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THE DESIGN OF AN ECONOMICAL, HIGH SPEED INTERFACE
BETWEEN THE CIRRUS COMPUTER AND THE CHEMICAL
ENGINEERING PROCESS CONTROL LABORATORY

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The Registrar,
The University of Adelaide,
ADELAIDE, S.A. 5000

Dear Sir,

I hereby give consent to the loan of or photocopying of
the thesis "The Design of a High Speed Computer Interface" as
required.

Yours faithfully,

(L.J. Dunne)

STATEMENT

The design as set out in the attached thesis was carried out independently by the undersigned while a post graduate student in the Department of Chemical Engineering at the University of Adelaide. The material described has not been accepted for the award of any other degree or diploma in any University. Due acknowledgement has been made in the bibliography of all information upon which the design was based.

(L. J. Dunne)

SUMMARY

This thesis describes the design and construction of a simple interface equipment to allow the use of CIRBUS, a small micro-programmed digital computer, as a control element in direct digital control of Chemical Engineering Process Control experiments in the laboratory.

Conversion of up to 8 analogue voltages, these being the outputs of transducers measuring parameters in the process, into digital form and transmitting these data to the computer is carried out in 1 msec. After processing in the computer, up to 8 digital quantities can be returned to the interface where they are converted into analogue form for operating the control mechanisms in the process. This whole operation, conversion, computation and return and reconversion, is possible at sampling rates of up to 100 samples per second. The actual sampling rate is, of course, dependent on the complexity of the process and control computation being carried out. In all operations the conversions are made to an accuracy of 9 binary digits (1 part in 512) this being compatible with the basic accuracy of the majority of the process transducers and actuators with which the equipment will be associated.

Extensive use has been made of microelectronics in the realisation of the equipment. This has resulted in an interface of high speed, small physical size, high reliability, and at a reasonable capital cost.

While the equipment has been designed initially for the computer CIRBUS, the design of the interface is general in character, and, with small modification, should be capable of

working compatibly with many of the general purpose digital computers available now.

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