APPENDIX   :   TELETYPE OPERATION

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LOCAL Operation

The teletype is placed in the LOCAL mode of operation by turning the LINE-OFF-LOCAL switch clockwise to the LOCAL position.   The switch is found to the right of and below the keyboard.   A typical application of the "off line" mode of operation would be the generation or editing of source tapes.   Input may be made either through the keyboard or tape reader.   Output is the printed copy generated by the printer and, when turned on, the tape punch.

LINE Operation

The teletype is placed in the LINE mode of operation by turning the LINE-OFF-LOCAL switch, found to the right of and below the keyboard, counterclockwise

to the LINE position. This is the mode used whenever information is to be transferred between the teletype and 1080. Note, though, that the 1080 must be programmed to properly complete the transfer. Again, as in LOCAL, input may be accomplished either through the keyboard or the paper tape reader. The printer/punch will not echo input, however, unless programmed to do so. Output is the printed copy generated by the printer, and when turned on, the tape punch.

Switch Functions

LINE-OFF-LOCAL: found below and to the right of the keyboard. This switch, in addition to controlling the mode of operation (see above) is the main power switch. When in the OFF position, power to the tape reader and tape punch is also off.

START-STOP-FREE switch on the Paper Tape Reader: The START position is used when a paper tape is to be read. STOP stops the paper tape from advancing. FREE enables the paper tape sprocket wheel to move freely. This position is used to rapidly move the tape forward or backward. It is good practice to place this switch to the FREE position when loading a paper tape in the reader. This helps prevent accidental tearing of the tapes.

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is the Back Space button. If, when typing "off line" an error is made,

it can be corrected (perhaps "neutralized" is a better word) by depressing

the B. SP. button and then typing RUB OUT. This action punches all eight

holes. Most programs are designed to ignore the RUB OUT character.

Generating a Source Tape

Although a program can be entered into FASS directly from the keyboard,

generally it is preferable to generate a source tape "off line." To accomplish

this:

1) Turn the teletype (TTY) on by placing the LINE-OFF-LOCAL switch
   in the LOCAL position.

2) Depress the paper tape punch ON switch.

3) Generate a few inches of leader. FASS accepts blank tape as leader;
   therefore, a simple way of generating leader is to depress the HERE
   IS key a few times.

4) Type the source tape using FASS programming rules.

5) If an error is made, the tape may be corrected by backspacing the
   punch (see Tape Punch Switches, above) and typing a RUB OUT. FASS
   ignores rubouts.

6) Upon completion of typing the source program, the tape must have
   some trailer tape. Again, similar to leader tape, blank tape is
   acceptable and may be generated by depressing the HERE IS key.

Reading a Paper Tape

The paper tape punch and reader uses an eight level code (see Appendix __ page ___ ASCII Code). When generating a symbolic tape, a row of holes is punched for each character. Each character is assigned a unique pattern as determined by the ASCII code. An assignment will be given to call the row of holes <u>along</u> the tape the term "file" and the row of holes <u>across</u> the tape will be termed "rank" (see Fig. 1).
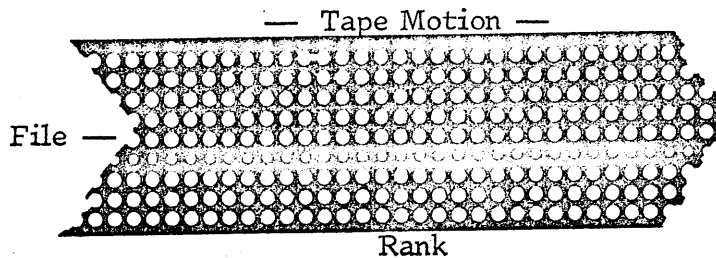

Fig. 1. Punched Tape

Each rank represents one ASCII character and each file is assigned the value indicated in Fig. 1.

By checking the ASCII code, the letter "A" is assigned the value 301. Fig. 2 is a tape consisting of a series of A's.
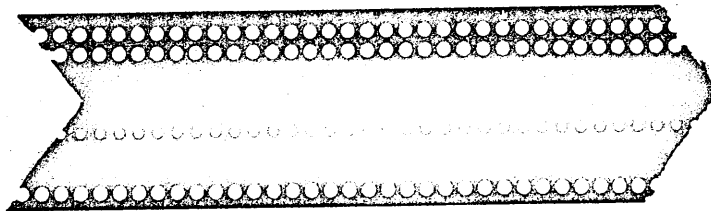

Figure 2.

By examining the value of each hole in a rank, the binary number 1 1 0 0 0 0 0 1 is derived. The octal equivalent is 301. Thus, the binary value of the holes, converted to octal, is the ASCII code for a character.
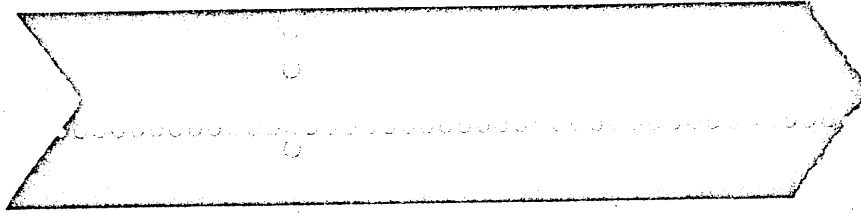
Figure 3.

Figure 3 appears to have the number 1 0 1 0 0 1 0 0 punched. The octal equivalent is 244. Therefore the character is a "$". Similar calculations indicate that Fig. 1 contains a series of RUB OUT characters.

Editing a Program "Off Line"

Editing, under most circumstances, will be done "on line" with the FASS-EDITOR. There will be occasions, though, when "off line" editing is practical, for example, when the 1080 is tied up with some other task for a long period of time.

"Off line" editing consists of using an existing source tape to punch out a new tape, making insertions and deletions whenever necessary. To accomplish this:

1) Turn the LINE-OFF-LOCAL switch to LOCAL.

2) Place the reader switch to the FREE position.

3) Load the existing source tape in the tape reader.

4) Depress the punch ON switch.

The tape is ready to be edited. To duplicate portions of the existing tape, move the tape reader switch to START. When a correction is to be made, place the reader switch to STOP. Several actions can be made at this point:

1) Insertions may be made from the keyboard.

2) Deletions may be made by placing the reader switch to FREE and advancing the tape by hand (the ability to read a tape now becomes valuable). Another method is to turn the punch OFF, move the reader to START and allow the reader to advance through the unwanted section of tape.

3) If, when duplicating the desirable portions of a tape,

   a) an undesired section approaches and

   b) reactions fail, allowing a few of the undesirable characters to sneak through; it is possible to recover by

   c) depressing the B. SP. button the required number of times

   d) typing RUB OUT the same number of times and

Binary Tapes

Binary tapes are distinguishable from source tapes by examinging the eighth level. ASCII always punches this level, other than leader-trailer, while binary format never punches this level. (See Fig. 4.)
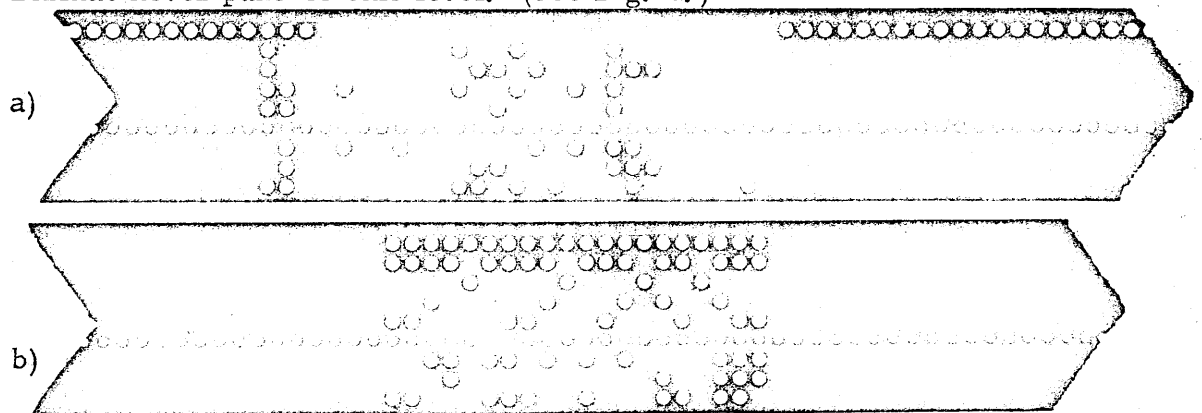

Figure 4

Binary tapes must have 200_8 for leader and trailer while source tapes may or may not have this level punched. The leader-trailer is automatically generated by FASS. When examining binary tapes, it may be noted that:

1) The first three ranks at the start of the trailer contain what appears to be ASCII characters. This is the checksum. The binary punch program keeps a running sub-total of the value of each character punched. The binary tape read-in program also keeps a running sub-total. If there is a discrepancy between the checksum on the tape and the total kept by the read-in program an error is indicated (see BIN LOADER).

2) The BIN LOADER recognizes the first character following the leader to be the starting address of the program on the tape.

3) When generating a binary tape, whenever an address is designated (a * in the source tape), a checksum is punched. Therefore, the eighth level may be occasionally punched. This is not an error.

4) A "rubout" character may be found on the trailer of binary tapes. This character is a BIN LOADER terminating character and will stop the loader program.

5) The 1080 is a 20 bit/address computer. The paper tape is limited to eight bits/rank. To enable a 20 bit binary word to be loaded from a binary tape, three ranks (bytes) must be used. The value of each bit of a byte is assigned such that

   a) The first byte consists of six bits corresponding to bits 14 through 19 in the 1080.

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APPENDIX I: ASCII and Compressed ASCII Code

Used by FASS

Character	ASCII	Compressed	Character	ASCII	Compressed
			0	260	20
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D	304	44	4	264	24
E	305	45	5	265	25
F	306	46	6	266	26
G	307	47	7	267	27
H	310	50	8	270	30
I	311	51	9	271	31
J	312	52			
K	313	53	RETURN*	215	77
L	314	54			
M	315	55	SPACE	240	00
N	316	56	!	241	01
O	317	57	"	242	02
P	320	60	#	243	03
Q	321	61	$	244	04
R	322	62	%	245	05
S	323	63	&	246	06
T	324	64	'	247	07
U	325	65	(	250	10
V	326	66	)	251	11
W	327	67	*	252	12
X	330	70	+	253	13
Y	331	71	,	254	14
Z	332	72	-	255	15
			.	256	16
			/	257	17

*The RETURN character is interpreted
as a RETURN-LINE FEED by FASS.

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Additional characters not used by FASS:

	ASCII			
EOT	204	:	272	
WRU	205	;	273	
RU	206	<	274	
BELL	207	=	275	
LINE FEED	212	>	276	
ALT MODE	375	?	277	
RUB OUT	377	@	300	
		[	333	
		\	334	
		]	335	
		↑	336	
		←	337	

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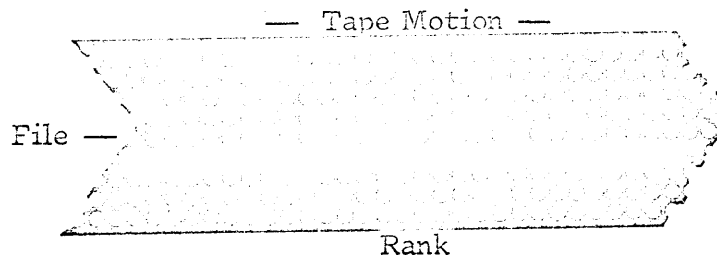

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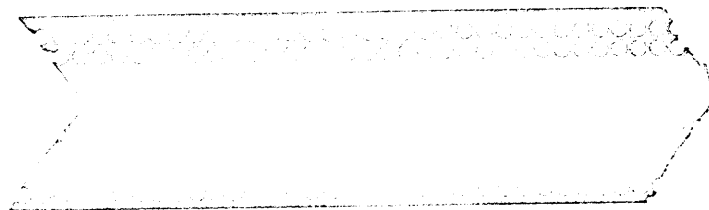

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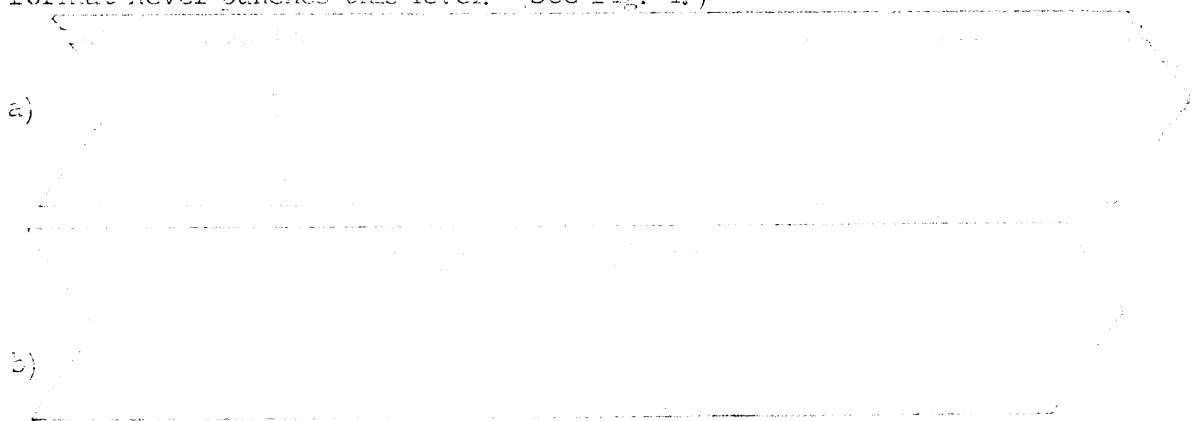
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-6-

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M	315	55		SPACE	240	00
N	316	56		!	241	01
O	317	57		"	242	02
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			←	337