

micro:bit TPS

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

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:

Caution: Due to the dual assignment of pins (especially the two A / D converters) can cause effects on the circuit in both directions. Protective diodes may be required there.

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

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

