INSTRUCTIONS

All instructions have 8-bit opcodes. Instructions range from having 0-2 parameters.
The total number of bits sent to the FPGA per instruction is 24, regardless of the number of instruction parameters. Any instruction that does not have 2 parameters will have 0's transmitted to the FPGA, which will act as a don't care for the parameters.

INSTRUCTION	DESC.	OPCODE
halt	End of program (also used to tell controller when UART is done transmitting the program)	8'b0000_0000
rstregs	Reset all registers to value 0 except program counter	8'b0000_0001
mov Rn, num	Put value num in register Rn	8'b0000_0010
mov Rn, Rm	Copy data in register Rm into register Rn	8'b0000_0011
mov [Rn], Rm	Copy data in register Rm into memory address stored in Rn	8'b0000_0100
mov Rn, [Rm]	Copy data from memory address stored in Rm into register Rn	8'b0000_0101
add Rn, Rm	Rn gets the sum of the contents of Rn and Rm	8'b0000_0110
sub Rn, Rm	Rn gets the difference of the contents of Rn and Rm	8'b0000_0111
inc Rn	Rn gets the contents of Rn + 1	8'b0000_1000
dec Rn	Rn gets the contents of Rn - 1	8'b0000_1001
and Rn, Rm	Rn gets the bitwise and of the contents of Rn and Rm	8'b0000_1010
or Rn, Rm	Rn gets the bitwise or of the contents of Rn and Rm	8'b0000_1011
xor Rn, Rm	Rn gets the bitwise xor of the contents of Rn and Rm	8'b0000_1100
cmp Rn, Rm	Returns true if contents of Rn and Rm are equal, else returns false	8'b0000_1101
jmp num	Jump to address num in memory (random addressing, e.g. 0 <= num <= size(memory))	8'b0000_1110
je num	Jump num values in memory if last cmp instruction compared equal items	8'b0000_1111
jne num	Jump num values in memory if last cmp instruction compared unequal items	8'b0001_0000

REGISTERS

There are eight 24-bit general purpose registers (R0, R1, … , R7).

MEMORY

There are 128 words of memory, each containing 24 bits of data.