

PROGRAM DESCRIPTION I

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00834C

Program Title Banner Printer

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Program Description, Equations, Variables The program prints characters in a 12x8 matrix. Six lines are used for the character and 2 are for the space between characters. The character is therefore 8 lines wide. The printer has the capacity of making a character 24 columns high. To minimize memory requirements the columns are grouped in twos, giving the 12 high matrix. While some smoothness is lost, the memory requirements for data are halved. Character "31" is used for printing because it is the darkest of the 127 characters available. Half the available dots are used.

The user enters codes for his letters and the program takes over to print a banner. The code is actually the number of the first register where the letter data is stored. The code for N is 49. The data for N is stored in registers 49, 50, 51.

There are 3 parts to this program. The first block of program is used to enter the codes for the letters and stores up to 12 characters. It's labeled "Barrn". This buffer was necessary because the printing process is not done at typewriter speed.

Necessary Accessories Printer, two memory modules

Operating Limits and Warnings

Reference(s)

This program has been verified only with respect to the numerical example given in Program Description II. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

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Although it is not indicated in the example, the DATA CARDS must be read in.

(CONTINUATION PAGE)

It takes 121.5 sec. to print C with my printer. The next part of the program is used to assemble the characters from the stored data and print them. This is labeled "BAN". This gets a little involved because a data compression scheme was used to store 40 characters $\times 12$ high $\times 6$ lines or 2880 bits of information in a reasonable number of registers. A register contains the 24 bits for two lines of a character. The last part is the actual data which is stored in 119 registers starting at R10 and coming to R129.

To build a unique character, begin by determining which of the 12×6 available dots you want to print. The left side of the printer paper will become the top of the banner. The first six lines will be taken two at a time, coded and stored in a register. The 1st register will hold the rightmost two lines, the 2nd register will have the middle lines and the 3rd register will contain the leftmost two lines. Two blank lines will be inserted automatically after the other lines are printed to separate characters. The individual lines are binary coded to develop a number that makes use of the full register. The binary coding for the 1st line starts at the bottom of the printer paper with 1 and goes to the top with 2048. The sequence for the 12 columns is 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048. If we were generating the bottom leg of "L" and wanted the first line to be 4 columns wide a $2+1=3$ would be used. The second line is developed the same way. Then the first line is multiplied by 1×10^5 and added to the second line. The entry for the two lines of the "L" is 300,003. This is indeed the contents of the 1st register for "L" (43). If we wanted 16 columns to be printed for the two lines at the center of "Y" we would use the first eight numbers of the sequence, $1+2+4+8+16+32+64+128=255$. The entry for the two lines becomes $255 \times 10^5 + 255 = 25500255$. This is what you will find in R83 which is the register for the second pair of lines in "Y".

MAKE A Banner "ABC"

[illegible][illegible]

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[illegible]

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PROGRAM LISTING

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STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
01	*LBL "BAN			42	FRC		
N"				43	1 E03		
02	CLST			44	*		
03	STO 06			45	INT		
04	STO 07			46	X=0?		
05	STO 08			47	XEQ "BAN		
06	STO 09			"			
07	5			48	RCL IND		
08	STO 05			05			
09	*LBL 10			49	1 E03		
10	1			50	/		
11	ST+ 05			51	FRC		
12	STOP			52	1 E03		
13	ST+ IND			53	*		
05				54	X=0?		
14	X=0?			55	XEQ "BAN		
15	GTO 11			"			
16	1 E03			56	RCL 05		
17	STOP			57	1		
18	*			58	-		
19	ST+ IND			59	5		
05				60	X=Y?		
20	X=0?			61	STOP		
21	GTO 11			62	RDN		
22	1 E06			63	STO 05		
23	STOP			64	GTO 11		
24	*			65	STOP		
25	ST+ IND			66	.END.		
05							
26	X=0?						
27	GTO 11						
28	RCL 05						
29	9						
30	X>Y?						
31	GTO 10						
32	*LBL 11						
33	RCL IND						
05							
34	1 E06			90			
35	/						
36	INT						
37	X=0?						
38	XEQ "BAN						
"							
39	RCL IND						
05							
40	1 E06						
41	/			00			

initialization

check to
end inputEntering
letter codes
into registers
packed 3
to a registerThis unpacks
the stored
codes and
feeds them
in correct
sequence
to the print
program
"BAN".

PROGRAM LISTING

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STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
01	LBL "BAN			45	RCL 03		
02	1			46	X<Y?		
03	-			47	SF 01		SET = space
04	STO 04			48	1		CLEAR = SOLID
05	0.00301			49	ENTER↑		
06	STO 02			50	31		
07	LBL 01			51	FS? 01		
08	FS? 02			52	+		
09	GTO 07			53	ACCHR		
10	ISG 02			54	ACCHR		
11	GTO 08			55	FS? 01		
12	ADV			56	GTO 04		
13	ADV			57	RCL 03		
14	RTN			58	2		
15	LBL 08			59	RCL 01		
16	1			60	Y↑X		
17	ST+ 04			61	-		
18	LBL 07			62	STO 03		
19	FS? 02			63	LBL 04		
20	GTO 06			64	CF 01		
21	RCL IND			65	1		
04				66	RCL 01		
22	RCL IND			67	X<Y?		
04				68	GTO 05		
23	1 E05			69	1		
24	/			70	ST- 01		
25	INT			71	GTO 03		
26	SF 02			72	LBL 05		
27	STO 03			73	PRBUF		
28	GTO 02			74	GTO 01		
29	LBL 06			75	STOP		
30	RCL IND			76	END		
04							
31	1 E05						
32	/						
33	FRC						
34	1 E05						
35	*			90			
36	CF 02						
37	STO 03						
38	LBL 02						
39	11						
40	STO 01						
41	LBL 03						
42	2						
43	RCL 01						
44	Y↑X			00			

} 2 spaces AT
END of letter

SET = space
CLEAR = SOLID

ACCUMULATE
2 columns AT
A Time.

REGISTERS, STATUS, FLAGS, ASSIGNMENTS

DATA REGISTERS			STATUS			
00		R48= 284,784,095.0	SIZE <u>129</u>	TOT. REG. _____	USER MODE	
01	CHAR. COUNTER	R49= 489,584,094.0	ENG _____	FIX _____	SCI _____	ON _____ OFF _____
02	letter reg. counter	R50= 12,000,448.00	DEG _____	RAD _____	GRAD _____	
03	line data to print	R51= 284,784,095.0	FLAGS			
04	1st Reg. of Letter	R52= 182,002,046.0				
05	letter counter	R53= 387,583,075.0	#	INIT S/C	SET INDICATES	CLEAR INDICATES
06	3 letter storage	R54= 284,681,020.0	1	C	Print SPACE	Print SOLID
07	3 letter storage	R55= 89,681,984.00	2	C	2nd LINE	1st LINE
08	3 letter storage	R56= 316,883,168.0				
09	3 letter storage	R57= 489,584,095.0				
	R10= 12,781,023.00	R58= 182,182,046.0				
	R11= 388,963,868.0	R59= 388,783,075.0				
	R12= 182,388,127.0	R60= 284,681,020.0				
	R13= 79,681,982.00	R61= 98,381,998.00				
	R14= 329,983,299.0	R62= 317,683,184.0				
	R15= 489,584,095.0	R63= 489,584,095.0				
	R16= 387,483,075.0	R64= 318,083,126.0				
	R17= 387,583,075.0	R65= 317,183,171.0				
	R18= 284,681,020.0	R66= 173,189,899.0				
	R19= 182,002,046.0	R67= 387,283,072.0				
	R20= 387,583,075.0	R68= 489,584,095.0				
	R21= 489,584,095.0	R69= 387,283,072.0				
	R22= 387,583,075.0	R70= 489,284,094.0				
	R23= 317,183,171.0	R71= 388,083,088.0				
	R24= 489,584,095.0	R72= 489,484,092.0				
	R25= 387,283,072.0	R73= 483,284,088.0				
	R26= 316,883,168.0	R74= 1,588,015,000				
	R27= 489,584,095.0	R75= 488,884,832.0				
	R28= 159,683,646.0	R76= 489,584,092.0				
	R29= 318,783,075.0	R77= 11,288,112.00				
	R30= 284,681,020.0	R78= 489,284,095.0				
	R31= 489,584,095.0	R79= 387,583,855.0				
	R32= 9,688,096,000	R80= 58,488,584.00				
	R33= 489,584,095.0	R81= 385,583,075.0				
	R34= 387,583,075.0	R82= 358,481,984.0				
	R35= 489,584,095.0	R83= 25,588,255.00				
	R36= 387,583,075.0	R84= 198,483,584.0				
	R37= 387,284,094.0	R85= 358,783,971.0				
	R38= 489,583,075.0	R86= 329,983,187.0				
	R39= 387,988,086.0	R87= 318,383,079.0				
	R40= 179,981,884.0	R88= 4,095,000.00				
	R41= 21,688,112.00	R89= 489,581,536.0				
	R42= 489,584,095.0	R90= 0.0000				
	R43= 388,083,088.0	R91= 96,381,891.00				
	R44= 388,083,088.0	R92= 312,383,099.0				
	R45= 489,584,095.0	R93= 155,188,771.0				
	R46= 489,582,847.0	R94= 92,482,046.00				
	R47= 38,488,384.00	R95= 317,183,171.0				

REGISTERS, STATUS, FLAGS, ASSIGNMENTS

[illegible]