

MICROPROCESSOR FREE RUN TESTING

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SUMMARY

The objectives of this project were to study the testing methods available when a microcontroller is Free-Running and to apply these methods for fault finding on a microcontroller .

The project is therefore divided into two main parts . The construction of the microcontroller to be tested and the study and application of the fault finding techniques and instruments on this microcontroller .

Construction : The Z80 8-bit family of components was used in the construction because this is superior in both software and hardware capabilities to most 8-bit microcomputer systems on the market . To explore these capabilities apart from the Central Processing Unit (CPU) and Memory , the Z80 Serial (DART) and Parallel (PIO) Input/Output devices and the Z80 Clock Timer Circuit(CTC) were included in the construction . This microcontroller communicates with an ATARI terminal via serial transmission which is enabled using the CTC for the generation of the baud rates and the SIO for the interfacing circuit .

Fault finding techniques and instruments : First , various troubleshooting instruments were examined , starting from the simple hand held instruments and their applications and going to the more sophisticated ones (Logic and Signature Analyser) . Next , the techniques were analysed and these included the Free-Run Test and Self Test programs . This microcontroller is capable of testing 2K RAM chips by using certain Self Test routines , an application also examined in the Self Test techniques .

By following the above sequence , the troubleshooting techniques were studied and the Free Run test was carried out being fully aware of hardware and software aspects of the Z80 based system . Also , since the instruments were examined with reference to existing ones in the workshop , the Free Run test was carried out both easier and with more efficiency .

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MICROPROCESSOR SYSTEM BLOCK DIAGRAM

MICROPROCESSOR SYSTEM PCB

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