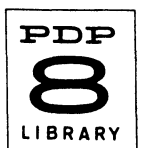


- 1. IDENTIFICATION
- 1.1 Teletype Output Subroutines
- 1.2 Digital-8-19-U-Sym
- 1.3 April 7, 1965



2. ABSTRACT

A group of subroutines useful in controlling ASR-33 output is presented as a package. Provision is made for the simulation of tabulation stops. The distance "tabbed" may be controlled by the user. Characters whose ASR-33 codes are in the groups 241 through 277, inclusive, and 300 through 337, inclusive, are legal. Space, carriage return then line feed, and tabulation are provided via subroutines.

3. REQUIREMENTS

3.1 Storage

This collection of subroutines occupies 74 (decimal) core locations.

3.3 Equipment

Basic PDP-8

4. USAGE

4.1 Loading

This package may be placed in memory by the use of the Binary Loader. See Digital-8-2-Rim for a complete discussion of this loader.

4.2 Calling Sequence

All subroutines are called with a JMS instruction and return to the next location in core. Enter the character typeout subroutines with a single character in AC bits 6 through 11 or a pair of characters in AC bits 0 through 5 and 6 through 11, respectively. (The character in bits 0 through 5 will be typed first in the latter case.) Enter the digit typeout subroutine with the digit to be typed in AC bits 8, 9, 10, and 11. Other subroutines are merely called.

5. RESTRICTIONS

(Not Applicable)

6. DESCRIPTION

6.1 Discussion

This package uses short subroutines to type the formatting characters, carriage return followed by line feed, space, and tabulate.

Other characters are represented internally by 6-bit codes so that two characters may be packed to a word. A short subroutine is used to convert the "trimmed" 6-bit code to the 8-bit code required for the ASR-33.

Digits are represented internally by a 4-bit code which must be in the AC (bits 8, 9, 10, and 11) on entry to the type digit subroutine. If a code greater than 1001 is present in AC bits 8, 9, 10, and 11 on entry, the subroutine merely returns to the calling sequence of instructions with no typeout.

Every time the minor subroutine which actually types a character or digit, tagged OTY, is used, a counter is incremented. When the tabulate subroutine is called, the contents of this counter are used to determine the remaining space to the next tab stop. Use of the tabulate or carriage return followed by line feed subroutines sets the contents of this counter to 0.

7. METHODS

Straightforward

8. FORMAT

For these subroutines external (ASCII) and internal core formats may best be illustrated by the following tables.

Characters Developed From Stored Code

00	300	@			
01	301	A	41	241	!
02	302	B	42	242	"
03	303	C	43	243	#
04	304	D	44	244	\$
05	305	E	45	245	%
06	306	F	46	246	&
07	307	G	47	247	'
10	310	H	50	250	(
11	311	I	51	251)
12	312	J	52	252	*
13	313	K	53	253	+
14	314	L	54	254	,
15	315	M	55	255	-
16	316	N	56	256	.
17	317	O	57	257	\
20	320	P	60	260	0
21	321	Q	61	261	1

22	322	R	62	262	2
23	323	S	63	263	3
24	324	T	64	264	4
25	325	U	65	265	5
26	326	V	66	266	6
27	327	W	67	267	7
30	330	X	70	270	8
31	331	Y	72	272	9
32	332	Z	72	272	:
33	333	[73	273	;
34	334	/	74	274	<
35	335]	75	275	=
36	336	↑	76	276	>
37	337	→	77	277	?

Characters Provided By Subroutines

carriage return then line feed
space
tabulation

All other ASCII characters are illegal in the sense that they can never be developed by these subroutines.

9. EXECUTION TIME

These subroutines are output limited.

10. PROGRAM

10.4 Program Listing

A listing of these subroutines with TYPE located in 0200 is as follows:

```

/PDP-8 TELETYPE OUTPUT PACKAGE
0200 0000 TYPE, 0 /TYPE ONE CHARACTER
0201 0301 AND TTAB+1 /0077
0202 4260 JMS CON
0203 4266 JMS OTY
0204 5600 JMP I TYPE
0205 0000 TY2, 0 /TYPE TWO CHARACTERS
0206 3276 DCA TEMY
0207 1276 TAD TEMY
0210 7012 RTR
0211 7012 RTR

```


0212	7012		RTR	
0213	4200		JMS TYPE	
0214	1276		TAD TEMY	
0215	4200		JMS TYPE	
0216	5605		JMP I TY2	
0217	0000	TYCR,	0	/TYPE C.R. AND L.F.
0220	7200		CLA	
0221	1302		TAD TTAB+2	/0215
0222	4266		JMS OTY	
0223	1303		TAD TTAB+3	/0212
0224	4266		JMS OTY	
0225	3277		DCA TBC	
0226	5617		JMP I TYCR	
0227	0000	TYSP,	0	/TYPE A SPACE
0230	7200		CLA	
0231	1304		TAD TTAB+4	/0240
0232	4266		JMS OTY	
0233	5627		JMP I TYSP	
0234	0000	TYTB,	0	/TYPE A TAB
0235	7200		CLA	
0236	1277		TAD TBC	
0237	1300		TAD TTAB	/-10 OR USER SET
0240	7500		SMA	
0241	5237		JMP .-2	
0242	3277		DCA TBC	
0243	4227		JMS TYSP	
0244	5243		JMP .-1	
0245	0000	TDIG,	0	/TYPE A DIGIT
0246	0305		AND TTAB+5	/0017
0247	3276		DCA TEMY	
0250	1276		TAD TEMY	
0251	1306		TAD TTAB+6	/-12
0252	7700		SMA CLA	
0253	5645		JMP I TDIG	
0254	1276		TAD TEMY	
0255	1307		TAD TTAB+7	/0260
0256	4266		JMS OTY	
0257	5645		JMP I TDIG	
0260	0000	CON,	0	/TRIMMED TO ASR 33
0261	7510		SPA	
0262	7510		TAD TTAB+10	/-40
0263	1311		TAD TTAB+11	/0100
0264	1304		TAD TTAB+4	/0240

0265	5660		JMP I CON	
0266	0000	OTY,	0	/ONE CH. OUT AND COUNT
0267	6046		TLS	
0270	6041		TSF	
0271	5270		JMP .-1	
0272	7200		CLA	
0273	2277		ISZ TBC	
0274	5666		JMP I OTY	
0275	5634		JMP I TYTB	
0276	0000	TEMY,	0	/VARIABLES
0277	0000	TBC,	0	
0300	7770	TTAB,	7770	/CONSTANTS
0301	0077		77	
0302	0215		215	
0303	0212		212	
0304	0240		240	
0305	0017		17	
0306	7766		7766	
0307	0260		260	
0310	7740		7740	
0311	0100		0100	
CON	0260			
OTY	0266			
TBC	0277			
TDIG	0245			
TEMY	0276			
TTAB	0300			
TYCR	0217			
TYPE	0200			
TYSP	0227			
TYTB	0234			
TY2	0205			

11. DIAGRAMS (Not Applicable)
12. REFERENCES (Not Applicable)
13. ADDENDA (Not Applicable)
14. ERRATA (Not Applicable)

