

8CU35C

7080 MANUAL INTERRUPT TEST

May 15, 1962

7080 MANUAL INTERRUPT TEST

NOTE: Release version 8CU35B completely supersedes release version 8CU35A.

Unit Tested: All circuitry peculiar to the logic and control of manual interrupts 251, 252, and 253.

A. PURPOSE OF TEST

8CU35 tests the functioning of the console (manual) interrupt keys. The two conditions tested are: Interrupting to the proper interrupt program and setting up of the proper interrupt machine status.

B. METHOD OF TEST

1. After the program is auto loaded into memory, the normal housekeeping type-out and halt occur. To continue with the program, the console operator then depresses "start".
2. The next type-out (and halt) instructs the operator to depress a certain console (manual) interrupt key and then to depress "start".
3. Depressing the "start" key should cause the program to execute an interrupt to a certain interrupt program and to set up a pre-determined interrupt program machine status. The interrupt program tests this machine status, and indicates any incorrect status by a short type-out of the routine-number, during which the error occurred.
4. If an interrupt is made to an interrupt program other than the correct one, then two error type-outs will occur:
 - a. First, a long type-out will indicate the interrupt program to which the incorrect interrupt was made.
 - b. Second, a short routine-number type-out will indicate the routine in which the incorrect interrupt occurred.

(This incorrect interrupt might be due to the operator depressing the wrong console interrupt key, or, possibly, due to an error in the wiring of the console interrupt keys.) If no interrupt occurs, then only the short routine-number error type-out will result.

5. The entire program consists of seven routines:

- a. Routines 251-A and 251-B Test Interrupt 251
- b. Routines 252-A and 252-B Test Interrupt 252
- c. Routines 253-A and 253-B Test Interrupt 253
- d. Routine 123 Tests for any undesirable interaction among the interrupt circuits when the three console interrupt keys are depressed simultaneously.

An internal priority processing system will give recognition priority to interrupts 251, 252, and 253, in that order, whenever two or more of the interrupts are selected simultaneously.

Those routines designated "A" differ from their corresponding routines designated "B", only with respect to their interrupt status-bit settings. ("7080 Mode" is the only status bit that remains in the same state in both routines.) By testing two different combinations of interrupt status-bit settings, routines "A" and "B" provide sufficient diagnostic coverage of the manual interrupt status-setting feature.

C. AREA OF MACHINE REQUIRED

1. Units

7153 Console
7302 Memory
7102 CPU
7305 Storage and I/O Control

2. Memory Locations

0000 - 03308 Test Routines
18200-18800 Reserved for loading Program

D. LOADING PROCEDURE

1. For card input, use load program 8LD01A with cards in the following order:

8LD01A	-	2 Cards
8CU35	-	42 Cards
8TR02A	-	1 Card
3 Blank Cards	-	

2. For tape input, use a tape file generated by 8TR06. See 8TR06 write-up for proper usage.

E. PROGRAM CONTROL**1. Alteration Switches**

911 ON - Bypass Error type-outs and error halts
 912 ON - Loop-in routines
 913 ON - Halt on error, if 911 off
 914 ON - Loop-in program, and type-out "Z" on each pass
 915, 916 - None

2. Check Switches - All on program**3. Other Switches**

705 I/II Switch - Off
 Non-Stop Switch - Off
 40K Switch - Off
 I/O Interpret - Off

4. Manual Control

If the operator depresses the wrong interrupt key, and notices his error before he depresses "start", he should depress "channel reset" and then depress the correct interrupt key. He is then ready to depress "start" to continue with the program.

F. NORMAL STOPS

Halt	00000	Occurs after type-out "ALL CHECK SWITCHES ON, PROGRAM--NON STOP OFF;" changed to a No Op, after the first pass of the program.
Halt	00001	Occur after type-out "*Y* PUSH MAN INT 25X -- START."
	00003	
	00005	
	00007	
	00009	
	00011	
	00122	

G. ERROR HALTS

Halt	00002	Occur after error type-outs, if 913 on and 911 off.
	00004	To continue, depress the console start key.
	00006	
	00008	
	00010	
	00012	
	00123	

H. PRINTED RESULTS

1. Normal Type-Outs

- a. **"*Y* PUSH MAN INTO 25X - START"**
This instructs the operator to depress the console interrupt key 25X, and then to depress the start key; to avoid problems, wait until machine stops before depressing the console interrupt key. ("Y" represents either "A" or "B", to indicate which routine the operator is in.)
- b. **"Z"**

Indicates a complete run of the program; only occurs when 914 on.
- c. **"ALL CHECK SWITCHES ON PROGRAM--NON STOP OFF."**

Initial Housekeeping instruction to operator.

2. Error Type-Outs

- a. **"25X - A"** Short type-out of routine number,
"25X - B" in which error occurred.
"123"
- b. **"IMPROPERLY SELECTED 25X"**

This long type-out precedes the short type-out, to indicate that an incorrect interrupt was made to interrupt 25X.

BKWD TR LOCATION OPN ASU ADDRESS

FWD TR

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MANUAL INTERRUPT DIAGNOSTIC

CHANNEL RESET TO TURN OFF
ALL INTERRUPT CALL TRIGGERS
ENTER 7080 MODE
ENTER INTERRUPT MODE

T/O ALL CHECK SWITCHES ON PROG

CHANGE HALT 0000 TO NOP
LOAD ERROR HOUSEKEEPING INTO
INTERRUPT WORDS 251 252 253

```

000004 CHR 3 13 0000 06 0
000009 CHR 3 13 0000 06 0
000014 EEM 3 14 0000 06-0
000019 EIM , 06 0000 0 -0
000024 SEL 2 0500
000029 WR R 2796
000034 HLT J 0000
000039 SBN % 13 0030 0&T0
000044 SPC , 2510
000049 SET B 0024
000054 LOD 8 2864

```

NEXT PAGE

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[illegible]

```

LEAVE INTERRUPT PROGRAM
  TURN-OFF
    FORCED-ON
      CHECK INDICATORS
        IF 912 ON, LOOP-IN ROUTINE

```


DATA FOR ABOVE ROUTINE

2	004	00308
3		00312
2	023	00335
2	003	00338
2	001	00339
2	005	00344
2	001	00345

0099 0099

2F66

A PUSH MAN INT 251-ST

ART

□

251 A

□

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TEST 251 B

```
00504 CHR 3 13 0000 06 0
00509 SPC , 2510
00514 SET B 0008
00519 LOD 8 0762
```

SET INTERRUPT PROGRAM LOCATION
AND INTERRUPT PROGRAM STATUS
IN INTERRUPT WORD 251

```
00524 SEL 2 0500
00529 WR R 0763
00534 HLT J 0003
00539 TR 1 0679
```

T/O PUSH MAN INT 251--START
MAN INT TRANSFER INCORRECT

```
00544 TRP M 01 0554 05V4-
00549 TR 1 0679-
00554 TRP M 0679-
00559 TRZ N 0679-
00564 TRZ N 01 0574 05X4-
00569 TR 1 0679-
00574 NOP A 0002.....
00579 NOP A 000S
00584 LDA # 01 0579 05X9
00589 ULA * 01 0574 05X4
00594 RCV U 0574
00599 TZB . 05 0679 0WX9-
00604 TRH K 0624-
00609 TRE L 0619-
00614 TR 1 0679-
00619 TR 1 0679-
00624 TOC O 14 0634 0FL4-
00629 TR 1 0679-
00634 TSC O 15 0679 0FG9-
00639 TRA I 0679-
00644 TIC O 10 0654 0ON4-
00649 TR 1 0679-
00654 TMC O 11 0679 0OG9-
00659 TRC O 12 0679 0F79-
00664 TEC O 13 0674 0FX4-
00669 TR 1 0679-
00674 TR 1 0709-
```

ASU SIGN NOT PLUS
ACC SIGN NOT MINUS
ACC ZERO NOT OFF

ASU ZERO NOT ON

7080 MODE NOT ON

LOW COMPARISON NOT OFF
HIGH COMPARISON NOT ON

OVERFLOW CHECK NOT ON
SIGN CHECK NOT OFF
TRANSFER ANY NOT OFF

INSTRUCTION CHECK NOT ON
MACHINE CHECK NOT OFF
READ-WRITE CHECK NOT OFF

RECORD CHECK NOT ON
MACHINE STATUS CORRECT

```
B14.....00679 TAA I 01 0709 07 9-
00684 SEL 2 0500
00689 WR R 0790
00694 TAC I 03 0704 0764-
00699 TR 1 0709-
00704 HLT J 0004.....
00709 NOP A 0000.....
```

TEST 251-B ERROR SECTION

T/O 251 B

```
00714 SPC , 2510
00719 SET B 0008
00724 LOD 8 2864
```

RELOAD ERROR HOUSEKEEPING
INTO INT WORD 251

```
00729 LIP , 15 3700 3G80
00734 TIC O 10 0739 0PL9-
00739 TEC O 13 0744 0GU4-
00744 TOC O 14 0749 0GM9-
00749 TAB I 02 0504 05-4-
00754 TR 1 1004
```

LEAVE INTERRUPT PROGRAM
TURN-OFF
FORCED-ON
CHECK INDICATORS
IF 912 ON, LOOP-IN ROUTINE

DATA FOR ABOVE ROUTINE

2 004 00758
3 000 00762
2 023 00785
2 003 00788
2 001 00789
2 005 00794
2 001 00795

0544 0544

1AAA

B PUSH MAN INT 251-ST

ART

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251 B

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TEST 252 A

```
01004 CHR 3 13 0000 0& 0
01009 SPC , 2520
01014 SET B 0008
01019 LOD 8 1257
```

```
01024 SEL 2 0500
01029 WR R 1258
01034 HLT J 0005
01039 TR 1 1174
```

```
01044 TRP M 01 1174 11X4-
01049 TRP M 1059-
01054 TR 1 1174-
01059 TRZ N 01 1174 11X4-
01064 TRZ N 1074-
01069 TR 1 1174-
01074 NOP A 0002.....
01079 NOP A 000S'
01084 LDA # 01 1079 10X9
01089 ULA * 01 1074 10X4
01094 RCV U 1074
01099 TZB . 05 1174 1/X4-
01104 TRH K 1174-
01109 TRE L 1174-
01114 TOC O 14 1174 1AP4-
01119 TSC O 15 1129 1AB9-
01124 TR 1 1174-
01129 TRA I 1139.....
01134 TR 1 1174-
01139 TIC O 10 1174 1JP4-
01144 TEC O 13 1174 1AX4-
01149 TMC O 11 1159 1JE9-
01154 TR 1 1174-
01159 TRC O 12 1169 1A69-
01164 TR 1 1174-
01169 TR 1 1204.....
```

C14.....

```
01174 TAA I 01 1204 12 4-
01179 SEL 2 0500
01184 WR R 1285
01189 TAC I 03 1199 1119-
01194 TR 1 1204-
01199 HLT J 0006.....
01204 NOP A 0000.....
```

```
01209 SPC , 2520
01214 SET B 0008
01219 LOD 8 2856
```

```
01224 LIP , 15 3700 3G&0
01229 TMC O 11 1234 1KC4-
01234 TRC O 12 1239 1B39-
01239 TSC O 15 1244 1BD4-
01244 TAB I 02 1004 10-4-
01249 TR 1 1504
```

SET INTERRUPT PROGRAM LOCATION
AND INTERRUPT PROGRAM STATUS
IN INTERRUPT WORD 252

T/O PUSH MAN INT 252--START
MAN INT TRANSFER INCORRECT

ASU SIGN NOT MINUS

ACC SIGN NOT PLUS
ASU ZERO NOT OFF

ACC ZERO NOT ON

7080 MODE NOT ON
HIGH COMPARISON NOT OFF
LOW COMPARISON NOT ON
OVERFLOW CHECK NOT OFF

SIGN CHECK NOT ON

TRANSFER ANY NOT ON
INSTRUCTION CHECK NOT OFF
RECORD CHECK NOT OFF

MACHINE CHECK NOT ON

READ-WRITE CHECK NOT ON
STATUS CORRECT

TEST 252-A ERROR SECTION

T/O 252 A

RELOAD ERROR HOUSEKEEPING
INTO INT WORD 252LEAVE INTERRUPT PROGRAM
TURN-OFF
FORCED-ON
CHECK INDICATORS
IF 912 ON, LOOP-IN ROUTINE

DATA FOR ABOVE ROUTINE

2	004	01253
3		01257
2	023	01280
2	003	01283
2	001	01284
2	005	01289
2	001	01290

1044 1044

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A PUSH MAN INT 252-ST

ART

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252 A

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TEST 252 B

```

01504 CHR 3 13 0000 06 0
01509 SPC , 2520
01514 SET B 0008
01519 LOD 8 1762

```

SET INTERRUPT PROGRAM LOCATION
AND INTERRUPT PROGRAM STATUS
IN INTERRUPT WORD 252

```

01524 SEL 2 0500
01529 WR R 1763
01534 HLT J 0007
01539 TR 1 1679

```

T/O PUSH MAN INT 252--START
MAN INT TRANSFER INCORRECT

```

01544 TRP M 01 1554 15V4-
01549 TR 1 1679-
01554 TRP M 1679-
01559 TRZ N 1679-
01564 TRZ N 01 1574 15X4-
01569 TR 1 1679-
01574 NOP A 0002.....
01579 NOP A 000S
01584 LDA # 01 1579 15X9
01589 ULA * 01 1574 15X4
01594 RCV U 1574
01599 TZB . 05 1679 1WX9-
01604 TRH K 1624-
01609 TRE L 1619-
01614 TR 1 1679-
01619 TR 1 1679-
01624 TOC O 14 1634 1FL4-
01629 TR 1 1679-
01634 TSC O 15 1679 1FG9-
01639 TRA I 1679-
01644 TIC O 10 1654 1ON4-
01649 TR 1 1679-
01654 TMC O 11 1679 1OG9-
01659 TRC O 12 1679 1F79-
01664 TEC O 13 1674 1FX4-
01669 TR 1 1679-
01674 TR 1 1709-

```

ASU SIGN NOT PLUS
ACC SIGN NOT MINUS
ACC ZERO NOT OFF
ASU ZERO NOT ON

7080 MODE NOT ON

LOW COMPARISON NOT OFF
HIGH COMPARISON NOT ON

OVERFLOW CHECK NOT ON
SIGN CHECK NOT OFF
TRANSFER ANY NOT OFF

INSTRUCTION CHECK NOT ON
MACHINE CHECK NOT OFF
READ-WRITE CHECK NOT OFF

RECORD CHECK NOT ON
MACHINE STATUS CORRECT

```

D14.....01679 TAA I 01 1709 17 9-
01684 SEL 2 0500
01689 WR R 1790
01694 TAC I 03 1704 1764-
01699 TR 1 1709-
01704 HLT J 0008.....
01709 NOP A 0000.....

```

TEST 252-B ERROR SECTION
T/O 252 B

```

01714 SPC , 2520
01719 SET B 0008
01724 LOD 8 2856

```

RELOAD ERROR HOUSEKEEPING
INTO INT WORD 252

```

01729 LIP , 15 3700 3G60
01734 TIC O 10 1739 1PL9-
01739 TEC O 13 1744 1GU4-
01744 TOC O 14 1749 1GM9-
01749 TAB I 02 1504 15-4-
01754 TR 1 2004

```

LEAVE INTERRUPT PROGRAM
TURN-OFF
FORCED-ON
CHECK INDICATORS
IF 912 ON, LOOP-IN ROUTINE

DATA FOR ABOVE ROUTINE

2 004 01758
2 023 01762
2 003 01785
2 001 01788
2 005 01789
2 001 01794
2 001 01795

1544 1544

1AAA

B PUSH MAN INT 252-ST

ART

252 B

DATA FOR ABOVE ROUTINE

2	004	02253
3		02257
2	023	02280
2	003	02283
2	001	02284
2	005	02289
2	001	02290

2044 2044

2F66

A PUSH MAN INT 253-ST

ART

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253 A

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TEST 253 B

```
02504 CHR 3 13 0000 06 0
02509 SPC , 2530
02514 SET B 0008
02519 LOD 8 2762
```

```
02524 SEL 2 0500
02529 WR R 2763
02534 HLT J 0011
02539 TR 1 2679
```

```
02544 TRP M 01 2554 25V4
02549 TR 1 2679
02554 TRP M 2679
02559 TRZ N 2679
02564 TRZ N 01 2574 25X4
02569 TR 1 2679
02574 NOP A 0002
02579 NOP A 000S
02584 LDA # 01 2579 25X9
02589 ULA * 01 2574 25X4
02594 RCV U 2574
02599 TZB . 05 2679 2WX9
02604 TRH K 2624
02609 TRE L 2619
02614 TR 1 2679
02619 TR 1 2679
02624 TOC O 14 2634 2FL4
02629 TR 1 2679
02634 TSC O 15 2679 2FG9
02639 TRA I 2679
02644 TIC O 10 2654 2ON4
02649 TR 1 2679
02654 TMC O 11 2679 2OG9
02659 TRC O 12 2679 2F79
02664 TEC O 13 2674 2FX4
02669 TR 1 2679
02674 TR 1 2709
```

F14.....

```
02679 TAA I 01 2709 27 9
02684 SEL 2 0500
02689 WR R 2790
02694 TAC I 03 2704 2764
02699 TR 1 2709
02704 HLT J 0012
02709 NOP A 0000
```

```
02714 SPC , 2530
02719 SET B 0008
02724 LOD 8 2848
```

```
02729 LIP , 15 3700 3G&0
02734 TIC O 10 2739 2PL9
02739 TEC O 13 2744 2GU4
02744 TOC O 14 2749 2GM9
02749 TAB I 02 2504 25-4
02754 TR 1 3094
```

SET INTERRUPT PROGRAM LOCATION
AND INTERRUPT PROGRAM STATUS
IN INTERRUPT WORD 253

T/O PUSH MAN INT 253--START
MAN INT TRANSFER INCORRECT

ASU SIGN NOT PLUS
ACC SIGN NOT MINUS
ACC ZERO NOT OFF

ASU ZERO NOT ON

7080 MODE NOT ON

LOW COMPARISON NOT OFF
HIGH COMPARISON NOT ON

OVERFLOW CHECK NOT ON
SIGN CHECK NOT OFF
TRANSFER ANY NOT OFF

INSTRUCTION CHECK NOT ON
MACHINE CHECK NOT OFF
READ-WRITE CHECK NOT OFF

RECORD CHECK NOT ON
MACHINE STATUS CORRECT

TEST 253-B ERROR SECTION

T/O 253 B

RELOAD ERROR HOUSEKEEPING
INTO INT WORD 253

LEAVE INTERRUPT PROGRAM
TURN-OFF
FORCED-ON
CHECK INDICATORS
IF 912 ON, LOOP-IN ROUTINE

G15

GENERAL DATA AND WORKING AREA

2 004 02758
 3 023 02762
 2 023 02785
 2 003 02788
 2 001 02789
 2 005 02794
 2 001 02795
 2 044 02839
 2 001 02840
 2 004 02844
 3 004 02848
 2 004 02852
 3 004 02856
 2 004 02860
 3 004 02864
 2 023 02887
 2 001 02888
 2 023 02911
 2 001 02912
 2 023 02935
 2 001 02936
 5 005 02944 00

2544 2544

2999 2999

2974 2974

2949 2949

1AAA

B PUSH MAN INT 253-ST

ART

□

253 B

□

ALL CHECK SWITCHES ON PROGRAM---NON STOP OFF

□

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2F66

2F66

251 IMPROPERLY SELECTED

□

252 IMPROPERLY SELECTED

□

253 IMPROPERLY SELECTED

□

CASU 15 CONTENTS WORKING AREA

T-0 251 IMPROPER SEL

T-O 252 IMPROP SEL

T-O 253 IMPROP SEL

253-A ERROR ROUTINE
253-B ERROR ROUTINE

G12.....

```

03094 SPC , 2510
03099 SET B 0024
03104 LOD 8 3403
03109 CHR 3 13 0000 0& 0
03114 LIP , 15 3700 3G&0
03119 RCV U 01 3448
03124 BLM $ 01 0003 00 3
03129 SEL 2 R 0500
03134 WR R 3404
03139 HLT J 0122
03144 NOP A 0000
03149 TR 1 3314-----
03154 SPC , 0000
03159 SET B 0001
03164 LOD 8 3444
03169 UNL 7 3448
03174 LIP , 15 3700 3G&0
03179 NOP A 0000
03184 TR 1 3314-----
03189 SPC , 0000
03194 LOD 8 3444
03199 CMP 4 3448
03204 TRE L 3214-----
03209 TR 1 3224-----
03214 LOD 8 3445.....
03219 UNL 7 3449
03224 LIP , 15 3700 3G&0.....
03229 NOP A 0000
03234 TR 1 3314-----
03239 SPC , 0000
03244 SET B 0002
03249 LOD 8 3445
03254 CMP 4 3449
03259 TRE L 3269-----
03264 TR 1 3284-----
03269 SET B 0001.....
03274 LOD 8 3446
03279 UNL 7 3450
03284 LIP , 15 3700 3G&0.....
03289 SPC , 0000
03294 SET B 0003
03299 LOD 8 3446
03304 CMP 4 3450
03309 TRE L 3344-----
03314 TAA I 01 3344 33U4.....
03319 SEL 2 0500
03324 WR R 3438
03329 TAC I 03 3339 33C9-----
03334 TR 1 3344-----
03339 HLT J 0123.....
03344 TAB I 02 3094 30R4.....
03349 TAD I 04 3369 3T69-----
03354 LIM , 07 0000 0 &0
03359 LEM 3 15 0000 0&&0
03364 TR 1 18219 Y219
03369 SEL 2 0500.....
03374 WR R 3442
03379 TR 1 0004

```

ROUTINE 123

TESTS FOR
ANY INTERACTION
AMONG INTERRUPT
CALL TRIGGERS

AND
TESTS PRIORITY
PROCESSING OF
INTERRUPT CALLS

TEST 123 ERROR SECTION

IF 914 ON, T/O Z AND
RE-RUN PROGRAM

DATA FOR THE ABOVE ROUTINE

2 004 03383
3 004 03387
2 004 03391
3 004 03395
2 004 03399
3 004 03403
2 033 03436
2 001 03437
2 003 03440
2 001 03441
2 001 03442
2 004 03446
2 004 03450

3239 3239 -6--
3189 3189 -6--
3154 3154 -6--

PUSH MAN INT 251, 252, 253--START
□
123
□
Z
□ABC