

TO: MSPM Distribution
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The overview of POPS has been re-issued to provide an expanded view of the relationships involved in working with POPS and POPS-described compilers, and as an attempt to clarify any confusion that may have arisen in this regard.

It also supersedes the Addenda, BZ.7.00A, 09/20/68.

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Identification

POPS Overview

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POPS are machine instructions for a pseudo-computer simulated on the GE-645. This pseudo-computer was designed specifically for writing compilers and assemblers. Each POP corresponds to a GE-645 machine language subroutine. In order to execute a POPS language program, an interpreter interprets each POP and calls the proper subroutine.

The POPS interpreter operates under Multics. It is currently being used by FL and FORTRAN, both of which are written in POPS language.

The following comments describe the relationships which exist between

- 1) The FL command-and-translator and the POPS interpreter,
- 2) The FORTRAN command-and-translator and the POPS interpreter and,
- 3) A hypothetical POPS command-and-translator and the POPS interpreter.

Since FORTRAN and FL do not differ with respect to these relationships, only FL will be described; FORTRAN is analogous to, and parallels, this description. In addition, the POPS will be described.

The FL (FORTRAN) command program (itself coded in EPL) serves as the interface between the POPS interpreter and the rest of the Multics system. When the command is invoked, it gets pointers to the source segment, the POPS driver tables for the particular translator, a copy of the template data segment associated with the particular translator, and all other intermediate and output segments. The appropriate pointers are placed in that part of the data segment used to communicate with the POPS interpreter. The POPS interpreter program is then called; upon return the command program wraps up the output segments leaving them in the user's working directory.

The particular translator or POPS driver is a table which is interpreted by the POPS interpreter. It may be a read-only or read-and-execute segment (the latter if an escape to machine code has been used).

The interpreter is a pseudo-machine which executes the instructions coded into a given driver table.

While a POPS command could be constructed to translate POPS "source language"-code into the form required for a POPS driver table, neither such a language nor such a translator exists. Instead, the POPS "instructions" are coded using the FL/I syntax, and the FL command is invoked with special options such that the POPS interpreter is given an extended symbol table in the template data segment which contains a set of definitions for the

POPS "language" mnemonics in terms of the FL language functions. A special handler in the definition of the FL translator assembles the POPS instructions into the appropriate form. Thus all the other facilities of FL from macros and pseudo-ops to actual machine language are available for use in coding a "POPS Language" program.

Finally, in creating a POPS program ("driver table") it is necessary to assemble the template data segment under one counter and the POPS instructions under another counter. Two passes through FL are now necessary, the first to assemble the data segment as the output text and the second to assemble the POPS instructions as the output text and the data segment as an external segment for proper address references.

MSPM sections BZ.7.01 and BZ.7.02 describe the GE-645 interpreter, the POPS language, and the POPS machine which is simulated by the interpreter. These sections are written in manual form. The Contents for the manual appear in this overview.

All examples in the manual are coded in the FL/I syntax. Chapter 1, Paragraph B.1. gives a brief description of FL/I syntax. Further details are contained in the FL/I User's Manual to be published shortly.

For information on the GE-645 hardware and related data on the Multics operating system, see the following documents:

GE-645 System Manual

GE-625/635 Programming Reference Manual, CPB-1004

MSPM BD.1. The Segment Symbol Table

MSPM BD.7. Intersegment Linkage

MSPM BX.7.01 The fl Command

MSPM BX.7.02 The FORTRAN Command

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Appendix A - Summary of Commonly Used Areas in the Data Segment

Appendix B - Special Topics

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