D16/M Front Panel Controls/Indicators

Name	(Type)/Function
POWER	(Key Switch) This is the computer's main power control. When turned clockwise, it turns on the computer. When turned counter-clockwise, it turns the computer off. After application of power, the computer will be in its Reset state; halted, with the Program Counter, Accumulator, and Flag Register (C and OV) cleared.
SWITCH REGISTER 15 – 0	(Fixed Position Toggle Switches) These 15 switches set the contents of the Switch Register. For each switch, The UP position represents logical 1 and the DOWN position represents 0.
AC LD	(Momentary Toggle Switch) Loads the Accumulator with the contents of the Switch Register.
ADDR LD	(Momentary Toggle Switch) Loads the Program Counter with the contents of the Switch Register.
MEM LD	(Momentary Toggle Switch) Loads the contents of the Switch Register into the Operand Register and into memory (RAM) at the address specified by the contents of the Program Counter. Then, increments the Program Counter to point to the next memory address. After this switch is actuated, the Address Register contains the memory address to which the data word was written.
MEM RCL	(Momentary Toggle Switch) Reads the data word at the memory address specified by the contents of the Program Counter, and loads it into the Operand Register. Then, increments the Program Counter to point to the next memory address. After this switch is actuated, the Address Register contains the memory address from which the data word was read.

I/O LD   (Momentary Toggle Switch)
Writes the contents of the Switch Register to the Operand Register and to the I/O port at the address specified by the Program Counter. The Program Counter is not incremented as with **MEM LD**.

After this switch is actuated, the Address Register will contain the I/O port address to which the data word was written.

I/O RCL   (Momentary Toggle Switch)
Reads the data word at the I/O port address specified by the contents of the Program Counter, and loads it into the Operand Register. The Program Counter is not incremented as with **MEM RCL**.

After this switch is actuated, the Address Register will contain the I/O port address from which the data word was read.

ROM/RAM   (Fixed Position Toggle Switch)
The lower 32K words of the computer's memory space consists of co-incident ROM and RAM. If this switch is in the **ROM** position, the computer accesses the ROM block; if in the **RAM** position, the computer accesses the RAM block.

The upper 32K of the computer's memory space (RAM only) is not affected by this switch.

RESET   (Momentary Toggle Switch)
This is the computer's main Reset control. When actuated, it clears the Program Counter, Accumulator, Flag Register, RUN state, and control logic.

After the actuation of this switch, the computer will be halted at memory address 0000.

RUN/HALT

(Momentary Toggle Switch, Up and Down, Center Off)
This switch sets or clears the computer's RUN state. When thrown to the **RUN** position, the computer will execute instructions from the memory address specified by the contents of the Program Counter. When thrown to the **HALT** position, the computer will halt after completing execution of the current instruction.

If the computer has halted as a result of executing the *HLT* instruction, it may be re-started at the next address by throwing the **RUN/HALT** switch to the **RUN** position.

INSTRUCTION STEP

(Momentary Toggle)
If the computer is halted, actuating this switch will cause the execution of a single instruction at the address specified by the Program Counter. If the computer is running, this switch will halt the computer, just as if the **RUN/HALT** switch had been thrown to the **HALT** position.

REGISTER Displays

(Red LED lamps)
Each of these 16-bit displays indicates the contents of its respective CPU register; the Program Counter, Stack Pointer, Accumulator, Operand Register, Address Register, or Instruction Register. An LED on represents a 1 and an LED off represents a 0.

CONDITIONS/FLAGS

(Yellow LED lamps)
These indicators display the status of the computer's conditions and flags, as follows:

IE: Interrupt Enable bit.
P: Accumulator Positive status.
Z: Accumulator Zero status.
OV: Two's Complement Overflow flag.
C: Carry flag.

(OV and C are the two bits of the computer's Flag Register, which may be loaded or stored.)

FETCH
(Green LED lamp)
This indicator is on when the computer reads an operation code and operand (if any) from memory (Steps 00 through 05 of the computer's Base sequence).

INDIRECT
(Green LED lamp))
This indicator is on when the computer reads an operand from an indirect memory address (Steps 06 through 0A of the Base sequence).

EXEC
(Green LED lamp)
This indicator is on when the computer actually executes an instruction (Steps 00 through up to 7F of the Execute sequence).

INTERRUPT
(Green LED lamp)
This indicator is on when the computer is processing a pending interrupt (Steps 20 through 27 of the Base sequence).

SR REQ
(Green LED lamp)
This indicator is on when the computer reads the front panel Switch Register.

MEM REQ
(Green LED lamp)
This indicator is on when the computer has asserted its MEM_REQ bus line for a memory read or write.

I/O REQ
(Green LED lamp)
This indicator is on when the computer has asserted its IO_REQ bus line for an I/O read or write.

READ
(Green LED lamp)
This indicator is on when the computer has asserted its READ bus line for receiving data from memory or I/O.

WRITE
(Green LED lamp)
This indicator is on when the computer has asserted its WRITE bus line for sending data to memory or I/O.

RUN
(Blue LED lamp)
This indicator displays the computer's RUN state. The LED is on when the computer is automatically executing instructions, and off when the computer is halted.

SKIP   (Green LED lamp)
This indicator displays the state of the computer's SKIP status. When SKIP is 1, the next instruction fetched will be ignored, behaving as though it were a *NOP* instruction.