

SERIES 200

CARD LOADER-MONITOR B

GENERAL SYSTEM:

SERIES 200/OPERATING SYSTEM - MOD 1

SUBJECT:

Program Operating Procedures for the Card Loader-Monitor B Program (formerly PLUS — Card Loader-Monitor).

SPECIAL INSTRUCTIONS:

This software manual supersedes the bulletin of the same name dated September 27, 1965, reprinted December 30, 1965. This is a companion document to the publication entitled Tape Loader-Monitor C, Order No. 221.

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FOREWORD

The Card Loader-Monitor B Program of the SERIES 200/OPERATING SYSTEM - MOD 1 (formerly the PLUS — Card Loader-Monitor) is designed to operate in both the two- and three-character addressing modes, permitting the storage of programs which require up to 32K characters of memory.

Card Loader-Monitor B is similar in operation to Tape Loader-Monitor C (Tape Loader-Monitor C Manual, Order No. 221). The communication areas of the two programs are identical in both structure and absolute location.

The program load cards in Card Loader-Monitor B have the same format as binary run tape (BRT) records, except that they are limited to 80 characters.

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SECTION I

INTRODUCTION

Card Loader-Monitor B searches for, loads, and starts programs punched on cards in binary run deck format as produced by a Series 200 assembly system or compiler. A given program is identified by various combinations of keys or search parameters. A call to search for and load a program may originate from either the operator or another program.

If the Card Loader-Monitor B program is supplied in symbolic form, it must be assembled by Easycoder Assembler A or Easycoder Assembler B, since these are the two methods of producing a self-loading, punched-card object program.

BINARY RUN DECK

The binary run deck consists of machine-language punched cards. The cards are punched to simulate a BRT format (a Series 200 BRT is a tape file which is the source of the programs for the Tape Loader-Monitor C program). The binary run deck, which consists of one or more program units, has the following format:

1. A header card for each program unit which contains the characters 1HDRA in columns 1 through 5. (This card is not necessary. It may precede the segment header card, but, if present, it is ignored by the Loader-Monitor.)
2. A segment header card for each program unit followed by the BRD cards for that unit. These cards are punched in normal mode, special code, with 80 characters per record maximum.
3. An end-of-file card containing the characters 1EOFΔ in columns 1 through 5 and the program name in columns 21 through 30.
4. Two end-of-reserved information cards each containing the characters 1ER1Δ in columns 1 through 5.

EQUIPMENT REQUIREMENTS

1. A Series 200 central processor with the Advanced Programming Instructions (Feature 1011, 010, or 011).
2. 936 core memory locations (decimal locations 64 through 999).
3. Index registers X5 and X6.
4. One Series 200 Card Reader.

STANDARD PROCEDURES

The following procedures for standard operation should enable you to use the loader easily and simply without going into the complexities of the various optional methods of operation of Card Loader-Monitor B.

The Loader-Monitor is on a self-loading deck of cards. To load it, the operator places the deck in the card reader, bootstraps into location 1620_g, and presses RUN. The Loader-Monitor is then ready to load programs in BRD format that are desired for the run. Next, he arranges the input deck containing the programs desired for the run with any control and data cards that are needed, places the deck in the card reader, and presses RUN. The Loader-Monitor will load the first program unit in the deck into the locations specified in assembly, and then start execution of this unit by branching to its normal starting address.

When the program unit has completed its processing, it should branch back to the Loader-Monitor. If this is an indirect Branch to location 139, the Loader-Monitor will halt (halt 3). The operator presses RUN. The Loader-Monitor loads the next program unit and proceeds as before. Alternatively, the program unit currently in control may call for the next unit to be loaded without causing a console call halt. To do this it returns control to the Loader-Monitor with a direct Branch to location 130.

Operating Procedures for the Loader-Monitor

1. Initialize the central processor and activate the peripheral devices to be used.
2. Place the self-loading Card Loader-Monitor deck in the card reader. Arrange the desired programs, with any control and data cards that are needed, in the order these programs will be wanted during the run. Place the correctly arranged deck in the card reader immediately behind the Card Loader-Monitor deck.
3. Bootstrap the first card into location 1620_g.
4. Press RUN.
5. When halt 3 (B-address = 17002) occurs, the Loader-Monitor is in memory and ready to begin to load and start the first program.
6. When halt 3 occurs again, press RUN to load and start the next program. If other halts occur, refer to Table 4-1 and/or the procedures for the program that has just been loaded.

Programming Procedures for the User's Program

1. ORG to location 1,000 or above. Do not store anything in locations 64 through 999. This area is reserved for the Loader-Monitor.
2. Do not load into or clear index registers X5 or X6. The Loader-Monitor uses X5 and X6 as distribution registers and does not restore previous contents.
3. The last executable instruction in any program unit must transfer control to the Loader-Monitor.
 - a. An indirect Branch to 139 will cause a console call halt (halt 3). The operator then presses RUN, which loads the next program unit in the deck.
 - b. A direct Branch to 130 will start the Loader-Monitor without halting or resetting any parameter values.

SECTION II
DETAILED DESCRIPTION

GENERAL

Card Loader-Monitor B performs three related functions:

1. Searching for the requested program unit.
2. After finding the program unit, loading it.
3. Starting the loaded unit or some other routine in memory of returning control to the program that made the call.

These three functions are controlled through a communication area (see Table 2-1), which is located in main memory locations 64 through 155. This communication area contains:

1. Parameters that control the searching, loading, and starting operations of the Loader-Monitor.
2. Returns for transferring control back to the Loader-Monitor.
3. Exit and Return points for own-coding associated with the loading operation.
4. Parameters that are provided for use by other programs.

All the parameters in the communication area, except for program name, segment name, and halt name are initially set to certain standard values. Some of these are automatically reset by a console call, a special call, or after loading a program unit. "Initial Value," as used in the following paragraphs, refers to the contents of a parameter field within the communication area which are established when the Loader-Monitor itself is initially loaded into memory. "Reset" refers to a value entered by the Loader-Monitor into a parameter field within the communication area at a console call, special call, or after loading a program unit.

A complete sequential layout of the communication area is presented in Table 2-1. Following that, the searching, loading, and starting functions of the Loader-Monitor are described including the parameters that control each function. Then follows an explanation of the various return points for returning control to the Loader-Monitor. Additional features in the communication area are described at the end of the section. The own-code exit and returns are explained in Appendix B.

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Table 2-1. Sequential Layout of the Loader-Monitor Communication Area

Location ¹		Function	Initial Value	Reset		
Decimal	Octal			Console Call	After Loading	Special Call
64	100	Not Used	0			
65-67	101-103	Revision Number of Unit Last Loaded	Δ			
68-73	104-111	Program Name	Δ			
74-75	112-113	Segment Name	Δ			
76	114	Not Used	0			
77-84	115-124	Halt Name	Δ			
85	125	Not Used	0			
86-89	126-131	Fixed Start 0 (Manual Return for Console Call)				
90-93	132-135	Fixed Start 1 (Not Used by Loader-Monitor)				
94-97	136-141	Fixed Start 2 (Not Used by Loader-Monitor)				
98-101	142-145	Fixed Start 3 (Not Used by Loader-Monitor)				
102-105	146-151	Exit to Own-Code	No Exit ²	No Exit ²	No Exit ²	
106	152	Not Used				
107-109	153-155	Relocation Augment	0	0	0	
110	156	Relative Position	01	01	01	
111	157	Search Mode	77	77	20 ³	77
112	160	Start Mode	N	N		N
113-118	161-166	Not Used				
119-121	167-171	Special Start Location	0			
122-125	172-175	Own-Code Return 1 (before distribution).				
126-129	176-201	Own-Code Return 2 (after distribution).				
130-138	202-212	Return for Normal Call				
139-141	213-215	General Return Address (Halt for Console Call)				
142-146	216-222	Current Date	Δ			
147	223	Trapping Mode	0			
148-150	224-226	Alternate Return Address (Not ordinarily used)				

SECTION II. DETAILED DESCRIPTION

Table 2-1 (cont). Sequential Layout of the Loader-Monitor Communication Area

Location ¹		Function	Initial Value	Reset		
Decimal	Octal			Console Call	After Loading	Special Call
151-154	227-232	ECD Field	JJO			
155	233	Console Typewriter Availability	Item Mark			
<p><u>NOTES:</u></p> <ol style="list-style-type: none"> 1. All fields in the communication area except 155₁₀ have a word mark in their leftmost location — punctuation in the communication area <u>must not</u> be changed. 2. The exit to own-code parameter is set initially and reset to assume that there is no own-coding. 3. When a program unit is found using search mode 77, the Loader-Monitor before starting to load resets the search mode to 20. This enables it to load segmented programs the same as Mod 1 Loader-Monitors. 						

SEARCHING

Each program unit is identified by its segment header card, which contains the program and segment names of the unit. When searching, the Loader-Monitor looks only for segment header cards, and it will continue reading cards until it finds the correct segment header — all non-header cards are ignored. The Loader-Monitor can search the input deck for the requested unit in one of six ways, as designated by the search mode parameter. Usually, it is set to unconditionally load the next unit in the deck. If the Loader-Monitor encounters a 1EOF card before finding the requested loading unit, it halts (halt 8).

Blank cards cause unspecified results, because the Loader-Monitor interprets them as segment header cards.

Table 2-2 contains the parameters that control a search (locations are given in decimal notation and values are given in octal notation).

When a program unit is found using search mode 77, the Loader-Monitor, before starting to load, resets the Search Mode to 20. This enables it to handle segmented programs the same way as the Tape Loader-Monitor. If the program (after it has been loaded and executed) returns control to the Loader-Monitor with an indirect Branch to 139, the Search Mode is again set to 77. But if the program returns with a direct Branch to 130, the Search Mode is not reset and retains the value of 20.

Table 2-2. Searching Parameters

Location Specified by Parameter	Location	Values and Meaning
Search Mode	111	<p>77 = Unconditionally load the next unit.</p> <p>01 = Search by relative position. Load the (n)th unit where "n" is the value of the relative position parameter.</p> <p>20 = Search for and load the unit with the specified program and segment name.</p> <p>00 = Search for and load the unit with the specified segment name within the current program. This mode is similar to 20 above, except that the Loader-Monitor halts upon reading a segment header card with a program name different from that of the unit last loaded. (The operator can call for a continued search by pressing the RUN button.)</p> <p>60 = Search for and load the unit with specified program and segment name. (This mode is the same as 20 above; it is included for compatibility with Tape Loader-Monitor C.)</p> <p>40 = Search for and load the unit with specified segment name within the current program. (This mode is the same as 00 above; it is included for compatibility with Tape Loader-Monitor C.)</p>
Program Name	68-73	This field contains the program name to be used as a search key in search modes 20, 00, 60 and 40. When a unit is loaded, its program name is placed in this field by the Loader-Monitor.
Segment Name	74&75	This field contains the segment name to be used as a search key in search modes 20, 00, 60 and 40. When a unit is loaded, its segment name is placed in this field by the Loader-Monitor.
Relative Position	110	This location contains the binary number "n" to be used with search mode 01. Relative position "0" is undefined.

LOADING

If the search was successful, Card Loader-Monitor B proceeds to set up the called unit in memory by reading successive cards and distributing and punctuating the data strings. Loading is terminated by control character 61g. The deck then remains positioned in the reader with

SECTION II. DETAILED DESCRIPTION

the next card to be read as the one immediately following the card on which the control character appeared. Table 2-3 contains the loading parameter values.

Table 2-3. Loading Parameters

Information Specified by Parameter	Location	Values and Meaning
Relocation Augment	107-109	This field contains the binary augment to be added to the base location of each load string. The same augment is applied to the starting location of the unit, if the starting mode parameter is set to "normal" (see "N", Table 2-4). The relocation augment is not added for any other starting mode. The augment is also added to the upper and lower addresses of an area to be cleared.
Halt Name	77-84	<p>This field provides space for a program name (location 77-82) and segment name (locations 83-84). The Loader-Monitor halts when the unit with this name has been loaded. When the RUN button is depressed, the Loader-Monitor continues, as directed by the starting parameter.</p> <p>The halt name is treated as one field. The only word mark is at location 77.</p> <p>The halt name is checked against the name on the segment header card after a successful search has been made, but before loading begins. The resulting halt occurs after loading has been completed.</p>

The normal operation of the Card Loader-Monitor may be modified using one or both of the two load parameters described in Table 2-3. The relocation augment parameter provides the ability to load a unit into a higher memory location than that for which it was assembled. However, since the Loader-Monitor performs no address adjustment, the unit is loaded into the new area in the same form as it was assembled. Thus, the relocation augment is normally used in conjunction with object programs that contain indexed addressing. Using the halt name parameter, the machine can be directed to halt after loading a particular unit by entering the name of that program unit into the halt name parameter location in the communication area.

In addition, the Loader-Monitor also provides an own-coding exit after each card is read into the input buffer, thus enabling the execution of own-coding routines during loading. Also, an own-coding routine may return to the same point and use the distribution process (loading data into memory with appropriate punctuation) of the Loader-Monitor, or the data portion of the loading unit records may be distributed by an own-coding routine (bypassing the distribution process of the Loader-Monitor).

After a program unit has been loaded, the Loader-Monitor resets the relative position parameter to 01, relocation augment to 0, and exit to own-coding to assume no own-coding. It will then either halt (halt 6) or proceed to the starting operation.

STARTING

Starting refers to the action performed after the called unit is loaded. The Loader may return to the calling unit or branch to a normal or special location within the called unit. The branch is always performed in the three-character addressing mode. The starting parameters are listed in Table 2-4.

Table 2-4. Starting Parameters

Information Specified by Parameter	Location	Value and Meaning
Starting Mode	112	N = Branch to the location specified as the normal starting location in the called program. This is the address following control character 61. The relocation augment is added before the branch is made. S = Branch to the address given by the parameter "Special Starting Location." The relocation augment is not added to this address. R = Branch to the location immediately following that from which the call to the Loader-Monitor was made.
Special Starting Location	119-121	This field contains the address which the Loader-Monitor branches to in order to start the called unit if the parameter "Starting Mode" has the value "S".
Trapping Mode	147	00 = Non-trapping mode 04 = Trapping mode

RETURNS TO THE LOADER-MONITOR

Return Points

The return points in the communication area provide several methods of returning control to the Loader-Monitor. These returns are described below. Methods for using them are described in Section III.

RETURN FOR NORMAL CALL (Locations 130-138)

This return to the Loader-Monitor is used to load another program unit automatically without any operator action. The program unit making the call changes the appropriate parameter values in the communication area and then branches to the return for normal call,

location 130. When this return is used, the Loader-Monitor does not reset any parameter values - any changes in parameter values must be made by the program in control before it branches to 130¹.

Locations 130 through 134 contain an SCR instruction that stores the address used for the Return start mode. Locations 135 through 138 contain a branch to the search routine of the Loader-Monitor.

GENERAL RETURN ADDRESS (Locations 139-141)

The general return address is used as a program return to set up a console call. The program unit in control, without changing values in the communication area, branches indirectly to location 139 - B(139). This resets the start mode parameter to N, search mode to 77, relative position to 01, relocation augment to 0, and exit to own-code to assume no own-coding; and then causes a console call halt (halt 3) for changing parameter values. These values may be entered manually through the control panel.

FIXED START 0 (Locations 86-89)

Fixed start 0 provides, for the operator, a manual return to the Loader-Monitor to set up a console call. Using the procedure given on page 4-2, the operator executes fixed start 0. This has the same effect as an indirect program Branch to the general return address (location 139). It resets the start mode parameter to N, search mode to 77, relative position to 01, relocation augment to 0, and exit to own-code to assume no own-coding; and then causes a console call halt (halt 3).

ADDITIONAL FEATURES

Console Fixed Starts

The communication area contains four Branch instructions that may be used for console starts. The first Branch instruction is designated as fixed start 0, and it is stored in locations 86 to 89 (octal 126 to 131). The execution of fixed start 0 is described in the preceding paragraph. The other three Branch instructions (locations 90 through 101) are available for use by the object programs. The Branch op code is located in the leftmost location of each four-character field, followed by the three-character A-address portion. The initial value in each is a Branch to location 0.

¹Note that the relocation augment and relative position parameters were reset when the calling unit was loaded. See Table 2-1.

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Parameters

Several parameters in the Loader-Monitor communication area are provided for the use and convenience of other programs and are not used by the Loader-Monitor itself (see Table 2-5).

Table 2-5. Additional Parameters

Parameter	Location		Values	Initial Value	Reset at Console Call	Reset After Loading	Reset at Special Call
	Decimal	Octal					
Revision Number	65-67	101-103	-	Δ	-	-	-
Current Date	142-146	216-222	-	Δ	-	-	-
ECD Field	151-154	227-232	-	JJ0#	-	-	-
Console Type-writer Availability	155	233	Item Mark: no console typewriter Word Mark: console typewriter	Item Mark	-	-	-

REVISION NUMBER (Locations 65-67)

Before starting to load, the Loader-Monitor enters the revision number of this unit into the revision number parameter, locations 65 through 67. This is provided for use or reference by the operator or other programs.

CURRENT DATE (Locations 142-146)

The operator may enter the current date into locations 142 through 146 for reference by other programs. The standard format is for locations 142 and 143 to specify the year (00 to 99) and for locations 144 through 146 to specify the day of the year (001 to 366).

ECD FIELD (Locations 151-154)

The ECD Field is used by some systems programs in the Mod 1 Operating System. It should contain either a device address from which to read an equipment configuration descriptor (see Table 2-6) or a standard equipment configuration number (see Table 2-7). The initial value is JJ0# for card reader entry of the ECD. Any changes must be made manually - it is never automatically reset.

CONSOLE TYPEWRITER AVAILABILITY (Location 155)

The console typewriter availability parameter is provided for reference by other programs. An item mark indicates that no console typewriter is available. A word mark indicates that a console typewriter is available for use by the program. The initial value is an item mark. Any changes must be made manually - it is never automatically reset.

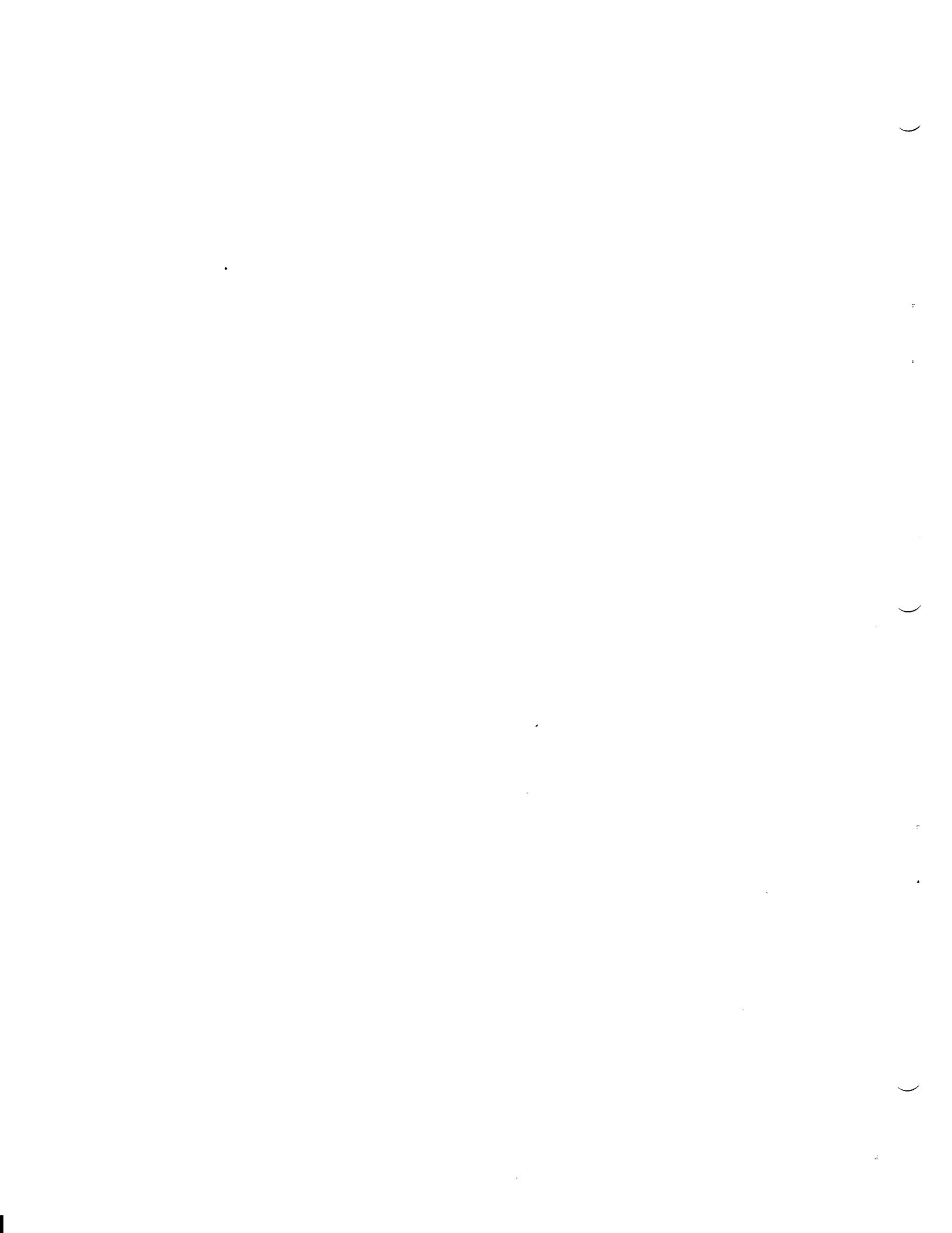
SECTION II. DETAILED DESCRIPTION

Table 2-6. ECD Entry Device

Location	Decimal	151	152	153	154
	Octal	227	230	231	232
Contents		Device Type	PCU Address (C2 variant of PDT)	Device Address (0 through 7)	Read/Write Channel (C1 variant of PDT)
Initial Value		J	J	0	#

Table 2-7. Standard ECD Number

Location	Decimal	151	152	153	154
	Octal	227	230	231	232
Contents		Blank (Δ)	Standard Configuration Number (0 through 9)	Octal number of the highest memory bank available to the systems program. If blank, the memory size in the standard configuration is used.	



SECTION III CALLING PROCEDURES

To call a program or segment, two operations are required:

1. Setting up the communication area with the desired parameter values, and
2. Transferring control to the Loader-Monitor.

This may be done with a console call, where the operator enters the desired parameter values into the communication area, or it may be done with a program call, where the program initiating the call moves in the desired values.

CONSOLE CALLS

For a console call, the first step is to give control to the Loader-Monitor. This may be done by the operator, using fixed start 0, or it may be done by the program unit currently in control, using an indirect Branch to the general return address (location 139). The Loader-Monitor resets the start mode parameter to N, search mode to 77, relative position to 01, relocation augment to 0, and exit to own-code to assume no own-coding; and then halts (halt 3).

Card Loader-Monitor B does not use or accept a console call card. It is set initially and reset at console call and special call to load unconditionally the first unit encountered. If the operator wishes to search any other way, he must enter the appropriate parameter values through the control panel during the console call halt.

PROGRAM CALLS

Once the first unit has been loaded and started using a console call, subsequent units may be loaded and started without operator action, using a program call. This may be either a normal program call or a special program call.

Normal Program Call

A normal program call is performed by instructions in the current program. The program unit making the call first moves the desired parameter values into the communication area and then transfers control to the Loader-Monitor. The return to the Loader-Monitor is made to the return for normal call (location 130). This loads the requested unit without resetting any parameter values or halting. For examples of how to code a normal program call, refer to the Tape Loader-Monitor C Manual.

Special Program Call

The special program call is often used by programs in the Basic Programming System to make these programs compatible with any loader in either the Basic or Mod 1 Systems. It requires no parameter entry — the special call, by resetting the search mode parameter to 77 and the start mode parameter to N, unconditionally loads the next unit encountered and uses a normal start. For an example of how to code a special program call, refer to the Tape Loader-Monitor C Manual.

CODING CONSIDERATIONS

1. Always ORG to 1,000 or above. Do not store anything in locations 64 through 999. This area is reserved for the Loader-Monitor.
2. Do not load into or clear index registers X5 or X6. The Loader-Monitor uses X5 and X6 as distribution registers (X5 addresses data in the buffer and X6 addresses the locations where the data is to be stored). To use X5 and X6, move the desired contents into the index register during execution with an LCA rather than storing there during the loading process with a DC or DCW.
3. The last executable instruction of any program unit should be a Branch to one of the Loader-Monitor returns - 130, or (139).
4. A return start can be executed only if the previous return to the Loader-Monitor was made to location 130 (the return for normal call).
5. All returns to the Loader-Monitor must be made in three-character mode.

SECTION IV
OPERATING PROCEDURES

BOOTSTRAP AND LOADER OPERATING PROCEDURES

The Card Loader-Monitor B program provides efficient loading of punched card programs that are placed in the card reader input hopper in the order that they are to be executed. In addition, the Loader-Monitor also provides a convenient means of searching forward and selectively loading the desired program(s) according to parameter values manually entered into the communication area through the operator's control panel (or console). The Card Loader-Monitor cannot perform any action analogous to a backward search of the BRT; therefore, it does not interrogate the direction parameter in the communication area.

The Card Loader-Monitor does not accept a console call card; it is set to load unconditionally the first program unit encountered in the card reader.

To bootstrap and load from cards, proceed as follows:

1. Place the assembled object program deck in the input hopper behind the self-loading Card Loader-Monitor deck (there may be one or more object programs, but the last object program must be followed by a 1EOFΔ card). If more than one program is to be loaded, only the last program in the binary load deck may be followed by a 1EOFΔ card;
2. Depress INITIALIZE;
3. Set the ADDRESS indicators to 1620;
4. Set the CONTENTS indicators to designate the address assignment of the card reader (normally 4lg);
5. Cycle up the card reader;
6. Depress BOOTSTRAP; and
7. Depress RUN.
8. Check that halt number three has occurred (i. e., the A-address register contents = 00000, B-address register contents = 17002).
NOTE: When halt 3 occurs, the Card Loader-Monitor is ready to accept a console call (using "search mode" 77, see Table 2-2).
9. Depress the RUN button to load the first program unconditionally; otherwise, perform steps 10 and 11 to search forward and load the desired subsequent program in the deck.
10. Enter the desired search parameter values into the appropriate fields of the communication area through the operator's control panel (or console). Do not disturb word marks in these fields.

<u>Location (Octal)</u>	<u>Contents</u>
104-111	Program name of requested unit.
112-113	Segment name of requested unit.
115-124	If a halt after loading is desired, enter the program and segment name into these locations. After the loading of the unit is completed, the machine is directed to halt. (This field is initially blank.)
157	Search mode (20 ₈).

11. After performing the above entries, depress the RUN button.

If an end-of-file card is encountered before the requested loading unit is found, the Loader-Monitor will halt. The operator may continue the search by placing a binary run deck in the card reader (without the Loader-Monitor deck) and depressing the RUN button.

CONSOLE CALL PROCEDURE

A console call is a request by the operator for the loading of a unit. The console call procedure is performed after the Card Loader-Monitor is loaded and awaiting operator action (i. e., after the occurrence of halt 3 in step "8" above).

Halt 3 is obtained automatically at the conclusion of the loading procedure for the Card Loader-Monitor. When halt 3 occurs, the Loader-Monitor parameters have been reset to load unconditionally the next unit in the card reader and to execute a normal start. The normal start is effected when the operator depresses the RUN button (see step "9" above).

If the operator wishes to search for a specific unit by program and segment name, to start at some address other than the normal starting address, or to perform any non-standard operation, he must place the appropriate parameters in the Loader-Monitor communication area (through the control panel or console) before depressing the RUN button (see steps "9", "10", and "11" above).

To obtain halt 3 at any time other than the normal halt (following the loading of the Card Loader-Monitor), proceed as follows:

1. Set the sequence register to 000126₈;
2. Set the central processor to operate in the three-character addressing mode;
3. Depress the RUN button and wait for halt 3 to occur.

At this point, the operator may search for a specific unit by program and segment name (as described above), or he may depress the RUN button again to load the next unit in the input hopper unconditionally.

PROGRAMMED HALTS

Programmed halts are listed in Table 4-1. Generally, these halts result from errors. However, halts 3 and 6 are included to facilitate the operations of the Card Loader-Monitor. Halt 3 always occurs during loading to allow a console call, and halt 6 occurs when the halt name loading parameter is specified.

Table 4-1. Coded Halts for Card Loader-Monitor B.

Halt Number	A Address	B Address	Meaning	Operator Action
3	000000	017002	Loader awaits console call.	If next unit in card reader is to be loaded and started under normal conditions, depress the RUN button. Otherwise, enter necessary parameters into communication area through the control panel and depress the RUN button.
5	000000	010110	Hole-count error on input card.	Depress the NON PROC RUN OUT button, correct, and re-feed cards. Depress RUN button to reread.
6	000000	014000	"Halt Name" unit has been loaded.	Perform action directed by object program operating instructions. Depress the RUN button.
8	000000	014011	Called unit not found on forward search prior to reading end-of-file card.	Operator may load a deck in card reader (without Loader-Monitor deck) and continue search by depressing the RUN button.
9	000000	014012	Called segment was not found within current program.	Operator may continue search by placing a deck in the card reader (without Loader-Monitor deck) and depressing the RUN button.

APPENDIX A
CARD FORMATS

FORMAT OF PROGRAM CARDS

Each program begins with a segment header card. This card may be followed by any number of non-header cards.

Segment Header Cards

The format of segment header cards is illustrated in Figure A-1 and described below.

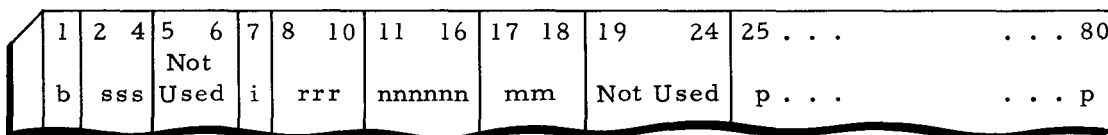


Figure A-1. Segment Header Card

<u>Column(s)</u>	<u>Content</u>	<u>Meaning</u>
1	$b = 50_8 \text{ or } 54_8$	Constitutes banner character. An octal 50 signifies the segment header card which is <u>not</u> the last card of a program unit. An octal 54 signifies the segment header card which is the <u>last</u> card of a program unit.
2-4	sss	Card sequence number.
5&6		Not used.
7	$i = 30_8$	Number of locations in identification and control fields.
8-10	$000000_8 \leq rrr \leq 777777_8$	Revision number.
11-16	nnnnnn	Program name.
17 & 18	mm	Segment name.
19-24		(Visibility key not used by Card Loader-Monitor).
25-30	p . . . p	Program information.

Non-Header Cards

The format of other binary run deck format cards (which are non-header cards) is illustrated in Figure A-2 and described below.

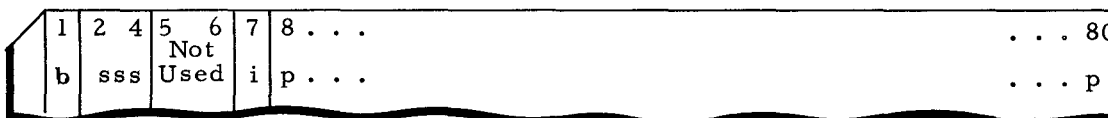


Figure A-2. Non-Header Card

<u>Column(s)</u>	<u>Content</u>	<u>Meaning</u>
1	$b = 41_8$ or 44_8	Constitutes banner character. An octal 41 identifies a card that is not a segment header card and is <u>not</u> the last card of a program unit. An octal 44 identifies a card that <u>is</u> the last card of a program unit and is not a segment header card.
2-4	sss	Card sequence number.
5&6		Not used.
7	$i = 07_8$	Number of locations in identification and control fields.
8-80	p . . . p	Program information.

LOADING DATA

Control Characters

The data from which the program unit is to be set up in memory follows the control information on both the header and non-header cards. The data portion of the BRD card is variable in length (up to the maximum record size of 80 characters). The loading data includes Loader control characters inserted by the assembler that specify location and punctuation and perform various other functions. The configurations and interpretations of the control characters follow:

<u>Octal</u>	<u>Binary</u>	<u>Interpretation</u>
XX	00nnnn	Interpret nnnn as a binary number. Move the following nnnn characters to successive locations, placing the leftmost character in the location specified by the current setting of the distribution counter (X6). Clear punctuation in the locations to which characters are moved. Advance the distribution counter by the value nnnn.
XX	01nnnn	Perform the same action as for the first control character above. Then set a <u>word</u> mark in the location into which the leftmost character was moved.
XX	10nnnn	Perform the same action as for the first control character above. Then set an <u>item</u> mark in the location into which the leftmost character was moved.
60	110000	Place the following three characters into the distribution counter. The next string will be loaded with its leftmost character at this address.
61	110001	Terminate loading. Interpret the following three characters as the normal starting location of the unit just loaded.
62	110010	Clear an area of memory as specified by the following seven characters. Characters one through six are interpreted as the two three-character addresses of the lowest and highest locations to be cleared. The seventh character is transferred, with punctuation marks cleared, to every location in this area.
63	110011	Set a word mark at a location one lower than the current setting of the distribution counter.

64	110100	Set an item mark at a location one lower than the current setting of the distribution counter.
77	111111	Read the next record.

Use of Control Characters in Data Records

The binary run deck for a unit which is to be loaded and distributed by the Loader has the following characteristics:

1. The data portion of each card begins with a control character;
2. Every card of a loading unit, except the last, terminates with an octal 77 control character;
3. The last card of a program unit terminates with an octal 61 control character followed by a three-character address; and
4. In the control characters listed above, "nnnn" cannot be equal to 0000.

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USERS' REMARKS FORM

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SOFTWARE MANUAL

DATED: MAY, 1966

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