NANO

65040

the virtual processor that runs an an arduino nano

Virtual Processor Data Sheet

Registers:
- Program Counter (PC): 8-bit register to store the memory address of the next instruction.
- Accumulator (AC): 8-bit register used for arithmetic and logical operations.
- X Register (X): 8-bit register used for arithmetic and logical operations.
- Y Register (Y): 8-bit register used for arithmetic and logical operations.
- Status Register (SR): 8-bit register to store various flags.
  - Bit 0: Carry Flag (CF)
  - Bit 1: Zero Flag (ZF)
  - Bits 2-6: Reserved (unused)
  - Bit 7: Negative Flag (NF)
- Stack Pointer (SP): 8-bit register to point to the current location in the stack.

Additional Registers:
- Data Register (DATA): 8-bit register for storing data.
- Index Register (INDEX): 8-bit register for indexing purposes.

Instructions:
- LOAD_IMMEDIATE: Load a value into the Accumulator.
- LOAD_REGISTER: Load a value from memory into the Accumulator.
- STORE_REGISTER: Store the value in the Accumulator into memory.
- ADD_IMMEDIATE: Add an immediate value to the Accumulator.
- ADD_REGISTER: Add the value in the X Register to the Accumulator.

- JUMP: Jump to a specified memory address.
- BITWISE_AND: Perform bitwise AND operation between the Accumulator and a value from memory.
- BITWISE_XOR: Perform bitwise XOR operation between the Accumulator and a value from memory.
- BITWISE_OR: Perform bitwise OR operation between the Accumulator and a value from memory.
- SUB_REGISTER: Subtract the value in the X Register from the Accumulator.
- SUB_IMMEDIATE: Subtract an immediate value from the Accumulator.
- ADD_WITH_CARRY: Add the Accumulator and the Carry Flag.
- BRANCH_ON_CARRY_SET: Branch to a specified memory address if the Carry Flag is set.
- CLEAR_CARRY: Clear the Carry Flag.
- CLEAR_DECIMAL: Clear the Decimal Flag.
- BRANCH_ON_CARRY_CLEAR: Branch to a specified memory address if the Carry Flag is clear.
- JP: Jump to a specified memory address if the Negative Flag is clear.
- JN: Jump to a specified memory address if the Negative Flag is set.
- INC: Increment the Accumulator.
- DEC: Decrement the Accumulator.
- JZ: Jump to a specified memory address if the Zero Flag is set.
- JE: Jump to a specified memory address if both the Zero and Negative Flags are set.

Pin Configuration:
- PC_PIN: Pin number for the Program Counter register output.
- AC_PIN: Pin number for the Accumulator register output.
- X_PIN: Pin number for the X Register register output.
- Y_PIN: Pin number for the Y Register register output.
- SR_PIN: Pin number for the Status Register register output.
- stackpointer_PIN: Pin number for the Stack Pointer register output.
- DATA_REGISTER_PIN: Pin number for the Data Register register output.
- INDEX_REGISTER_PIN: Pin number for the Index Register register output.

Note: This data sheet assumes an Arduino Nano board for the pin configuration.

the code is on