

Problem

A 729 tape file contains single, variable length records, Each variable length record consists of a constant portion which heads the record and is 15 words long, followed by the variable portion. It is desired to write on another 729 tape the constant portion of each record for which a 6-bit field starting at bit 36 of the 4th word, is equal to 31.

General Outline of Program

Records from the input file will be read 4 at a time and only the constant portions of the records will be entered into memory. Initially 4 records from the input file will be read. When these are in memory, another *Read will be triggered into an alternate area and computing will proceed on the set of records that are already in memory. Writing will take place directly from the compute area. When the computing is completed and both reading and writing is finished, the meanings of the two areas are switched and the cycle is repeated (to*). The solution will concern itself with End of Operation and End Exception interruptions only.

	<u>area 1</u>	<u>area 2</u>
initial cycle	RD	
cycle 1	C+WR	RD
cycle 2	RD	C+WR
cycle 3	C+WR	RD
cycle 4	RD	C+WR
cycle 5	C+WR	RD
⋮	⋮	⋮

Memory Assignment

Interrupt Table	400.00 - 440.00
Programmed Bit Indicators	50.00
	50.01
	50.02
Control Words	60.00 - 68.00
Input File area 1	100.00 - 159.00
Input File area 2	160.00 - 219.00
Instructions	300.00 - 345.00
ERASABLE	51.00 Exchange CW
	52.00 Saved indicator register
Input File	Unit 1 of Channel 0
Output File	Unit 1 of Channel 1

Interrupt Table: Interruption Address set = 400.00

	<u>Location</u>	<u>Instruction</u>
	400.00	-----
	⋮	
	⋮	
EE	411.00	SICI 334.32, BD 326.32
EOP	412.00	SICI 324.32, BD 319.32
	⋮	
	⋮	
	440.00	-----

Control Words

	<u>Location</u>	<u>DWA</u>	<u>CNT</u>	<u>RFA</u>	<u>MLT</u>	<u>CH</u>
Input	60.00	100	15	61	1	1
	61.00	115	15	62	1	1
	62.00	130	15	63	1	1
	63.00	145	15	60	1	0
	64.00	160	15	65	1	1
	65.00	175	15	66	1	1
	66.00	190	15	67	1	1
	67.00	205	15	60	1	0
Output	68.00	[]	15	0	0	0

SWAP (curved arrow pointing from CH=1 to CH=0)

Programmed Bit Indicators

- 50.00 0: Channel 0 is Free
 1: Channel 0 is Busy
- 50.01 0: Channel 1 is Free
 1: Channel 1 is Busy
- 50.02 0: Final Routine is entered for first time.
 1: Final Routine is entered for second time.

Instructions: Assume programmed bit indicators set to zero, system enabled, and interrupt address set = 400.00

	<u>Location</u>	<u>Operation</u>	<u>Statement</u>	<u>Comments</u>
INITIALIZE	300.00	LX	X2, 60.00	initialize index register 2
		LOC (EOS)	CH1, UN 1	Locate channel 1 to Unit 1
		LOC	CH0, UN 1	Locate channel 0 to Unit 1
		W	303.00	Set and Wait
	303.00	RD	CH0, 60.00	Initial Read
	W	304.32	Set and Wait	
MAIN LOOP	304.32	SWAP I	1, 60.00, 64.00	SWAP control words 60.00 and 64.00
		BB1	50.00, 306.32	Indicate channel 0 busy
	306.32	RD	CH0, 60.00	
	307.32	L (BU 6, 0)	3.36 (X2)	Compare field in record
		KI (BU, 6, 0)	31	to 31
		BAE	314.32	if equal, go to WRITE
	310.00	R	X2	Refill index register 2
		BXF	307.32	go to 307.32 if index flag = 1
	311.00	BD	311.32	Disable interrupt mechanism
	311.32	BB	50.00, 314.00	Test if channel 0 busy
		BB	50.01, 314.00	Test if channel 1 busy
313.32	BE	[304.32]	Branch Enable if neither busy	
314.00	W	311.00	Set and Wait	
WRITE	314.32	BD	315.00	Disable interrupt mechanism
	315.00	BZB	50.01, 316.32	Test if channel 1 busy
		W	314.32	Yes
	316.32	SV	X2, 68.00	No
		BB1	50.01, 318.00	indicate channel 1 busy
	318.00	WR	CH1, 68.00	Write output record
	BE	310.00	Return	
EOP	319.32	THI	2, 11.00, 52.00	Save indicator register
	320.32	LV	X3, 5.00	load X3 with channel address
	321.00	B	305.32 (X3)	
	321.32	B	322.32	Channel 0, addr 32
	322.00	B	325.00	Channel 1, addr 33
	322.32	BBZ	50.00, 322.00	Indicate channel 0 is free
	323.32	THI	2, 52.00, 11.00	Restore indicator register
	324.32	BE	[]	return

	<u>Location</u>	<u>Operation</u>	<u>Statement</u>	<u>Comments</u>
	325.00	BBZ	50.01.324.00	Indicate Channel 1 Free
	326.00	B	323.32	
EE	326.32	THI	2,11.00,52.00	Save indicator register
	327.32	LV	X3, 5.00	
	328.00	B	312.32 (X3)	
	328.32	B	329.32	Channel 0, addr 32
	329.00	B	ERROR	Channel 1, addr 33
	329.32	CCW	CH0,51.00	Copy Exchange Control Word
		BBZ	50.00,331.32	Indicate channel 0 free
	331.32	LVI	X3, 335.0	Change exit addr } From main routine)
		SAD	X3, 313,32	
		BBZ	50.02,333,32	Indicate first entry to final routine
	333.32	THI	2,52.00,11.00	Restore indicator register
	334.32	BE	[]	Return
FINAL ROUTINE	335.00	BZBI	50.02,336.32	Final Routine
	336.00	B	END OF JOB	Go to Write tape mark & rewind tap
	336.32	LV	X3, 0	
	337.00	L(BU,18,0)	51.00, 46	Load exchange CW with offset 46
		-I(BU,4,0)	15, 46	Subtract 15 (Immediate)
		K(BU,18,0)	60.00, 46	Compare to value of CW 60.00
	340.00	BAL	END OF JOB	
		BAE	343.32	
		-I(BU,7,0)	100, 46	Subtract 100 (Immediate)
		/I(BU,4,0)	15, 46	Divide by 15 (Immediate)
	343.00	LV	X3, 9.00	load x3 from Right Acc
	343.32	CM 0000(BU,0)	60.25 (X3)	Set chain flag to zero
	344.32	LX	X2 60.00	
	345.00	B	307.32	Return to complete computation

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