

Microcode

\PH* PH ^ currInt<<2
 \PL* PL ^ currInt<<2

test Din == 011xxxxx
 math Din != x11xxxxx
 jump Din == 111x11xx
 imm Din == 111xxxxx & !jump
 k Din == xxx1xxxx
 zs Din == xxxx11xx
 zd Din == xxxxxx11
 jop Din[4,1:0]
 aluOp Imm ? Din[4:2] : Din[7:5]
 cond Din[3:0]
 \fetch TZ?fetcha:timer

\decodeSkip \decode

test	fetch	test	
Math & zs & zf	skip2	useK?\$zpa,mathzzb:\$zpa,mathzz	note:
Math & !zs & zd	skip1	useK?\$zpa,kmathrz:\$zpa,mathrz	
Math & zs & !zd	skip1	\$zpa,mathzr	
Math & !zs & !zd	fetch	mathrr	
Imm & zd	skip2	mathiz	
Imm & !zd	skip1	mathir	
Jump & jop == 0	skip2	jump	
Jump & jop == 1	skip2	call	
Jump & jop == 2	fetch	fetch	
Jump & jop == 3	fetch	return	
Jump & jop == 4	skip1	\$zpa,jumpz	
Jump & jop == 5	skip1	callz	
Jump & jop == 6	fetch	fetch	
Jump & jop == 7	skip1	\$zpa,table	

\memz svZInd?mem:(svZReg?(svZIO?(1,reg[0]):B):mem)
 \mA SvAluOp[2]?00:SvAluOp[1:0]
 \mL SvAluOp[2]?svAluOp[1:0]:11
 \mCin !svAluOp[2]&svAluOp[0]
 \S {00,svS}
 \D {00,svD}
 \kD prevK ? 0011 : {00,svD}
 \kD2 useK ? 0011 : {00,svD}

label	aAd	bAd	wAd	wReg	dIn	rMem	dOut	wMem	aSel	bSel	logSel	Cin
reset	x	x	PL		1 ?		0 ?		0	0 B	^	0
resetb	x	x	PH		1 ?		0 ?		0	0 B	^	0
resetc	x	x	TL		1 ?		0 ?		0	0 B	^	0
resetd	x	x	TH		1 ?		0 ?		0	0 B	^	0
timer	x	TL	TL		1 ?		0 ?		0	-2 B	B	1

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timerb	x	TH	TH	1 ?	0 ?	0	-2 B	B	1
timerc	x	TL	TL	1 ?	0 ?	0	-2 B	B	0
fetcha	PH*	PL*	PL*	1 ?	1 ?	0	0 B	B	1
fetchb	x	PH*	PH*	1 Inst	0 ?	0	0 B	B	1
fetchc	x	x	x	0 Inst	0 ?	0 x	x	x	x
skipf	PH*	PL*	PL*	1 ?	1 ?	0	0 B	B	1
skipfb	x	PH*	PH*	1 Inst	0 ?	0	0 B	B	1
skipfc	x	x	x	0 Inst	0 ?	0 x	x	x	x
skip2	x	PL*	PL*	1 ?	0 ?	0	0 B	B	1
skip2b	x	PH*	PH*	1 ?	0 ?	0	0 B	B	1
skip1	x	PL*	PL*	1 ?	0 ?	0	0 B	B	1
skip1b	x	PH*	PH*	1 ?	0 ?	0	0 B	B	1
test	x	x	K	1 ?	0 ?	0	0 B	^	tr
mathrr	S	kD	kD2	1 ?	0 ?	0 mA	B	mL	mCir
call	x	PL*	LL	1 ?	0 ?	0	0 B	B	0
callb	x	PH*	LH	1 ?	0 ?	0	0 B	B	0
jump	PH*	PL*	PL*	1 ?	1 ?	0	0 B	B	1
jumpb	x	x	ML	1 PCL	0 ?	0	0 mem	B	0
jumpc	x	x	ML	1 PCL	0 ?	0	0 mem	B	0
jumpd	x	PH*	PH*	1 ?	0 ?	0	0 B	B	1
jumpe	PH*	PL*	x	0 ?	1 ?	0 x	x	x	x
jumpf	x	x	PH*	1 PCH	0 ?	0	0 mem	B	0
jumpg	x	ML	PL*	1 ?	0 ?	0	0 B	B	0
return	x	LL	PL*	1 ?	0 ?	0	0 B	B	0
returnb	x	LH	PH*	1 ?	0 ?	0	0 B	B	0
mathir	PH*	PL*	PL*	1 ?	1 ?	0	0 B	B	1
mathirb	kD	x	D	1 #	0 ?	0 mA	mem	mL	mCir
mathirc	kD	x	D	1 #	0 ?	0 mA	mem	mL	mCir
mathird	x	PH*	PH*	1 ?	0 ?	0	0 B	B	1
zpa	PH*	PL*	PL*	1 ?	1 ?	0	0 B	B	1
zpab	x	x	ZL	1 zpa	0 ?	0	0 mem	B	0
zpac	x	x	ZL	1 zpa	0 ?	0	0 mem	B	0
zpad	x	PH*	PH*	1 ?	0 ?	0	0 B	B	1
zpaе	ZH	ZL	x	0 ?	1 ?	0 x	x	x	x
zpaф	ZH	ZL	x	0 ?	1 ?	0 x	x	x	x
zpag	x	x	ML	1 lowp	0 ?	0	0 mem	B	0
zpah	ZH	ZL	x	0 ?	1 ?	0 x	x	x	x
zpai	x	x	MH	1 highp	0 ?	0	0 mem	B	0
zpai	x	ML	x	0 ?	0 ?	0	0 B	B	1
zpak	ZH	ZL	x	0 ?	0 ML+1	1 x	x	x	x
zpal	ZH	ZL	x	0 ?	0 ML+1	1 x	x	x	x
zpaм	x	MH	x	0 ?	0 ?	0	0 B	B	1
zpan	ZH	ZL	x	0 ?	0 MH+1	1 x	x	x	x
zpaо	MH	ML	x	0 ?	1 ?	0 x	x	x	x

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mathiz	PH*	PL*	PL*	1 ?	1 ?	0	0 B	B	1
mathizb	x	reg	K	1 #	0 ?	0	0 memz	B	0
mathizc	x	reg	K	1 #	0 ?	0	0 memz	B	0
mathizd	K	reg	K	1 #	0 ?	0 mA	memz	mL	mCir
mathize	K	reg	K	1 #	0 ?	0 mA	memz	mL	mCir
mathizf	x	PH*	PH*	1 ?	0 ?	0	0 B	B	1
mathizg	x	PH*	PH*	1 ?	0 ?	0	0 B	B	1
mathizo	K	reg	K	1 value	0 ?	0 mA	memz	mL	mCir
mathizp	x	K	x	0 ?	0 ?	0	0 B	B	0
mathizq	MH	ML	x	0 ?	0 K	1 x	x	x	x
mathizr	x	K	reg	1 ?	0 K	0	0 B	B	0
mathizs	x	K	reg	0 ?	0 K	0	0 B	B	0
callz	x	PL*	LL	1 ?	0 ?	0	0 B	B	0
callzb	x	PH*	LH	1 ?	0 ?	0	0 B	B	0
jumpz	x	ML	PL*	1 ?	0 ?	0	0 B	B	0
jumpzb	x	MH	PH*	1 ?	0 ?	0	0 B	B	0
table	LL	reg	ML	1 ?	0 ?	0	0 memz	B	0
tableb	x	LH	MH	1 ?	0 ?	0	0 B	B	1
tablec	x	LH	MH	1 ?	0 ?	0	0 B	B	0
tabled	MH	ML	ML	1 ?	1 ?	0	0 B	B	1
tablee	x	x	PL	1 newPL	0 ?	0	0 mem	B	0
tablef	x	x	PL	1 newPL	0 ?	0	0 mem	B	0
tableg	MH	ML	x	0 ?	1 ?	0 x	x	x	x
tableh	x	MH	MH	1 ?	0 ?	0	0 B	B	1
tablei	x	x	PH	1 newPL	0 ?	0	0 mem	B	0
mathzr	kD	reg	kD2	1 value	0 ?	0 mA	memz	mL	mCir
mathrz	S	reg	K	1 value	0 ?	0 mA	memz	mL	mCir
mathrzb	MH	ML	x	0 ?	0 K	1 x	x	x	x
mathrzc	x	K	reg	1 ?	0 K	0	0 B	B	0
mathrzd	x	K	reg	0 ?	0 K	0	0 B	B	0
kmathrz	S	K	K	1 ?	0 ?	0 mA	B	mL	mCir
mathzz	x	reg	K	1 value	0 ?	0	0 memz	B	0
mathzzb	K	x	K	1 value	0 ?	0 mA	memz	mL	mCir
mathzzc	MH	ML	x	0 ?	0 K	1 x	x	x	x
mathzzd	x	K	reg	1 ?	0 K	0	0 B	B	0
mathzze	x	K	reg	0 ?	0 K	0	0 B	B	0

15: PH	PH*	PH*	PH*
14: PL	?	PL*	PL*
13: MH	MH	MH	MH
12: ML	?	ML	ML
11: iH	?	?	?
10: iL	?	?	?
9: LH	?	LH	LH

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8:	LL	LL	LL	LL
7:	ZH	ZH	?	?
6:	ZL	?	ZL	ZL
5:	TH	?	TH	TH
4:	TL	?	TL	TL
3:	K	K	K	K
2:	Y	?	?	kD2
1:	X	kD	kD	D
0:	W	S	reg	reg

aSel	bSel	logSel	Cin
x	x	x	tr
mA	memz	^	mCir
	-2 mem	mL	1
	0 B	B	0

Microcode

: useK will become prevK at the end of this clock cycle

sA7	sA0	A0	wIR	wFL	next
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x	x	x	0	0 resetb	PH,PL = 0
x	x	x	0	0 resetc	
x	x	x	0	0 resetd	TH,TL = 0
x	x	x	0	0 fetch	

x	x	x	0	0 Z?(TZ?fetcha:timerb):timer	TL -= 1
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x	x	x	0	0 timerc	TH -= 1
x	x	x	0	0 timer	TL -= 2
	0	0 x	0	0 C?fetchb:fetchc	
x	x	x	1	0 decode	
x	x	x	1	0 decode	
	0	0 x	0	0 C?skipfb:skipfc	
x	x	x	0	0 decodeSkip	
x	x	x	0	0 decodeSkip	
x	x	x	0	0 C?skip2b:skip1	
x	x	x	0	0 skip1	
x	x	x	0	0 C?skip1b:fetch	
x	x	x	0	0 fetch	
x	x	x	0	0 useK tr?fetch:skipf	
x	x	x	0	1 fetch	
x	x	x	0	0 callb	
x	x	x	0	0 jump	
	0	0 x	0	0 C?jumpb:jumpc	
x	x	x	0	0 jumpd	
x	x	x	0	0 jumpe	
x	x	x	0	0 jumpe	
	0	0 x	0	0 jumpf	
x	x	x	0	0 jumpg	
x	x	x	0	0 fetch	
x	x	x	0	0 returnb	
x	x	x	0	0 fetch	
	0	0 x	0	0 C?mathirb:mathirc	
x	x	x	0	1 mathird	
x	x	x	0	1 fetch	
x	x	x	0	0 fetch	
	0	0 x	0	0 C?zpab:zpac	
x	x	x	0	0 zpad	
x	x	x	0	0 svlnd?zpf:zpe	
x	x	x	0	0 svlnd?zpf:zpe	
	0	0 x	0	0 rtn	
	1	1 0	0	0 zpag	
x	x	x	0	0 zpah	
	1	1 1	0	0 zpai	
x	x	x	0	0 svlnc?zpj:zpao	
x	x	x	0	0 C?zpak:zpal	
	1	1 0	0	0 zpam	
	1	1 0	0	0 zpao	
x	x	x	0	0 zpan	
	1	1 1	0	0 zpao	
x	x	x	0	0 rtn	

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0	0 x	0	0 prevK?(C?mathizd:mathize):(C?mathizb:mathizc)
0	0 x	0	0 \$zpa,mathizo
0	0 x	0	0 mathizf
x	x	x	0 1 \$zpa,mathizp
x	x	x	0 1 mathizg
x	x	x	0 0 \$zpa,mathizo
x	x	x	0 0 \$zpa,mathizp
x	x	x	0 1 mathizp
x	x	x	0 0 svZReg?(svZIO?mathizs:mathizr):mathizq
x	x	x	0 0 fetch
x	x	x	0 0 fetch
x	x	x	0 0 fetch
x	x	x	0 0 callzb
x	x	x	0 0 \$zpa,jumpz
x	x	x	0 0 jumpzb
x	x	x	0 0 fetch
x	x	x	0 0 C?tableb:tablec
x	x	x	0 0 tabled
x	x	x	0 0 tabled
x	x	x	0 0 C?tablee:tablef
x	x	x	0 0 tableg
x	x	x	0 0 tableh
x	x	x	0 0 tablei
x	x	x	0 0 tableg
x	x	x	0 0 fetch
x	x	x	0 1 fetch
x	x	x	0 1 svZReg?(svZIO?mathrzd:mathrzc):mathrzb
x	x	x	0 0 fetch
x	x	x	0 0 fetch
x	x	x	0 0 fetch
x	x	x	0 1 svZReg?(svZIO?mathrzd:mathrzc):mathrzb
x	x	x	0 0 \$zpa,mathzzb
x	x	x	0 1 svZReg?(svZIO?mathzze:mathzzd):mathzzc
x	x	x	0 0 fetch
x	x	x	0 0 fetch
x	x	x	0 0 fetch

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0	0	E3300000	3811573760 reset	K	3 K	3 PL	14	1
1	1	F3300000	4080009216 resetb	K	3 K	3 PH	15	1
2	2	43300000	1127219200 resetc	K	3 K	3 TL	4	1
3	3	53300000	1395654656 resetd	K	3 K	3 TH	5	1
4	4	#N/A	#N/A	###	###	#N/A		
5	5	44300000	1143996416 timer	K	3 TL	4 TL	4	1
6	6	55300000	1429209088 timerb	K	3 TH	5 TH	5	1
7	7	44300000	1143996416 timerc	K	3 TL	4 TL	4	1
8	8	#N/A	#N/A	###	###	#N/A		
9	9	EEF00000	4008706048 fetcha	PH*	15 PL*	14 PL*	14	1
10	A	FF300000	4281335808 fetchb	K	3 PH*	15 PH*	15	1
11	B	33300000	858783744 fetchc	K	3 K	3 K	3	0
12	C	#N/A	#N/A	###	###	#N/A		
13	D	EEF00000	4008706048 skipf	PH*	15 PL*	14 PL*	14	1
14	E	FF300000	4281335808 skipfb	K	3 PH*	15 PH*	15	1
15	F	33300000	858783744 skipfc	K	3 K	3 K	3	0
16	10	EE300000	3996123136 skip2	K	3 PL*	14 PL*	14	1
17	11	FF300000	4281335808 skip2b	K	3 PH*	15 PH*	15	1
18	12	EE300000	3996123136 skip1	K	3 PL*	14 PL*	14	1
19	13	FF300000	4281335808 skip1b	K	3 PH*	15 PH*	15	1
20	14	#N/A	#N/A	###	###	#N/A		
21	15	33300000	858783744 test	K	3 K	3 K	3	1
22	16	#N/A	#N/A	###	###	#N/A		
23	17	21000000	553648128 mathrr	S	0 kD	1 kD2	2	1
24	18	#N/A	#N/A	###	###	#N/A		
25	19	8E300000	2385510400 call	K	3 PL*	14 LL	8	1
26	1A	9F300000	2670723072 callb	K	3 PH*	15 LH	9	1
27	1B	EEF00000	4008706048 jump	PH*	15 PL*	14 PL*	14	1
28	1C	C3300000	3274702848 jumpb	K	3 K	3 ML	12	1
29	1D	C3300000	3274702848 jumpc	K	3 K	3 ML	12	1
30	1E	FF300000	4281335808 jumpd	K	3 PH*	15 PH*	15	1
31	1F	3EF00000	1055916032 jumpe	PH*	15 PL*	14 K	3	0
32	20	F3300000	4080009216 jumpf	K	3 K	3 PH*	15	1
33	21	EC300000	3962568704 jumpg	K	3 ML	12 PL*	14	1
34	22	#N/A	#N/A	###	###	#N/A		
35	23	E8300000	3895459840 return	K	3 LL	8 PL*	14	1
36	24	F9300000	4180672512 returnb	K	3 LH	9 PH*	15	1
37	25	#N/A	#N/A	###	###	#N/A		
38	26	EEF00000	4008706048 mathir	PH*	15 PL*	14 PL*	14	1
39	27	13100000	319815680 mathirb	kD	1 K	3 D	1	1
40	28	13100000	319815680 mathirc	kD	1 K	3 D	1	1
41	29	FF300000	4281335808 mathird	K	3 PH*	15 PH*	15	1
42	2A	#N/A	#N/A	###	###	#N/A		
43	2B	EEF00000	4008706048 zpa	PH*	15 PL*	14 PL*	14	1
44	2C	63300000	1664090112 zpab	K	3 K	3 ZL	6	1
45	2D	63300000	1664090112 zpac	K	3 K	3 ZL	6	1
46	2E	FF300000	4281335808 zpad	K	3 PH*	15 PH*	15	1
47	2F	36700000	913309696 zpae	ZH	7 ZL	6 K	3	0
48	30	36700000	913309696 zpaf	ZH	7 ZL	6 K	3	0
49	31	C3300000	3274702848 zpag	K	3 K	3 ML	12	1
50	32	36700000	913309696 zpah	ZH	7 ZL	6 K	3	0
51	33	D3300000	3543138304 zpai	K	3 K	3 MH	13	1
52	34	3C300000	1009778688 zpaj	K	3 ML	12 K	3	0

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53	35	36700000	913309696	zpak	ZH	7 ZL	6 K	3	0
54	36	36700000	913309696	zpal	ZH	7 ZL	6 K	3	0
55	37	3D300000	1026555904	zpam	K	3 MH	13 K	3	0
56	38	36700000	913309696	zpan	ZH	7 ZL	6 K	3	0
57	39	3CD00000	1020264448	zpao	MH	13 ML	12 K	3	0
58	3A	#N/A	#N/A		###	###	#N/A		
59	3B	EEF00000	4008706048	mathiz	PH*	15 PL*	14 PL*	14	1
60	3C	30300000	808452096	mathizb	K	3 reg	0 K	3	1
61	3D	30300000	808452096	mathizc	K	3 reg	0 K	3	1
62	3E	30300000	808452096	mathizd	K	3 reg	0 K	3	1
63	3F	30300000	808452096	mathize	K	3 reg	0 K	3	1
64	40	FF300000	4281335808	mathizf	K	3 PH*	15 PH*	15	1
65	41	FF300000	4281335808	mathizg	K	3 PH*	15 PH*	15	1
66	42	30300000	808452096	mathizo	K	3 reg	0 K	3	1
67	43	33300000	858783744	mathizp	K	3 K	3 K	3	0
68	44	3CD00000	1020264448	mathizq	MH	13 ML	12 K	3	0
69	45	3300000	53477376	mathizr	K	3 K	3 reg	0	1
70	46	3300000	53477376	mathizs	K	3 K	3 reg	0	0
71	47	#N/A	#N/A		###	###	#N/A		
72	48	8E300000	2385510400	callz	K	3 PL*	14 LL	8	1
73	49	9F300000	2670723072	callzb	K	3 PH*	15 LH	9	1
74	4A	EC300000	3962568704	jumpz	K	3 ML	12 PL*	14	1
75	4B	FD300000	4247781376	jumpzb	K	3 MH	13 PH*	15	1
76	4C	#N/A	#N/A		###	###	#N/A		
77	4D	C0800000	3229614080	table	LL	8 reg	0 ML	12	1
78	4E	D9300000	3643801600	tableb	K	3 LH	9 MH	13	1
79	4F	D9300000	3643801600	tablec	K	3 LH	9 MH	13	1
80	50	CCD00000	3436183552	tabled	MH	13 ML	12 ML	12	1
81	51	E3300000	3811573760	tablee	K	3 K	3 PL	14	1
82	52	E3300000	3811573760	tablef	K	3 K	3 PL	14	1
83	53	3CD00000	1020264448	tableg	MH	13 ML	12 K	3	0
84	54	DD300000	3710910464	tableh	K	3 MH	13 MH	13	1
85	55	F3300000	4080009216	tablei	K	3 K	3 PH	15	1
86	56	#N/A	#N/A		###	###	#N/A		
87	57	20100000	537919488	mathzr	kD	1 reg	0 kD2	2	1
88	58	#N/A	#N/A		###	###	#N/A		
89	59	30000000	805306368	mathrz	S	0 reg	0 K	3	1
90	5A	3CD00000	1020264448	mathrzb	MH	13 ML	12 K	3	0
91	5B	3300000	53477376	mathrzc	K	3 K	3 reg	0	1
92	5C	3300000	53477376	mathrzd	K	3 K	3 reg	0	0
93	5D	33000000	855638016	kmathrz	S	0 K	3 K	3	1
94	5E	#N/A	#N/A		###	###	#N/A		
95	5F	30300000	808452096	mathzz	K	3 reg	0 K	3	1
96	60	33300000	858783744	mathzzb	K	3 K	3 K	3	1
97	61	3CD00000	1020264448	mathzzc	MH	13 ML	12 K	3	0
98	62	3300000	53477376	mathzzd	K	3 K	3 reg	0	1
99	63	3300000	53477376	mathzze	K	3 K	3 reg	0	0
100	64	#N/A	#N/A		###	###	#N/A		
101	65	#N/A	#N/A		###	###	#N/A		
102	66	#N/A	#N/A		###	###	#N/A		
103	67	#N/A	#N/A		###	###	#N/A		
104	68	#N/A	#N/A		###	###	#N/A		
105	69	#N/A	#N/A		###	###	#N/A		

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106	6A	#N/A	#N/A	###	###	#N/A
107	6B	#N/A	#N/A	###	###	#N/A
108	6C	#N/A	#N/A	###	###	#N/A
109	6D	#N/A	#N/A	###	###	#N/A
110	6E	#N/A	#N/A	###	###	#N/A
111	6F	#N/A	#N/A	###	###	#N/A
112	70	#N/A	#N/A	###	###	#N/A
113	71	#N/A	#N/A	###	###	#N/A
114	72	#N/A	#N/A	###	###	#N/A
115	73	#N/A	#N/A	###	###	#N/A
116	74	#N/A	#N/A	###	###	#N/A
117	75	#N/A	#N/A	###	###	#N/A
118	76	#N/A	#N/A	###	###	#N/A
119	77	#N/A	#N/A	###	###	#N/A
120	78	#N/A	#N/A	###	###	#N/A
121	79	#N/A	#N/A	###	###	#N/A
122	7A	#N/A	#N/A	###	###	#N/A
123	7B	#N/A	#N/A	###	###	#N/A
124	7C	#N/A	#N/A	###	###	#N/A
125	7D	#N/A	#N/A	###	###	#N/A
126	7E	#N/A	#N/A	###	###	#N/A
127	7F	#N/A	#N/A	###	###	#N/A

address hex data label aAd bAd wAd wReg

15: PH	PH*	PH*	PH*
14: PL	?	PL*	PL*
13: MH	MH	MH	MH
12: ML	?	ML	ML
11: iH	?	?	?
10: iL	?	?	?
9: LH	?	LH	LH

ROM

8:	LL	LL	LL	LL
7:	ZH	ZH	?	?
6:	ZL	?	ZL	ZL
5:	TH	?	TH	TH
4:	TL	?	TL	TL
3:	K	K	K	K
2:	Y	?	?	kD2
1:	X	kD	kD	D
0:	W	S	reg	reg

\PH* PH ^ currInt<<2
 \PL* PL ^ currInt<<2

test Din == 011xxxxx
 math Din != x11xxxxx
 jump Din == 111x11xx
 imm Din == 111xxxxx & !jump
 k Din == xxx1xxxx
 zs Din == xxxx11xx
 zd Din == xxxxxx11
 jop Din[4,1:0]
 aluOp Imm ? Din[4:2] : Din[7:5]
 cond Din[3:0]
 \fetch TZ?fetcha:timer

\decode

test	fetch
Math & zs & zf	skip2
Math & !zs & zd	skip1
Math & zs & !zd	skip1
Math & !zs & !zd	fetch
Imm & zd	skip2
Imm & !zd	skip1
Jump & jop == 0	skip2
Jump & jop == 1	skip2
Jump & jop == 2	fetch
Jump & jop == 3	fetch
Jump & jop == 4	skip1
Jump & jop == 5	skip1
Jump & jop == 6	fetch
Jump & jop == 7	skip1

\memz svZInd?mem:(svZReg?(svZIO?[1,reg[0]]:B):men
 \mA SvAluOp[2]?00:SvAluOp[1:0]

ROM

\mL	SvAluOp[2]?svAluOp[1:0]:11
\mCin	!svAluOp[2]&svAluOp[0]
\S	{00,svS}
\D	{00,svD}
\kD	prevK ? 0011 : {00,svD}
\kD2	useK ? 0011 : {00,svD}

ROM

0	0	0	0B	0^	2	0	0	0	0	0	0	0 resetb
0	0	0	0B	0^	2	0	0	0	0	0	0	0 resetc
0	0	0	0B	0^	2	0	0	0	0	0	0	0 resetd
0	0	0	0B	0^	2	0	0	0	0	0	0	0 fetch
		#N/A		#N/A	###		###					
0	0	-2	1 B	0B	0	1	1	0	0	0	0	0 Z?(TZ?fetcha:
0	0	-2	1 B	0B	0	1	1	0	0	0	0	0 timerc
0	0	-2	1 B	0B	0	0	0	0	0	0	0	0 timer
		#N/A		#N/A	###		###					
1	0	0	0B	0B	0	1	1	0	0	0	0	0 C?fetchb:fetch
0	0	0	0B	0B	0	1	1	0	0	0	1	0 decode
0	0	0	0B	0B	0	0	0	0	0	0	1	0 decode
		#N/A		#N/A	###		###					
1	0	0	0B	0B	0	1	1	0	0	0	0	0 C?skipfb:skipf
0	0	0	0B	0B	0	1	1	0	0	0	0	0 decodeSkip
0	0	0	0B	0B	0	0	0	0	0	0	0	0 decodeSkip
0	0	0	0B	0B	0	1	1	0	0	0	0	0 C?skip2b:skip
0	0	0	0B	0B	0	1	1	0	0	0	0	0 skip1
0	0	0	0B	0B	0	1	1	0	0	0	0	0 C?skip1b:fetcl
0	0	0	0B	0B	0	1	1	0	0	0	0	0 fetch
		#N/A		#N/A	###		###					
0	0	0	0B	0^	2tr	3		0	0	0	0	0 useK tr?fetch::
		#N/A		#N/A	###		###					
0	0 mA		2 B	0 mL	1 mCir	2		0	0	0	0	1 fetch
		#N/A		#N/A	###		###					
0	0	0	0B	0B	0	0	0	0	0	0	0	0 callb
0	0	0	0B	0B	0	0	0	0	0	0	0	0 jump
1	0	0	0B	0B	0	1	1	0	0	0	0	0 C?jumpb:jump
0	0	0	0 mem	1 B	0	0	0	0	0	0	0	0 jumpd
0	0	0	0 mem	1 B	0	0	0	0	0	0	0	0 jumpe
0	0	0	0B	0B	0	1	1	0	0	0	0	0 jumpe
1	0	0	0B	0B	0	0	0	0	0	0	0	0 jumpf
0	0	0	0 mem	1 B	0	0	0	0	0	0	0	0 jumpg
0	0	0	0B	0B	0	0	0	0	0	0	0	0 fetch
		#N/A		#N/A	###		###					
0	0	0	0B	0B	0	0	0	0	0	0	0	0 returnb
0	0	0	0B	0B	0	0	0	0	0	0	0	0 fetch
		#N/A		#N/A	###		###					
1	0	0	0B	0B	0	1	1	0	0	0	0	0 C?mathirb:ma
0	0 mA		2 mem	1 mL	1 mCir	2		0	0	0	0	1 mathird
0	0 mA		2 mem	1 mL	1 mCir	2		0	0	0	0	1 fetch
0	0	0	0B	0B	0	1	1	0	0	0	0	0 fetch
		#N/A		#N/A	###		###					
1	0	0	0B	0B	0	1	1	0	0	0	0	0 C?zpab:zpac
0	0	0	0 mem	1 B	0	0	0	0	0	0	0	0 zpad
0	0	0	0 mem	1 B	0	0	0	0	0	0	0	0 svlnd?zpaf:zpa
0	0	0	0B	0B	0	1	1	0	0	0	0	0 svlnd?zpaf:zpa
1	0	0	0B	0B	0	0	0	0	0	0	0	0 rtn
1	0	0	0B	0B	0	0	0	1	1	0	0	0 zpag
0	0	0										

ROM

0	1	0	0B	0B	0	0	0	1	1	0	0	0 zpa
0	1	0	0B	0B	0	0	0	1	1	0	0	0 zpa
0	0	0	0B	0B	0	1	1	0	0	0	0	0 zpa
0	1	0	0B	0B	0	0	0	1	1	1	0	0 zpa
1	0	0	0B	0B	0	0	0	0	0	0	0	0 r
			#N/A	#N/A	###		###					
1	0	0	0B	0B	0	1	1	0	0	0	0	0 prevK?(C?ma
0	0	0	0 memz	2B	0	0	0	0	0	0	0	0 \$zpa,mathizo
0	0	0	0 memz	2B	0	0	0	0	0	0	0	0 mathizf
0	0 mA		2 memz	2 mL	1 mCir	2	0	0	0	0	0	1 \$zpa,mathizp
0	0 mA		2 memz	2 mL	1 mCir	2	0	0	0	0	0	1 mathizg
0	0	0	0B	0B	0	1	1	0	0	0	0	0 \$zpa,mathizo
0	0	0	0B	0B	0	1	1	0	0	0	0	0 \$zpa,mathizp
0	0 mA		2 memz	2 mL	1 mCir	2	0	0	0	0	0	1 mathizp
0	0	0	0B	0B	0	0	0	0	0	0	0	0 svZReg?(svZl
0	1	0	0B	0B	0	0	0	0	0	0	0	0 fetch
0	0	0	0B	0B	0	0	0	0	0	0	0	0 fetch
0	0	0	0B	0B	0	0	0	0	0	0	0	0 fetch
			#N/A	#N/A	###		###					
0	0	0	0B	0B	0	0	0	0	0	0	0	0 callzb
0	0	0	0B	0B	0	0	0	0	0	0	0	0 \$zpa,jumpz
0	0	0	0B	0B	0	0	0	0	0	0	0	0 jumpzb
0	0	0	0B	0B	0	0	0	0	0	0	0	0 fetch
			#N/A	#N/A	###		###					
0	0	0	0 memz	2B	0	0	0	0	0	0	0	0 C?tableb:table
0	0	0	0B	0B	0	1	1	0	0	0	0	0 tabled
0	0	0	0B	0B	0	0	0	0	0	0	0	0 tabled
1	0	0	0B	0B	0	1	1	0	0	0	0	0 C?tablee:table
0	0	0	0 mem	1B	0	0	0	0	0	0	0	0 tableg
0	0	0	0 mem	1B	0	0	0	0	0	0	0	0 tableh
1	0	0	0B	0B	0	0	0	0	0	0	0	0 tablei
0	0	0	0B	0B	0	1	1	0	0	0	0	0 tableg
0	0	0	0 mem	1B	0	0	0	0	0	0	0	0 fetch
			#N/A	#N/A	###		###					
0	0 mA		2 memz	2 mL	1 mCir	2	0	0	0	0	0	1 fetch
			#N/A	#N/A	###		###					
0	0 mA		2 memz	2 mL	1 mCir	2	0	0	0	0	0	1 svZReg?(svZl
0	1	0	0B	0B	0	0	0	0	0	0	0	0 fetch
0	0	0	0B	0B	0	0	0	0	0	0	0	0 fetch
0	0	0	0B	0B	0	0	0	0	0	0	0	0 fetch
0	0 mA		2B	0 mL	1 mCir	2	0	0	0	0	0	1 svZReg?(svZl
			#N/A	#N/A	###		###					
0	0	0	0 memz	2B	0	0	0	0	0	0	0	0 \$zpa,mathzzb
0	0 mA		2 memz	2 mL	1 mCir	2	0	0	0	0	0	1 svZReg?(svZl
0	1	0	0B	0B	0	0	0	0	0	0	0	0 fetch
0	0	0	0B	0B	0	0	0	0	0	0	0	0 fetch
0	0	0	0B	0B	0	0	0	0	0	0	0	0 fetch
			#N/A	#N/A	###		###					
			#N/A	#N/A	###		###					
			#N/A	#N/A	###		###					
			#N/A	#N/A	###		###					
			#N/A	#N/A	###		###					
			#N/A	#N/A	###		###					

ROM

[illegible]

rMem	wMem	aSel	bSel	logSel	Cin	sA7	sA0	A0	wIR	wFL	next
------	------	------	------	--------	-----	-----	-----	----	-----	-----	------

```
Z?(TZ?fetcha:
C?b:c
useK|tr?fetch::
svInd?b:c
prevK?(C?mal
$zpa,mathzzb
rtn
decode
decodeSkip
```


ROM

aSel	bSel	logSel	Cin
x	x	x	tr
mA	memz	^	mCin
-2	mem	mL	1
0	B	B	0

\decode

test

useK?\$zpa,mathzzb:\$zpa,mathzz

useK?\$zpa,kmathrz:\$zpa,mathrz

\$zpa,mathzr

mathrr

mathiz

mathir

jump

call

fetch

return

\$zpa,jumpz

callz

fetch

\$zpa,table

note: useK will become prevK at the end of this cl

n)

ROM

timerb):timer

IC

C

1

1

skipf

IC

thirc

ae
ae

ao

$\text{thizd:mathize):(C?mathizb:mathizc)}$

$\text{O?mathizs:mathizr):mathizq}$

:C

:f

$\text{O?mathrzd:mathrzc):mathrzb}$

$\text{O?mathrzd:mathrzc):mathrzb}$

$\text{O?mathzze:mathzzd):mathzzc}$

ROM

timerb):timer

skipf

thizd:mathize):(C?mathizb:mathizc)

ROM

lock cycle