PDP-8 FAMILY
PAPER TAPE
SYSTEM USER'S GUIDE

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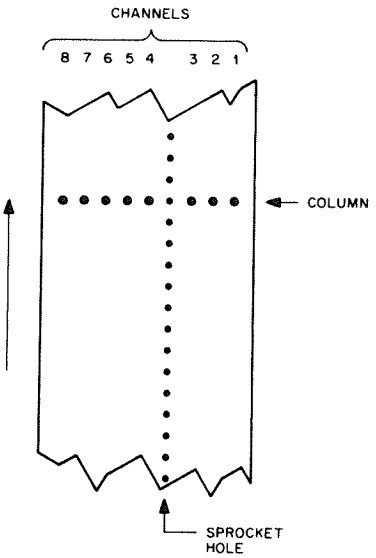
Your attention is invited to the last two pages of this manual. The Reader's Comments page, when filled in and returned, is beneficial to both you and DEC. All comments received are considered when documenting subsequent manuals, and when assistance is required, a knowledgeable DEC representative will contact you. The Software Information page offers you a means of keeping up-to-date with DEC's software.

Documents Referenced:

Read-In Mode Loader	DEC-08-LRAA-D
Binary Loader	DEC-08-LBAA-D
HELP Loader	DEC-08-LHAA-D
Symbolic Tape Editor	DEC-08-ESAB-D
PAL III Symbolic Assembler	DEC-08-ASAC-D
MACRO-8 Assembler	DEC-08-CMAA-D
8K SABR Assembler	DEC-08-ARXA-D
DDT-8	DEC-08-CDDB-D
ODT-8	DEC-08-COCO-D
FOCAL	DEC-08-AJAD-D
4K FORTRAN	DEC-08-AFC0-D
8K FORTRAN	DEC-08-KFXB-D
TC01 Bootstrap Loader	DEC-08-LUAA-D
DECtape Programming	DEC-08-SUC0-D
TC01/TU55 DECtape Formatter	DEC-08-EUFA-D
Disk Monitor System	DEC-D8-SDAB-D
Introduction to Programming	C-18
PDP-8/I and PDP-8/L User's Handbook	ABM

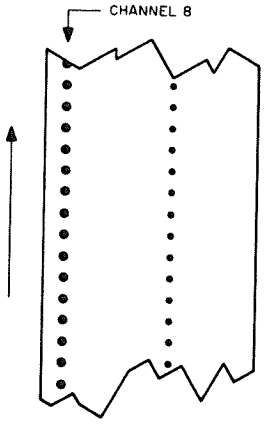
PAPER TAPE FORMATS

Data are recorded (punched) on paper tape by groups of holes arranged in a definite format along the length of the tape. The tape is divided into channels which run the length of the tape, and into columns which extend across the width of the tape as shown in the adjacent diagram. The paper tape readers and punches used with the PDP-8/I computers accept 8-channel paper tape. The various formats are briefly explained and identified below.



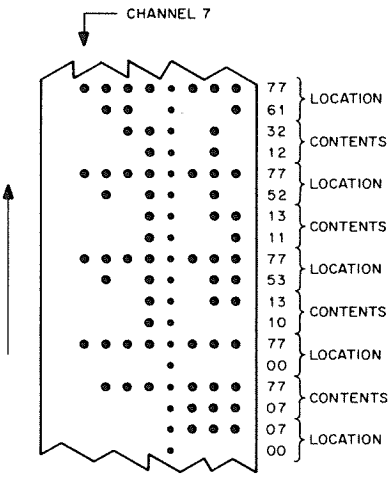
Leader/Trailer Format

Leader/trailer tape is used to introduce and conclude the object program when punched on paper tape. Leader/trailer tape can be recognized by a consistent channel 8 punch only as shown in the adjacent diagram.



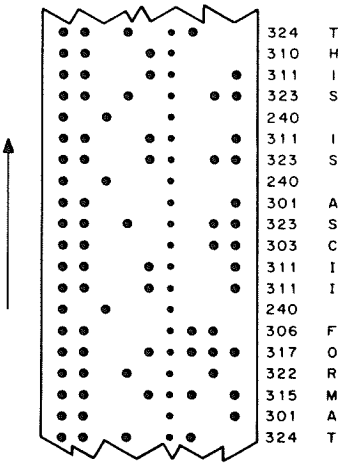
RIM Format

Paper tape punched in RIM format can be identified by the absence of a channel 8 punch, and by a channel 7 punch in every fourth column. The channel 7 punch indicates the start of a line of coding, and that (the first) column and the second column contain the location and the third and fourth columns contain the contents of the location.



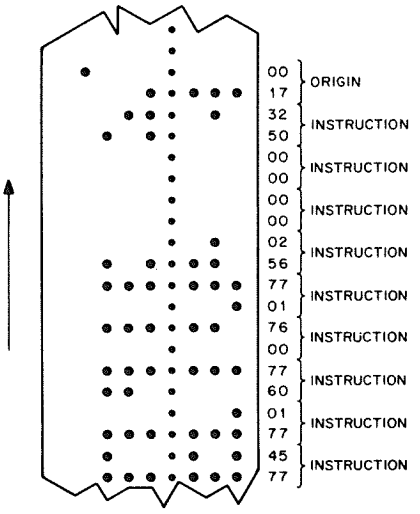
USASCII Format

USASCII (USA Standard Code for Information Interchange) format uses all eight channels to represent a single character (letter, number, or symbol) as shown in the adjacent diagram.



Binary Format

Binary format can be recognized by the absence of a channel 8 punch, an occasional channel 7 punch, and frequent sections of blank tape. The channel 7 punch denotes an origin of a program or subprogram or a change in origin, and subsequent columns contain the instructions (two columns per instruction) or data of succeeding locations.



ABBREVIATIONS

The abbreviations listed below are used throughout the guide.

Abbreviations	Meaning
AC	Accumulator
ADDR	Address
B. SP.	Back Space
BIN	Binary
CLC	Current Location Counter
CONT	Continue
CR	Carriage Return
CR/LF	Carriage Return-Line Feed
CTRL/L	Control/L (represents holding down the CTRL key while depressing the L key or the key following the slash)
DEC	Digital Equipment Corporation
DEP	Deposit
DF	Data Field
EAE	Extended Arithmetic Element
EXAM	Examine
IF	Instruction Field
INST	Instruction
L	Link
LF	Line Feed
LOAD ADD	Load Address
LOC	Location
LSP	Low-Speed Punch
LSR	Low-Speed Reader
HSP	High-Speed Punch
HSR	High-Speed Reader
KBRD	Keyboard
PC	Program Counter
PROG	Program
MA	Memory Address
MB	Memory Buffer
MQ	Multiplier Quotient
MRI	Memory Reference Instruction
REL	Release
RIM	Read-In Mode
SA	Starting Address
SHIFT/P	Shift/P (similar to CTRL/L)
SING INST	Single Instruction
SING STEP	Single Step
SR	Switch Register
SW	Console Switches
TTY	Teletype
USASCII	USA Standard Code for Information Interchange

SECTION 2

SYSTEM PROGRAMS

PURPOSE

The RIM Loader is used to load into core memory programs punched on paper tape in RIM format, e.g., the Binary Loader. (See DEC-08-LRAA-D for details.)

STORAGE REQUIREMENTS

RIM requires locations 7756-7776 (21_8 locations). Starting Address=7756.

LOADING

RIM is loaded (toggled) into core memory using the console switches. RIM can use either the low- or high-speed readers when loading RIM coded program tapes into core. The locations and corresponding instructions for both input devices are listed below.

	Instruction	
Location	Low-Speed Reader	High-Speed Reader
7756	6032	6014
7757	6031	6011
7760	5357	5357
7761	6036	6016
7762	7106	7106
7763	7006	7006
7764	7510	7510
7765	5357	5374
7766	7006	7006
7767	6031	6011
7770	5367	5367
7771	6034	6016
7772	7420	7420
7773	3776	3776
7774	3376	3376
7775	5356	5357
7776	0000	0000

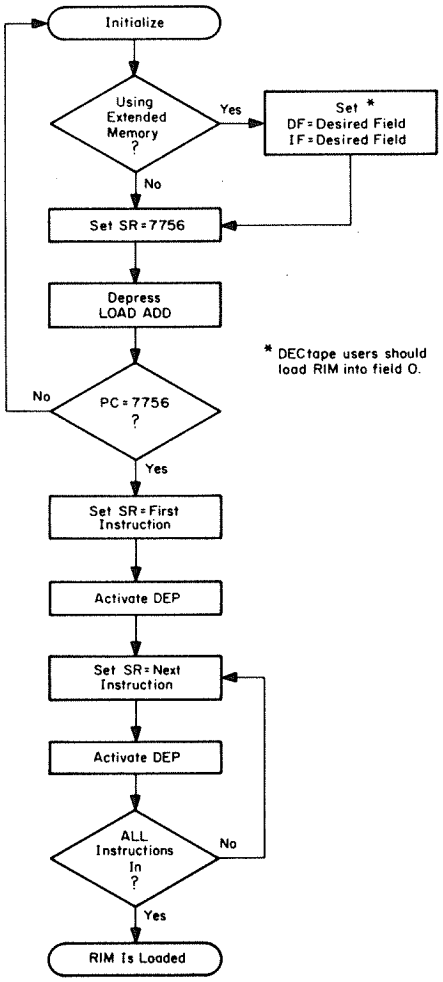


Figure RIM-1 Loading the RIM Loader

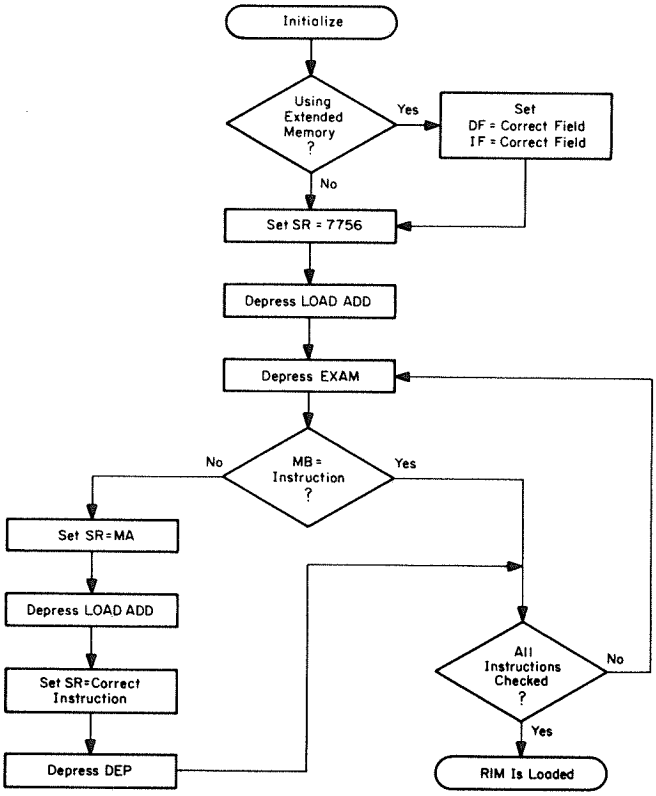


Figure RIM-2 Checking the RIM Loader

PURPOSE

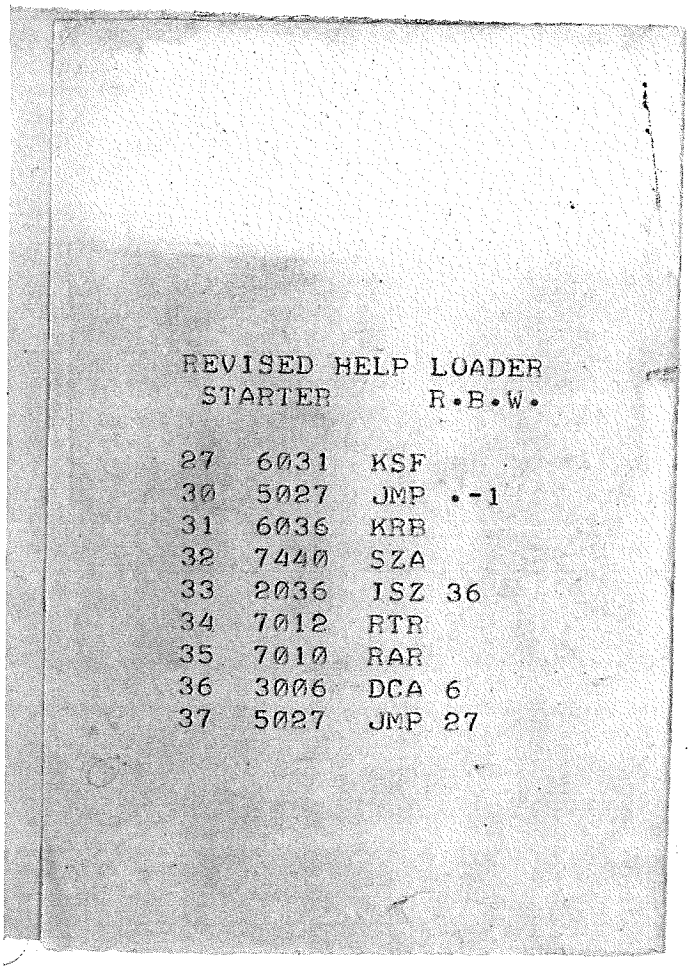
The HELP Loader is used to quickly load into core memory the RIM and BIN Loader programs. (See DEC-08-LHAA-D for details.)

STORAGE REQUIREMENTS

HELP uses locations 0005-0036 (32_8 locations) to load the HELP tape into core. The HELP tape contains the RIM and BIN Loaders.

LOADING

HELP is in two parts: The first part consists of the 11_8 instructions shown below, which are toggled into core using the console switches. The second part is the HELP Bootstrap Loader punched on paper tape, which is loaded into core using the low-speed reader.



```
REVISED HELP LOADER
 STARTER      R.B.W.

27  6031  KSF
30  5027  JMP .-1
31  6036  KRB
32  7440  SZA
33  2036  ISZ 36
34  7012  RTR
35  7010  RAR
36  3006  DCA 6
37  5027  JMP 27
```

Location	Instruction
0027	6031
0030	5027
0031	6036
0032	7450
0033	5027
0034	7012
0035	7010
0036	3007
0037	2036
0040	5027

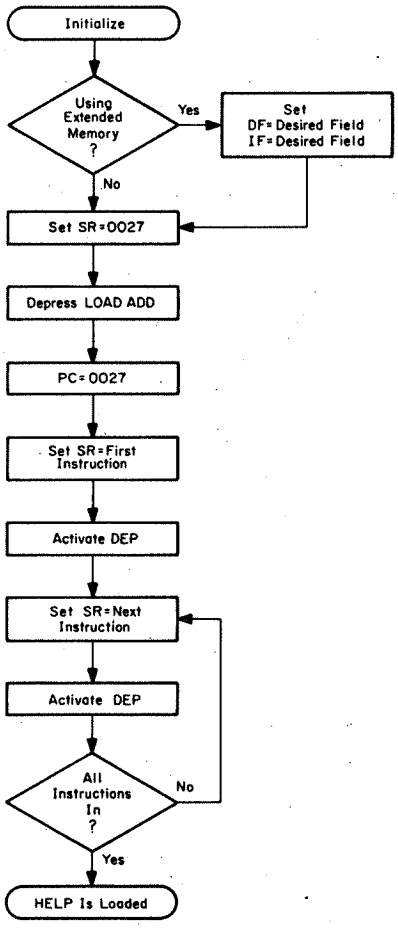


Figure HELP-1 Loading the HELP Loader

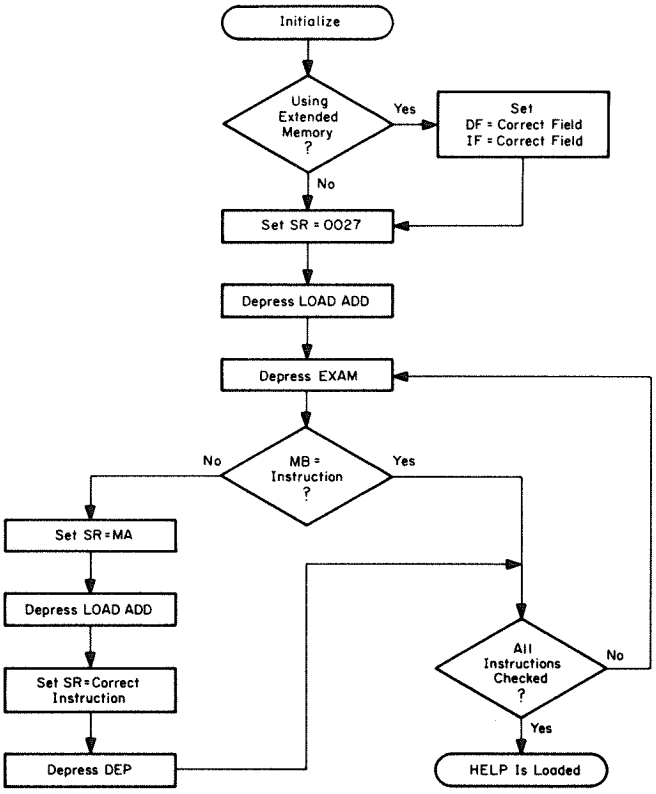


Figure HELP-2 Checking the HELP Loader

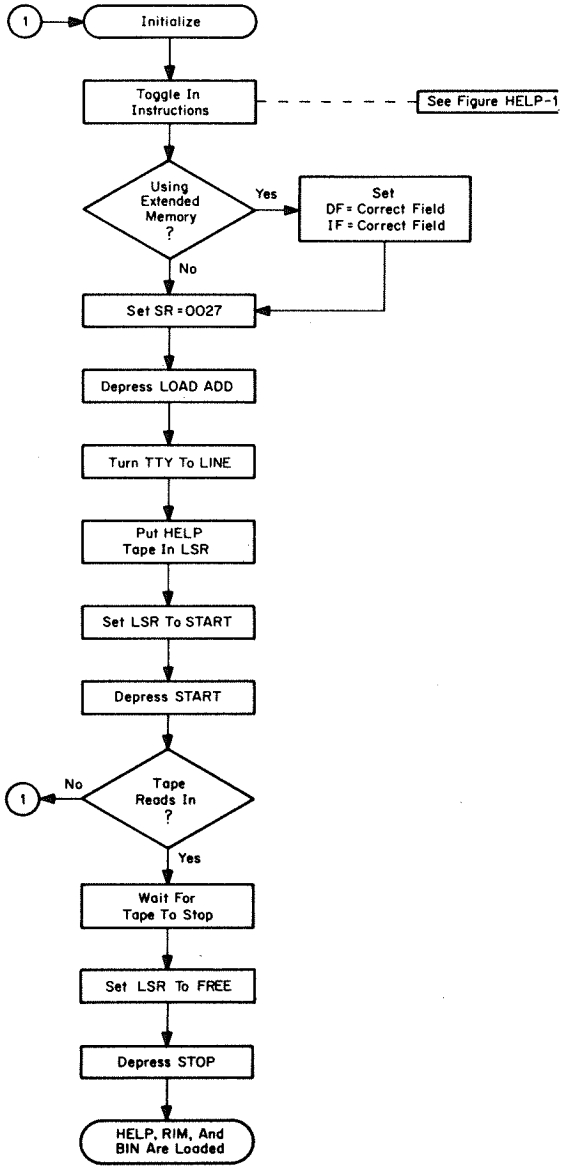


Figure HELP-3 Loading the HELP Bootstrap Tape Into Core

PURPOSE

The BIN Loader is used to load into core memory binary coded programs punched on paper tape. When in core, BIN can be destroyed only by the user's program because DEC's programs (excluding Disk Monitor) do not use the last page of core (location 7600-7777). (See DEC-08-LBAA-D for details.)

STORAGE REQUIREMENTS

BIN occupies locations 7625-7752 and 7777 (123_8 locations). Starting Address=7777

LOADING

RIM is used to load BIN into core. BIN must be loaded into the same field as RIM, and the input device (low- or high-speed reader) must be that which was selected when loading RIM.

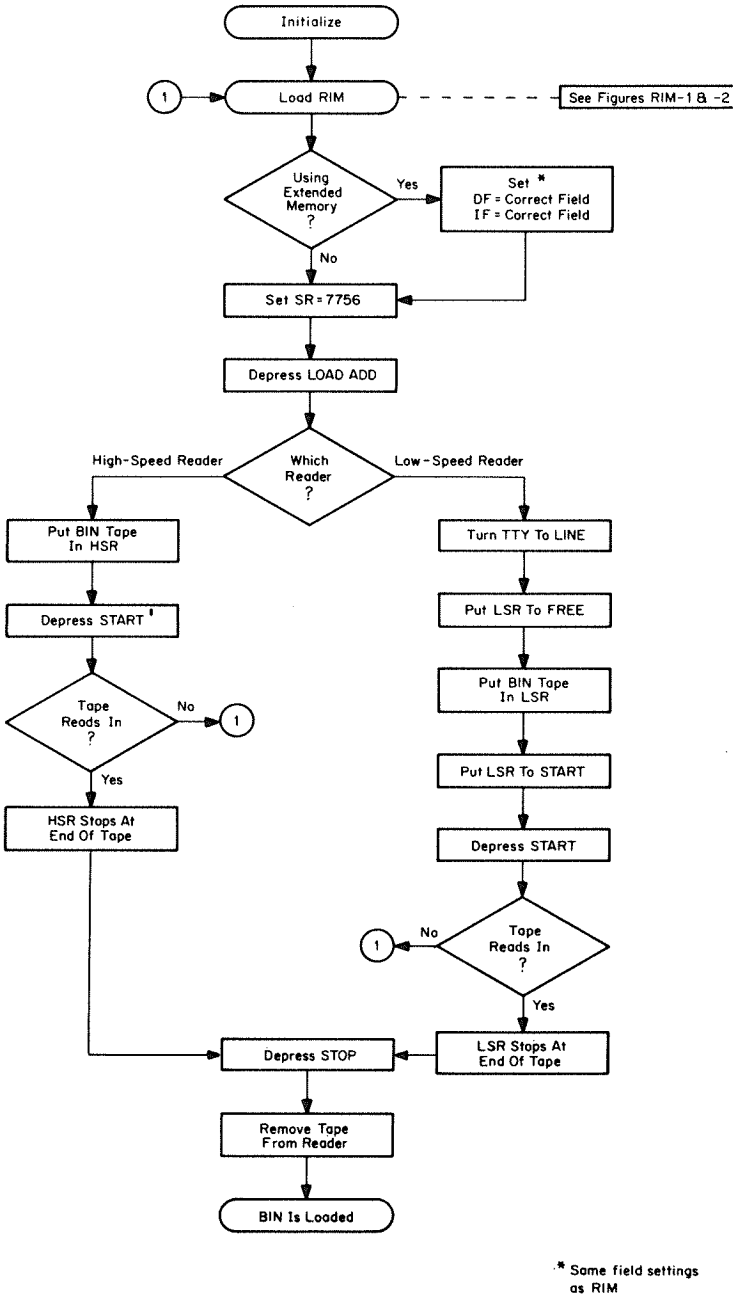


Figure BIN-1 Loading the BIN Loader

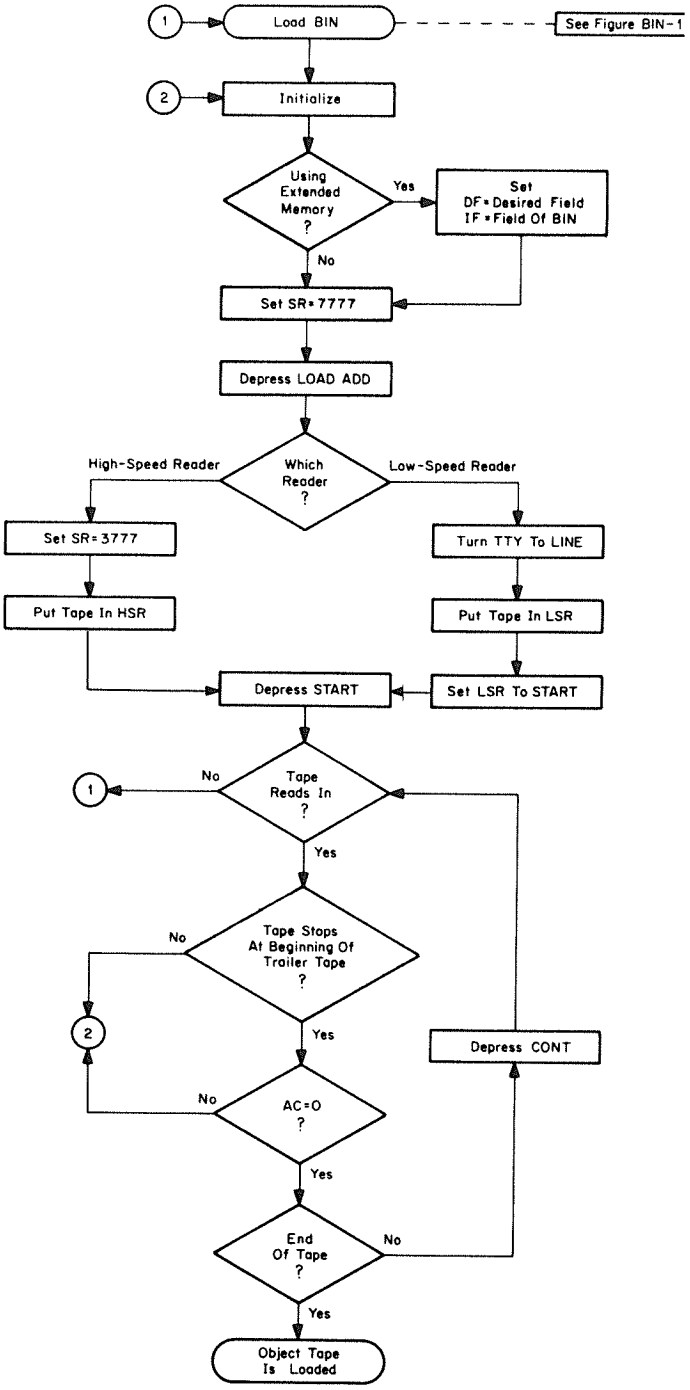


Figure BIN-2 Loading A Binary Coded Object Tape Using BIN