

ROYAL MCBEE CORPORATION
ELECTRONIC COMPUTER DEPARTMENT

HEXADECIMAL PUNCH
(Program 13.3)

FUNCTION:

To punch the contents of consecutive memory locations and to compute and punch a check sum. The output of this routine may be punched on tape through the typewriter or through the twenty character per-second punch unit.

INPUT:

Beginning and final locations (L_o and L_f) in decimal.

OUTPUT:

The output of this routine is in the form required by program 10.4

1. An identification word will be the first word punched on tape. This identification word consists of $v N M$, where N is the number of words in the record and M is the initial location (L_o) of the record. Both N and M are in hexadecimal. $(001)_{16} \leq N \leq (7ww)_{16}$.
 - (a) Example:
The identification word $v084218J'$ denotes a record of 132 words beginning in location 3335.
2. After the identification word has been punched the contents of memory locations L_o through L_f will be punched.* Following every eighth word the routine will punch a carriage return.
3. The output is in blocks of 64 pieces of data. As an example, say I want to punch 132 pieces of data starting in track 300. The output would look like the following:

```
V0400300
  64 pieces of data 8 per line
  check sum 20 spaces
V0400400
  64 pieces of data 8 per line
  check sum 20 spaces
V0040500
  4 pieces of data
  check sum
```

PROCEDURE:

- A. When the output is through the medium of the typewriter.
 1. Depress MANUAL INPUT lever on the typewriter.
 2. Transfer to the first location of this routine.
 3. After the "manual input" light turns on, type the beginning and final locations in decimal. This will be one eight digit word (L_o and L_f).
 4. Put break point switch 32 in the UP position.

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5. Depress the PUNCH ON lever on the typewriter.
6. Depress the START COMP. lever on the typewriter.

NOTE: Following step six this program begins punching. After the check sum has been punched control is returned to step 3 of the procedure where a new L_o and L_f may be entered.

* Leading zeros are not punched. For the contents of a memory location which contains a zero only the conditional stop code will be punched.

B. When the output is through the medium of the twenty character per-second punch unit.

1. Make sure the input selector switch is turned to TYPEWRITER.
2. Depress MANUAL INPUT lever on the typewriter.
3. Transfer to the first location of this routine.
4. After the "manual Input" light turns on, type the beginning and final locations in decimal. This will be one eight digit word (L_o and L_f).
5. Put break point switch 32 in the DOWN position.
6. Turn the output selector switch to PUNCH position.
7. Depress the START COMP. lever on the typewriter.

NOTE: Following step seven this program begins punching. After the check sum has been punched control is returned to step 4 of the procedure where a new L_o and L_f may be entered.

TIME:

- A. Approximately 64 words per-minute using the typewriter.
- B. Approximately 128 words per-minute using the twenty character per-second punch unit.

STORAGE:

Five tracks of instructions and constants. Twelve locations of temporary on track 63 (sectors 14, 17, 22, 31, 32, 35, 37, 38, 43, 48, 53, 60).

Problem HEXADECIMAL PUNCH Track _____

Program Input Codes	Stop	Location	Instruction Op.	Address	Stop	Contents of Address	Notes
0.0.0							
1.0.0	<input checked="" type="checkbox"/>						
		0.0.0.0	B.0.1.2.9			U0460	
		0.1	H.0.1.0.8				
		0.2	B.0.2.3.3			8@29	
		0.3	X.C.6.3.3.2		<input checked="" type="checkbox"/>		
		0.4	U.0.1.2.6				
		0.5	X.C.6.3.3.5				
		0.6	B.0.1.5.6				
		0.7	C.0.3.1.7		<input checked="" type="checkbox"/>		
		0.8	X.P.0.0.5.8				
		0.9	X.I.0.0.5.9				
		1.0	X.H.6.3.6.0				
		1.1	U.0.0.1.9		<input checked="" type="checkbox"/>		
		1.2	X.Z.0.0.0.0				
		1.3	U.0.0.0.0				
		1.4	X.Z.0.0.6.3				
		1.5	H.0.1.0.1		<input checked="" type="checkbox"/>		
		1.6	X.H.6.3.3.1				
		1.7	U.0.1.0.1				
		1.8	X.Z.0.2.5.6			290	
		1.9	N.0.3.6.2		<input checked="" type="checkbox"/>	1@29	
		2.0	R.0.1.4.2				
		2.1	U.0.0.3.0				
		2.2	X.H.6.3.3.7				
		2.3	X.H.6.3.3.8		<input checked="" type="checkbox"/>	FINAL loc.	
		2.4	X.B.6.3.6.0				
		2.5	M.0.3.6.1			1@14	
		2.6	U.0.0.2.7				
		2.7	R.0.1.4.2		<input checked="" type="checkbox"/>		
		2.8	U.0.0.3.0				
		2.9	U.0.4.5.1				
		3.0	E.0.3.0.9			3wwwJ	
		3.1	X.H.6.3.1.7		<input checked="" type="checkbox"/>		

Conditional Stop Code Carriage Return

Job No. 0160 Prog. No. 13.3 Prep. by J. Goforth Ck'd. by _____

Problem HEXADECIMAL PUNCH Track _____

Program Input Codes	Stop	Location	Instruction Op.	Address	Stop	Contents of Address	Notes
	<input checked="" type="checkbox"/>						
		0032	E0147			35350	
		33	M0419			-6@4	
		34	XA6317				
		35	XH6314		<input checked="" type="checkbox"/>		
		36	U0139				
0000006'		37	2000000			1@6	
		38	3J00			3500	
		39	2F8		<input checked="" type="checkbox"/>		
		40	WWW0			1@15-1@30	
		41	4000000			1@1	
		42	L	1		(N-1)B[L0]	
		43	T0208		<input checked="" type="checkbox"/>		
		44	S0159			1@1	
		45	T0319				
		46	S0161			1@1-1@30	
		47	T0319		<input checked="" type="checkbox"/>		
		48	A0163			1@30	
		49	XA6335			Σ	
		50	S0322			1@1	
		51	T0055		<input checked="" type="checkbox"/>		
		52	S0138			1@1-1@30	
		53	T0055				
		54	U0056				
		55	A0041		<input checked="" type="checkbox"/>	1@1	
		56	XC6335			Σ	
		57	XB6343				
		58	S0137			1@11-1@29	
		59	T0220		<input checked="" type="checkbox"/>		
		60	U0120				
		61	XZ0400			1@21	
		62	XZ6000			3500	
		63	XZ0216		<input checked="" type="checkbox"/>	240	

Conditional Stop Code



Carriage Return

Job No. 0160 Prog. No. 13.3

Prep. by _____ Ck'd. by _____

Date 6-1-60

Problem HEXADECIMAL PUNCH

Track _____

Program Input Codes	Stop	Location	Instruction Op.	Address	Stop	Contents of Address	Notes
		<input checked="" type="checkbox"/>					
		01 0 0	B	[]			
		0 1	[]				
		0 2	U	[]		40103 40131	
		0 3	XH	63.53			<input checked="" type="checkbox"/>
		0 4	XZ	32.54			
		0 5	XH	63.48			
		0 6	XP	32.56			
		0 7	XH	63.72			<input checked="" type="checkbox"/>
		0 8	[T 02.00]			→ NEG. WORD
		0 9	S	03.59			1 @ 30
		1 0	T	02.46			→ 0 WORD
		1 1	S	00.40			<input checked="" type="checkbox"/> 1 @ 15-1 @ 30
		1 2	T	01.48			
		1 3	S	02.35			1 @ 11-1 @ 15
		1 4	T	02.50			→ 30'S
		1 5	S	01.58			<input checked="" type="checkbox"/> 1 @ 7-1 @ 11
		1 6	T	02.12			
		1 7	S	03.60			1 @ 3-1 @ 1
		1 8	T	02.38			
		1 9	U	02.00			<input checked="" type="checkbox"/>
		2 0	H	00.42			
		2 1	XH	63.43			
		2 2	U	00.42			
		2 3	A	02.59			<input checked="" type="checkbox"/> -1 @ 23 + 1 @ 1
		2 4	T	03.36			
		2 5	U	02.62			
		2 6	B	00.05			
		2 7	C	04.40			<input checked="" type="checkbox"/>
		2 8	U	00.05			
		2 9	U	04.60			
		3 0	U	04.32			
		3 1	XH	63.53			<input checked="" type="checkbox"/>

Conditional Stop Code



Carriage Return

Job No. 0160 Prog. No. 13.3 Prep. by J. Goforth Ck'd. by _____

Problem HEXADECIMAL PUNCH Track _____

Program Input Codes	Stop	Location	Instruction Op.	Address	Contents of Address	Notes
	<input checked="" type="checkbox"/>					
		0132	XZ	3.2.1.8		
		33	XH	6.3.4.8		
		34	XP	1.6.2.0		
		35	40	1.0.7	<input checked="" type="checkbox"/>	
0000003		36		350.0	3500	
		37	WWW	5	1@11-1@29	
		38	3WWW	WW0	1@1-1@30	
		39	E0	4.2.5	<input checked="" type="checkbox"/>	
		40	M0	1.6.2	-3/4@0	
		41	XA	6.3.1.4		
		42	4L			
0000005		43	3W	0.0.0.0	<input checked="" type="checkbox"/>	
		44	WWW	00.0.0		
		45	WWW	5	1@11-1@29	
		46	WWW	5.00.0	-1@17	
		47	35	3.5.0	<input checked="" type="checkbox"/>	
		48	A0	2.3.4	-1@27+1@15	
		49	T0	3.1.0		
		50	S0	2.3.6	1@19-1@27	
		51	T0	1.2.3	<input checked="" type="checkbox"/>	
		52	40	2.2.4		
		53	XH	6.3.3.2		
		54	B0	4.1.2		
		55	40	3.4.4	<input checked="" type="checkbox"/>	
		56	40	2.4.6		
		57	40	1.3.3	DELAY	
0000006		58	W	0.0.0.0	1@17-1@11	
		59	4	0.0.0.0	<input checked="" type="checkbox"/> 1@1	
		60				
		61	3WWW	WW0	1@1-1@30	
		62	F0	0.0.0.0	-3/4@0	
		63		2	<input checked="" type="checkbox"/> 1@30	

Conditional Stop Code



Carriage Return

Job No. 0160 Prog. No. 13.3 Prep. by J. G. Forth Ck'd. by _____

Problem HEXADECIMAL PUNCH Track _____

Program Input Codes	Stop	Location	Instruction Op.	Address	Stop	Contents of Address	Notes
		<input checked="" type="checkbox"/>					
		0 2 0 0	X.B	63.22		N ①	
		0 1	M	02.23		1 ① ¹⁸	
		0 2	E	00.38		3500	
		0 3	A	00.18	<input checked="" type="checkbox"/>	290	
		0 4	Y	02.06			
		0 5	X.Z	32.55			
		0 6	PL	J			
		0 7	U	02.38	<input checked="" type="checkbox"/>		
		0 8	A	03.58		1 ①	
		0 9	U	00.45			
3 0 0 0 0 0 0 2 1		1 0		35.00			
		1 1	2 0 0 0 0 0 0 0		<input checked="" type="checkbox"/>	1 ②	
		1 2	X.B	63.48		N ③	
		1 3	M	03.63		1 ① ¹⁰	
		1 4	E	01.36		3500	
		1 5	A	02.58	<input checked="" type="checkbox"/>	210 (HEX)	
		1 6	Y	02.18			
		1 7	X.Z	32.03			
		1 8	PL	J			
		1 9	U	02.50	<input checked="" type="checkbox"/>		
		2 0	X.B	63.35			
		2 1	X.H	63.53			
		2 2	U	01.57			
		2 3	X.Z	32.00	<input checked="" type="checkbox"/>	1 ① ¹⁸	
		2 4	X.B	63.53		N ⑤	
		2 5	M	02.11		1 ②	
		2 6	E	00.67		3500	
		2 7	A	00.63	<input checked="" type="checkbox"/>	240	
		2 8	Y	02.30			
		2 9	X.Z	32.15			
		3 0	PL	J			
		3 1	U	02.62	<input checked="" type="checkbox"/>		

Conditional Stop Code



Carriage Return

Job No. 0160 Prog. No. 13.3 Prep. by _____ Ck'd. by _____

Problem HEXADECIMAL PUNCH Track _____

Program Input Codes	STOP	Location	Instruction Op.	Address	SOB	Contents of Address	Notes
	<input checked="" type="checkbox"/>						
00000006		02.3.2	WWWWS			1@11-1@29	
		3.3		20		8@29	
		3.4	WWWWO			-1@27+1@15	
		3.5	W0.00.0			<input checked="" type="checkbox"/> 1@11-1@15	
		3.6	WWO			1@19-1@27	
		3.7	2.K.8			0254	
		3.8	X.B.63.5.3			N ②	
		3.9	M.03.6.1			<input checked="" type="checkbox"/> 1@14	
		4.0	E.00.6.2			3500	
		4.1	A.03.0.6				
		4.2	Y.02.4.4				
		4.3	X.Z.3.2.2.9			<input checked="" type="checkbox"/>	
		4.4	P[.]				
		4.5	U.02.1.2				
		4.6	X.B.6.3.3.2			WORD COUNTER	
		4.7	S.03.6.2			<input checked="" type="checkbox"/> 1@29	
		4.8	T.03.2.4				
		4.9	U.0.1.5.3				
		5.0	X.B.63.2.2			N ④	
		5.1	M.00.3.7			<input checked="" type="checkbox"/> 1@6	
		5.2	E.02.1.0				
		5.3	A.00.3.9			2 F8	
		5.4	Y.02.5.6				
		5.5	X.Z.3.2.4.1			<input checked="" type="checkbox"/>	
		5.6	P[.]				
		5.7	U.02.2.4				
		5.8	X.Z.02.0.4				
		5.9	X.Z.15.0.0			<input checked="" type="checkbox"/> -1@23+1@19	
		6.0	X.Z.0.0.0.1			1@29	
		6.1	X.Z.02.2.8				
		6.2	X.B.63.4.8			N ⑥	
		6.3	M.03.2.1			<input checked="" type="checkbox"/> 1@29	

Conditional Stop Code



Carriage Return

Job No. 0160 Prog. No. 13 Prep. by J. G. P. Ck'd. by

Problem HEXADECIMAL PUNCH Track

Program Input Codes	Stop	Location	Instruction Op.	Address	Stop	Contents of Address	Notes
		<input checked="" type="checkbox"/>					
		03.00	F0.1.3.6			3500	
		01	A.0.2.3.7			2K8	
		02	Y.0.3.0.4				
		03	XZ.3.2.5.3		<input checked="" type="checkbox"/>		
		04	PL.]				
		05	U.0.3.3.6				
		06	XZ.0.2.3.0			278	
		07	XZ.0.0.0.7		<input checked="" type="checkbox"/>	1@29	
00000002		08	XZ.0.0.0.4				
		09	3WWW.5				
		10	XB.6.3.5.3			N 8	
		11	N.0.0.6.1		<input checked="" type="checkbox"/>	1@21	
		12	E.0.0.6.2			3500	
		13	A.0.3.3.5			208	
		14	Y.0.3.1.6				
		15	XZ.3.2.0.1		<input checked="" type="checkbox"/>		
		16	PL.]				
		17	[. U.0.2.4.6			OR 40432	
		18					
		19	A.0.0.4.1		<input checked="" type="checkbox"/>	1@1	
		20	U.0.0.4.9				
00000003		21		4		1@29	
		22	4.0.0.0.0.0.0.0			1@1	
		23		4.0	<input checked="" type="checkbox"/>	1@25	
		24	B.0.3.0.7			7@29	
		25	XH.6.3.3.2				
		26	B.0.3.5.6			40131	
		27	XZ.3.2.1.3		<input checked="" type="checkbox"/>		
		28	XP.3.2.1.4				
		29	U.0.3.4.4				
		30	S.0.1.0.2				
		31	T.0.0.4.2		<input checked="" type="checkbox"/>		

Conditional Stop Code



Carriage Return

Problem HEXADECIMAL PUNCH Track _____

Program Input Codes	Stop	Location	Instruction Op.	Address	Stop	Contents of Address	Notes
		<input checked="" type="checkbox"/>					
		03.3.2	XZ	32.18			
		3.3	XP	32.19			
		3.4	UO	0.42			
		3.5	XZ	02.02	<input checked="" type="checkbox"/>	208	
		3.6	XB	63.22		N ^①	
		3.7	N	03.23		1 ^② 25	
		3.8	E	02.10			
		3.9	A	02.61	<input checked="" type="checkbox"/>	270	
		4.0	Y	03.42			
		4.1	XZ	32.27			
		4.2	PI	2			
		4.3	U	03.10	<input checked="" type="checkbox"/>		
		4.4	Y	01.02			
		4.5	XB	63.31			
		4.6	S	02.32		1 ^③ 11-1 ^④ 29	
		4.7	T	03.49	<input checked="" type="checkbox"/>	→ FINISHED	
		4.8	U	00.15			
		4.9	B	04.00		40200	
		5.0	H	01.08			
		5.1	B	01.30	<input checked="" type="checkbox"/>	40432	
		5.2	C	03.17			
		5.3	XC	63.32			
		5.4	B	04.12			
		5.5	U	03.30	<input checked="" type="checkbox"/>		
		5.6	U	01.31			
		5.7	U	00.12			
0.0000.006		5.8	4.0000.000	0.0		1 ^⑤	
		5.9		2	<input checked="" type="checkbox"/>	1 ^⑥ 30	
		6.0	W	0000.000		1 ^⑦ 3-1 ^⑧ 7	
		6.1	2	000.0		1 ^⑨ 14	
		6.2		4		1 ^⑩ 29	
		6.3	2	0000.0	<input checked="" type="checkbox"/>	1 ^⑪ 10	

Conditional Stop Code Carriage Return

Job No. 0160 Prog. No. 13.3 Prep. by J. Goforth Ck'd. by _____

Problem HEXADECIMAL PUNCH Track _____

Program Input Codes	Stop	Location	Instruction Op.	Address	SOB	Contents of Address	Notes
		<input checked="" type="checkbox"/>					
		04.0.0		U02.0.0			
		0 1					
		0 2					
		0 3		N01.4.6		<input checked="" type="checkbox"/> 1@17	
		0 4		A01.0.0			
		0 5		XH6.3.4.8			
		0 6		XH6.3.5.3			
		0 7		XH6.3.2.2		<input checked="" type="checkbox"/>	
		0 8		E01.4.4		WWW0000	
		0 9		N04.2.4		1@27	
		1 0		S02.6.0		1@29	
		1 1		U04.1.4		<input checked="" type="checkbox"/>	
		1 2		U01.0.3			
2.0000.0.0.1		1 3		WWW000.0			
		1 4		A01.0.0			
		1 5		H01.0.1		<input checked="" type="checkbox"/>	
		1 6		XH6.3.3.1			
		1 7		S02.3.2		1@11-1@29	
		1 8		U04.2.0			
2.0000.0.0.1		1 9		K0.0000.0.0		<input checked="" type="checkbox"/> -6@4	
		2 0		H00.4.2			
		2 1		X06.3.4.3			
		2 2		X03.1.0.8			
		2 3		U02.3.8		<input checked="" type="checkbox"/>	
		2 4		X07.0.0.4		1@27	
2.0000.0.0.1		2 5		WWW0.0.0			
		2 6		T02.0.0			
		2 7		H04.4.0		<input checked="" type="checkbox"/>	
		2 8		X06.3.4.3			FINAL GROUP
		2 9		U04.0.3			
		3 0		B01.4.3			
		3 1		U04.0.4		<input checked="" type="checkbox"/>	

Conditional Stop Code



Carriage Return

LGP-30 CODING SHEET

PREPARED FOR:				PAGE 10 OF 10
JOB NO. 0160	PROGRAM NO. 13.3	PROGRAM PREPARED BY: J. Goforth	PROGRAM CHECKED BY:	DATE 6-1-60
PROBLEM: HEXADECIMAL PUNCH 13.3				TRACK

PROGRAM INPUT CODES	STOP	LOCATION	INSTRUCTION		STOP	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
	1						
	1	X					
		043 12		B 0233	1		8 @ 29
		3 13		X C 6332	1		
		3 14		B 0129	1		U(0460)
		3 15		X E 3200	1	X	
		3 16		C 0108	1		
		3 17		B 0156	1		U 0246
		3 18		C 0317	1		
		3 19		X F 3207	1	X	
		4 10	[X C 6335	1	or U0460	
		4 11		B 0413	1		- 21 @ 29
		4 12		X Z 0000	1		1 @ 29
		4 13		A 0308	1	X	Punch 20 spaces
		4 14		X P 0301	1	(SPACE)	between each
		4 15		T 0442	1		block
		4 16		X E 0000	1		
		4 17		X P 1600	1	X	
		4 18		X B 6338	1		Lf
		4 19		A 0321	1		1 @ 29
		5 10		X Z 3201	1		delay
		5 11		Y 0110	1	X	Lfg
		5 12		A 0014	1		XZ 0063
		5 13		X H 6338	1		Lfg
		5 14		X S 6337	1		Lff
		5 15		T 0430	1	X	more than one complete row
		5 16		S 0014	1		XZ 0063
		5 17		X H 6343	1		
		5 18		B 0357	1		U 0460
		5 19		U 0427	1	X	
		6 10		B 0426	1		T 0200
		6 11		C 0108	1		
		6 12		X B 6348	1		
		6 13		U 0132	1	X	

