

Building a Microprocessor System

Having decided to construct a microprocessor system, there are three practical considerations to be taken into account: the circuit of the system, the physical construction of the circuit, and the housing of the circuit. The design of the microprocessor's circuit has been considered elsewhere in this book, leaving two questions to be answered—'How do I build it?' and 'What do I put it in?'

The choice of method of construction was limited in the case of the TS1 by two constraints—the system had to be capable of being built at home with few tools, and it had to be modular, enabling new units to be added to the existing system without difficulty. These constraints led to the use of 203 mm (8 in) square circuit boards plugging into a series of slots in a cardframe. The circuit boards (or cards) are manufactured by the same company which produces the cardframe and the metal case (rack) into which the cards fit. The components mounted on each module are connected together by means of a technique known as wire wrapping. This technique, described later in this section, enables complex digital circuits to be produced remarkably rapidly with no more than three specialized tools. Moreover, wire wrapping is one of the few construction techniques which permits easy modification of the circuit at a later date. Plate 9.1 illustrates the TS1 and Plate 9.2 shows one of the eight cards (modules) which make up the TS1.

The Construction of the Modules

Here we look at the reasons for choosing the particular type of card for the TS1's modules and consider alternative forms of construction. In the 1940s and 1950s the construction of electronic equipment was largely metal work (or "metal bashing") involving the machining of a metal chassis. In those days electronic apparatus was largely composed of a relatively small number of components of widely differing physical characteristics (e.g. the valve, transformer, resistor, and capacitor). Today the situation has changed dramatically. The advent of digital electronics has led to systems made up of large numbers of components, each of which falls into three or four basic physical sizes. In general, the size and shape of