

DECLASSIFIED  
 Authority 13526  
 By L.S. HAWA, Date 12-18

	Act	Info
1	JVC	
2		
3	WVJ	
31 Return to address 302 JB		

1 August 1960

MPRO-104 HARVEST BULLETIN NO. 3

SUBJECT: HARVEST INTERRUPT IDENTIFICATION ROUTINE

An elementary STRETCH routine has been written to aid the programmer in debugging initial programs by informing him which interrupts occur, giving the approximate location, and performing some simple action to aid in taking care of each interrupt. The actions performed are limited to stopping, repeating the interrupted instruction, or continuing with the next instruction; therefore, it should be emphasized that this is not an interrupt fixup routine. At present the Interrupt Identification routine must be assembled manually into the problem program, which introduces the possibility of duplicated symbols. Thought is being given to incorporating it in the initial macro generator system.

The Interrupt Identification Routine takes up about 400 words of memory and uses the value field of \$X10. It consists of the following parts:

1. A card to be placed at the beginning of the problem program to set up the Interrupt Address register and enable the interrupt mechanism. The programmer must set on the mask register bits for any interrupt he wishes to recognize beyond the 1st twenty.

2. A primary interrupt table, consisting of SIC and BD for each valid interrupt for indicators 0 thru 47.

3. A secondary interrupt table, which prints the name of the interrupt which occurred, branches to the interrupt location counter and channel address print out sub-routines, and then either stops or returns to the problem program. The programmer is at liberty to make changes in the secondary interrupt routine to tailor it to his own requirements for each interrupt.

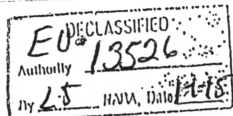


Table A summarizes the action normally taken. The most doubtful of these actions is the one taken for the End Exception indicator, which occurs after reading an end of file mark on tape (among other causes). The secondary interrupt table entry for this interrupt prints out the IC and CA and then branches to a location named "END", which must be supplied by the programmer.

4. The interrupt location counter and channel address printout routines, which publish on the printer the address which is one full word less than the contents of the IC at the time of interrupt and also the symbolic notation for the contents of the channel address register for the I/O interrupts (Table B). This may not be the exact address or channel on which the interrupt occurred.

5. Control words, index words, DD's, DR's, and synonym cards used by the Interrupt Identification Routine.

This routine has been used by several programmers on the Simulator and seems to work alright, but some changes doubtless will be needed to adapt it to STRETCH. These modifications will be distributed as they are made.

FRANKLIN B. MALLORY  
MPRO-104

DECLASSIFIED  
 E.O. 13526  
 Authority  
 Date 1-18-15

#	INDICATOR NAME	MNEMONIC	ACTION TAKEN			INFO PRINTED*	
			STOP	GO TO IC	GO TO IC-1	IC-1	CA
0	Machine Check	MK	X			X	
1	Instruction Check	IK	X			X	
2	Instruction Reject	IJ	X			X	
3	Exchange Control Ck	EK	X			X	X
4	Time Signal	TS		X		X	
5	CPU Signal	CPU	X			X	
6	Exchange Check Reject	EKJ	X			X	X
7	Unit Not Ready Reject	UNR			X	X	X
8	Channel Busy	CBJ			X	X	X
9	Exchange Program Ck	EPG	X			X	X
10	Unit Check	UK	X			X	X
11	End Exception	EE	Go to "END"			X	X
12	End of Operation	EOP		X		X	X
13	Channel Signal	CS		X		X	X
14	Undefined	--	X				
15	Operation Code Invalid	OP	X			X	
16	Address Invalid	AD	X			X	
17	Unended Seq. of Addr.	USA	X			X	
18	Execute Exception	EXE	X			X	
19	Data Store	DS	X			X	
20	Data Fetch	DF		X		X	
21	Instruction Fetch	IF		X		X	
22	Lost Carry	LC		X		X	
23	Partial Field	PF		X		X	
24	Zero Divisor	ZD		X		X	
25	Imaginary Root	IR		X		X	
26	Lost Significance	LS		X		X	
27	Prep. Shift Gr. than 48	PSH		X		X	
28	Exponent Flag Positive	XPPF		X		X	
29	Exponent Overflow	XPO		X		X	
30	Exponent High	XPH		X		X	
31	Exponent Low	XPL		X		X	
32	Exponent Underflow	XPU		X		X	
33	Exponent Flag Negative	XPFN		X		X	
34	Remainder Underflow	RU		X		X	
35	Data Flag T	TF		X		X	
36	Data Flag U	UF		X		X	
37	Data Flag V	VF		X		X	
38	Index Flag	XF		X		X	
39	Binary Transit	BTR		X		X	
40	Decimal Transit	DTR		X		X	
41	Program Indicator 0	PG0		X		X	
42	" " 1	PG1		X		X	
43	" " 2	PG2		X		X	
44	" " 3	PG3		X		X	
45	" " 4	PG4		X		X	
46	" " 5	PG5		X		X	
47	" " 6	PG6		X		X	

Table A

\* In addition to Indicator Name

DECLASSIFIED  
 E.O. 13526  
 Authority  
 By L.S. NAWA, Date 11-18

<u>SYMBOL</u>	<u>NAME</u>	<u>ADDRESS</u>
CN	CONSOLE	19.32
DK	DISK	0.00
PR	PRINTER	18.32
PU	CARD PUNCH	19.0
RD	CARD READER	18.0
T1	TAPE 1 (4&5)	16.0
T2	TAPE 2 (6&7)	16.32
T3	TAPE 3	17.0

Table B