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PDP-6 LISP Input-Output for the Dataphone

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ABSTRACT

A version of LISP 1.5 for the PDP-6 Computer has been extended to include IO through the dataphone. This makes possible communication between programs running in Project MAC time sharing and LISP programs running on the PDP-6. The method of handling input-output for the dataphone is similar to that for the typewriter, paper tape punch, and paper tape reader. Three useful LISP functions are presented as examples of dataphone programming.

The dataphone generates in sequence break mode, requesting service each millisecond. It must be turned on and off with the LISP function dp; however, when it is running, input and output to it are handled in the same manner as to the teletype, paper tape reader, and paper tape punch. The dataphone is controlled by the control characters:

A	Write on dataphone.
C	Do not write on dataphone.
D	Read from dataphone.
E	Do not read from dataphone.

Control characters can be typed from the teletype or executed with the function echar. Since CTSS truncates lines longer than 72 characters, a carriage return is inserted whenever 72 characters have been output to the dataphone since the last carriage return. If the user sends the ASCII character $^{c}/_{o}$ through the dataphone program, it will be sent as the CTSS interrupt character. There are several LISP functions written in machine language which are useful for dataphone programming:

dp (x) — If x is NIL the dataphone is turned off; otherwise it is turned on and initialized.

dpd (x) — The value of dpd (x) is a flag for characters in the dataphone input buffer. If x is NIL, dpd returns NIL

if there are no characters; otherwise, it waits until some arrive. When characters are received this function returns a list of the mode of the characters and the number of characters. The mode is a number determined by the sender. Characters sent from CTSS in the same manner as to a normal console are assigned mode 1.

ttyd ( ) — Returns the number of characters in the teletype input buffer or NIL if there are none.

cchar (x) — Executes the lower case ASCII character x as a control character.

To establish communication with CTSS, turn on the dataphone by executing dp (T). Then execute ctss ( ) and type S followed by a space. The teletype can now be used as a CTSS console. Several useful features of the LISP functions ctss, dpwrite, and dpread are described below. LISP expressions for these functions are at the end of the memo.

dpread ( ) — This function waits until there is input from the dataphone. It then prints the characters on the teletype

one by one. If it receives $, it does not print this, but instead evaluates the S-expression which follows.

dpwrite (x;y)

dpwrite takes two forms of input. If y is NIL dpwrite assumes that x is a list of atoms and sends over the dataphone the characters in the PNAMES of these atoms, with a space between each PNAME. Otherwise it sends x as an S-expression.

ctss ( )

ctss allows the user to operate the PDP-6 as a CTSS console. There are two modes; local and send. ctss is initially in local mode. In this mode it accepts S-expressions for eval but watches for the single atom S-expressions S, STOP, and L. If it finds S it goes into send mode. If it finds STOP it terminates returning NIL. If it finds L it sends over the dataphone the two S-expressions which are typed next, but stays in local mode. In send mode it sends characters one by one while watching for @ and #. @ returns it

to local mode. If it sees ## it sends the evaluation of the S-expression which follows and then types #.

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(DEFLIST ((CTSS (LAMBDA NIL (PROG (U V) A (COND ((TTYD NIL) (GO
B)) ((DPD NIL) (DPREAD))) (GO A) B (SETQ U (READ)) (TERPRI) (CON
D ((EQUAL U (QUOTE S)) (GO C)) ((EQUAL U (QUOTE STOP)) (RETURN N
IL)) ((EQUAL U (QUOTE L)) (PROGβ (DPWRITE (READ) T) (DPWRITE (RE
AD) T))) (T (PRINT (EVAL U NIL))))) E (TERPRI) (GO A) C (COND ((D
PD NIL) (DPREAD)) ((TTYD NIL) (GO D))) (GO C) D (SETQ U (READCH)
) (COND ((EQUAL U @) (GO E)) ((EQUAL U #) (GO G))) (CCHAR (QUOTE
A)) (CCHAR (QUOTE W)) (PRINI U) (CCHAR (QUOTE C)) (CCHAR (QUOTE
V)) (GO C) G (DPWRITE (EVAL (READ) (CDR ALIST)) T) (PRINI #) (G
O C))))) EXPR)

(DEFLIST ((DPWRITE (LAMBDA (X Y) (PROG (U) (CCHAR (QUOTE A)) (CC
HAR (QUOTE W)) (COND (Y (GO C))) (SETQ U X) A (COND ((NULL U) (G
O B))) (PRINI (CAR U)) (PRINI BLANK) (SETQ U (CDR U)) (GO A) C (
PRINT X) B (TERPRI) (CCHAR (QUOTE C)) (CCHR (QUOTE V)) (RETURN
NIL))))) EXPR)

(DEFLIST ((DPREAD (LAMBDA NIL (PROG (U V) (SETQ U (DPD T)) (CCHA
R (QUOTE D)) A (SETQ U (CADR U)) B (COND ((ZEROP U) (GO C))) (SE
TQ V (READCH)) (COND ((EQUAL V S) (GO D))) (PRINI V) (SETQ U (PL
US U 68719476735)) (GO B) D (TERPRI) (EVAL (READ) NIL) C (CCHAR
(QUOTE E)) (RETURN NIL))))) EXPR)
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