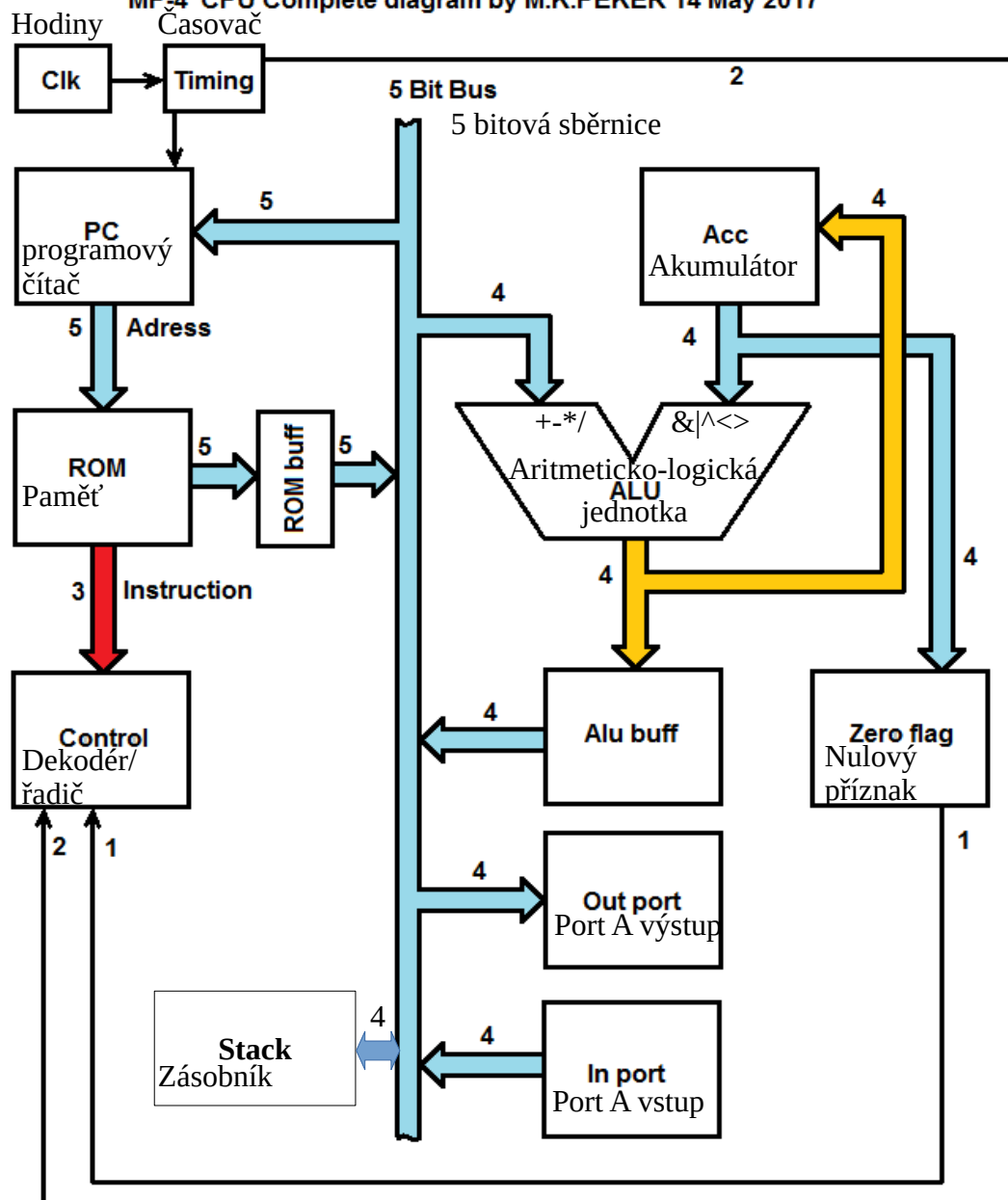


MP-4 CPU Complete diagram by M.K.PEKER 14 May 2017



0	HLT	halt	stát
2	LDA,n	load accumulator	nahraj do akumulátoru
4	ADD,n	add immediate	přičti
6	SUB,n	subtract immediate	odečti
8	IN A	input to acc.	vstup portu A do akumulátoru
10	OUT A	acc. to out port	výstup z akumulátoru do portu A
12	PUSHA	push acc. to stack	vlož akumulátor do zásobníku
14	POPA	pop to acc. from stack	vyjmi ze zásobníku do akumulátoru
16	JMP,n	jump to address	skoč na adresu
18	JMP2,n	jump if zero to address	skoč na adresu pokud je akumulátor 0

Inspired by: <https://www.instructables.com/Simplest-4-Bit-TTL-CPU/>

Also by: https://en.wikibooks.org/wiki/X86_Assembly

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N Á V Ě S T Í	A D R E S A	I N S T R U K C E	O P E R A N D		P A M Ě Ť
LABEL	ADDR	INSTR.	OP.		MEMORY
INIT	0	LDA	49		02 49
	1	PUSHA			12 00
TEXT	2	LDA	72		02 72
	3	OUT A			10 00
	4	LDA	69		02 69
	5	OUT A			10 00
	6	LDA	76		02 76
	7	OUT A			10 00
	8	LDA	76		02 76
	9	OUT A			10 00
	10	LDA	79		02 79
	11	OUT A			10 00
	12	LDA	32		02 32
	13	OUT A			10 00
	14	LDA	87		02 87
	15	OUT A			10 00
	16	LDA	79		02 79
	17	OUT A			10 00
	18	LDA	82		02 82
	19	OUT A			10 00
	20	LDA	76		02 76
	21	OUT A			10 00
	22	LDA	68		02 68
	23	OUT A			10 00
NUM	24	POPA			14 00
	25	PUSHA			12 00
	26	OUT A			10 00
	27	LDA	10		02 10
	28	OUT A			10 00
	29	POPA			14 00
	30	ADD	1		04 01
	31	PUSHA			12 00
	32	SUB	52		06 04
	33	JMP2	34		18 32
	34	JMP	2		16 02
END	35	HLT			00 00

Po vykonání programu by měl na výstupním portu A být v ASCII kódu výstup

HELLO WORLD1

HELLO WORLD2

HELLO WORLD3

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Tabulka ASCII kódů
ASCII TABLE

0 NUL	NULL character	32 (SP)	64 @	96 `
1 SOH	Start of Header	33 !	65 A	97 a
2 STX	Start of Text	34 "	66 B	98 b
3 ETX	End of Text	35 #	67 C	99 c
4 EOT	End of Transmission	36 \$	68 D	100 d
5 ENQ	Enquiry	37 %	69 E	101 e
6 ACK	Acknowledge	38 &	70 F	102 f
7 BEL	Bell	39 '	71 G	103 g
8 BS	Backspace	40 (72 H	104 h
9 HT	Horizontal Tab	41)	73 I	105 i
10 LF	Line feed	42 *	74 J	106 j
11 VT	Vertical Tab	43 +	75 K	107 k
12 FF	Form Feed	44 ,	76 L	108 l
13 CR	Carriage return	45 -	77 M	109 m
14 SO	Shift Out	46 .	78 N	110 n
15 SI	Shift In	47 /	79 O	111 o
16 DLE	Data Link Escape	48 0	80 P	112 p
17 DC1	Device Control (XOn)	49 1	81 Q	113 q
18 DC2	Device Control	50 2	82 R	114 r
19 DC3	Device Control (XOff)	51 3	83 S	115 s
20 DC4	Device Control	52 4	84 T	116 t
21 NAK	Negative Acknowledge	53 5	85 U	117 u
22 SYN	Synchronous Idle	54 6	86 V	118 v
23 ETB	End of Transmission Block	55 7	87 W	119 w
24 CAN	Cancel	56 8	88 X	120 x
25 EM	End of Medium	57 9	89 Y	121 y
26 SUB	Substitute	58 :	90 Z	122 z
27 ESC	Escape	59 ;	91 [123 {
28 FS	File Separator	60 <	92 \	124
29 GS	Group Separator	61 =	93]	125 }
30 RS	Record Separator	62 >	94 ^	126 ~
31 US	Unit Separator	63 ?	95 _	127 DEL

LF = Line feed = Odřádkování = Enter (někdy nutno LF+CR)

SP = Space = Mezera