

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

PROJECT MAC

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A Primitive Control P Feature

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A program, some TECO macros, and some small modifications to existing systems software have been written, called PRO, whose purpose is to reduce the large number of control languages and system programs it has been necessary to know about and the large amount of redundant typing it has been necessary to do to effectively use the MAC PDP-6 system. PRO allows a user knowing the command languages on only TECO, DDT, and PRO to effectively edit and debug small absolute programs with a minimum of command typing overhead (systems of this sort are called control P features for historic reasons). The remainder of this memo, which describes PRO and its use in detail, assumes some knowledge of TECO, DDT, and the MAC PDP-6 system. (In this memo the symbol \$ always stands for the character ALT MOD).

PRO may be initially entered from MACDMP when it is looking at the MACDMP system tape by light penning the word "PRO" on the display screen or by typing "PRO" followed by a carriage return. If one is in TECO one may type "1ERPRO2\$YHXJMJ\$\$". Note that entering PRO this way will destroy TECO's buffer and various of its Q registers (see Appendix B). When control is transferred to the TECO macro in Q register P, which is the heart of PRO, it will type a carriage return and a line feed. PRO is then ready for commands.

Commands in PRO are in the form of one line terminating with a carriage return and beginning with a command word. The effect of the command word is determined solely by its first letter and it may be followed by one argument (always a tape number) or two arguments (always a tape number and file name, in that order) which are separated from it and from each other by spaces.

(no commas, periods or other punctuation should appear other than as part of a file name). The part of the current command typed in at any time is always visible on the display and until a carriage return is typed a command may be cancelled by typing a RUB OUT.

The structure of PRO is sufficiently simple that the bulk of its explanation can be in the form of explanations of the individual PRO commands. One may escape from PRO by typing a letter which is not the start of any command word (such as Z) followed by a carriage return, by typing repeat RUB OUT, or because of a TECO error. PRO is re-entered by typing "MP\$\$". PRO assumes that the system tape is on microtape drive one.

Usually the first command typed is:

TEMP.

This is a command of one argument which tells PRO that the tape drive whose number is the command's argument has on it the scratch tape which PRO is to use as a temporary tape.

Commands which use the temporary tape are not safe until PRO is informed which tape is temporary unless tape two is being used as that is PRO's initial assumption. At this point, in order to examine the contents of one's tapes to find the exact names of the file to be edited and debugged with PRO, one uses the command:

LISTF.

This command takes a tape number as an argument and displays the names of the files on that tape until another character is typed. In order to first introduce one's program to the PRO system, one uses the command:

READ.

which takes two arguments. The second argument is the name of a file on the tape whose drive number is the first argument. This file is transferred to the temporary tape with the name PRO 1. To edit this file which has been introduced, one naturally enough uses the command:

EDIT.

This command exits to the top level of TECO after appropriately setting IO switches so one may proceed to edit one's current symbolic. It also modified the macro in Q register P so that when one returns to PRO by typing ["MP \$\$"] it will P through any remaining pages, rename PRO 1 as PRO 2 and file the output of the edit as PRO 1. If one wishes a listing one uses the PRO command:

PRINT

which lists one's current symbolic on the line printer. One may then enter a machine language debugging phase with the command:

START

This command causes one's current symbolic to be assembled and loaded along with DDT. Quite a bit of tape spinning may be involved and one can tell that one is in DDT when three X's are typed out. In case of an assembly or loading error, simply return to MACDMP, load the dump "TECO" on the temporary tape, then type["MP \$\$"]. If one reaches DDT, a dump of one's program with DDT has been created on the temporary tape as a file called "PROD". After some debugging one may return to PRO with one's file status preserved by the ["\$\$U"] command in DDT. If one

wishes to return to a particularly correct symbolic, as when one's last edit did more harm than good, the command:

BACKUP

which destroys the current symbolic and replaces it with the immediately previous version. This is only effective to one level. One may exit from PRO directly to MACIMP by means of the command:

MACDMP.

which does not dump the current TECO status as it goes to MACDMP. Lastly, PRO will list its commands for you when you use the command:

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APPENDICIES

A. The following files are oriented and maintained on one's temporary tape by PRO.

- (1) PRO 1 - current symbolic file.
- (2) PRO 2 - immediately previous symbolic file.
- (3) PRO B - binary file of an assembly(usually of PRO 1).
- (4) PRO D - dump file of loading of PRO B and DDT.
- (5) TECO - dump file of TECO with PRO macros.

B. The following Q registers are used by PRO:

- Q8 - temporary tape number.
- QA - command word first letter.
- QF - file name argument.
- QG - used as part of START command.
- QJ - used only once when PRO is loaded.
- QN - tape number argument.
- QP - main PRO macro.

C. At the time this memo is written, an implementation problem exists which may, twice during the execution of PRO's START command, cause a microtape to continue spinning when a second microtape is started. The first time, the temporary tape keeps spinning as the system tape is started. The second time, it is the other way around. In both cases, the REV-AUTO-FOR switch on the drive initially spinning should be momentarily pushed to the reverse (REV) position.

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