

# micro:bit TPS

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This is my implementation of the TPS. The instructions will be compatible to my ArduinoSPS Version. And you will get some nice new Commands, implementing some of the micro:bit features, like images, Soundlevel, Logo...

If you find a bug, feel free to create a issue in the tracker.

## Command implementation Chart

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The actual command implementation list for the microbit V2:

	0	1	2	3	4	5	6	7
	n.n.	Port [DOUT]	Delay [WAIT]	Jump back relative [RJMP]	A=# [LDA]	=A	A=	A=Ausdruck
0	NOP [NOP]	aus	1ms	0	0	A<->B [SWAP]		
1	SetPixel(X,Y) X=A, Y=B	1	2ms	1	1	B=A [MOV]	A=B [MOV]	A=A + 1 [INC]
2	ClearPixel(X,Y) X=A, Y=B	2	5ms	2	2	C=A [MOV]	A=C [MOV]	A=A - 1 [DEC]
3	0: ClearDisplay 1..63: show(Image)	3	10ms	3	3	D=A [MOV]	A=D [MOV]	A=A + B [ADD]
4		4	20ms	4	4	Dout=A [STA]	Din [LDA]	A=A - B [SUB]
5		5	50ms	5	5	Dout.1=A.1 [STA]	Din.1 [LDA]	A=A * B [MUL]
6		6	100ms	6	6	Dout.2=A.1 [STA]	Din.2 [LDA]	A=A / B [DIV]
7		7	200ms	7	7	Dout.3=A.1 [STA]	Din.3 [LDA]	A=A and B [AND]
8		8	500ms	8	8	Dout.4=A.1 [STA]	Din.4 [LDA]	A=A or B [OR]
9		9	1s	9	9	PWM.1=A [STA]	ADC.1 [LDA]	A=A xor B [XOR]
a		10	2s	10	10	PWM.2=A [STA]	ADC.2 [LDA]	A= not A [NOT]
b		11	5s	11	11	Servo.1=A [STA]	RCin.1 [LDA]	A= A % B (Rest) [MOD]
c		12	10s	12	12	Servo.2=A [STA]	RCin.2 [LDA]	A= A + 16 * B [BYTE]
d		13	20s	13	13	E=A [MOV]	A=E [MOV]	A= B - A[BSUBA]
e		14	30s	14	14	F=A [MOV]	A=F [MOV]	A=A SHR 1 [SHR]
f		15	60s	15	15	Push A [PUSH]	Pop A [POP]	A=A SHL 1 [SHL]

new commands for the microbit

SetPixel: sets a pixel directly with x,y coordinates. X=A Y=B

ClearPixel: clears a pixel

ShowImage(image): if image is set to 0, the display is cleared, otherwise it will set a nice image on the display.

	8	9	a	b	c	d	e	f
	Page [PAGE]	Jump absolut (#+16*page) [JMP]	C* C>0: C=C- 1; Jump # + (16*page) [LOOPC]	D* D>0:D=D-1; Jump # + (16*page) [LOOPC]	Skip if	Call # + (16*Page) [Call]	Callsb/Ret	Byte Befehle
0	0	0	0	0	A==0 [SKIP0]	0	ret [RTR]	A=ADC.1 [BLDA]
1	1	1	1	1	A>B [AGTB]	1	Call 1 [CASB]	A=ADC.2 [BLDA]
2	2	2	2	2	A<B [ALTB]	2	2 [CASB]	A=RCin.1 [BLDA]
3	3	3	3	3	A==B [AEQB]	3	3 [CASB]	A=RCin.2 [BLDA]
4	4	4	4	4	Din.1==1 [DEQ1 1]	4	4 [CASB]	PWM.1=A [BSTA]
5	5	5	5	5	Din.2==1 [DEQ1 2]	5	5 [CASB]	PWM.2=A [BSTA]
6	6	6	6	6	Din.3==1 [DEQ1 3]	6	6 [CASB]	Servo.1=A [BSTA]
7	7	7	7	7	Din.4==1 [DEQ1 4]	7		Servo.2=A [BSTA]
8	8	8	8	8	Din.1==0 [DEQ0 1]	8	Def 1 [DFSB]	Tone=A [TONE]
9	9	9	9	9	Din.2==0 [DEQ0 2]	9	2 [DFSB]	GetACC a=acc.x, E=acc.y, F=acc.z
a	10	10	10	10	Din.3==0 [DEQ0 3]	10	3 [DFSB]	A= Compass (in 5°)
b	11	11	11	11	Din.4==0 [DEQ0 4]	11	4 [DFSB]	A=SoundLevel()
c	12	12	12	12	S_PRG==0 [PRG0]	12	5 [DFSB]	A=LightLevel (0..255)
d	13	13	13	13	S_SEL==0 [SEL0]	13	6 [DFSB]	A=LogoTouched
e	14	14	14	14	S_PRG==1 [PRG1]	14		
f	15	15	15	15	S_SEL==1 [SEL1]	15	restart [REST]	PrgEnd [PEND]

new commands for the microbit

GetACC: get values from the accelerator, A will be the x-axis, E the y-axis, and F the z-axis all  
Values range form 0..255

Compass: get the value of the compass, the value is in 5° Steps, so 0 = 0° 1 = 5°, 2=10°...

SoundLevel: level of the microfon

LightLevel: level of the ambient light

LogoTouched: the logo was touched.

## Hardware assignments:

Button A is PRG or S1 (pin5)

Button B is SEL or S2 (pin11)

output pins

1 pin0

2 pin1

3 pin2

4 pin12

input pins

1 pin13

2 pin14

3 pin15

4 pin16

a/d pins

1 pin3

2 pin 4

d/a pins

1 pin8

2 pin9

servo pins

1 pin8

2 pin9

ppm in pins

not implemented yet

## Microbit pin Mapping

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pin number	microbit function	TPS function
0	a/d	DOut.1
1	a/d	DOut.2
2	a/d	DOut.3
3	LED Col 3 a/d	A/D 1
4	LED Col 1 a/d	A/D 2
5	Button A	PRG/S1
6	LED Col 4	unusable
7	LED Col 2	unusable
8		D/A 1
9		D/A 2
10	LED Col 5 a/d	unusable
11	Button B	SEL/S2
12	reserved	DOut.4
13		DIn.1
14		DIn.2
15		DIn.3
16		DIn.4
19	I2C	unusable
20	I2C	unusable

## Image List:

Here is the image list:

- 1: Image.HEART,
- 2: Image.HAPPY,
- 3: Image.SMILE,
- 4: Image.SAD,
- 5: Image.CONFUSED,
- 6: Image.ANGRY,
- 7: Image.ASLEEP,
- 8: Image.SURPRISED,
- 9: Image.SILLY,
- 10: Image.FABULOUS,
- 11: Image.MEH,
- 12: Image.YES,
- 13: Image.NO,

14: Image.CLOCK1,  
15: Image.CLOCK2,  
16: Image.CLOCK3,  
17: Image.CLOCK4,  
18: Image.CLOCK5,  
19: Image.CLOCK6,  
20: Image.CLOCK7,  
21: Image.CLOCK8,  
22: Image.CLOCK9,  
23: Image.CLOCK10,  
24: Image.CLOCK11,  
25: Image.CLOCK12,  
26: Image.ARROW\_N,  
27: Image.ARROW\_NE,  
28: Image.ARROW\_E,  
29: Image.ARROW\_SE,  
30: Image.ARROW\_S,  
31: Image.ARROW\_SW,  
32: Image.ARROW\_W,  
33: Image.ARROW\_NW,  
34: Image.TRIANGLE,  
35: Image.TRIANGLE\_LEFT,  
36: Image.CHESSBOARD,  
37: Image.DIAMOND,  
38: Image.DIAMOND\_SMALL,  
39: Image.SQUARE,  
40: Image.SQUARE\_SMALL,  
41: Image.RABBIT,  
42: Image.COW,  
43: Image.MUSIC\_CROTCHET,  
44: Image.MUSIC\_QUAVER,  
45: Image.MUSIC\_QUAVERS,  
46: Image.PITCHFORK,  
47: Image.XMAS,  
48: Image.PACMAN,  
49: Image.TARGET,  
50: Image.TSHIRT,  
51: Image.ROLLERSKATE,  
52: Image.DUCK,  
53: Image.HOUSE,  
54: Image.TORTOISE,  
55: Image.BUTTERFLY,  
56: Image.STICKFIGURE,  
57: Image.GHOST,  
58: Image.SWORD,  
59: Image.GIRAFFE,  
60: Image.SKULL,  
61: Image.UMBRELLA,  
62: Image.SNAKE,  
63: Image.HEART\_SMALL

