

BRANCH LOW

REPRODUCTION

A. PURPOSE OF TEST

1. TO TEST THE BRANCH LOW CIRCUITRY BY COMPARING EACH OF THE 64 POSSIBLE CHARACTERS WITH ALL OTHER CHARACTERS THAT ARE SEQUENTIALLY LOWER. ERRORS ARE DETECTED BY A NO-BRANCH (HIGH OR EQUAL) WHICH FORCES A PRINTOUT OF THE TWO CHARACTERS COMPARED, RESULT SHOULD BE (ALWAYS LOW), RESULT IS (HIGH OR EQUAL), AND THE WORD "ERROR"; OR STOPS THE MACHINE WITH SENSE SWITCH E ON.
2. TO TEST THE BRANCH LOW CIRCUITRY BY COMPARING EACH OF THE 64 POSSIBLE CHARACTERS WITH ALL OTHER CHARACTERS THAT ARE SEQUENTIALLY HIGHER. ERRORS ARE DETECTED BY A BRANCH (LOW OR EQUAL) WHICH FORCES A PRINTOUT OF THE TWO CHARACTERS COMPARED, RESULT SHOULD BE (ALWAYS HIGH), RESULT IS (LOW OR EQUAL) AND THE WORD "ERROR"; OR STOPS THE MACHINE WITH SENSE SWITCH E ON.

NOTE: NO PRINTOUT OCCURS FOR CORRECT RESULTS EXCEPT THE PRINTING OF THE TITLE AND HEADINGS WHEN "1" IS MANUALLY ENTERED IN \$52.

B. LOADING PROCEDURES:

1. PLACE TEST IN 1402 READ HOPPER AND DEPRESS LOAD KEY.
2. WHEN RUNNING TEST FROM TAPE, ENTER A 1 IN 1259.

C. PROGRAM CONTROL

1. SENSE SWITCHES

- B ON TO REPEAT FOR SCOPING
OFF TO CONTINUE
- D ON TO REPEAT INCLUDING LOOP COUNTER
OFF TO CONTINUE
- E ON TO STOP ON ERROR
OFF TO PRINT ERROR
- G ON TO REPEAT ENTIRE PROGRAM
OFF TO CONTINUE

D. TEST PROCEDURE:

THE FOLLOWING CHARACTERS AND BLANKS ARE STORED IN ASCENDING SEQUENCE BY THE LOADING ROUTINE IN LOCATION 701-830, EXCEPT THE WORD MARKS IN ALL ODD-NUMBERED POSITIONS, THE WORD SEPARATOR CHARACTER IN LOCATION 733, AND THE A-BIT IN LOCATION 739 WHICH ARE PROGRAM GENERATED:

DATE	2-2-61	6-29-63	17 10 63				
ENG. CHG. NO.	110378	117628	TA 1976				

DIAGNOSTIC FUNCTION TEST

D. (CONTINUED)

REPRODUCTION

	12 12 12	11 11 11	0 0 0	5 6 7 12															
	□ 8 8 8	ε \$ * 8 8 8	- / , % 8 8 8	α # @ 8 8 8	0	A	B	C	D	E	F								
(777777					77	77													77
LOC. (000000					33	34													66
(123456					34	90													34

	11	0	2																	
	G H I	J K L	M N O	P Q R	8	S T U	V W X	Y Z	0 1 2	3 4 5	6 7 8	9 9 1								
7777					77							8888								
LOC. 6666					99							2223								
5678					12							7890								

AFTER STORING THE ABOVE TABLE IN THE LOCATIONS INDICATED, THE TWO CHARACTERS IN LOCATIONS 703-704 (.BLANK) ARE COMPARED WITH THE TWO BLANKS IN LOCATIONS 701-702. THE COMPARISON SHOULD BE LOW; IF NOT, AN ERRONEOUS HIGH OR EQUAL CONDITION BRANCHES TO AN ERROR PRINT ROUTINE AND PRINTS THE RESULTS IF SENSE SWITCH E IS OFF OR STOPS THE MACHINE IF THE SWITCH IS ON. IF THE COMPARISON IS LOW AS IT SHOULD BE, THE PROGRAM BRANCHES TO A SET OF INSTRUCTIONS WHICH WILL INTERCHANGE THE A AND B FIELDS OF THE COMPARE INSTRUCTION. THE COMPARISON SHOULD NOW BE HIGH. A TEST FOR LOW, THEREFORE, SHOULD NOT BRANCH. IF IT DOES, AN ERRONEOUS LOW OR EQUAL CONDITION BRANCHES TO THE ERROR PRINT ROUTINE AND EITHER PRINTS THE RESULTS OR STOPS THE MACHINE.

THE A FIELD LOADING ADDRESS (704) IN THE COMPARE INSTRUCTION IS THEN INCREASED BY 2 AND □ BLANK IN 705-706 ARE NOW COMPARED WITH THE TWO BLANKS IN 701-702 IN THE SAME MANNER AS DESCRIBED ABOVE, INCLUDING THE INTERCHANGE OF THE A AND B FIELDS IN THE COMPARE INSTRUCTION. WHEN THE A FIELD LOADING ADDRESS REACHES 830, ALL OTHER CHARACTERS IN THE TABLE HAVE BEEN COMPARED WITH THE TWO BLANKS.

NEXT, ALL OTHER CHARACTERS IN THE TABLE MUST NOW BE COMPARED WITH THE TWO CHARACTERS IN 703-704 (.BLANK). THIS IS DONE BY SETTING BOTH THE A AND B FIELDS OF THE COMPARE INSTRUCTION TO 706 AND 704 RESPECTIVELY. THUS, THE FIRST TWO CHARACTERS TO BE COMPARED WITH . BLANK IN 703-704 ARE THE TWO CHARACTERS (□ BLANK) IN 705-706, THE SECOND ARE THE 12-5-8 BLANK IN 707-708, THE THIRD ARE THE 12-6-8 BLANK IN 709-710, AND SO ON UNTIL THE A FIELD LOADING ADDRESS AGAIN REACHES 830.

BY CONTINUALLY INCREASING THE A AND B FIELD LOADING ADDRESSES BY 2 AS DESCRIBED ABOVE, THE LAST COMPARISON IS FINALLY MADE WHEN THE TWO CHARACTERS (91) IN LOCATIONS 829-830 ARE COMPARED WITH THE TWO CHARACTERS (90) IN LOCATIONS 827-828. THIS INDICATES THE END OF THE TEST WHICH MAY BE REPEATED AS OFTEN AS DESIRED IF SENSE SWITCH G IS IN THE ON POSITION.

DATE	2-2-61	6-29-63	17.10.63				
ENG. CHG. NO.	110378	117628	TA 1976				

REPRODUCTION

E. STOPS

979 OR 1089 IN STORAGE ADDRESS REGISTER: ERROR SENSE E ON.

F. PRINTOUTS

1. CORRECT

NONE

2. ERROR

<u>A FIELD</u>	<u>B FIELD</u>	<u>RESULT SHOULD BE</u>	<u>RESULT IS</u>	
B	A	LOW	HIGH	ERROR
F	B	LOW	EQUAL	ERROR
Q	Y	HIGH	LOW	ERROR
R	Z	HIGH	EQUAL	ERROR
9I	8I	LOW	HIGH	ERROR
\$		LOW	HIGH	ERROR
	*	HIGH	EQUAL	ERROR
		LOW	HIGH	ERROR
		HIGH	LOW	ERROR

NOTE: NO PRINTOUT OCCURS IN THE A AND B FIELD COLUMNS FOR UNPRINTABLE CHARACTERS.

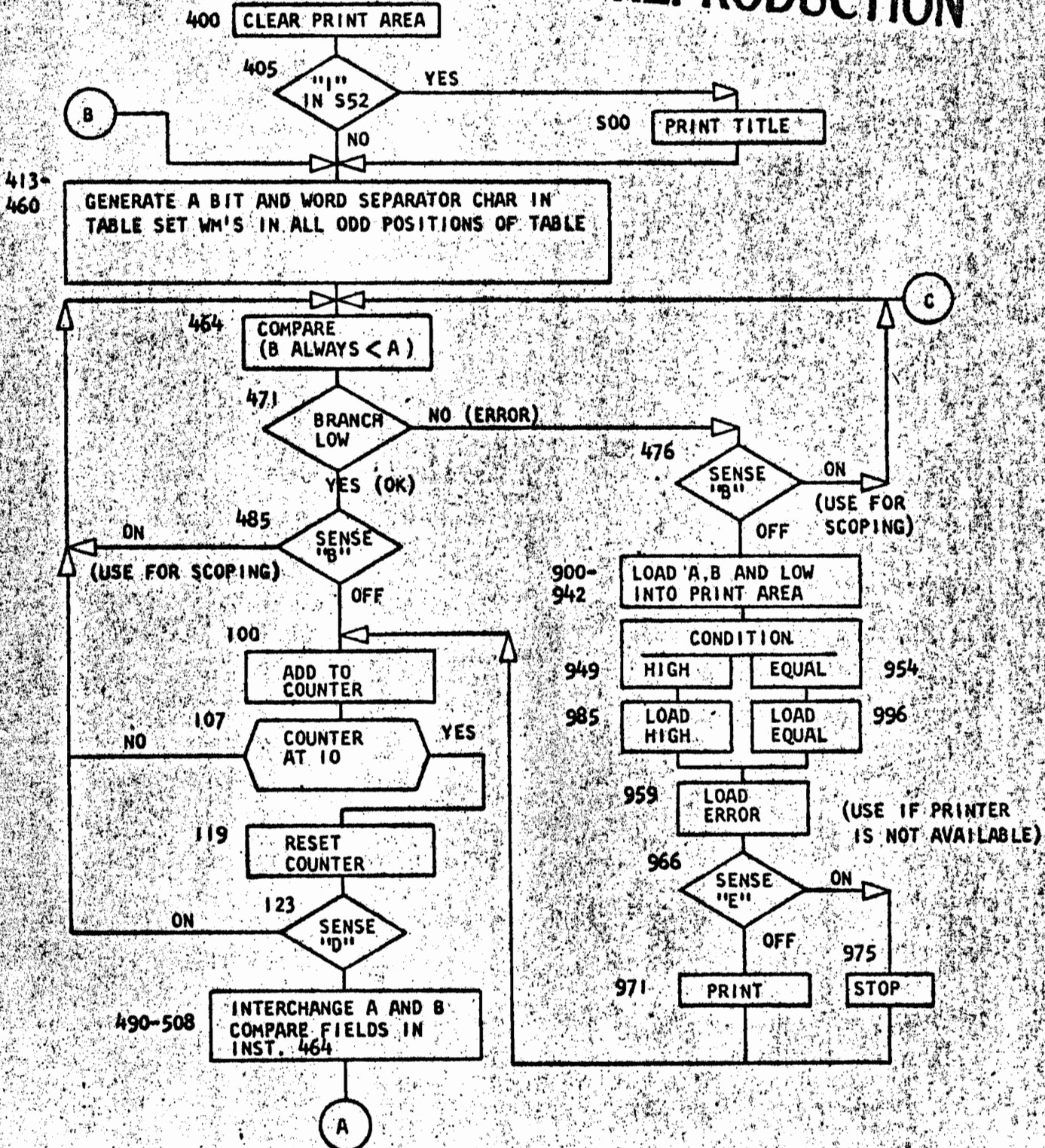
G. COMMENTS

AN OPERATION COUNTER IS INCLUDED TO REPEAT EACH BRANCH ON LOW TEST 10 TIMES. THE APPROXIMATE RUNNING TIME OF THE COMPLETE TEST IS 30 SECONDS.

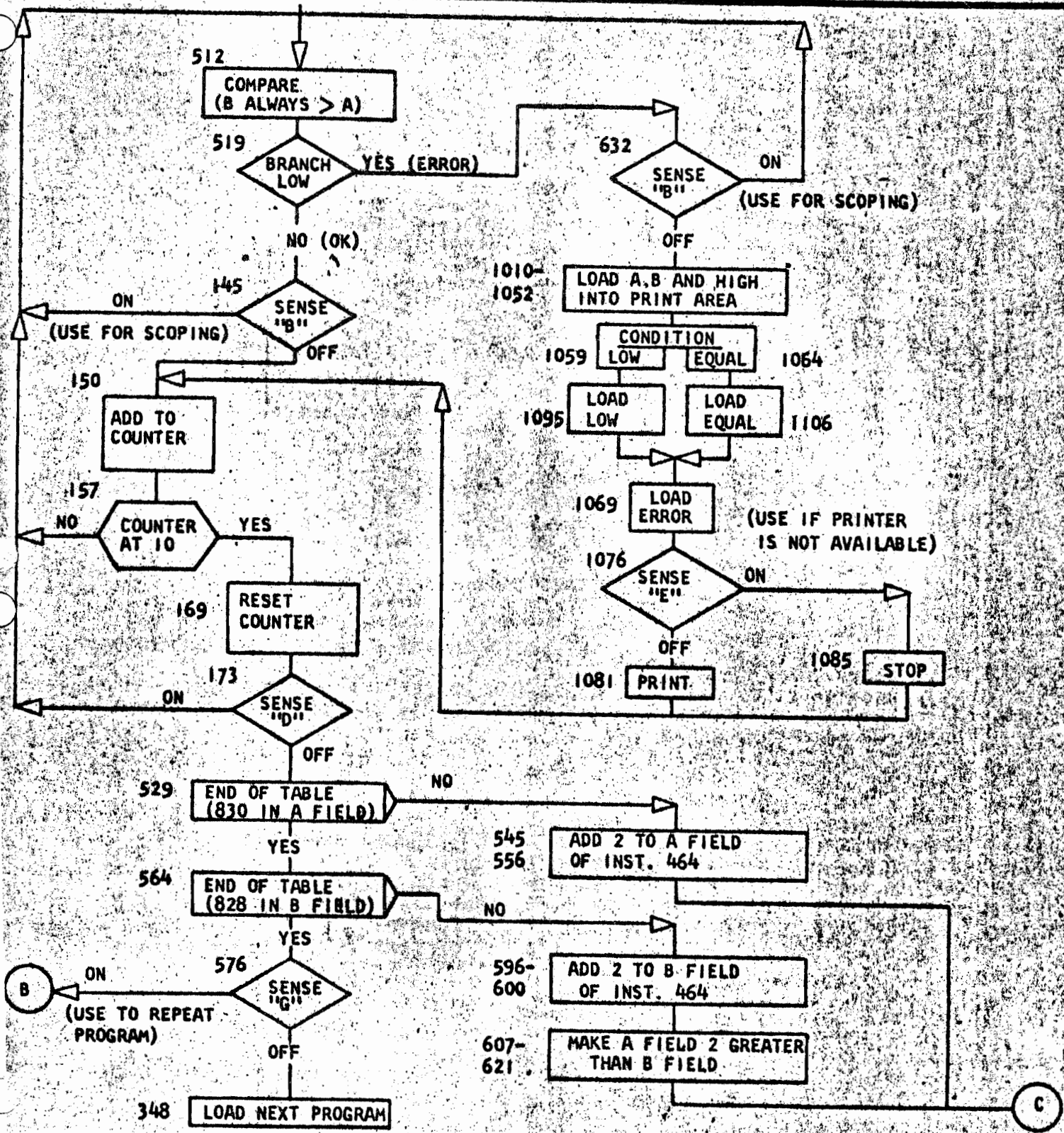
DATE	2-2-61	6-29-63	17. 10. 63				
ENG. CHG. NO.	110378	117628	TA 1976				

REPRODUCTION

BRANCH LOW
 FLOW CHART



DATE	2-2-61	6-29-63	17.10.63				
ENG. CHG. NO.	110378	117628	TA 1976				



DATE	2-2-61	6-29-63	17.10.63				
ENG. CHG. NO.	110378	117628	TA 1976				

1401 DATA PROCESSING SYSTEM
 DIAGNOSTIC FUNCTION TEST
REPRODUCTION

PROGRAM LISTING FOR USE WITH FLOW CHART

BRANCH LOW

33108

INSTRUCTION ADDRESS	OP	A	B	REMARKS
100	100	A	100 371	ADD ONE TO LOOP COUNTER
107	107	B	119 3701	BRANCH OUT OF LOOP COUNTER C FOR TA
115	115	B	464	REPEAT LOOP
119	119	S	371	RESET LOOP COUNTER
123	123	B	464 D	REPEAT LOOP ON SW D SS
128	128	,	513	INTERCHANGE A + B FLDS OF COMP IN 464
132	132	B	494	GO SET UP COMPARE FOR 512 FOR LOW COND
145	145	B	512 B	B ON TO SCOPE SS
150	150	A	150 371	ADD ONE TO LOOP COUNTER
157	157	B	169 3701	BRANCH OUT OF LOOP COUNTER C FOR TA
165	165	B	512	REPEAT LOOP
169	169	S	371	RESET LOOP COUNTER
173	173	B	512 D	REPEAT LOOP ON SW D SS
178	178	B	529	CONTINUE WITH TEST
368	368	0	00+	LOOP COUNTER
377	377	B	400 S591	USE WHEN TESTS ARE RUN FROM TAPE
385	385	B	S88	..
400	400	/	332	START TEST
404	404	/		..
405	405	B	500 S521	BR TO TITLE PRINT ROUTINE IF 1 IN S52
413	413	L	653 441	SET INSTR IN 438 + 464 TO INITIAL COND
420	420	L	660 470	..
427	427	B	850	BR TO GEN WD SEP + A BIT FOR TABLE
434	434	□	439	SET WORD MARK IN ALL ODD ADDR OF TABLE
438	438	,	701 439	..
445	445	V	464 8291	..
453	453	A	971 441	..
460	460	B	434	..
464	464	C	704 702	*COMPARE
471	471	B	485 T	BRANCH LOW - SHOULD BRANCH
476	476	B	464 B	B ON TO SCOPE SS
481	481	B	900	BRANCH TO ERROR PRINT ROUTINE
485	485	B	464 B	B ON TO SCOPE SS
490	490	B	100	GO TO LOOP COUNTER
494	494	M	467 518	TO SET UP COMP IN 512 FOR HIGH COND
501	501	M	470 515	..
508	508	□	513	..
512	512	C	702 704	*COMPARE
519	519	B	632 T	BRANCH LOW - SHOULD NOT BRANCH
524	524	B	145	GO TO SWITCH B
529	529	C	467 666	TEST FOR END OF TABLE IN A FIELD OF 464
536	536	B	545 /	BRANCH IF UNEQUAL TO ADD 2 TO A FIELD
541	541	B	564	BRANCH TO TEST FOR END OF TABLE IN B FLD

DATE	2-2-61	6-29-63	17.10.63				
ENG. CHG. NO.	110378	117628	TA 1976				

REPRODUCTION

545	545	,	465							ADD 2 TO A FIELD OF COMP IN 464
549	549	A	971	467						..
556	556	□	465							..
560	560	B	464							BRANCH TO COMPARE NEXT SET OF CHARACTERS
564	564	C	470	663						TEST FOR END OF TABLE IN B FIELD
571	571	B	596	/						BRANCH IF UNEQUAL TO ADD 2 TO B FIELD
576	576	B	413	G						G ON TO REPEAT TEST
581	581	□	711	829						CLEAR ANY GM-WM FROM PROGRAM
588	588	/	230							..
592	592	B	348							BRANCH TO READ NEXT RECORD
596	596	,	468							ADD 2 TO B FIELD OF COMP IN 464
600	600	A	971	470						..
607	607	L	470	467						MAKE A' FIELD 2 GREATER THAN B' FIELD
614	614	A	971	467						..
621	621	□	465	468						..
628	628	B	464							BRANCH TO COMPARE NEXT SET OF CHARACTERS
632	632	B	512	B						B ON TO SCOPE
637	637	B	#10							SS
650	650	,	701							BRANCH TO ERROR PRINT ROUTINE
654	654	C	704	702						CONSTANTS TO SET INSTR TO INITIAL COND
661	661	B	28							..
664	664	B	30							CONSTANTS TO DETECT END OF TABLE
667	667	H	IGH							..
672	672	L	OW							CONSTANTS FOR PRINTOUTS
677	677	E	QUA	L						..
682	682	E	RRO	R						..
701	701
721	721	.	.	.						TABLE USED IN COMPARING
741	741	#	2							..
761	761	E	.F	G H I						..
781	781	N	0	P Q R						..
801	801	W	X	Y Z 0						..
821	821	6	7	8 19 91						..
850	850	Y	850	733						..
857	857	Y	857	739						GENERATE WORD SEPARATOR CHARAC FOR TABLE
864	864	B	434							GENERATE A BIT FOR TABLE
900	900	,	929	936						BRANCH TO SET WORD MARKS IN TABLE
907	907	M	467	931						ERROR PRINT ROUTINE IF NO BR OCCURRED
914	914	M	470	938						ON LOW CONDITION
921	921	□	929	936						..
928	928	L	AAA	202						..
935	935	L	BBB	222						..
942	942	L	676	245						..
949	949	B	985	U						..
954	954	B	996	S						..
959	959	L	686	285						..
966	966	B	975	E						..
971	971	2	100							E ON TO ERROR STOP
975	975	.	979							SS
979	979	B	100							ERROR PRINT
985	985	L	671	265						ERROR STOP
992	992	B	959							GO TO LOOP COUNTER
										LOAD -RESULT IS- COMMENT

DATE	2-2-61	6-29-63	17. 10. 63				
ENG. CHG. NO.	110378	117628	TA 1976				

1401 DATA PROCESSING SYSTEM
DIAGNOSTIC FUNCTION TEST

REPRODUCTION

996 996 L 681 265
1003 #03 B 959
1010 #10 , #39 #46
1017 #17 M 515 #41
1024 #24 M 518 #48
1031 #31 □ #39 #46
1038 #38 L AAA 202
1045 #45 L BBB 222
1052 #52 L 671 245
1059 #59 B #95 T
1064 #64 B /06 S
1069 #69 L 686 285
1076 #76 B #85 E
1081 #81 Z 150
1085 #85 . #89
1089 #89 B 150
1095 #95 L 676 265
1102 /02 B #69
1106 /06 L 681 265
1113 /13 B #69
1120 /20 A FI ELD
1140 /40 B FI ELD
1160 /60 R ESU LT SHOULD BE
1180 /80 R ESU LT IS

..
..
ERROR PRINT ROUTINE IF BRANCH OCCURRED
ON HIGH CONDITION

..
..
..
..
..
..
..
..
E ON TO ERROR STOP
ERROR PRINT
ERROR STOP
GO TO LOOP COUNTER
LOAD -RESULT IS- COMMENT

SS

..
..
..
HEADINGS CONSTANTS

DATE	2-2-61	6-29-63	17. 10. 63				
ENG. CHG. NO.	110378	117628	TA 1976				

REPRODUCTION

TABLE OF UNPRINTABLE CHARACTERS

LP-LEFT PARENTHESIS	12 5 8	SE-SEMICOLON	11 6 8	DE-DELTA	11 7 8
WS-WORD SEPARATOR	0 5 8	LT-LESS THAN	12 6 8	PZ-PLUS ZERO	12 0
TS-TAPE SEGMENT MARK	0 7 8	GT-GREATER THAN	6 8	TM-TAPE MARK	7 8
GM-GROUP MARK	12 7 8	MZ-MINUS ZERO	11 0	CO-COLON	5 8
RP-RIGHT PARENTHESIS	11 5 8	AP-APOSTROPHE	0 6 8		

,008015,022029,033033N	1001	BRANCH LOW	33108	0A
,008015,022029,033033N	1001	SET WORDMARK CARD	33108	02
L069136,107115,119123,1281321001A100371B1193701B464S371B464D,513B494			33108	03
L070182,150157,165169,1731781001B512BA150371B1693701B512S371B512D8529			33108	04
L067367,340344,348349,3573611001,008012,00110011B361080A8400/340080			33108	05
L069404,377385,389400,4044041001000P	B400S5916S88	/332/	33108	06
Z				
L072444,413420,427434,4384451001B500S521L653441L660470B850		439,70143933108	07	
L072484,453460,464471,4764811001V4648291A971441B434C704702B485TB4648890033108			08	
L071523,490494,501508,5125191001B4648B100M467518M4705154513C7027048632T			33108	09
L068559,529536,541545,5495561001B145	C467666B545/8564,465A971467465		33108	10
L068595,564571,576581,5885921001B464C4706638596/B413G4711829/2308348			33108	11
L068631,600607,614621,6286321001,468A971470L470467A9714674654688464			33108	12
L072671,637650,654661,6646671001B512BB+10		,701C704702828830HIGH	33108	13
L072711,677682,701701,7017011001LOW	EQUALERROR		33108	14
P T M				
L0727514712712,721741,7417411001	+ \$ * R S D - / , % C A T # @ C G T P		33108	15
P E E O P S O T M Z				
L0727914752752,761781,7817811001	A B C D E F G H I M J K L M N O P Q R		33108	16
Z				
L0728314792792,801821,8218211001	S T U V W X Y Z 0 1 2 3 4 5 6 7 8 9 9 1		33108	17
L0648634832832,850857,8648641001		Y850733Y857739	33108	18
L068899,900900,900900,9009001001B434			33108	19
L067934,907914,921928,9359351001,929936M467931M4709384929936LAAA202			33108	20
L072974,942949,959966,9719751001LB8B222L676245B985U8996SL686285B975E210033108			21	
L067409,979985,992996,+03+101001.979B100	L671265B959L681265B959		33108	22
L06744,+17+24,+31+38,+45+451001,+39+46M515+41M518+48+39+46LAAA202			33108	23
L07284,+52+59,+64+69,+76+811001LB8B222L671245B+95TB/06SL686285B+85E215033108			24	
L06719,+89+95,/02/06,/13/201001.+89B150	L676265B+69L681265B+69		33108	25
L07259,/40/60,/60/60,/60/601001A	FIELD	B FIELD	33108	26
L07299,/80S00,80S00,80S001001RESULT SHOULD BE	RESULT IS		33108	27
L057S24,S01S05,S12S13,S17S1810012,049L0772772/27724/40/60			33108	28
L052S44,S29S36,S37S41,S45S4510014/80L/892702/2702413			33108	29
/333080N		CLEAR WORDMARK CARD	33108	30
,019027,031,038042B031T98GB400L046352BW04BS88		BRANCH LOW	33108	31

M

DATE	2-2-61	6-29-63	17.10.63				
ENG. CHG. NO.	110378	117628	TA 1976				