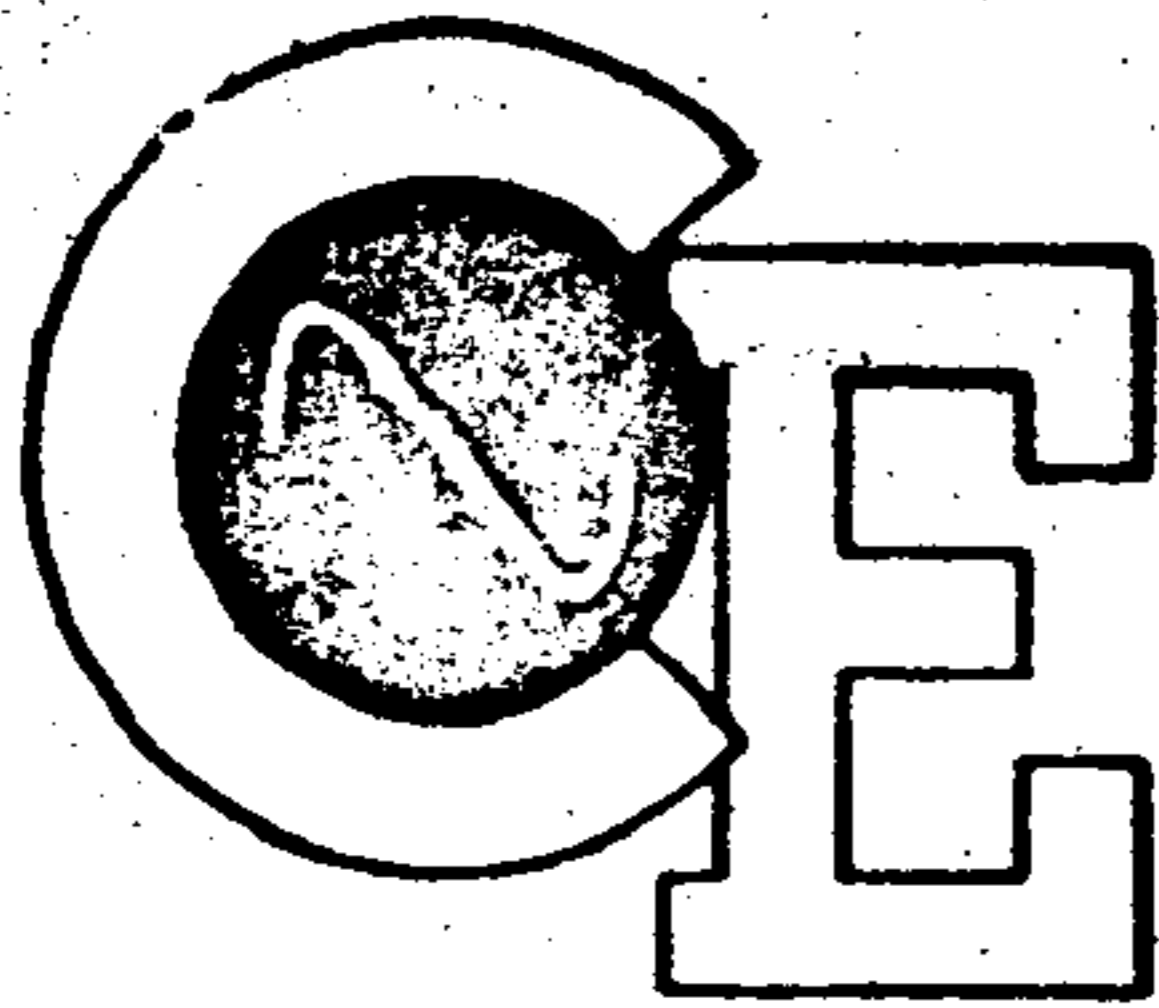


IBM POUGHKEEPSIE
December 31, 1964



Diagnostic Engineering Publication

1410/7010

Subject: Diagnostic Program W001G - 1403 Printer Test

Sequence Number 541
Replaces - W001F

System and channel control cards are required by this program and must be inserted prior to running.

System control card	W001	001
Channel One Control Card	W001	002
Channel Two Control Card	W001	003
Channel Three Control Card	W001	004
Channel Four Control Card	W001	005

The following changes were made to W001F to create W001G:

1. All routines and references to channel 3 & 4 operation have been removed.
2. The series of instructions in the ripple pattern print routine have been rearranged slightly for two reasons:
 - a. To control more closely the entry into and exit from Alert Mode
 - b. To correct a problem that existed because three routines used the same counter "ACCUM" and altering its contents. This resulted in an overlap time failure message to be typed when no overlap time failure existed.

Enclsoures: 36 Pages
 8 Cards - Card Loader (1-7) and 1 Core Clear
 105 Cards No. 001-105 Data Cards
 1 Card Execute Card

Distribution: X 1410 with 1403 Printer
 X 7010 with 1403 Printer

W001
Page 002

W001
Page 003

W 0 0 1 G
1403 Printer Test
12/31/64

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5.00.00.0

TEST DESCRIPTION

I 00.1

MODIFICATIONS

See release page for modifications from level to level.

I 00.2

DESCRIPTION

This program tests the operation of the 1403 printer and associated circuits while printing ripple patterns of chosen numerics, special characters and alphabetic characters plus a four-page bleacher pattern. This program tests either or both the numeric and alpha chain printers. (Note: Alphabetic information will not be printed on a numeric chain. 1403.) The program checks proper operation of the "overlap" and/or "priority" circuits if the machine has these features available.

Sixty-eight groups of characters are read in with the program. These groups of characters are each expanded to a full print line in a work area. This line is then moved to a print area and printed out. After the line is printed, the work area is end around moved one character to the right for ripple. This line is now printed out and so on until 24 lines have been printed. At this point a new group of characters is moved, printed out and rippled until all groups are used (only 45 groups used for numeric printer).

This printing can be accomplished in overlap and/or priority modes by altering program control with the special TADs. If priority is to be tested, a complete check is made of the priority circuits associated with the 1403. The Y(I) U, Y(I) l and Y(I) E instructions are checked. The Y(I) U is checked to insure that an interrupt does occur only when the 1403 goes "not busy" and does occur within 1.5 min. The Y(I) l is checked to insure that this interrupt does not occur unless the program is overlap mode. If an interrupt does occur that is not programmed for, it causes an error message to be typed at the operator's console.

5.00.00.0 TEST DESCRIPTION (continued)

In overlap mode of operation a test is made to insure that the 1403 write instruction was overlapped; in un-overlapped mode a test is made to insure that the instruction was not overlapped.

Because the test is designed to run on both numeric and alpha chain printers, all error messages and operator instructions will be typed at the console.

The ability of the 1403 and associated circuits to print word marks is tested by printing two distinct patterns. One pattern appears as bleachers face to face, the other as bleachers back to back; any extraneous word mark or character that may be present is obvious by observing the printed patterns. Because of the geometric patterns printed, a failure to print word marks is also obvious.

00.3 EQUIPMENT TO BE TESTED

1. 1414 Model III, IV, or VIII
2. 1403 Printer, Model 1, 2, or 3

00.4 CARD DECK

See bottom of Release Page for description of card deck.

00.5 EC LEVEL OF MACHINE

Not applicable.

5.00.02.0

OPERATING PROCEDURES

For normal operation of the program, no TADs or other information need be entered.

If running the program in priority mode, a message is typed to "Set Priority switch ON select switch to Printer" position; this is followed by a programmed halt to allow setting of the switches. After the switches have been set as directed, resume program operation by pressing START; no other manual intervention is required to run the program to completion.

If running the program in non-priority mode, manual intervention is not required at any time.

The following normal and special tads are used to allow the operator some flexibility in program operation.

NORMAL TADs

TAD 0	Loc 01000	Off	1	Type all errors.
		On	1	Bypass all error typeouts.
TAD 1	Loc 01001	Off	1	Run complete program.
		On	1	Loop in the same routine.
TAD 2	Loc 01002	Off	1	Bypass all error halts.
		On	1	Halt on all errors.
TAD 3	Loc 01003	Off	1	One pass of program.
		On	1	Repeat entire program.

SPECIAL TADS

TAD 4	Loc 01004	Off	1	Print in Priority mode.
		On	1	Bypass operation.
TAD 5	Loc 01005	Off	1	Print in overlap mode.
		On	1	Bypass overlap printing.

All tads are loaded in the 1 or off position.

5.00.03.0 OPERATING HINTS, COMMENTS

1. At the beginning of the test the program identification is typed. At the conclusion of the program pass "W001 COMPLETE" is typed (if TAD 0 is off). When running in Priority Alert Mode a message to set priority switches is typed. (See 5.00.05 for illustrations of typeouts.)

Any messages other than those listed in 5.00.05, (1.), (2.), and (3.) indicate errors.
2. If the message W001 COMPLETE does not occur, it is because either error typeouts have been bypassed (possibility of an error not indicated) or the program has not run to completion.)
3. The program normally prints 24 lines of each pattern. This can be altered, however, to print more or less lines as needed by altering the constant at location 07183 accordingly.
4. There are normally four pages of bleacher patterns printed; however, this may be altered by changing the constant located at location 07178.
5. If the printer under test has 132 character positions, the bleacher word mark patterns will be symmetrical; however, this will not be the case if the printer has only 100 character positions.
6. Hints for observing the 1403 printout can be found in the Appendix, page 11.
7. The standard "Program Alter Routine" is included in this test to allow the operator to alter any portion of the program, tads, data fields, etc., he desires with a minimum of effort at any time during the program pass. To use this routine, press the 1415 Inquiry Request key and enter the five digit address of the low order position of memory to be altered when the typewriter prints the letter "I" and spaces. After the address has been entered, press Inquiry Release and then Inquiry Request again; the typewriter will again print an "I" and space and at this time the new information altered into memory. If an error is made in typing in the address of core to be altered, or the data, simply press Inquiry Cancel and then press Inquiry Request once more.

5.00.04.0 PROGRAM STOPS AND RESTARTS

1. Program Stops

All programmed STOPS are preceded by messages. All messages except instructions to the operator, and all STOPS are under TAD control.

After any halt, the program may be resumed by pressing start. Error halts will only occur if TAD 2 is a 1 (On).

2. Program Restarts

A program restart can be accomplished at any time by simply pressing computer Reset and then pressing Start.

5.00.05.0 TYPEOUTS

1. W001x This is the program identification, x represents test level.
2. SET PRIORITY SW. ON, SELECT SW. TO PRINTER.
3. W001 COMPLETE. This typeout indicates a complete program pass.
4. All error typeouts are self-explanatory. See listing of program for further information.

5.xx.07.0

APPENDIX

A. Incorrect 1403 Output

Note

All references to faulty printouts are made to Figure 1, sheet 1, of the appendix.

1. Line 1 (all 2's) shows no gaps or "breakes" in the line, thus indicating an intermittent auto-space failure.
2. Line 2 (all dark squares) shows that many different characters were printed on top of each other. This may be a result of the carriage spacing control in a neutral position or a complete failure of the auto-space circuitry.
3. Lines 3 through 15 (all 5's), print position 17, shows a "blurred" or "distorted" 5 in all lines in the same print position. The balance of the print lines are correct. This fault points out a defective printer hammer.

Example: 555555

4. Lines 16 through 22 (5's and 6's) demonstrate the effect of faulty "print hammer timing." Note that the left side of all characters in this group are missing. This indicates that the print hammers are firing too late.

If the right side of all characters in this group are missing, it indicates that the print hammers are firing too early.

5. Lines 23 through 35 (all 6's) are correct except that the last print positions are not printing although there are no "print checks." This indicates that the printer ribbon is not aligned properly.
6. Lines 36 through 53 (6's and 7's) indicate a worn printer ribbon. Note the marked difference in print intensity between the first three lines or last three lines and the lines between these two groups.

LABEL OPCODE OPERAND CT ADDRS INSTRUCTION

♦STANDARD SYSTEM CONTROL CARD.

SYST	ORG	1256	CHARACTER & PURPOSE	COL
	DC	0 0	ALPHA 0,1,X - 1410,1410ACC,7010	13
	01 DC	0 0	0,1,3,5,7,9-10,20,40,60,80,100K	14
	02 DC	0 0	SPARE	15
	03 DC	0 0	1,2-CHNL1 100,132 CHAR PRINTER	16
	04 DC	0 0	1,2-CHNL2 100,132 CHAR PRINTER	17
	05 DC	0 0		20
	07 DC	0 0	1 - OVERLAP	20
	08 DC	0 0	1 - PRIORITY ALERT	21
	09 DC	0 0		26
	013 DC	0 0	1 - CHANNEL TWO PRESENT	26
	DC	0	0 NOT INTERROGATED	

♦STANDARD CHANNEL 1 CONTROL CARD.

CHN1	ORG	1289	CHARACTER & PURPOSE	COL
	DC	0	0 NOT INTERROGATED	01289
	016 DC	0 0	P - 1403 PRINTER	29
	017 DC	0 0	A,N - ALPHA,NUMERIC PRINT CHAIN	30
	018 DC	0 0	1,2 - 100,132 CHAR PRINT BUFFER	31
	DC	0	0 NOT INTERROGATED	18 01325
	DC	0	0	18 01343
	DC	0 0	0	2 01345

♦STANDARD CHANNEL 2 CONTROL CARD.

CHN2	ORG	1346	CHARACTER & PURPOSE	COL
	DC	0	0 NOT INTERROGATED	01346
	016 DC	0 0	P - 1403 PRINTER	29
	017 DC	0 0	A,N - ALPHA,NUMERIC PRINT CHAIN	30
	018 DC	0 0	1,2 - 100,132 CHAR PRINT BUFFER	31
	DC	0	0 NOT INTERROGATED	18 01382
	DC	0	0	18 01400
	DC	0 0	0	2 01402

LABEL OPCODE OPERAND CT ADDR INSTRUCTION

 * START HERE ---- HOUSEKEEPING

ORG 2000
 BAL *C1
 CS 99
 MRCWG BRANCH,1
 MLCS 9999,UNITSV
 NUPWM

MOVE RESTART INSTR.
 RESET UNIT SV BLANK

BR IF NOT 1ST PASS
 TYPE IDENT.

SET BYPASS ID SWITCH

SET
 IX REGS

1-4
 TO
 ZERO

CH1,CHN1&16,P
 CH2,CHN2&16,P

FILLER

BR IF 1403 WAS TSTED

NO PRINTER SET ON CHANNEL CTL CDS&G

02000		
7 02000	R 02007	M ^G
6 02007	/	00099
12 02013	D 07228	00001 L ^D
12 02025	D 09999	07194 3
1 02037		N
7 02038	J 02068	
10 02045	M X10	01250 M ^G
7 02055	R 02045	M
6 02062	*	02038
7 02068	J 06240	0
11 02075	*	00025 00030
11 02086	*	00035 00040
6 02097	S	00044
1 02103		S
1 02104		S
1 02105		S
12 02106	B 02214	01305 P
12 02118	B 02439	01362 P
12 02141		
12 02153		
12 02154	B 04252	07194 1
7 02166	J	01007
34 02206		
6 02208	*	02000

W001	PRINTER TEST	W001	ADDRS	INSTRUCTION
LABEL	OPCODE	OPERAND	CT	
CHI	SBR	PGRET65	7 02214	G 04169 B
	MLCS	ONES,SIZE	12 02221	D 06322 07199 3
	BCE	*613,CHN1&18,1	12 02233	B 02257 01307 1
	MLCS	TWOS,SIZE	12 02245	D 06334 07199 3
	SW	SW4&1	6 02257	, 03578
	BCE	*67,CHN1&17,A	12 02263	B 02281 01306 A
	CW	SW4&1	6 02275	B 03578
	MLCS	PER,CHCODE	12 02281	D 07202 06238 3
	CW	SW2&1	6 02293	B 03438
	MLCS	LCNT-1,OLSW	12 02299	D 07181 07193 3
	BCE	*643,SY51&7,	12 02311	B 02365 01263
	BCE	*631,TAD5,1	12 02323	B 02365 01005 1
	MLCS	COM,CHCODE	12 02335	D 07203 06238 3
	MLCS	ONES,OLSW	12 02347	D 06322 07193 3
	SW	SW2&1	6 02359	, 03438
	MLCS	RRR,CHSTAT	12 02365	D 07205 06237 3
	MLNA	ADD3,STARAD	12 02377	D 07217 06230 /
	MLNA	ADD4,STOPAD	12 02389	D 07222 06235 /
	MLCS	ONES,BOLOM	12 02401	D 06322 06236 3
	B	CHSTT	7 02413	J 05443
	MLCS	UUU,YIUH-21	12 02420	D 07207 05402 3
	B	START	7 02432	J 03090

STORE B FOR NEXT CHAN
 SET 100 CHAR BUFFER
 BR IF 100 CHAR
 SET 132 CHAR BUFFER
 SET ALPHA PRINTER
 BR IF ALPHA
 SET NUMERIC PRINTER
 SET 2 TO CHAN.ALTER
 TURN OFF BOL SWITCH
 SET UNOVERLAP
 BR IF OLAP NOT AVAIL
 BR IF BYPASS OLAP
 SET 3 TO CHAN ALTER
 SET OVERLAP
 TURN ON BOL SWITCH
 SET R FOR STATUS
 SET CH ALTER START
 SET CH ALTER STOP
 SET BOL TO 1
 GO TO ALTER PROGRAM

W001 PRINTER TEST

CH2	LABEL	OPCOD	OPERAND	CT	ADDRS	INSTRUCTION
		SBR	PGRET&S	7	02439	G 04169 B
		MLCS	ONES,SIZE	12	02446	D 06322 07199 3
		BCE	*&13,CHN2&18,1	12	02458	B 02482 01364 1
		MLCS	TWOS,SIZE	12	02470	D 06334 07199 3
		SW	SW4&1	6	02482	* 03578
		BCE	*&17,CHN2&17,A	12	02488	B 02506 01363 A
		CW	SW4&1	6	02500	* 03578
		MLCS	LOZ,CHCODE	12	02506	D 07201 06238 3
		CW	SW2&1	6	02518	* 03438
		MLCS	LCNT-1,OLSW	12	02524	D 07181 07193 3
		BCE	*&43,SYSI&7,	12	02536	B 02590 01263
		BCE	*&31,TAD5,1	12	02548	B 02590 01005 1
		MLCS	ASTER,CHCODE	12	02560	D 07204 06238 3
		MLCS	ONES,OLSW	12	02572	D 06322 07193 3
		SW	SW2&1	6	02584	* 03438
		MLCS	XX,CHSTAT	12	02590	D 07223 06237 3
		MLNA	ADD3,STARAD	12	02602	D 07217 06230 /
		MLNA	ADD4,STOPAD	12	02614	D 07222 06235 /
		MLCS	TWOS,BOLOM	12	02626	D 06334 06236 3
		B	CHSTT	7	02638	J 05443
		MLCS	FFF,YIUH-21	12	02645	D 07206 05402 3
		B	START	7	02657	J 03090
		H		1	02664	*
		ORG	3090			03090

W001 PRINTER TEST

CT ADDR INSTRUCTION

LABEL OPCOD OPERAND

* BEGIN TEST

START	MLCHA	KONLEN,X2	SET X2 TO 11	12	03090	D	07142	00034	X
	MLCHA	KONLEN	SET X1 TO 11	6	03102	D	07142		D
	MRCWG	PRIINS,101	MOVE PRIORITY SBR	12	03108	D	05287	00101	L
	CW	SW1G1,SW3E1	RESET PRIORITY SW S	11	03120	D	03420	03474	
	CW	LASTABE1,SW44G1		11	03131	D	03658	03460	
	BCE	TAGO,SYS1E8,	BR IF PRIOR.NOT AVAIL	12	03142	B	03241	01264	
	BCE	TAGO,TAD4,I	BR IF BYPASS PRIORITY	12	03154	B	03241	01004	I
	SW	SW1G1,SW3E1	TURN PRIORITY SW S ON	11	03166	,	03420	03474	
	SW	LASTABE1		6	03177	,	03658	G	
	BA1	*G1		7	03183	R	03190	M	
	B	PRT1		7	03190	J	01007		

DCW			SET PRIORITY SW. ON	20	03216				
DC			SELECT SW. TO PRINTER,G	22	03238				

H			STOP TO SET SWITCHES	1	03240	.			
TAGO	MLCS	ONES,UNITSV	SET UNIT TESTED	12	03241	D	06322	07194	3
	SW	9931	SET WM IN OUTPUT	6	03253	,	09931		
	B	RESTOR	GO TO SKIP TO 1	7	03259	J	04215		
	CS	9930	CLEAR	6	03266	/	09930		
	CS		RIPPLE	1	03272	/			
	CS	9731	PRINT	6	03273	/	09731		
	CS		AREA	1	03279	/			

MOVE	HLCA	ONES&X2,9800&X1	MOVE PATTERN TO RIPPLE AREA	12	03280	D	063K2	098t0	T
	C	FLOLEN,X1		11	03292	C	07147	00029	
	BE	*G19	BR IF MOVE 132 CHAR	7	03303	J	03328	S	
	A	KONSZ,X1	ADD 12 TO X1	11	03310	A	07152	00029	
	B	MOVE		7	03321	J	03280		
	S	X1	RESET X1 TO 0	6	03328	S	00029		
	A	KONLEN,X1	ADD 11 TO X1	11	03334	A	07142	00029	
	S	CNTER	RESET LINE COUNTER	6	03345	S	07192		
	BCE	BUF100,SIZE,1	BR IF 100 CHAR 1403	12	03351	B	04190	07199	I

TAG2	MLGWS	WMGM,9732	SET WMGM	12	03363	D	07212	09732	7
	MLCA	ADU1,X3		12	03375	D	07157	00039	T
	MRC	9800,9600	MOVE TABLE	12	03387	D	09800	09600	#

LABEL W001 PRINTER TEST
 OPCOD OPERAND

LABEL	OPCOD	OPERAND	CT	ADDRS	INSTRUCTION
SW1	BNG	ITR	7	03399	J 06240 Q
	S	ACCUM	6	03406	S 07189
	BAV	*E1	7	03412	J 03419 Z
	NOPWM		1	03419	N
	BEPA	*E1	7	03420	Y 03427 E
	W	9600	10	03427	M X20 09600 W
	NOPWM		1	03437	N
SW2	BOLI	OIPI	7	03438	J 04560 I
	BCBI	*-24	7	03445	R 03427 Z
	BAI	PERR	7	03452	R 04314 M
SW44	G	NOPWM	1	03459	N
	G	OLTST	7	03460	J 04598
	G	SW44E1	6	03467	* 03460
SW3	G	NOPWM	1	03473	N
	G	WAIT	7	03474	Y 05163 E
	BCE	TAG1,TAD1,1	12	03481	B 03399 01001 I
	C	CNTER,LICNT	11	03493	C 07192 07185
	BE	SW4	7	03504	J 03577 S
	SH	9731	6	03511	* 09731
	MRC	0EX3,9600	12	03517	D 000M0 09600 M
	SBR	RIP&10	7	03529	G 03557 B
	S	E1,X3	11	03536	S 07241 00039
RIP	MRC	9800,0	12	03547	D 09800 00000 M
	A	E1,CNTER	11	03559	A 07241 07192
	B	TAG1	7	03570	J 03399
SW4	NOPWM		1	03577	N
	B	ALPSTP	7	03578	J 03621
	C	X2,NUMCNT	11	03585	C 00034 07167
	BE	LASTAB	7	03596	J 03657 S
	A	KONSZ,X2	11	03603	A 07152 00034
	B	MOVE	7	03614	J 03280
ALPSTP	C	X2,ALPCNT	11	03621	C 00034 07172
	BE	LASTAB	7	03632	J 03657 S
	A	KONSZ,X2	11	03639	A 07152 00034
	B	MOVE	7	03650	J 03280

TO ALTER
 RESET ACCUM TO ZERO
 RESET OVFL0

PRINT
 BR IF SW2 IS ON

ENTER ALERT MODE-WAIT FOR BUPR
 BR IF IN LOOP
 SEE IF 24 LINES

ADD ONE TO LINE CNT
 PRINT NEXT LINE

CT ADDR INSTRUCTION

LABEL OPCODE OPERAND

 * ROUTINE TO PRINT WM BLEACHER PATTERNS

LASTAB NOPWM
 BXPA *C1
 MLNA ADD5,6 MOVE WM ROUTINE ADDR
 MLCWA LCNT,X1
 B RESTOR GO TO SKIP TO ONE
 CS 9731
 CS

SW 9732
 SBR *C19
 CW 9601
 SBR *C24
 SW 9731
 SBR *-7

MRW 9732,9600
 SBR *-8
 BCE *C13,SIZE*2
 MLCWS WMGM,9700

TAG11
 BNQ ITR
 WM 9600 PRINT WMS ---- IN
 BCBI *-16
 BAI PERR
 BCE TAG10,TAD1,1
 BW *C8,9665
 B TAG11
 CS 9731
 CS

TAG10
 CW 9666
 SBR *C19
 CW 9667
 SBR *C24
 SW 9665
 SBR *-7

TAG12
 SBR *C19
 CW 9666
 SBR *C19
 CW 9667
 SBR *C24
 SW 9665
 SBR *-7

1 03657 N
 7 03658 Y 03665 X
 12 03665 D 07240 00006 /
 12 03677 D 07182 00029 X
 7 03689 J 04215
 6 03696 / 09731
 1 03702 /
 6 03703 . 09732
 7 03709 G 03734 B
 6 03716 B 09601
 7 03722 G 03752 B
 6 03729 . 09731
 7 03735 G 03734 B
 12 03742 D 09732 09600 @
 7 03754 G 03752 B
 12 03761 B 03785 07199 2
 12 03773 D 07212 09700 7
 7 03785 J 06240 Q
 10 03792 M 321 09600 M
 7 03802 R 03792 2
 7 03809 R 04314 M
 12 03816 B 03785 01001 1
 12 03828 V 03847 09665 1
 7 03840 J 03729
 6 03847 / 09731
 1 03853 /
 6 03854 B 09666
 7 03860 G 03885 B
 6 03867 B 09667
 7 03873 G 03903 B
 6 03880 . 09665
 7 03886 G 03885 B

LABEL	OPCOD	OPERAND	CT	ADDRS	INSTRUCTION
	MRW	9665,9666	12	03893	D 09665 09666
	SBR	*-8	7	03905	G 03903 B
	BCE	*613,SIZE,2	12	03912	B 03936 07199 2
	MLCWS	WMGM,9700	12	03924	D 07212 09700 7
	BNQ	ITR	7	03936	J 06240 Q
TAG69	WM	9600	10	03943	M 321 09600 M
	BCB1	*-16	7	03953	R 03943 2
	BA1	PERR	7	03960	R 04314 M
	BW	*68,9731	12	03967	V 03986 09731 I
	B	TAG12	7	03979	J 03880
	S	ONES,X1	11	03986	S 06322 00029
	BCE	*68,X1,1	12	03997	B 04016 00029 I
	B	PGRET	7	04009	J 04164
	BCE	PGRET,SYS168,	12	04016	B 04164 01264
	BCE	WXY,SYS1612,	12	04028	B 04096 01268
	BCE	WXY,TAD4,1	12	04040	B 04096 01004 I
	BCE	WXY,CHN1616,	12	04052	B 04096 01305
AA1	A	ONES,CNTR	11	04064	A 06322 07211
	BZ	*68	7	04075	J 04089 V
	B	AA1	7	04082	J 04064
	BUPR1	*61	7	04089	Y 04096 U
	BCE	PGRET,SYS1613,	12	04096	B 04164 01269
WXY	BCE	PGRET,TAD4,1	12	04108	B 04164 01004 I
	BCE	PGRET,CHN2616,	12	04120	B 04164 01362
AA2	A	ONES,CNTR	11	04132	A 06322 07211
	BZ	*68	7	04143	J 04157 V
	B	AA2	7	04150	J 04132
	BUPR2	*61	7	04157	Y 04164 F
PGRET	BCE	0,X1,1	12	04164	B 00000 00029 I
	CS	9731	6	04176	/ 09731
	CS		1	04182	/
	B	LASTAB639	7	04183	J 03696

BR IF WM IN POSIT 132

PRIOR NOT AVAIL

CHAN 1 NOT AVAIL

NOT PRIORITY MODE

RESET I/O UNIT PRI REQ IND CH 1

CHAN 2 NOT AVAIL

NOT PRIORITY MODE

RESET I/O UNIT PRI REQ IND CH 2

BR IF 4 PAGES

CLEAR PRINT OUT AREA

GO TO DO NEXT PAGE

LABEL	OPCODE	OPERAND	CT	ADDRS	INSTRUCTION

* MISC ROUTINES					

BUF100	SM	9699	6	04190	0 09699
	MLCHS	WMGM,9700	12	04196	D 07212 09700 7
	B	TAG2	7	04208	J 03363
RESTOR	SBR	RRET65	7	04215	G 04250 B
	CC	1	2	04222	F 1
	BCB1	*-8	7	04224	R 04222 Z
	BA1	*E1	7	04231	R 04238 M
	BPCB	*-6	7	04238	J 04238 R
RRET	B	0	7	04245	J 00000
END	BCE	2000,TAD3,1	12	04252	B 02000 01003 1
	CC	1	2	04264	F 1
	BA1	*E1	7	04266	R 04273 M
	BCE	400,TAD0,1	12	04273	B 00400 01000 1
	B	PRT1	7	04285	J 01007
	DCW	2 W001 COMPLETE2,G	14	04305	
	B	400	7	04307	J 00400

RESTORE FORM

BR IF REPEAT TEST

BR IF BYPASS TYPEOUTS

LABEL OPCODE OPERAND CT ADDR INSTRUCTION

LABEL	OPCODE	OPERAND	CT	ADDR	INSTRUCTION

•	ERROR ROUTINE				

PERR	SBR	PERRET65	7	04314	G 04558 B
	BCE	PERHLT,IAD0,I	12	04321	B 04517 01000 I
	BNR1	*CB	7	04333	R 04347 I
	B	NNR	7	04340	J 04370
	B	PRT1	7	04347	J 01007
G	DCW	3 1403 NOT RDY 3,G	14	04367	
G	H		1	04369	.
NNR	BER1	*CB	7	04370	R 04384 4
	B	NER	7	04377	J 04421
	B	PRT1	7	04384	J 01007
NER	DCW	3 1411 TO 1414 DATA XFER ERROR3,G	29	04419	
	BEF1	*CB	7	04421	R 04435 8
	B	NEF	7	04428	J 04475
	B	PRT1	7	04435	J 01007
NEF	DCW	3 LAST 1403 LINE PRINTED IN ERROR3,G	32	04473	
	BWL1	*CB	7	04475	R 04489 -
	B	PERHLT	7	04482	J 04517
	B	PRT1	7	04489	J 01007
PERHLT	DCW	3 1403 WRONG LEN.REC.3,G	20	04515	
	BCE	*CB,IAD2,	12	04517	B 04530 01002
	H		1	04529	.
	CC	1	2	04530	F 1
	BCB1	*-B	7	04532	R 04530 2
	BA1	*B1	7	04539	R 04546 M
	BNQ	ITR	7	04546	J 06240 Q
PERRET	B	O	7	04553	J 00000

LABEL OPCOD OPERAND CT ADDR INSTRUCTION

* OVERLAP TEST ROUTINES

OIP1 SBR OIP1R65 7 04560 G 04596 B
 SW 100 6 04567 , 00100
 A ONES,ACCUM 11 04573 A 06322 07189
 BOL1 *-17 7 04584 J 04573 I
 B 0 7 04591 J 00000

OLTST SBR OLTSTR65 7 04598 G 04724 B
 BW YESOL,100 12 04605 V 04726 00100 I
 BCE OLTSTR,OLSW,0 12 04617 B 04719 07193 0
 MLCA SW2-1,*E42 12 04629 D 03436 04682 I
 BCE OLH1,TAD0,1 12 04641 B 04706 01000 I
 BA1 *E1 7 04653 R 04660 H
 B PRT1 7 04660 J 01007

FAILED TO BR. OVERLAP,G

OLH1 DCW @ 1403 38 04704
 BCE *E2,TAD2, 12 04706 B 04719 01002
 H
OLTSTR B 0 1 04718 .
 7 04719 J 00000

YESOL CW 100 6 04726 B 00100 TURN SW.OFF

 BCE OLENHG13,OLSW,1 12 04732 B 04810 07193 I
 BCE OLERH,TAD0,1 12 04744 B 04797 01000 I
 B PRT1 7 04756 J 01007

 DCW @ 1403 WAS OVERLAPED-SHOULD NOT BE,G

 BCE *E2,TAD2, 33 04795
 H
 BNQ ITR 12 04797 B 04810 01002
 C ACCUM,LOOPK 1 04809 .
 BL OLTSTR 7 04810 J 06240 Q
 BCE TIMERH,TAD0,1 11 04817 C 07189 07198
 B PRT1 7 04828 J 04719 T
 DCW @ OVERLAP COMPUTE TIME TOO SMALL,G
 BCE *E2,TAD2, 12 04835 B 04886 01000 I
 H 7 04847 J 01007

TIMERH DCW @ OVERLAP COMPUTE TIME TOO SMALL,G 31 04884
 BCE *E2,TAD2, 12 04886 B 04899 01002
 H 1 04898 .

LABEL	OPCODE	OPERAND	CT	ADDRS	INSTRUCTION
WAIT	SBR	WAITRES	7	05163	G 05213 B
	S	ACCUM	6	05170	S 07189
	BAY	*G1	7	05176	J 05183 Z
	A	ONES, ACCUM	11	05183	A 06322 07189
	BAY	NOITER	7	05194	J 05215 Z
	B	WAITG13	7	05201	J 05176
WAITR	B	O	7	05208	J 00000
NOITER	BCE	NITH, TAD0,1	12	05215	B 05260 01000 I
	B	PRT1	7	05227	J 01007
NITH	DCW	2 1403 FAILED TO INTERRUPT, G	25	05258	
	BCE	*G2, TAD2,	12	05260	B 05273 01002
	H		1	05272	.
	BNQ	ITR	7	05273	J 06240 Q
	B	WAITR	7	05280	J 05208
PRINS	SBR	PRHLD	7	05287	G 07177 B
	B	INTER	7	05294	J 04913
	DCM	2M2	1	05301	
PORET	BW	*G0, SWHCL	12	05302	V 05321 03420 I
	B	PITERC12	7	05314	J 05047
	B	SK44-7	7	05321	J 03452
		ER IF PRIORITY MODE			
		BR IF NOT			
		RETURN TO TEST STATUS INDICATORS			
TSTBSY	MV	220, 00001, Y	10	05328	M 120 00001 V
	BCB1	YIUR	7	05338	R 05359 Z
	BA1	PERC	7	05345	R 04314 M
	B	SW368	7	05352	J 03481
		PRINTER NOP			
		ERROR IF BRANCH			
		RETURN TO PRINT			
YIUR	BCE	YIUR, TAD0,1	12	05359	B 05423 01000 I
	B	PRT1	7	05371	J 01007
	DCW	2 1403 WAS BUSY WHEN YBIB03	25	05402	
	DC	2 INTERRUPT OCCURRED, G	19	05421	
YIUH	BCE	*G2, TAD2,	12	05423	B 05436 01002
	H		1	05435	.
	B	SW368	7	05436	J 03481
		BR IF BYPASS ERROR			
		BR IF BYPASS ERR HLT			
		RETURN TO PROGRAM			

CT ADDR INSTRUCTION

LABEL OPCOD OPERAND

 * CHANNEL ALTER ROUTINE

CHSTT	SBR	CHSTR&5	7	05443	G	05885	B
	BCE	*632,BOLOM,2	12	05450	B	05493	06236 2
	MLCA	ONES,INTER&6	12	05462	D	06322	04919 T
	MLCA	UUU,INTER&20	12	05474	D	07207	04933 T
	B	*625	7	05486	J	05517	
	MLCA	TWOS,INTER&6	12	05493	D	06334	04919 T
	MLCA	FFF,INTER&20	12	05505	D	07206	04933 T
	MLNA	STARAD,SCAN&10	12	05517	D	06230	05562 /

	SW	25	6	05529	.	00025	
	S	29	6	05535	S	00029	
	A	&1,29	11	05541	A	07241	00029

SCAN	SCNLB	9999,0	12	05552	D	09999	00000 -
	SBR	ADDHLD	7	05564	G	06225	B
	A	&1,ADDHLD	11	05571	A	07241	06225
	C	ADDHLD,STOPAD	11	05582	C	06225	06235
	BE	CHSTR	7	05593	J	05880	S
	MLNA	ADDHLD,*66	12	05600	D	06225	05617 /
	MLCS	0,*&12	12	05612	D	00000	05635 3
	BCE	CHINS,K1,M	12	05624	B	05691	06200 M

	BCE		1	05636	B		
	BCE	STINS	6	05637	B	05722	
	BCE		1	05643	B		
	BCE		1	05644	B		
	BCE		1	05645	B		
	BCE	OLINS	6	05646	B	05753	
	BCE	FORMS	6	05652	B	06116	
	BCE		1	05658	B		
	BCE		1	05659	B		
	BCE		1	05660	B		

CT ADDR INSTRUCTION

LABEL OFCOD OPERAND

LABEL	OFCOD	OPERAND	CT	ADDR	INSTRUCTION
UPDATE	S	CG,ADDHLD	11	05661	S 07241 06225
	MLNA	ADDHLD,SCANGLO	12	05672	D 06225 05962 /
	B	SCAN	7	05684	J 05552
CHINS	MLNA	ADDHLD,C11	12	05691	D 06225 05713 /
	MLCS	CHCODE,06X1	12	05703	D 06230 00010 3
	B	UPDATE	7	05715	J 05661
STINS	MLNA	ADDHLD,C11	12	05722	D 06225 05744 /
	MLCS	CHSTAT,0	12	05734	D 06237 00000 3
	B	UPDATE	7	05746	J 05661
OLINS	A	CG,ADDHLD	11	05753	A 07242 06225
	MLNA	ADDHLD,C6	12	05764	D 06225 05781 /
	MLCS	C,C12	12	05776	D 00000 05799 3
	BCE	OL,K2,1	12	05788	E 05849 06220 1
	BCE		1	05800	B
	BCE		1	05801	B
	BCE		1	05802	B
	BCE	BPC80	6	05803	B 05887
	BCE		1	05809	B
	BCE	BC80	6	05810	B 06109
	BCE		1	05816	B
	BCE	CH12	6	05817	B 05961
	BCE		1	05823	B
	BCE	CH9	6	05824	E 06035
	BCE		1	05830	B
REDUCE	S	CG,ADDHLD	11	05831	S 07242 06225
	B	UPDATE	7	05842	J 05661
OL	MLNA	ADDHLD,C11	12	05849	D 06225 05871 /
	MLCS	BCLGM,C	12	05861	D 06236 00000 3
	B	REDUCE	7	05873	J 05831
CHSTR	B	C	7	05880	J 00000
BPC80	BCE	C12,BCLGM,1	12	05887	D 05430 06236 2
	MLNA	ADDHLD,C11	12	05899	D 06225 05921 /
	MLCS	K2-4,C	12	05911	D 06216 00000 3
	B	REDUCE	7	05923	J 05831

LABEL	OPCODE	OPERAND	CT	ADDRS	INSTRUCTION
	MLNA	ADDHLD, *E11	12	05930	D 06225 05952 /
	MLCS	K2-5,0	12	05942	D 06215 00000 3
	B	REDUCE	7	05954	J 05831
CH12	BCE	*E32, BOLOM, 2	12	05961	B 06004 06236 2
	MLNA	ADDHLD, *E11	12	05973	D 06225 05995 /
	MLCS	K2-8,0	12	05985	D 06212 00000 3
	B	REDUCE	7	05997	J 05831
	MLNA	ADDHLD, *E11	12	06004	D 06225 06026 /
	MLCS	K2-9,0	12	06016	D 06211 00000 3
	B	REDUCE	7	06028	J 05831
CH9	BCE	*E32, BOLOM, 2	12	06035	B 06078 06236 2
	MLNA	ADDHLD, *E11	12	06047	D 06225 06069 /
	MLCS	K2-10,0	12	06059	D 06210 00000 3
	B	REDUCE	7	06071	J 05831
	MLNA	ADDHLD, *E11	12	06078	D 06225 06100 /
	MLCS	K2-11,0	12	06090	D 06209 00000 3
	B	REDUCE	7	06102	J 05831
BC80	B	REDUCE	7	06109	J 05831
FORMS	BCE	*E32, BOLOM, 2	12	06116	B 06159 06236 2
	MLNA	ADDHLD, *E11	12	06128	D 06225 06150 /
	MLCS	K1-7,0	12	06140	D 06193 00000 3
	B	REDUCE	7	06152	J 05831
	MLNA	ADDHLD, *E11	12	06159	D 06225 06181 /
	MLCS	K1-8,0	12	06171	D 06192 00000 3
	B	REDUCE	7	06183	J 05831
K1	DCW	2**2FJ13XRLM2	11	06200	
K2	DCW	2*****9028MLR43212	20	06220	
ADDHLD		00000	5	06225	
STARAD		00000	5	06230	
STOPAD		00000	5	06235	
BOLOM		1	1	06236	
CHSTAT		0	1	06237	
CHCODE		0	1	06238	
			1	06239	.

CT ADDRS INSTRUCTION

LABEL OFCODE OPERAND

PROGRAM ALTER ROUTINE

ITR	SR	ITREXTS	2
	DCH	ON	
ITR1	RCP	ITR2G4	
	BEXL	ITR1,M	
	BNTL	ITREXT	
	BAL	ITR2	
ITR2	RCFH	O	
	BEXL	ITR2,M	
	BAL	GLI	
ITREXT	B	O	
	H		

7	06240	G	06319	B
12	06258			
10	06259	M	X10	06294 R
7	06269	R	06259	M
7	06276	R	06314	B
7	06283	R	06290	M
10	06290	L	X10	00000 R
7	06300	R	06290	M
7	06307	R	06314	M
7	06314	J	00000	
1	06321			

CT ADDRS INSTRUCTION

LABEL OPCOD OPERAND

 * TABLE OF PRINTER OUTPUT DATA

ONES	DCB	011111 11111	0	12	06322
TWOS		022222 22222	0	12	06334
THREES		033333 33333	0	12	06346
FOURS		044444 44444	0	12	06358
FIVES		055555 55555	0	12	06370
SIXES		066666 66666	0	12	06382
SEVENS		077777 77777	0	12	06394
EIGHTS		088888 88888	0	12	06406
NINES		099999 99999	0	12	06418
		098989898989	0	12	06441
		087878787878	0	12	06453
		076767676767	0	12	06465
		065656565656	0	12	06477
		054545454545	0	12	06489
		043434343434	0	12	06501
		032323232323	0	12	06513
		021212121212	0	12	06525
		010101010101	0	12	06537
		0.. ..	0	12	06549
		0*** \$\$\$\$	0	12	06561
		00000 00000	0	12	06573
		00000 00000	0	12	06585
		077777 88888	0	12	06597
		0.....	0	12	06609
		0\$\$\$\$ 00000	0	12	06621
		0- - - - -	0	12	06633
		0*****	0	12	06645
		0-..012000	0	12	06657
		0\$\$\$\$ 31111	0	12	06669
	DCB	0.....	0	12	06681
		055555 66666	0	12	06693
		00000 00000	0	12	06705
		0\$\$\$\$\$\$\$\$	0	12	06717

INSTRUCTION

CT	ADDRS	INSTRUCTION
12	06729	2000000000 2
12	06741	2----- 2
12	06753	266666 77777 2
12	06765	2\$\$\$\$\$ 2
12	06777	266666 ----- 2
12	06789	201234567899 2
12	06801	212342350899 2
12	06813	29..56 \$...5 2
12	06825	233333 44444 2
12	06837	200000 2
12	06849	2350..55588 2
12	06861	211111 22222 2
12	06862	211111 \$\$\$ 2
12	06885	2RRRRR 2
12	06897	2ZZZZ 2
12	06909	2GGGGG QQQQ 2
12	06921	2PPPPP YYYYY 2
12	06933	2XXXXX HHHH 2
12	06945	2FFFFF PPPP 2
12	06957	2WWWW GGGG 2
12	06969	2CCCCC CCCC 2
12	06981	2LLLLL UUUU 2
12	06993	2TTTTT ODDD 2
12	07005	2AAAAA KKKK 2
12	07017	2EEEE SSSS 2
12	07029	2VYVYV FFFF 2
12	07041	2MMMM JJJJ 2
12	07053	28888 NNNN 2
12	07065	211111 2
12	07077	2RRRRR ----- 2
12	07089	2ZZZZ KKKK 2
12	07101	27777 OOOO 2
12	07113	29..56 \$...5 2
12	07125	200000 2
12	07137	2 LAST TABLE 2

ALPHAT

OCK

CT ADDR INSTRUCTION

LABEL OPCOD OPERAND

• PROGRAM CONSTANTS

KONLEN	DCW	00011	5	07142
FLDLEN		00131	5	07147
KONSZ		00012	5	07152
ADD1		09931	5	07157
ADD2		09800	5	07162
NUMCNT		00539	5	07167
ALPCNT		00815	5	07172
PRIHLD		00000	5	07177
LCNT		00005	5	07182
LICNT		023	3	07185
ACCUM		0000	4	07189
CNTR		000	3	07192
OLSH		0	1	07193
UNITSV		0	1	07194
LOOPK		0004	4	07198
SIZE		2	1	07199
LLL		212	1	07200
LOZ		222	1	07201
PER		232	1	07202
COM		222	1	07203
ASTER		222	1	07204
RRR		222	1	07205
FFF		222	1	07206
UUU	DCW	222	1	07207
CNTR	DCW	200002	4	07211
WMGM	DCW	222	1	07212

NUMBER OF LINES PER PATTERN

CT ADDR INSTRUCTION

5 07217 05443
 5 07222 03363
 1 07223
 1 07224
 1 07225
 1 07226
 1 07227
 7 07228
 5 07240 03657

LABEL OPCOD OPERAND

ADD3 DCW CHSTT
 ADD4 TAG2
 XXX AX2
 DOLL AS2
 QUES Q
 POUND AM2
 EXCLA AN2
 BRANCH AJ02000 a.g
 ADD5 LASTAB ADDR OF WM ROUTINE

PST

END 2000
 C1
 C6

J02000

1 07241
 1 07242

END OF ASSEMBLY

SUMMARY

TITLE

W001 - 1403 Printer Test

PURPOSE

To test the operation of the 1403 Printer and associated circuits while printing special ripple pattern in "overlap" and/or "priority" modes if the machine has these features available.

LOADING PROCEDURES

Refer to Loading Procedures.

SYSTEM AND CHANNEL CONTROL CARDS

This program must have the system and channel configuration punched correctly. (See instructions in 1410/7010 INTRODUCTION).

TADS

DO NOT ENTER ANY TADS FOR NORMAL OPERATION. NORMALLY SET OFF (1).

STANDARD TADS

<u>TAD</u>	<u>Location</u>			
TAD 0	01000	OFF	1	Typeout
		ON	1	Bypass typeouts
TAD 1	01001	OFF	1	Proceed to next routine
		ON	1	Repeat the routine
TAD 2	01002	OFF	1	Bypass error halts
		ON	1	Halt on error
TAD 3	01003	OFF	1	One pass of program
		ON	1	Repeat memory

SPECIAL TADS

TAD 4	01004	OFF	1	Test w/priority
		ON	1	Bypass priority
TAD 5	01005	OFF	1	Test w/overlap
		ON	1	Bypass overlap

