

2

The TS1

In this chapter four aspects of the TS1 microprocessor system are dealt with. As the nature of a microprocessor system is so heavily affected by the particular microprocessor at its heart, we begin with a description of the actual microprocessor chosen for the TS1. This is followed by an outline of the TS1 microprocessor system and the functions of the various modules making up the TS1. Because the way in which the modules of the TS1 communicate with each other is of great importance in both defining the physical construction of the system and some of its electrical properties, the third part of this section is concerned with the design of a bus, or backplane, linking all modules together. The final part of this section deals with the power supply. A power supply is vital to the operation of any microprocessor system, and it is essential that the designer is familiar with its operation and characteristics.

2.1 THE CHOICE OF THE MICROPROCESSOR

A major step in the design of any microprocessor system is the selection of the microprocessor itself. This choice is not effortless, but it is not quite as difficult as the bewildering array of currently available chips would suggest. The importance of selecting the best chip for any given application lies in the fact that the microprocessor chip has a profound effect on some aspects of the microprocessor system. The use of the word "best" in the above sentence is somewhat unscientific as there is no simple figure of merit which can be applied to a microprocessor chip. The importance of choosing an adequate microprocessor can be seen from the following example. When putting together a Hi-Fi system the buyer knows that he can always improve its performance by substituting a better loudspeaker or amplifier at some later date. This type of action is not open to the microprocessor systems designer. He cannot choose an 8-bit microprocessor today, and then improve the accuracy of its computations by swapping it for a 16-bit processor later.

The microprocessor is the heart of the TS1 and determines the nature of the entire system. Great care must be exercised in the choice of a microprocessor. Some of the criteria by which this choice may be made are given below.