

INSTRUCTIONS

1. NOP	NO OPERATION	0000
2. ADD[R][CONST]	$AC \leftarrow AC + ([R] + [CONST])$	0001
3. SUB[R][CONST]	$AC \leftarrow AC - ([R] + [CONST])$	0010
4. MUL[R][CONST]	$AC \leftarrow AC * ([R] + [CONST])$	0011
5. DIV[R][CONST]	$AC \leftarrow AC / ([R] + [CONST])$	0100
6. SHR<8'b0>[N]	SHIFT RIGHT N BITS	0101
7. SHL<8'b0>[N]	SHIFT LEFT N BITS	0110
8. LOAD[M]	$MDR \leftarrow [M+2*MBR]$	0111
9. STORE[M]	$[M+2*MBR] \leftarrow MDR$	1000
10. JUMP[INST]	JUMP TO [INST]	1001
11. JMPZ[INST]	JUMP TO [INST] IF Z FLAG IS HIGH	1010
12. JMPDEC[INST]	DECREMENT LR BY ONE. JUMP TO [INST] IF LRZ IS LOW	1011
13. MOVE[S][D]	$[D] \leftarrow [S]$	1100
14. UARTSEND	WAIT FOR UART OUTPUT TO COMPLETE	1101
15. UARTEAD	WAIT FOR UART INPUT TO COMPLETE	1110

DATA WIDTH:

OPCODE	4 BITS
[R]	5 BITS
[CONST]	7 BITS
[N]	4 BITS
[M]	12 BITS
[INST]	12 BITS
[S], [D]	5 BITS

FLAGS

1. Z	AC IS ZERO FLAG
2. LRZ	LR IS ZERO FLAG
3. TXBUSY	UART TX BUSY FLAG
4. RXREADY	UART RX READY FLAG

REGISTERS

1. PC	PROGRAM COUNTER	
2. IR	INSTRUCTION REGISTER	
3. ZR	ZERO REGISTER	00000
4. MBR	MEMORY BASE REGISTER	00001
5. MDR	MEMORY DATA REGISTER	00010
6. UARCTX	UART TX REGISTER	00011
7. UARTRX	UART RX REGISTER	00100
8. AC	ACCUMULATOR	00101
9. LR	LOOP REGISTER	00110
10. R1	GP REG	1XXXX
11. R2	GP REG	
12. R3	GP REG	
13. R4	GP REG	
14. R5	GP REG	
15. R6	GP REG	
16. R7	GP REG	
17. R8	GP REG	
18. R9	GP REG	
19. R10	GP REG	