EXPERIMENT 1-1

Introduction to the Microprocessor Lab

CONCEPT

This experiment introduces you to the μLab. Several demonstration programs which are stored in the ROM are run. A variety of tasks can be performed using the same hardware but different programs.

PROCEDURE

A) Open the μLab case and remove the lid. Turn the lid around so that the outside is facing you, and hook the hinges back together (see Figure 1-12). Fold the unit into an "A" shape, and connect the strap to the two snaps on the right-hand side of the case.

B) Connect the power cord. If the μLab has not been used before, check that the voltage selector switches are set correctly (see Figure 1-13).

C) Turn the μLab line switch to ON. The display and output LEDs light up for about a second, and then the speaker beeps. This indicates that the automatic power-up self-test has been successfully completed. The display shows μLAb UP indicating that the system is ready and waiting for a command. If at any point you press the wrong key and want to return to this state, just press [RESET].

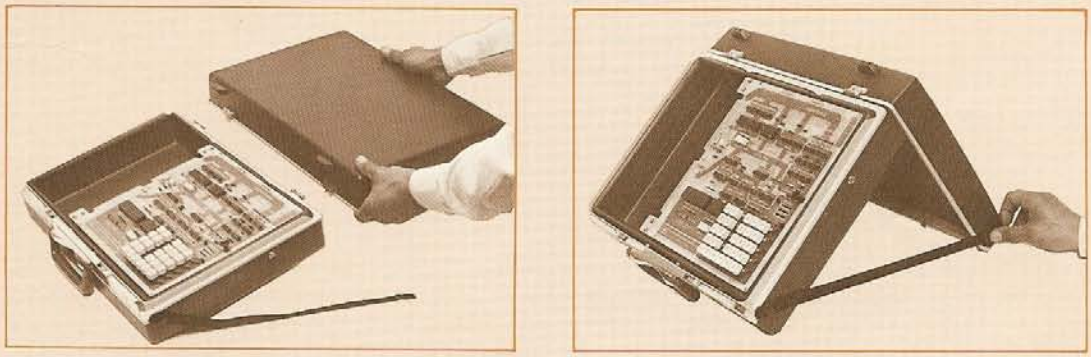

Figure 1-12. Assembling the Microprocessor Lab Case

Figure 1-13. Setting the Line Voltage

EXPERIMENT 1-1

Continued

D) Press [FETCH ADRS]. The dashes on the display indicate that the μLab is waiting for you to enter the address.

E) Press [0] [5] [F] [9]. This number now appears in the left four digits of the display.

F) Press [RUN]. You have now started the "rocket blast-off" program stored in the μLab's ROM.

G) You will see some flashing lights and hear some noises, and then the program will stop. If you want to run it again, just press [RUN].

H) Press [FETCH ADRS] [0] [5] [3] [E] [RUN]. This is a "random" tone generation program.

I) Press [RESET] to halt the program.

J) Press [FETCH ADRS] [0] [5] [5] [A] [RUN]. This program creates a moving pattern on the display.

K) Press [RESET] to halt the program.

SUMMARY

In this experiment, you directed the μLab to execute several programs which are stored in the ROM. You entered an address that specified the starting location of the program. Pressing RUN caused the program to be executed. The "rocket" program has an instruction at the end which caused the microprocessor to return to the monitor program. The other two programs run continuously until you press RESET. These programs demonstrate the wide variety of functions that can be performed with the same hardware by using different programs.

These programs require a long series of relatively complex events. The microprocessor is well suited to these kinds of tasks because the control is provided by the software. Consider, on the other hand, a random logic circuit which could perform the "rocket blast-off." It would have to be very complex in order to generate the long sequence of events, including displaying numbers and generating tones. It would also probably require extensive circuit changes to perform, for example, the random tone generation. The microprocessor, however, allows all of this to be done with a general-purpose hardware system. Try running some of the other demonstration programs, which include a game, stopwatch, and organ program. These are described in Appendix E.