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M-80 MICROCOMPUTER

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The Miller Technology M-80 single board microcomputer provides Z-80 computing power, versatility, and compact size at an economical price. Applications are limited only by your imagination. The M-80 board is of highest quality double sided epoxy glass construction with plated thru holes, solder mask on both sides, silkscreened component and digital line identification, and gold plated edge connector.

CPU: The heart of the M-80 is the popular Z-80 microprocessor driven by a 2 MHz crystal controlled clock. The Z-80 is upward software compatible with 8080 and 8085 code. Its 158 different instruction types form a powerful basis for creative software development. The non-multiplexed bus structure of the Z-80, straightforward control lines, and flexible hardware interrupts make this microprocessor one of the easiest to understand and to modify to suit your needs. Interfacing to custom circuitry is a snap. All Z-80 bus lines and control lines on the M-80 board are available at solder/wire wrap pads for simple hardware alteration.

ROM: The M-80 board has been designed to use up to 2K of the inexpensive and easily available 2708 type EPROM. However, should you wish to use a 2716, 2704, 2758, 2608, or 2316 type ROMs, the instruction manual gives full details as to how this may be accomplished.

RAM - I/O: The minimum system comes with 128 bytes of RAM and 16 bits of highly flexible I/O. Sockets on the board will accept up to 2K of additional 2114 type RAM. The M-80 monitor can run without using the additional 2114 RAMs. Each of the 16 I/O bits can be individually selected as either an output or an input. As outputs, they can be individually set, reset, or tested for their current output state. As inputs, they can be read individually. Alternatively, the 16 bits can operate as two separate I/O ports on an 8 bit wide basis. Or, one of the 8 bit ports may be defined as either a strobed input port, or a strobed output port with

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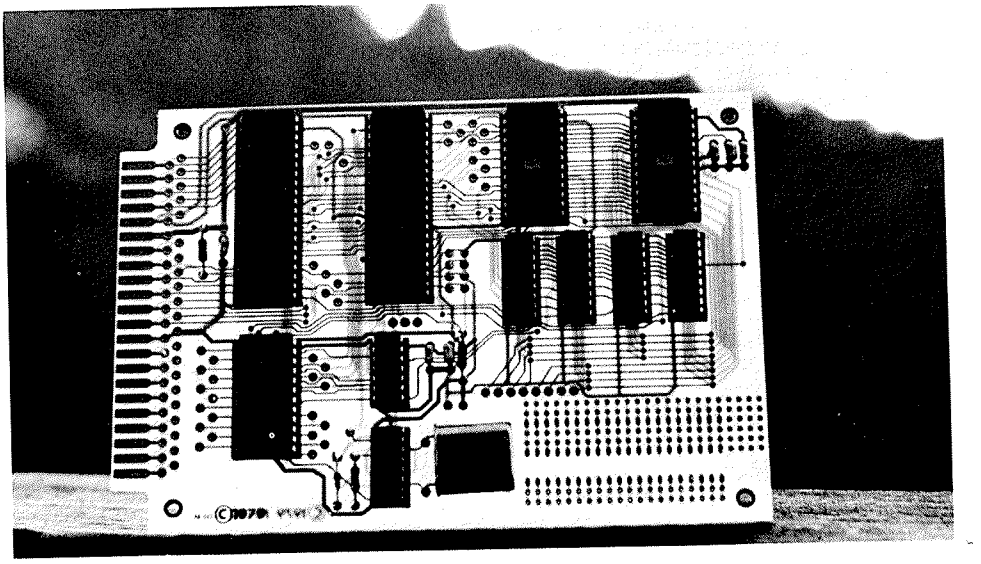

PS-80 POWER SUPPLY

The PS-80 power supply is the perfect companion to the M-80 microcomputer. It converts 115 VAC to +5 at 800 mA, +12 at 150 mA, -5 and -12 at 150 mA. PS-80 card size is the same as the M-80, 4.5 by 6.5 inches, overall height is 1.5 inches. All supplies are available on the M-80 compatible 22 pin edge connector. The PS-80 may be card cage mounted with the M-80, or attached to the M-80 by standoffs. The user must supply the desired line cord and on/off switch. Both connect to the board with the supplied mating connector. A standard slo-blo fuse for the supply is also mounted on the board in fuse clips, reducing external wiring to a minimum.

Each PS-80 can supply at least two fully stuffed M-80 boards. The +12 and -12 voltages make it easy to interface operational amplifiers, digital to analog and analog to digital converters to the M-80 microcomputer.

The PS-80 supply comes complete with a ten page manual that describes circuitry and kit construction.

SOFTWARE

Both Tiny Basic and a system monitor are available for use with the M-80 board.

M-80 MONITOR: Contained in a single 2708 ROM, the M-80 monitor implements 10 high level commands. The user can reset the M-80 board, dump memory, enter data into memory, download a program from another machine into memory, begin execution at any address, set a breakpoint, proceed from a breakpoint and set, clear, or test any of the 16 I/O bits. There are also a number of useful routines within the monitor which can be called by the user, such as serial I/O, wait loop, message printing, etc. The M-80 monitor assumes that a 2 MHz system clock is used, optional 2114 RAM is not necessary for monitor operation. Serial communications are via two of the 16 I/O bits. Specify baud rate when ordering; 110, 300 or 1200 baud are available.

TINY BASIC: Contained in two 2708 ROMs, Wang's popular Tiny Basic provides 30 functions and commands for the user. It is an easy to use, integer only basic, ideal for running on the M-80 board. Specify baud rate when ordering: 110, 300 and 1200 baud are available.

APPLICATIONS:

For the professional, the M-80 microcomputer provides a cost effective time saver for limited production instruments, dedicated test equipment, smart peripheral controllers, fast prototype construction, parallel and multi-processing computers. For the hobbyist who can't stand tying up his 64K computer and dual floppy disk drives with controlling his lawn sprinklers, the M-80 puts inexpensive intelligence into home applications. If you're a computer enthusiast on a tight budget, the M-80 gets you into personal computers at a price competitive with many programmable calculators.

Using the M-80 monitor gives you a low cost program debugging tool. Programs may be downloaded into the M-80 microcomputer's RAM, executed, and troubleshot using the monitor's breakpoint capability. The download capability is also handy for M-80 applications wherein the program must continuously change, or is under ongoing development. A single serial port on a computer or terminal may be multiplexed as many times as necessary to communicate with a number of M-80 microcomputers at remote locations. Complete control of an M-80 over thousands of miles is feasible by the use of modems and phone lines.

Areas where the M-80 is useful are; robotics, burglar alarms, heating/cooling controllers, smart printers, games, terminals, test equipment, intelligent peripherals, graphics, distributed processing, remote data acquisition, data entry, stepper motor control, unique device interfaces, ROM and PLA programmers, IC testers, display controllers, manufacturing automation, and your special needs!

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full handshaking. When used as a strobed output port, you may select this port to be used in the tri-state mode. In this manner, it is possible for the M-80 to sit on the bus of another computer, appearing as a very smart peripheral chip. All 16 I/O bits are available at the card edge connector.

BREADBOARD AREA: The breadboard area on the card can be used for adding a limited amount of additional circuitry. 12 uncommitted decoded address strobe lines are available for easily adding more RAM or ROM or for memory mapping additional I/O capability, You may wish to add a UART, floppy disk controller, video display controller, special data communications protocol chip, A/D or D/A converter, speech synthesis chip, printer controller, keyboard encoder, sound effects chip, floating point processor chip, another microprocessor, RS-232 converter, a fiber optics interface, or whatever custom circuitry you need for your application. Configuring the M-80 to your special rquirements may be accomplished by point to point wiring, solder wrap, or wire wrap techniques.

POWER: The M-80 board requires +5, +12 and −5 volts, the +12 and −5 supplies are used for the 2708s alone. A minimum system typically requires 130 mA at +5, 30 mA at +12 and 20 mA at −5. A fully loaded M-80 card typically takes 285 mA at +5, 60 mA at +12 and 40 mA at −5. The PS-80 power supply easily satisfies these requirements with power left over for additional circuitry.

PHYSICAL: The M-80 card is 4.5 inches by 6.5 inches overall. The card edge connector is a standard 22/44 .156 inch center type. Board thickness is .062 inch. Mounting the M-80 card may be by card guides alone, or in a card cage, or by using the four mounting holes provided at the card corners. The electrical interface may be completed by using a card edge receptacle, or by using the solder/wire wrap holes at the card edge.

INSTRUCTION MANUAL: Each M-80 comes with a 70 page manual which completely describes all technical details of the board. Following an exhaustive discussion of the hardware design of the M-80 and its components, the manual illustrates more than ten ways to interface other devices to the board. The instruction manual also describes the M-80 monitor commands, as well as the user accessible subroutines. Both hardware and software interfacing of the M-80 board to a terminal or to another computer is given. Kit construction and troubleshooting information are also present.