

NORMAL k DESIGNATOR

k	READ		STORE		REPLACE			JUMP	
	MN.	Origin	MN.	Dest.	MN.	Origin	Dest.	MN.	Jump to Modulo 218
0	'blank'	sy + Bb	QR	Q	'not used'	--	--	'blank'	sy + Bb
1	L	Y _L	L	Y _L	L	Y _L	Y _L	L	Y _L
2	U	Y _U	U	Y _U	U	Y _U	Y _U	U	Y _U
3	W	Y	W	Y	W	Y	Y	W	Y
4	RX	X[Y] + Bb	AS	A	'not used'	--	--	RX	Ys + Bb
5	LX	XY _L	CP	Y' → Y _L	LX	XY _L	Y _L	LX	XY _L
6	UX	XY _U	CP	Y' → Y _U	UX	XY _U	Y _U	UX	XY _U
7	AR	A	CP	Y' → Y	'not used'	--	--	AR	(A)

Y = (Ys + Bb)

Ys = Selected SR (4-0) or P (17-13)

concatenated with y (12-0)

sy = s (14-13) concatenated with y (12-0)

W = Whole word

L = Lower half

U = Upper half

Y = Sign extension

CP = Complement

MN = Mnemonic

SPECIAL j DESIGNATOR

j	C f04	M f22 k ≠ 7	D f23 k ≠ 7	LLP f40	RLP f44	AQ f26	ANQ f27
0	: No Skip	0: No Skip	No Skip	0: No Skip	0: No Skip	0: No Skip	
1	SK: Skip	SK: Skip	Skip	SK: Skip	SK: Skip	SK: Skip	
2	YLEQ: Y ≤ (Q)	NOVF: Q2g = A2g No Over flow	EVEN: Even Parity	AP: A Positive			
3	YGTQ: Y > (Q)	OVF: Q2g ≠ A2g Over flow	ODD: Odd Parity	AN: A Negative			
4	YIN: (A) < Y ≤ (Q)	AZ: A = ±Zero A = ±Zero	AZ: A + Zero	QZ: Q + Zero			
5	YOUT: Y > (Q) or Y ≤ (A)	ANZ: A ≠ ±Zero A ≠ ±Zero	ANZ: A Not + Zero	QNZ: Q Not + Zero			
6	YLEA: Y ≤ (A)	6: Skip	Skip	AP: A Positive	QP: Q Positive		
7	YGA: Y > (A)	7: No Skip	No Skip	AN: A Negative	QN: Q Negative		

The IOP interprets the 's' designator for the following instructions:

For all Format I read instructions 01-13, 20-23, 26-31, 40, 43, 50-52, 71 when k ≠ 0, 4, 7.

For all Format I store instructions 14-16, when k ≠ 0, 4.

For all replace instructions 24, 26, 34-37, 44, 54-56 when k ≠ 0, 4, 7.

For instructions 17, 62, 63, 67, 74-76 with all k values.

For instructions 7705, 7726, 7727.

For instructions 7742, 7745, 7760, 7770 when k ≠ 0, 7.

For jump instructions, 60, 61, 65, 72, 73 when k ≠ 0, 7.

NORMAL b DESIGNATOR

b	MEMONIC	DESCRIPTION
0	'blank'	No Mod
1	B1	B1
2	B2	B2
3	B3	B3
4	B4	B4
5	B5	B5
6	B6	B6
7	B7	B7

NORMAL j DESIGNATOR

j	MEMONIC	DESCRIPTION
0	'blank'	No Skip
1	SK	Skip
2	QP	Skip if Q Positive
3	QN	Skip if Q Negative
4	AZ	Skip if A + Zero
5	ANZ	Skip if A Not + Zero
6	AP	Skip if A Positive
7	AN	Skip if A Negative

ADDRESS EXTENSION(s) DESIGNATOR

s	MEMONIC	DESCRIPTION
00	S0	SR0
01	S1	SR1
10	S2	SR2
11	S3	SR3

or 'blank' Bit 17-13 of P

SPECIAL d,e,c DESIGNATOR

DES	MEMONIC	DESCRIPTION
d	ND	Normal Device Interrupts
e	EIS	External Interrupt & Status Words
c	CI	Channel Interrupts (Class V)



UNIVAC IOP

CHAIN INSTRUCTIONS

BINARY FUNCTION CODE	SYMBOLIC CODE SEQUENCE(S)	DESCRIPTION
00	BCW n,y	Buffer Control Word, n=number of words to be transferred
010 j=0,k=0	EFW y,I	External Function: Whole Word, I=1 for Indirect
010 j=1,k=0	FEFW y,I	Force External Function: Whole Word, I=1 for Indirect
010 j=0,k=1	EFH y,I	External Function: Half Word, I=1 for Indirect
010 j=1,k=1	FEFH y,I	Force External Function: Half Word, I=1 for Indirect
011	I0STOP,m	1/0 Stop, m=1 for Monitor Interrupt
100	I0CL y	1/0 Clear Flag: 0 → (y2g, 2g)
101	I0J,m,k	1/0 Jump, m=1 for Monitor Interrupt, k=1 insert channel number in y3-0
110	I0SET y	1/0 Set Flag: 1 → (y2g, 2g)
111	I0NOP	1/0 No Operation

CHAIN INSTRUCTION FORMAT

29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	0	n-1														y													
0	1	0	k	j	I	y																							
f	3-7	m	k	not used														y											

INTERRUPTS

INTERRUPT BY PRIORITY ①	INDIVIDUAL CLASS INTERRUPTS	RELATIVE INTERRUPT ENTRANCE ADDRESS (BINARY) ②
Power Class I (highest)	Power Tolerance Error	1 00X XX0 010
Hardware Class II (first come - first served priority)	Memory Address Parity Error	1 011 000 000
	Memory Resume Error	
	Memory Data Parity Error	
	High Priority Device Interrupt (a memory resume interrupt occurs if this address is non-existent)	100 001 00X XX1 001
Program Class III	Program Fault Monitor Clock	1 011 000 001 1 00X XXI 010
Normal Communication Class IV	Normal Device Interrupt	1 00X XXI 001
Class V	1/0 Channel Interrupt	0 XXX CCC C11

NOTES: ① If AUTO START switch is selected and power applied, processor starts at address 1 00X XX0 001.
② XXX implies 3 bit device number placed in address, thus completing relative address. CCCC represents channel number.

