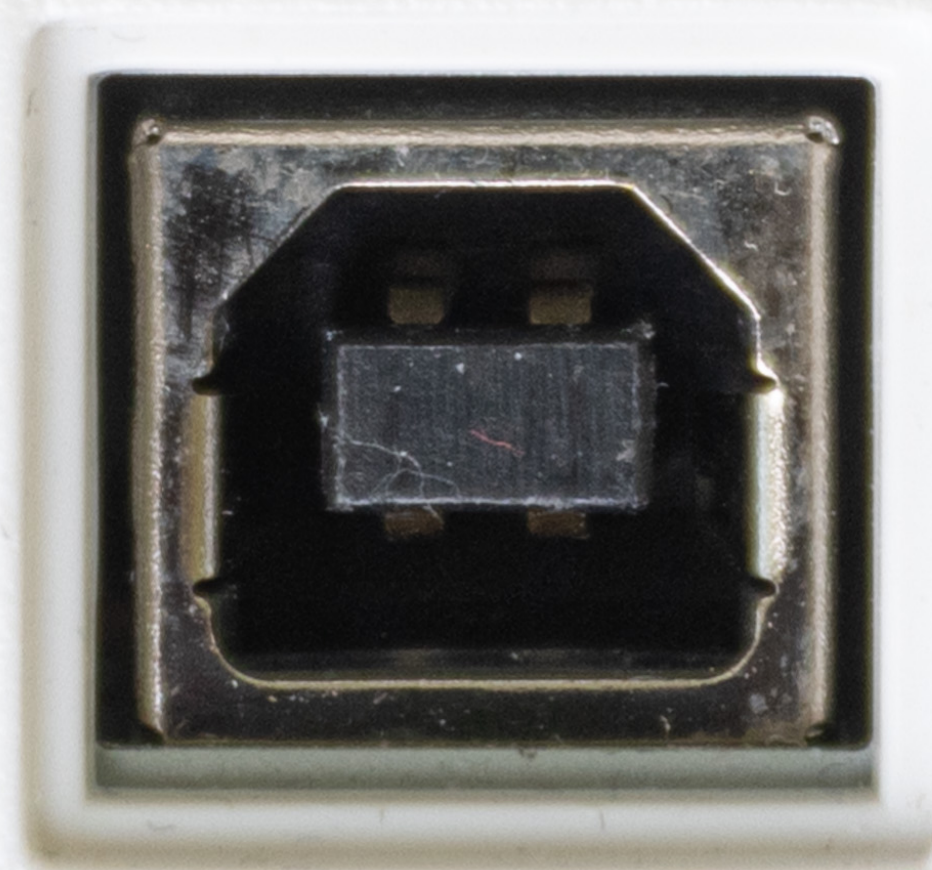
ESC | p | m | t1 | t2



RESET



LAN



DK  $\Delta$



DC24V

# EscPosEncoder

<https://github.com/NielsLeenheer/EscPosEncoder>




```
import EscPosEncoder from 'esc-pos-encoder.esm.js';

let encoder = new EscPosEncoder();
let payload = encoder
  .initialize()
  .text('Welcome to').newline()
  .bold().text('HalfStack Vienna').bold().newline()
  .newline()
  .text('Gutentag Österreich!').newline()
  .cut()
  .encode();

// To do: Send the contents of payload to the printer
```

But wait...



 salonhub

De Millijstraat 7  
9471 AG Zuidlaren  
The Netherlands

[www.salonhub.nl](http://www.salonhub.nl)  
[info@salonhub.nl](mailto:info@salonhub.nl)

Date: 2-9-2023 11:58:02  
Employee: Stefan

Womens Cut Full € 83,00  
Finish

Blowdry € 57,00

Elvive  
Multivitamines  
2-in-1 Shampoo 250 ml

€ 5,39

=====  
Total € 145,39

Thanks for your interest in  
this demo! Enjoy your time  
here at Google I/O Connect!

StarPRNT - pretty much the same as ESC/POS,  
except all the escape commands and codepages are different.



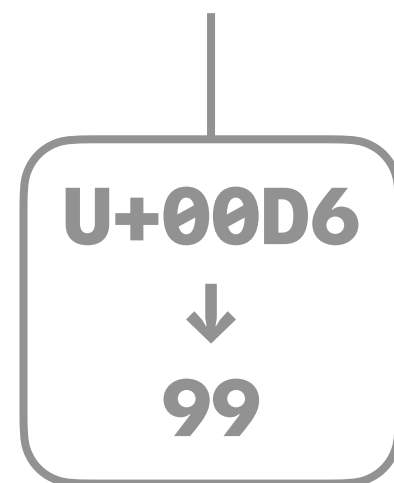
<sup>1B 40</sup> ESC @ <sup>1B 74 13</sup> ESC t n=cp858 Welcome to <sup>0A</sup> LF

<sup>1B 45 01</sup> ESC E 1 HalfStack Vienna <sup>1B 45 00</sup> ESC E 0 <sup>0A</sup> LF

<sup>0A</sup> LF

Gutentag Österreich! <sup>0A</sup> LF

<sup>1D 56 00</sup> GS V 0



1B 40 18  
ESC @ CAN

1B 74 13  
ESC t n=cp858

Welcome to LF

1B 45 01  
ESC E 1

HalfStack Vienna

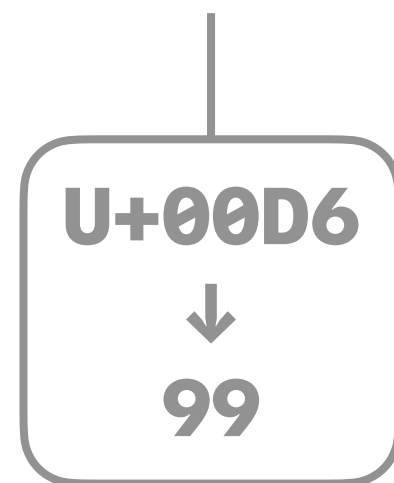
1B 45 00  
ESC E 0

0A  
LF

0A  
LF

Gutentag Österreich! LF

1D 56 00  
GS V 0



1B 40 18  
ESC @ CAN

1B 1D 74 04  
ESC GS t n=cp858

Welcome to LF

1B 45 01  
ESC E 1

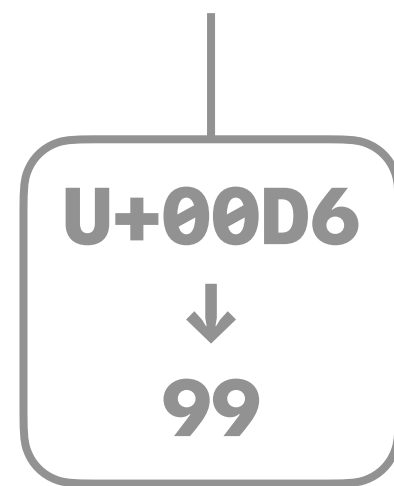
HalfStack Vienna

1B 45 00 0A  
ESC E 0 LF

0A  
LF

Gutentag Österreich! LF

1D 56 00  
GS V 0



1B 40 18  
ESC @ CAN

1B 1D 74 04  
ESC GS t n=cp858

Welcome to LF

1B 45  
ESC E

HalfStack Vienna

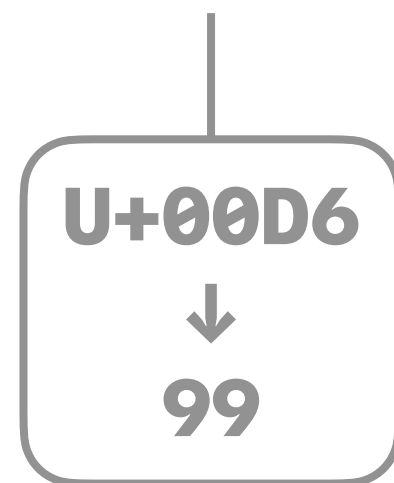
1B 46  
ESC F

0A  
LF

0A  
LF

Gutentag Österreich! LF

1D 56 00  
GS V 0



1B 40 18  
ESC @ CAN

1B 1D 74 04  
ESC GS t n=cp858

Welcome to LF

1B 45  
ESC E

HalfStack Vienna

1B 46  
ESC F

0A  
LF

0A  
LF

Gutentag Österreich! LF

1B 64 00  
ESC d 0

U+00D6  
↓  
99

# StarPrntEncoder

<https://github.com/NielsLeenheer/StarPrntEncoder>

# StarPrntEncoder

<https://github.com/NielsLeenheer/StarPrntEncoder>

Receipt printers are a big mess







# ThermalPrinterEncoder

<https://github.com/NielsLeenheer/ThermalPrinterEncoder>



```
import ThermalPrinterEncoder from 'thermal-printer-encoder.esm.js';
```

```
let encoder = new ThermalPrinterEncoder({  
  language: 'esc-pos',  
  codepageMapping: 'epson'  
});
```

```
let payload = encoder  
  .initialize()  
  .text('Welcome to').newline()  
  .bold().text('HalfStack Vienna').bold().newline()  
  .newline()  
  .text('Gutentag Österreich!').newline()  
  .cut()
```

```
let encoder = new ThermalPrinterEncoder({
  language: 'esc-pos',
  codepageMapping: 'epson'
});

let payload = encoder
  .initialize()
  .text('Welcome to').newline()
  .bold().text('HalfStack Vienna').bold().newline()
  .newline()
  .text('Gutentag Österreich!').newline()
  .cut()
  .encode();

// To do: Send the contents of payload to the printer
```

# WebUSBReceiptPrinter

<https://github.com/NielsLeenheer/WebUSBReceiptPrinter>



```
import WebUSBReceiptPrinter from 'webusb-receipt-printer.esm.js';

const receiptPrinter = new WebUSBReceiptPrinter();
await receiptPrinter.connect();

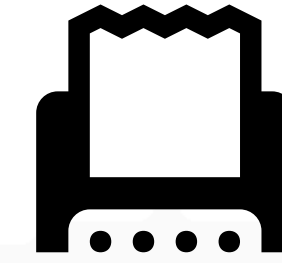
/* Send the contents of payload to the printer */
receiptPrinter.print(payload);
```

# WebSerialReceiptPrinter

<https://github.com/NielsLeenheer/WebSerialReceiptPrinter>

# WebBluetoothReceiptPrinter

<https://github.com/NielsLeenheer/WebBluetoothReceiptPrinter>



**Connect with WebUSB**



**Connect with WebSerial**



**Connect with WebBluetooth**

---

Receipt width



**32 characters**

**35 characters**





Customer display

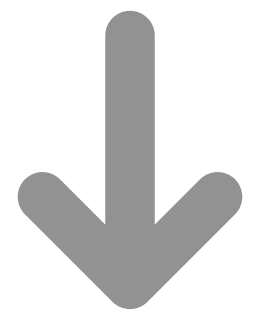
What language do customer displays speak?



FL L2 94Y-0 2 129

1B 40

ESC @



1B 3D 0

ESC = 0

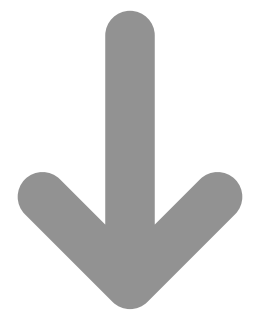
1B 3D 1

ESC = 1



1B 40

ESC @



1B 3D 0

ESC = 0

1B 3D 1

ESC = 1





```
let port = await navigator.serial.requestPort();
```



```
let port = await navigator.serial.requestPort();
```

```
  await port.open({  
    baudRate: 9600  
  });
```



```
let port = await navigator.serial.requestPort();
```

```
  await port.open({  
    baudRate: 9600  
  });
```

```
let writer = port.writable.getWriter();  
await writer.write(payload);
```






FL L2 54Y-0 2 129



But wait...

Let's talk about USB device classes




ADC




CDC



HID



MSC



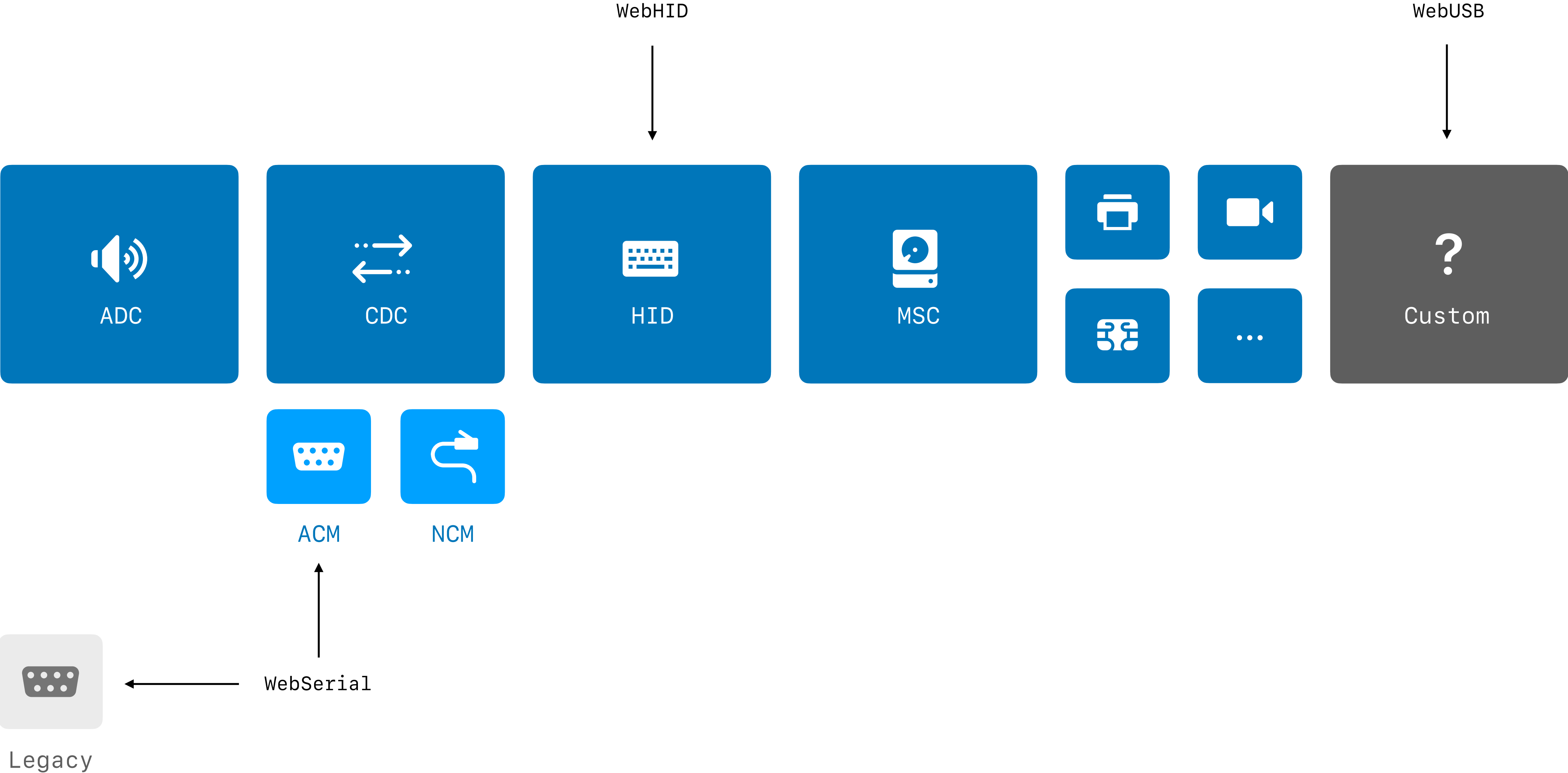
Custom

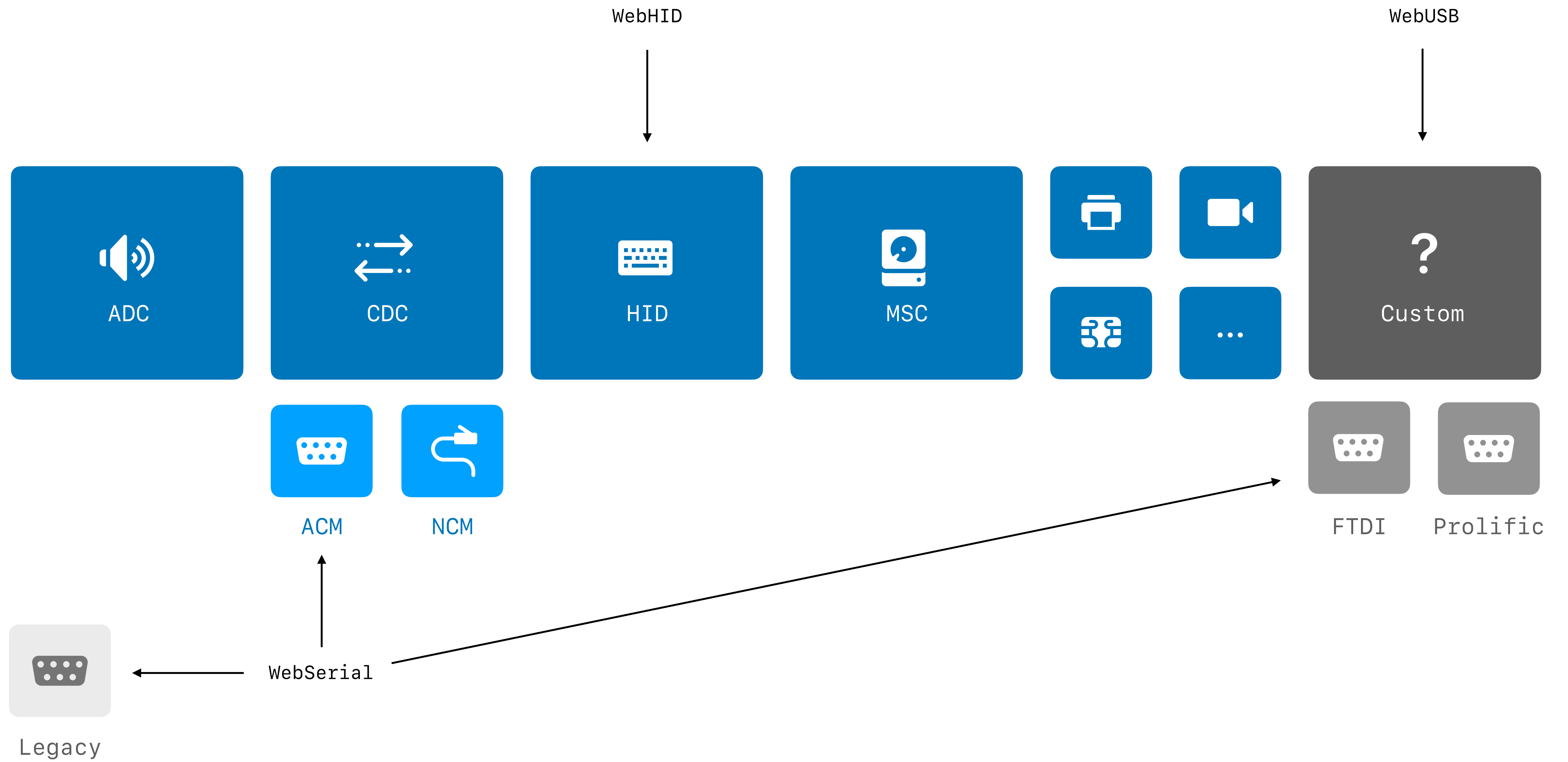


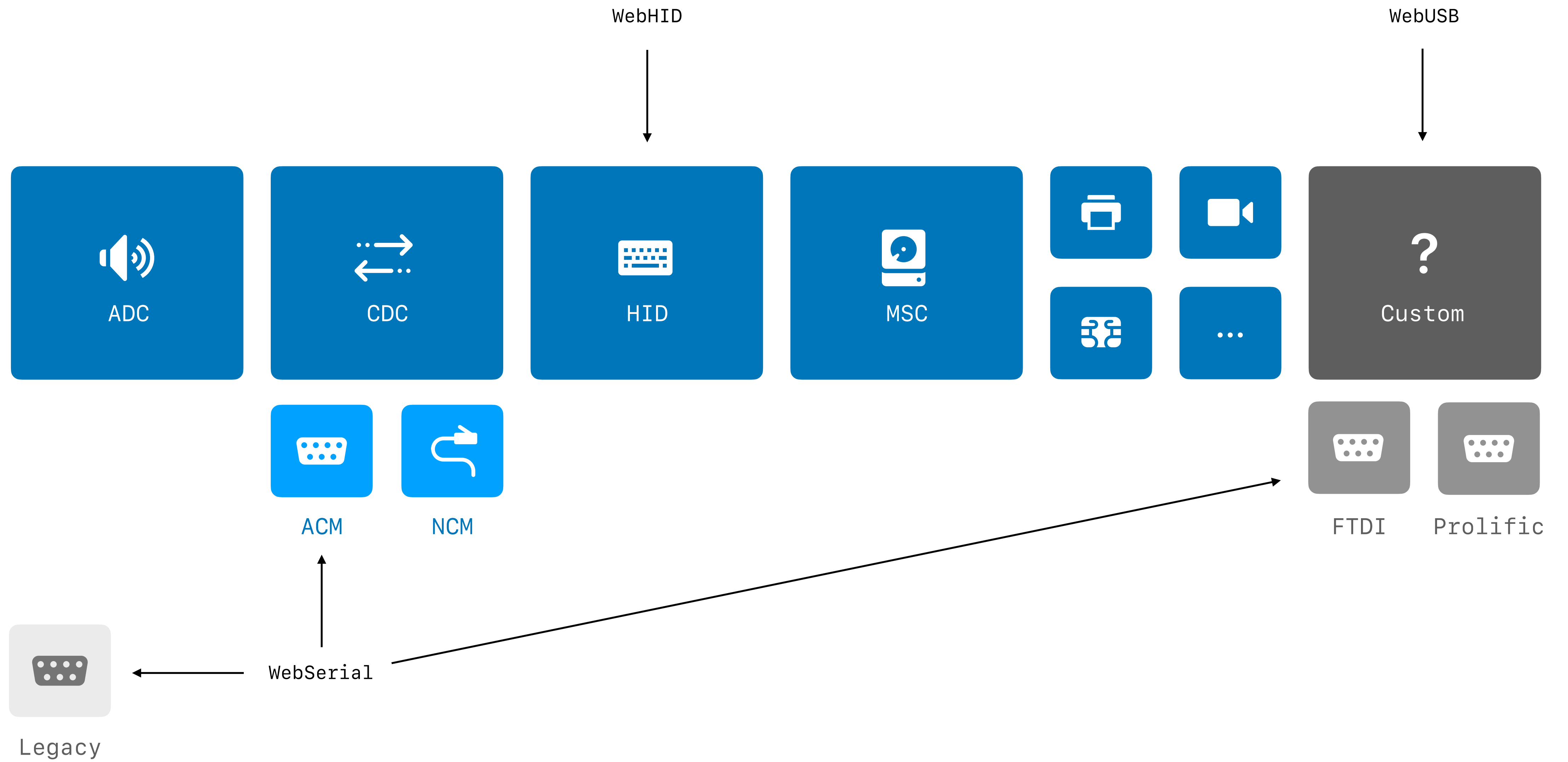
ACM



NCM







# WebUSBSerial

<https://github.com/NielsLeenheer/WebUSBSerial>



# WebUSBSerial

<https://github.com/NielsLeenheer/WebUSBSerial>

Serial ports are dead. Long live WebSerial.

# WebSerialCustomerDisplay

<https://github.com/NielsLeenheer/WebSerialCustomerDisplay>



```
import WebSerialCustomerDisplay from 'webserial-customer-display.esm.js';

const customerDisplay = new WebSerialCustomerDisplay();
await customerDisplay.connect();

customerDisplay.line([
  "Connected with",
  "WebSerial"
]);
```

# Barcode scanner



Barcode scanners are just keyboards...

F Spray définition et légèreté, cheveux bouclés: définit les boucles. HydraCoil: Inceil et glycérine aident à préserver les cheveux bouclés. Mode d'emploi: agiter avant emploi. Vaporiser sur les cheveux pré-séchés. Éviter de vaporiser sur une peau mouillée. Projection, rincer immédiatement et abondamment avec de l'eau. Coiffeurs. D Pflegespray für optimal geformte Locken: Verleiht den Locken Definition und Leichtigkeit. HydraCoil: Inceil und Glycerin sorgen für langanhaltende Locken. Anwendung: Vor dem Gebrauch schütteln. Auf das gewaschene und abgetrocknete Haar sprühen. Nicht auf gereizte Haut oder die Augen auftragen. Gründlich mit Wasser ausspülen. Verkauf nur über Friseur. M voor haar met krullen: geeft luchtige en veerkrachtige krullen. Helpen de vorm en de veerkracht van de krullen langdurig te behouden. Voor gebruik schudden. Op gewassen en handdoekdroog of vochtig haar gebruiken. Niet op een geïrriteerde huid of in de richting van de ogen gebruiken. Met de ogen, deze onmiddellijk met overvloedig water wassen. I Trattamento definizione e volume. HydraCoil: Inceil e glicerina aiutano a preservare le ricci. d'uso: INFIAMMABILE, agitare prima dell'uso. Non vaporizzare sui capelli asciutti. Non vaporizzare a contatto con gli occhi, sciacquare immediatamente con acqua. Pubblico riservato ai parrucchieri.

1058427 D - INGREDIENTS: AQUA / WATER / ALCOHOL DENAT. • PEG-14 DIMETHICONE / POLYQUATERNIUM-4 • DIMETHICONE / METHYLPARABEN • TRIDECETH-5 • HYDROXYETHYL METHYLPROPIONAL • HYDROXYETHYL METHYLCELLULOSE • DIMETHICONE • LACTIC ACID • PEG-40 HYDROGENATED CASTOR OIL • DIPALMITOYL ETHYLHEXANOATE • DIMETHYLUMMONIUM METHOSULFATE • POLYQUATERNIUM-17 • PROPYLENE GLYCOL • DIMETHYLUMMONIUM CHLORIDE • DIMETHICONE DECEYLATE • DIMETHYLUMMONIUM PROPYL TRIMONIUM CHLORIDE • PPG-1 TRIDECETH-6 • STYROLUM CHLORIDE • UNDECYL ALCOHOL • BENZYL SALICYLATE • BENZYL DIMETHYLUMMONIUM CHLORIDE • DIMETHYLUMMONIUM CHLORIDE

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TSA 10007 P 92062  
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L'Oréal B.V. PBT  
N.V. L'Oréal S.A.  
L'Oréal Division  
distr. Italia via Ga  
www.lorealprofe



3474630 618695

3 4 7 4 6 3 0 6 1 8 6 9 5

..but WebHID allows us to get barcodes  
instead of individual keystrokes



```
let devices = await navigator.hid.requestDevice({  
  filters: { vendorId: 0x0c2e }  
});
```

Honeywell Scanning & Mobility

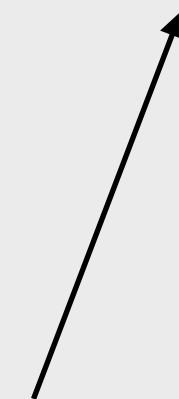




```
let devices = await navigator.hid.requestDevice({  
  filters: { vendorId: 0x0c2e }  
});
```

```
let device = devices.find(d => d.collections.some(c => c.usagePage == 140));
```

Barcode scanner





```
let devices = await navigator.hid.requestDevice({
  filters: { vendorId: 0x0c2e }
});

let device = devices.find(d => d.collections.some(c => c.usagePage == 140));

if (device) {
  await device.sendFeatureReport(254, new Uint8Array([ 0x01 ]));
}
```

Turn off keyboard emulation and use HID reports





```
let devices = await navigator.hid.requestDevice({
  filters: { vendorId: 0x0c2e }
});

let device = devices.find(d => d.collections.some(c => c.usagePage == 140));

if (device) {
  await device.sendFeatureReport(254, new Uint8Array([ 0x01 ]));

  device.addEventListener('inputreport', event => {
    console.log(event.data);
  });
}
```

```
000000  0e 5d 45 30 33 34 37 34 36 33 30 36 31 38 36 39  .]E0347463061869
000010  35 0d 00 00 00 00 00 00 00 00 00 00 00 00 00 00  5.....
000020  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  .....
000030  00 00 00 00 00 00 00 00 00 00 00 00 00 64 00 00  .....d..
```

Length of barcode = 14 characters

Value = 3474630618695

000000	0e	5d	45	30	33	34	37	34	36	33	30	36	31	38	36	39	.]E0347463061869
000010	35	0d	00	00	00	00	00	00	00	00	00	00	00	00	00	00	5.....
000020	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
000030	00	00	00	00	00	00	00	00	00	00	00	00	64	00	00		.....d..

Symbology of barcode = EAN13

Is this the last report for this barcode? 0 = yes

# WebHidBarcodeScanner

<https://github.com/NielsLeenheer/WebHidBarcodeScanner>



```
import WebHIDBarcodeScanner from 'webhid-barcode-scanner.esm.js';

const barcodeScanner = new WebHIDBarcodeScanner();
await barcodeScanner.connect();

barcodeScanner.addEventListener('barcode', e => {
  console.log(`Found barcode ${e.value} with symbology ${e.symbology}`);
});
```

# WebSerialBarcodeScanner

<https://github.com/NielsLeenheer/WebSerialBarcodeScanner>









Thank you!