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Memorandum No. __S-0038__   Date __10 October 1961__

To: Distribution List

From: J. H. Saltzer

Subject: CARDS COLUMN EQUIVALENT OF BSS LOADER

ABSTRACT

An eleven-card relocatable upper loader has been written for 704-type column binary cards. This loader is essentially equivalent in operation to the row binary BSS loader punched on-line with certain FORTRAN compilations, but has the advantage that it is used with standard FORTRAN off-line column binary decks to make a master tape on off-line equipment. This feature allows non-monitor operation with no loss in time for punching on-line row binary decks or on-line card reading.

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plf-1340a

DESCRIPTION

The eleven-card loader deck consists of a column binary version of the 9-card BSS loader, and two full instruction cards which make the necessary modifications to the BSS loader for column binary format. One of these cards is a self-loader which reads in the rest of the BSS loader and a modification card in the proper binary tape format. The other of the extra cards modifies those instructions which have 500_8 added to their decrement because of the 7-9 column binary identifying punch.

Control is then passed to the BSS loader itself, which has been further modified in two ways. First, it reads tape A1 rather than the card reader. Secondly, in each card it brings in, it removes the 7-9 punch in a logical "and" operation before deciding how to process it. (As always, however, the 7-9 punches are added into the checksum.)

At the end of the column binary deck must be placed a transfer card, viz., a card with a 12-7-9 punch in column 1; column 2 and 3 blank. This signals the loader that the last card has been read in and control should be transferred to the main program. The loader then erases itself and performs the transfer.

The 9BSSL loader used as a basis for this program is dated 14 November 1960.

Normal operation of the loader is straightforward. Place the 11-card deck in front of a complete deck of FORTRAN and/or FAP programs, subprograms, and library; place a transfer card after the deck, and "prestore" the deck (column binary mode) onto tape off-line. Place the tape on unit A1, press clear and load tape. From there, operation is automatic. Note that there is no library search performed, so all needed subroutines must be included with the deck. The library subroutines may be obtained at compilation time by adding a *LIBE Monitor control card to the FORTRAN deck. Since FAP assemblies do not have this provision, it may be necessary to secure certain subroutines from Program Support.

WARNINGS

This loader has been used with a variety of programs and has successfully performed all the operations called for by those programs. It has not yet been given as thorough a checkout as might be necessary. For this reason, it is suggested that if the loader is used, it be tested once with the program and a dump taken to insure correct operation. This is particularly important if more unusual formats are used, such as relocatable or absolute transfer cards, etc.

Beware of library subroutines which require the FMS Monitor tape, such as DUMP, PDUMP, or EXIT, as they are certain to cause trouble.

CARD FORMATS

The 11-card column binary loader will accept Program cards, Transfer cards, Control cards, Absolute Transfer cards, Absolute Binary Instruction or data cards, relocatable Binary Instruction or data cards, and Relocatable Binary transfer cards in

the formats described in the FORTRAN Operations Manual, C28-6066-3, pp. 28-35. These formats must be switched to their column binary equivalents, of course, and 7-9 punches added in column 1. Because of this last requirement, the loader will not accept another self-loader (something the original BSS row binary version will do).

Flip cards, Symbol Table Cards, and cards otherwise blank except for the 7-9 punch in column 1 will be ignored by the loader. If a Hollerith card, such as the ID card punched with off-line decks, or a complete blank, should get into the deck, the off-line card-to-tape machine will write a BCD record on tape, with even parity checks. Since the loader is looking for binary information with odd parity checks, an I-O Stop will result.

ERROR HALTS

The stops listed on page 57 of the above manual have been preserved; however, the recovery procedures are modified to consider tape handling. The missing subroutine stops and the end of file stop (on A1) cannot be recovered, as more cards must be placed on the tape.

The remaining stops may be recovered in the manner listed in the manual.

ERROR HALTS IN THE COLUMN BINARY BSS LOADER

Location (octal)	Reason for Halt	Procedure
77432	Instructions and data overlap	Terminate loading. Combination of instructions and common data too long. Rewrite program.
77613	Checksum error on cards	Depress the Start key to accept information
77615	I/O check indicator ON	Rewind A1. Clear, and depress Load Tape. If trouble persists, make a new master tape.
77616	EOF on Tape A1	Terminate Loading. Did you include a transfer card?
77672	Instructions overlap the symbol table of the Loader	Terminate Loading. Combination of program and transfer vectors too long. Rewrite program.
77733	More than 20 sub-routines are missing.	Terminate Loading. Rearrange programs and subprograms on master tape so that there will not be 20 missing subroutines at any time.
77746	Missing subroutines.	This stop indicates the Transfer card has been reached. It is caused by one of two occurrences:

(a) Loading has been completed, but at least one of the subroutines called for is missing. Location 77432_8 contains the BCD name of the first missing subroutine, location 77433_8, the second, etc. The list of missing subroutine names is terminated by a word of zeros.

(b) The Transfer card was encountered prematurely and should have been withdrawn. Terminate Loading and make a new master tape.

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