

A package of LAB 8/E subroutines for DEC OS/8 FORTRAN II

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With a DEC PDP-8/e computer running under the OS/8 V3-D operating system, the execution of FORTRAN II statements is considerably faster than that of FORTRAN IV statements without an FPP-12 floating-point processor or of BASIC statements. The disadvantages of FORTRAN II can be partially compensated by the FORTX compiler (Gonzalez, Note 1), which is an extension of FORTRAN II including most of the useful features of FORTRAN IV and features for structured programming. Because of the speed advantage of FORTRAN II, a package of 11 LAB 8/E subroutines has been developed for real-time control of experiments that can be called by FORTRAN II programs. The LAB 8/E subroutines support a DK8-EP real-time programmable clock, up to eight DR8-EA digital input/output interfaces, and an AD8-EA analog input interface. The subroutines communicate with the interfaces by SABR assembler statements. Therefore, fast subroutine execution times can be achieved, and the execution time between two successive subroutine calls is below 1 msec.

LAB 8/E Subroutines

Real-Time Clock Subroutines. With the subroutines for the DK8-EP programmable clock, program waiting loops can be established and selective or cumulative measurement of time intervals between external or internal events can be achieved.

The parameters of the clock function are selected with the subroutine CLK(IRATE,IPRESET,ISCHMTR,MODE) [see Digital Equipment Corporation (DEC), 1972, 1974, chap. 6]. Three clock overflow waiting subroutines are available. CLW(N,CLKP) and CLWB(N,CLKP) return by the value of CLKP the content of the clock counter register (CCR) and of the clock buffer register (CBR), respectively; N identifies the event that caused the return of the calling program (see DEC, 1974, pp.6-133). The third clock overflow waiting subroutine, CLWST(N,CLKP), starts with the first firing of a Schmitt trigger and returns to the calling program after the second firing of a Schmitt trigger.

Digital Input and Output Subroutines. The digital input and output subroutines can address up to eight

DR8-EA interfaces. The subroutine DRI(NUM,ICHAN) samples the input register of the channel ICHAN = 0, 1, . . . , or 7 and returns its content by the value of NUM. The subroutine DRO(NUM,ICHAN) loads the digital output register ICHAN with the value of NUM. The subroutine DRITME(NUM,ICHAN,CLKP) samples the content of the input register of the channel ICHAN, and, for the purpose of time measurement, it returns by the value of CLKP the content of the CCR at the time of readout. The subroutine DRISKP(NUM,ICHAN,CLKP) is similar to DRITME, but it waits until the input flag of the selected channel is set. The subroutine DRICLW(NUM,ICHAN,CLKP,NOVF,MAXOVF) also waits until the input flag is set, but it returns to the calling program after MAXOVF clock overflow cycles if the input flag has not been set during this time.

Analog Input Subroutine. The analog input register of the AD8-EA is sampled by the subroutine ADCLK(NUM,CLKP), which returns by the value of NUM the analog-to-digital converted input and by the value of CLKP the content of the CCR.

Date Subroutine. For the purpose of convenient documentation, the subroutine DATE(IDAY,MONTH, IYEAR) returns the current day, month, and year if the date has been defined in the monitor subroutine DATE.

Availability

Source listings of the LAB 8/E subroutines and of several demonstration programs and a user manual are available from the authors at no charge. Upon receipt of a formatted floppy disk (DEC RX01, single density), the authors will send the source files copied on floppy disk and a library, LIBLAB.RL, which includes all LAB 8/E subroutines in relocatable assembler.

REFERENCE NOTE

1. Gonzalez, G. *FORTTRAN (Extended). An improved and extended version of the OS/8 FORTRAN II compiler.* Unpublished manuscript, University of Minnesota, Hearing Research Lab, 1978.

REFERENCES

DIGITAL EQUIPMENT CORPORATION. *LAB-8/E maintenance manual.* Maynard, Mass: Author, 1972.
DIGITAL EQUIPMENT CORPORATION. *OS/8 handbook.* Maynard, Mass: Author, 1974.

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