HARVEST CONTROL PROGRAM

Load

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Wm. L. Wynn, Jr.
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I. Input Source

The principle function of the Load program is to transfer input files from 729 tapes to Tractor tapes. In so doing, the material will be blocked and specified conversions will be performed.

It is assumed, at least for the present, that all incoming material will have been processed by the 1401. This would insure that all files to be loaded would be on 729 tapes (High Density), that the block size would be reasonably large, and that certain counts would be provided. If it is decided at a later date that the system should accept non-1401-processed material, the Load program would have to have the facility to duplicate the 1401's efforts, in effect.

II. Load Request Parameters

Each Load request will consist of several cards and will be considered to be a job in its own right. That is, the Job Request Analyzer will assign a unique job number to each Load request.

The parameter cards making up a Load request will be of several types. The format of a Type 1 card is as follows :

Col.		
	1-5	MPRO Job Number
	6-7	Card number of Load Type
	8	Request Type (Load)
	9	Load Type
	10-49	File Identification
	50	Tractor Disposition (Hold or Permanent)
	51	Data Structure Code
	52-55	Valid Record Length (Longest record if Variable)
	56-60	Block Record Count
	61-64	Block Size (Maximum if Variable)
	65-71	Record Count (Logical)
	72	Blank
	73-79	Tape Serial Number and File Position Number
	80	Blank

A Type 2 card is provided for listing additional Tape Serial and File Position Numbers in the case of multiple-tape files. These numbers will be in Col. 10-80 with Col. 1-9 as above. The Type 3 card will contain a Data Descriptor in Col. 10-80. The Type 4 card will be available for listing Sponsor information, Space Reservation, etc. A Type 5 card will be used to list non-standard conversion alphabets.

The Job Request Analyzer sets up the File Control Table which contains File Request Entries, File Description Entries, and Data Description Entries. In addition, it stacks up all parameter entries into a Parameter Table and creates an Internal Request Table which consists of one-word entries.

III. Input Map

In order to reduce later copying, files will be checked for simultaneous usage and Tractor assignments made accordingly. A Load request entry in the Internal Request Table contains the location of the first File Request in the File Control Table. The File Request entry contains Job Number, Step Number, and File Sequence Indicators. The File Sequence Indicators for all Load files within each Step will be compared to determine which, if any, are to be used simultaneously. Those which are to be used simultaneously will be assigned to separate channels, if possible, and to separate cartridges.

There will be 4 incoming data channels, with two 729 drives on each channel. Four internal buffer areas will be used and there will be three output channels, with two Tractor drives per channel. The number of 729 drives, buffer areas, and Tractors used may vary, depending on the number of 729 drives and Tractors available.

In order to set up an equitable 729 input map, it will be necessary to first compute approximate reading-time weights for each file and each tape and distribute the tapes among the eight 729 drives in such a manner that the four channels, which input data more or less simultaneously, will carry loads which are roughly equal as far as reading time is concerned. The Tractor disposition must be taken into consideration in assigning input tapes. If any Tractor handler has only one drive available, only HOLD files (or only PERM files) will pass through the corresponding buffer area. Intermixing HOLD and PERM files would cause a good deal of unnecessary Unloading, Storing, Fetching, and Loading of Tractor cartridges. If any routes (729 channel to buffer area to Tractor Handler) are handling only HOLD files (or only PERM files), any multiple-file tapes which contain both HOLD and PERM files must be assigned to another route. All tapes of a multiple-tape file will be assigned to a single channel, in sequence (alternating between the two drives on the channel), unless the other channels have run out of input data. Prior Tractor assignment due to simultaneous usage is another factor which must be taken into consideration in setting up the 729 input map.

Within the HOLD and PERM categories, sorts will be made on the Tape Serial and File Position Numbers, principally to bring together, in the proper order, references to files on multiple-file tapes. Only the first Tape Serial Number of a multiple-tape file will be included in the sort so as to avoid assigning subsequent tapes to two different areas. Tapes will then be assigned successively to the eight 729 drives, making allowances for the exceptions imposed by the cases mentioned in the preceding paragraph. As input assignments are made, running totals of the time-weights

are kept for each 729 channel. When a total reaches approximately one-fourth of the total weight for all the files, no more tapes will be assigned to that channel.

When the input assignment is completed, an input map will be printed out to give the operators an opportunity to stack up the tapes for each drive in advance and in the proper sequence. Incoming material will be checked to make certain the tapes have been loaded in the correct order.

IV. Tractor Assignment

In order to determine Tractor space requirements, it will be necessary to calculate the approximate length of each file. (For a file which had not been processed by the 14Ø1, it would be necessary to assume that this file occupied the full reel of 729 tape). A total of the HOLD file lengths and a total of the PERM file lengths would then be accumulated for each Handler. Where possible, a Tractor cartridge will be located which contains adequate available space to accomodate all the PERM files to be loaded via a particular Tractor drive. This 'available space' information will be obtained from TUSC (Tractor Unit Storage Control Table) and the Space Allocation and Cartridge Utilization Catalog. In the case of HOLD files, it is only necessary to refer to TUSC, where empty HOLD tapes on a given Channel may be located.

As soon as it has been determined which Tractor cartridges are to be used, those cartridges comprising the first level of loading are fetched, loaded, and advanced to the correct starting positions. Also, the second level cartridges, if any, are fetched. This places them in the Deliver position, ready for loading at the appropriate time.

V. Internal Processing

Data blocks are now read into the internal buffer areas from the primary drives of each of the 729 channels being used. The details of 729 read-in and internal buffer manipulation have not been determined as yet, but the aim will be to effect as much overlap as possible in 729 read-in, internal processing, and Tractor output. At present it is planned to read in about 48,000 BCD characters (4500 Harvest words) at a clip. When conversion from BCD to one of the standard HCS character sets is specified, (Conversion to a non-standard character set may be specified on a Type 5 Load card), these 4500-word blocks will be expanded to about 6,000 words by the conversion and loaded onto Tractor with something approaching the maximum block size (6144 words), unless otherwise specified by the programmer or project planner in the Load parameters. Current plans are to allow a minimum Tractor block size of about 1430 words. This minimum will not apply to a file having a total length of less than 1430 words nor to the last block of a file.

Binary information will normally be received as either 6, 5, or 1 information bits per six-bit frame. If other than 6 bits per frame, the data will be packed solid before loading onto Tractor tape.
In order to have files written on Tractor, it will be necessary to provide the MCP with series of FLASC (File Location and Assignment Control Table) entries. Other tables and Catalogs to which the Load program must refer and/or in which the Load program must make entries are TUSC (Tractor Unit Storage Control Table), QUIP (a portion of TUSC), the Space Allocation and Cartridge Utilization Catalog, the Internal Request Table, the HCP File Control Table, the Name Table, and an internal Log.

VI. Tractor Format

Each file loaded on Tractor will be preceded by a File Header which will contain File Name and/or Number. Each block will be preceded by a Block Header containing block size, record count, and record size (Maximum record size if variable). Variable length records will be preceded by their character count.

VII. Rejects

If, for some reason, a Load request must be rejected, the Internal Request Table and the HCP File Control Table will be searched and the reject bit activated for all entries pertaining to the rejected file. Some possible rejection causes are : inability to read from a data tape, insufficient or incorrect parameters, incorrect file identification, etc. If there are any HOLD files yet to be loaded for the job requesting the rejected file, they will not be loaded.

VIII. Logging

An internal log will be kept, recording data pertaining to both successful and unsuccessful loading. This log will be output onto 729 tape at the end of the Load program's processing. Certain information must be output by way of the on-line printer during the running of the Load program for the instruction and edification of the operators, such as the 729 input schedule, specific instructions to remove and mount tapes, and instructions resulting from errors or irregularities.