\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

note:

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

\memz svZInd?mem:(svZReg?(svZIO?{1,reg[0]}:B):mem)

\S {00,svS} \D {00,svD}

\kD prevK ? 0011 : {00,svD} \kD2 useK ? 0011 : {00,svD}

label	aAd	bAd	wAd wReg	dln	rMem	dOut	wMem aSel	bSel	logSel (Cin
reset	x	Х	PL	1?	()?	0	0 B	۸	0
resetb	Χ	Х	PH	1?	(? (0	0 B	٨	0
resetc	Χ	Χ	TL	1?	(?	0	0 B	٨	0
resetd	Χ	Χ	TH	1?	(?	0	0 B	^	0
timer	х	TL	TL	1?	()?	0	-2 B	В	1

timorh	v	TH	TH	1?	0?	0	-2 B	В		4
timerb timerc	X X	TL	TL	1?	0?	0	-2 B -2 B	В		1 0
						-				
fetcha	PH*	PL*		1?	1?	0	0 B	В		1
fetchb	Χ	PH*	PH*	1 Inst	0?	0	0 B	В		1
fetchc	Χ	Χ	X	0 Inst	0?	0 x	X	Χ	Х	
skipf	PH*	PL*	PL*	1?	1?	0	0 B	В		1
skipfb	X		PH*	1 Inst	0?	0	0 B	В		1
skipfc	X	X	X	0 Inst	0?	0 0 x	Х	X	Х	•
skip2	X	PL*		1?	0?	0	0 B	В	^	1
skip2b	X	PH*		1?	0?	0	0 B	В		1
skip1	X	PL*		1?	0?	0	0 B	В		1
skip1b	X		PH*	1?	0?	0	0 B	В		1
•										
test	X	Χ	K	1?	0?	0	0 B	۸	tr	
mathrr	S	kD	kD2	1?	0?	0 mA	В	mL	m	Cir
								_		
call	Χ	PL*		1?	0?	0	0 B	В		0
callb	X	PH*		1?	0?	0	0 B	В		0
jump	PH*	PL*		1?	1?	0	0 B	В		1
jumpb	Χ	Χ	ML	1 PCL	0?	0	0 mem	В		0
jumpc	Χ	X	ML	1 PCL	0?	0	0 mem	В		0
jumpd	X		PH*	1?	0?	0	0 B	В		1
jumpe	PH*	PL*	X DLI*	0?	1?	0 x	χ	X	Х	^
jumpf	Х	X	PH*	1 PCH	0?	0	0 mem	В		0
jumpg	Х	ML	PL*	1?	0?	0	0 B	В		0
return	Х	LL	PL*	1?	0?	0	0 B	В		0
returnb	X	LH	PH*	1?	0 ?	0	0 B	В		0
mathir	PH*	PL*	PL*	1?	1?	0	0 B	В		1
mathirb	kD	X	D	1 #	0?	0 mA	mem	mL	m	Cin
mathirc	kD	X	D	1#	0?	0 mA	mem	mL		Cir
mathird	X		PH*	1?	0?	0	0 B	В		1
zpa	PH*	PL*		1?	1?	0	0 B	В		1
zpab	Χ	Χ	ZL	1 zpa	0?	0	0 mem	В		0
zpac	Χ	X	ZL	1 zpa	0?	0	0 mem	В		0
zpad	X		PH*	1?	0?	0	0 B	В		1
zpae	ZH	ZL	Χ	0?	1?	0 x	X	X	Χ	
zpaf	ZH	ZL	X	0?	1?	0 x	Х	X	Χ	^
zpag	X	X	ML	1 lowp	0?	0	0 mem	В		0
zpah	ZH	ZL	X	0 ?	1?	0 x	X	X	Х	0
zpai	X	X	MH	1 highp	0?	0	0 mem	В		0
zpaj	x ZH	ML ZL	X	0 ? 0 ?	0 ? 0 ML + 1	0 1 x	0 B	В	v	1
zpak	ZH ZH	ZL	X	0?	0 ML+1 0 ML+1	1 x 1 x	X	X	X	
zpal		ZL MH	X X	0?	0 VIL+1	0	х 0 В	x B	Χ	1
zpam zpan	x ZH	ZL	X	0?	0 ? 0 MH+1	1 x	Х	Х	Х	'
zpan zpao	∠⊓ MH		X	0?	1?	0 x	X	X	X	
2pa0	IVIII	IVIL	^	J .	1 .	υ Λ	^	^	^	

mathiz mathizb mathizc mathizd mathize mathizf mathizg mathizo mathizp mathizp mathizq mathizr mathizs	PH* x x K x x x MH x x	PL* reg reg reg PH* PH* reg K ML K	PL* K K K K PH* PH* K x reg	1 ? 1 # 1 # 1 # 1 ? 1 ? 1 ? 1 value 0 ? 0 ? 1 ? 0 ?	1? 0? 0? 0? 0? 0? 0? 0? 0 % 0 K 0 K	0 0 0 mA 0 mA 0 0 mA 0 1 x 0	memz mL r 0 B B 0 B B	1 0 0 mCir mCir 1 1 mCir 0
callz	х	PL*	LL	1?	0?	0	0 B B	0
callzb	Χ	PH*		1?	0?	0	0 B B	0
jumpz	Χ	ML	PL*	1?	0?	0	0 B B	0
jumpzb	Х	МН	PH*	1?	0?	0	0B B	0
table	LL	reg	ML	1?	0?	0	0 memz B	0
tableb	Χ	LH	MH	1?	0?	0	0 B B	1
tablec	Χ	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 MH	x ML	PL x	1 newPL 0 ?	0 ? 1 ?	0 0 x	0 mem B	0
tableg tableh	IVI⊓ X	MH	x MH	0 ? 1 ?	0?	0 x 0	x x x x	1
tablei	X	X	PH	1 newPL	0 ?	0	0 mem B	0
mathzr	kD	reg	kD2	1 value	0?	0 mA	memz mL r	nCir
mathrz	S	reg	K	1 value	0?	0 mA	memz mL r	mCir
mathrzb	MH	ML	Χ	0 ?	0 K	1 x	x x >	(
mathrzc	Χ	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 r	nCir
mathzz	Х	reg	K	1 value	0?	0	0 memz B	0
mathzzb	K	Χ	K	1 value	0?	0 mA	memz mL r	mCir
mathzzc	MH	ML	Χ	0?	0 K	1 x	x x >	
mathzzd	Χ	K	reg	1?	0 K	0	0 B B	0
mathzze	Х	K	reg	0 ?	0 K	0	0B B	0
15: PH	PH*	PH*	PH*					
14: PL	?		PL*					
13: MH	MH		MH					
12: ML	?	ML	ML					
11: iH								
10: iL	?	?	?					
10. IL	?	?	?					

9: LH

? LH LH

8:	LL	LL	LL	LL				
7:	ZH	ZH	?	?				
6:	ZL	?	ZL	ZL				
5:	TH	?	TH	ТН	aSel	bSel	logSel	Cin
4:	TL	?	TL	TL				
3:	K	K	K	К	х	Х	Х	tr
2:	Υ	?	?	kD2	mA	memz	٨	mCir
1:	X	kD	kD	D		-2 mem	mL	1
0:	W	S	rea	reg		0 B	В	0

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

sA7 sA0 A0 wIR wFL next

Х	Х	Х	0	0 resetb 0 resetc	PH,PL = 0
Χ	Х	Х	0	0 resetd	TH,TL = 0
X	Χ	X	0	0 fetch	
х	Х	Х	0	0 Z?(TZ?fetcha:timerb):timer	TL -= 1

.,	v	v	0	Otimoro	TU 1
X	X	X	0 0	0 timerc 0 timer	TH -= 1 TL -= 2
Х	Х	Х	U	O limer	1L -= 2
	0	0 x	0	0 C?fetchb:fetchc	
Х	Х	X	1	0 decode	
X	X	X	1	0 decode	
^	^	^	1	0 decode	
	0	0 x	0	0 C?skipfb:skipfc	
Х	Х	X	0	0 decodeSkip	
Х	Х	X	0	0 decodeSkip	
Х	X	X	0	0 C?skip2b:skip1	
Х	Х	X	0	0 skip1	
Х	X	X	0	0 C?skip1b:fetch	
Х	X	X	0	0 fetch	
^	^	χ	Ū	0 101011	
Х	Х	х	0	0 useK tr?fetch:skipf	
Χ	Х	Х	0	1 fetch	
.,	.,		0	0 aallb	
X	X	X	0	0 callb	
Х	X	X	0	0 jump	
	0	0 x	0	0 C?jumpb:jumpc	
Χ	Х	Х	0	0 jumpd	
Х	Х	Х	0	0 jumpe	
Х	Х	Х	0	0 jumpe	
	0	0 x	0	0 jumpf	
Х	Х	Х	0	0 jumpg	
Χ	Х	Х	0	0 fetch	
х	Х	Х	0	0 returnb	
X	X	X	0	0 fetch	
^	^	^	U	O IGIGIT	
	0	0 x	0	0 C?mathirb:mathirc	
Х	Х	Х	0	1 mathird	
Х	Х	X	0	1 fetch	
Х	Х	X	0	0 fetch	
	0	0 x	0	0 C?zpab:zpac	
Х	Х	Χ	0	0 zpad	
Χ	Χ	Х	0	0 svlnd?zpaf:zpae	
Χ	Χ	X	0	0 svlnd?zpaf:zpae	
	0	0 x	0	0 rtn	
	1	1 0	0	0 zpag	
Χ	Х	Х	0	0 zpah	
	1	1 1	0	0 zpai	
Х	Х	Х	0	0 svlnc?zpaj:zpao	
Χ	Х	Х	0	0 C?zpak:zpal	
	1	1 0	0	0 zpam	
	1	1 0	0	0 zpao	
Х	Х	X	0	0 zpan	
	1	1 1	0	0 zpao	
Х	Х	Х	0	0 rtn	

	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
Χ	Χ	Х	0	1 \$zpa,mathizp
Χ	Χ	Х	0	1 mathizg
Χ	Χ	Х	0	0 \$zpa,mathizo
Χ	Х	Χ	0	0 \$zpa,mathizp
Χ	Χ	Χ	0	1 mathizp
Χ	Χ	Χ	0	0 svZReg?(svZIO?mathizs:mathizr):mathizq
Χ	Х	Χ	0	0 fetch
Χ	Х	Χ	0	0 fetch
Χ	Х	Χ	0	0 fetch
Х	Х	Х	0	0 callzb
Χ	Χ	Х	0	0 \$zpa,jumpz
Χ	Χ	Х	0	0 jumpzb
Χ	Х	Χ	0	0 fetch
Х	х	х	0	0 C?tableb:tablec
Χ	Χ	Х	0	0 tabled
Χ	Χ	Х	0	0 tabled
Χ	Χ	Х	0	0 C?tablee:tablef
Χ	Χ	Х	0	0 tableg
Χ	Χ	Х	0	0 tableh
Χ	Х	Х	0	0 tablei
Χ	Х	Х	0	0 tableg
Χ	Х	Х	0	0 fetch
Х	Х	Х	0	1 fetch
Х	х	х	0	1 svZReg?(svZIO?mathrzd:mathrzc):mathrzb
Χ	Х	Χ	0	0 fetch
Χ	Χ	Х	0	0 fetch
Χ	Χ	Х	0	0 fetch
Х	Х	Χ	0	1 svZReg?(svZIO?mathrzd:mathrzc):mathrzb
х	Х	Х	0	0 \$zpa,mathzzb
Χ	Χ	Χ	0	1 svZReg?(svZIO?mathzze:mathzzd):mathzzc
Χ	Χ	Х	0	0 fetch
Χ	Χ	Х	0	0 fetch
Χ	Х	Χ	0	0 fetch

1

reset resetb resetc resetd	X X X	x x x x	PL PH TL TH	1? 1? 1?	0? 0? 0? 0?	0 0 0 0	0 B 0 B 0 B 0 B	^ ^	0 0 0 0
timer timerb timerc	X X X	TL TH TL	TL TH TL	1 ? 1 ? 1 ?	0 ? 0 ? 0 ?	0 0 0	-2 B -2 B -2 B	B B B	1 1 0
fetcha fetchb fetchc	PH* x x	PL* PH* x	PL* PH* x	1 ? 1 Inst 0 Inst	1? 0? 0?	0 0 0 x	0 B 0 B x	B B x	1 1 x
skipf skipfb skipfc skip2 skip2b skip1 skip1b	PH* x x x x x x	PH* x PL* PH* PL*	PL* PH* x PL* PH* PL*	1 ? 1 Inst 0 Inst 1 ? 1 ? 1 ?	1? 0? 0? 0? 0? 0?	0 0 0 x 0 0 0	0 B 0 B x 0 B 0 B 0 B	B B X B B B	1 1 X 1 1 1
test	Х	x	K	1?	0?	0	0 B	۸	tr
mathrr	S	kD	kD2	1?	0?	0 mA	В	mL	mCir
call callb jump jumpb jumpc jumpd jumpe jumpf jumpg	X X PH* X X X PH* X	PL* PH* X X PH* PL* X ML	LL LH PL* ML ML PH* X PH*	1? 1? 1PCL 1PCL 1? 0? 1PCH	0? 0? 1? 0? 0? 0? 1? 0?	0 0 0 0 0 0 0 0 x 0	0 B 0 B 0 B 0 mem 0 mem 0 B x 0 mem 0 B	B B B B B X B	0 0 1 0 0 1 x
return returnb	x x	LL LH	PL* PH*	1 ? 1 ?	0 ? 0 ?	0	0 B 0 B	B B	0 0
mathir mathirb mathirc mathird	PH* kD kD x	PL* x x PH*	PL* D D PH*	1 ? 1 # 1 # 1 ?	1? 0? 0? 0?	0 0 mA 0 mA 0	0 B mem mem 0 B	B mL mL B	1 mCin mCin 1
zpa zpab zpac zpad zpae zpaf zpag zpah zpai zpaj	PH* x x x ZH ZH x ZH x ZH x	PL* x x PH* ZL ZL x ZL x ML	PL* ZL PH* x ML x MH x	1? 1 zpa 1 zpa 1? 0? 0? 1 lowp 0? 1 highp 0?	1? 0? 0? 0? 1? 1? 0? 1?	0 0 0 0 x 0 x 0 x 0 x	0 B 0 mem 0 mem 0 B x x 0 mem x 0 mem 0 B	B B B X X B X B	1 0 0 1 x x 0 x

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

label aAd bAd wAd wReg dIn rMem dOut wMem aSel bSel logSel Cin

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

```
8: LL
                LL
                    LL LL
7:
   ZH
                ZΗ
                    ?
                        ?
6: ZL
                ?
                    ZL
                        ZL
5:
    TH
                ?
                    TH
                        ΤH
                                                           aSel
                                                                  bSel logSel Cin
    TL
4:
                ?
                    TL
                        TL
3:
    K
                K
                    Κ
                        Κ
                                                                             tr
                                                           Χ
                                                                  Χ
                                                                       Х
2:
    Υ
                ?
                    ?
                        kD2
                                                           mΑ
                                                                  memz ^
                                                                             mCin
1:
    X
                kD
                    kD
                        D
                                                                -2 mem mL
                                                                                1
0:
    W
                S
                                                                0 B
                                                                       В
                                                                                0
                    reg reg
```

\PH* PH ^ currInt<<2 \PL* PL ^ currInt<<2 test Din == 011xxxxxDin != x11xxxxxmath jump Din == 111x11xximm Din == 111xxxxx & !jump k Din == xxx1xxxxzs Din == xxxx11xxDin == xxxxxx11zd jop Din[4,1:0] Imm ? Din[4:2] : Din[7:5] aluOp cond Din[3:0]

Math & !zs & zd

\fetch TZ?fetcha:timer

\decodeSkip \decode test fetch test Math & zs & zf skip2

skip1

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

note:

Math & zs & !zd skip1 \$zpa,mathzr Math & !zs & !zd mathrr fetch Imm & zd skip2 mathiz Imm & !zd skip1 mathir Jump & jop == 0skip2 jump Jump & jop == 1skip2 call Jump & jop == 2fetch fetch Jump & jop == 3fetch return Jump & jop == 4skip1 \$zpa,jumpz

Jump & jop == 5skip1 callz Jump & jop == 6fetch fetch Jump & jop == 7skip1 \$zpa,table

\memz svZInd?mem:(svZReg?(svZIO?{1,reg[0]}:B):mem) \mbox{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}

```
0
                      0 resetb
Χ
     Х
          Χ
                  0
                      0 resetc
Χ
          Χ
     Х
                  0
                      0 resetd
Χ
     Χ
          Х
                  0
                      0 fetch
Χ
     Χ
          Χ
                  0
                      0 Z?(TZ?fetcha:timerb):timer
Χ
     Χ
          Χ
                  0
                      0 timerc
Χ
     Χ
          Χ
                  0
                      0 timer
Χ
     Χ
          Χ
   0
        0 x
                  0
                      0 C?fetchb:fetchc
                      0 decode
                  1
Χ
     Х
          Χ
                  1
                      0 decode
Χ
     Χ
          Χ
   0
        0 x
                  0
                      0 C?skipfb:skipfc
                  0
                      0 decodeSkip
          Χ
Χ
     Х
                  0
                      0 decodeSkip
Χ
     Χ
          Χ
                  0
Χ
     Χ
          Χ
                      0 C?skip2b:skip1
                  0
                      0 skip1
Χ
     Χ
          Χ
                  0
                      0 C?skip1b:fetch
Χ
     Χ
          Χ
                  0
                      0 fetch
Χ
     Χ
          Χ
                  0
                      0 useK|tr?fetch:skipf
Χ
     Х
          Χ
                  0
                      1 fetch
Χ
     Χ
          Χ
                  0
                      0 callb
Χ
     Χ
          Χ
                  0
                      0 jump
Χ
     Χ
          Χ
                      0 C?jumpb:jumpc
                  0
   0
        0 x
                  0
                      0 jumpd
Χ
     Χ
          Χ
                  0
                      0 jumpe
Χ
     Χ
          Χ
                      0 jumpe
                  0
Χ
     Х
          Χ
   0
        0 x
                  0
                      0 jumpf
                  0
                      0 jumpg
Χ
          Χ
     Х
Χ
     Χ
          Χ
                  0
                      0 fetch
                  0
                      0 returnb
Χ
     Χ
          Χ
                  0
                      0 fetch
Χ
     Χ
          Χ
                  0
                      0 C?mathirb:mathirc
   0
        0 x
                      1 mathird
                  0
Χ
     Х
          Χ
          Х
                  0
                      1 fetch
Χ
     Χ
                  0
                      0 fetch
     Χ
Χ
          Χ
                  0
   0
        0 x
                      0 C?zpab:zpac
                  0
                      0 zpad
          Χ
Χ
     Х
                  0
                      0 svlnd?zpaf:zpae
Χ
     Χ
          Х
                 0
                      0 svInd?zpaf:zpae
Χ
     Χ
          Χ
   0
                  0
                      0 rtn
        0 x
   1
        1
            0
                 0
                      0 zpag
          Χ
                 0
                      0 zpah
     Х
             1
                 0
                      0 zpai
                      0 svlnc?zpaj:zpao
                  0
          Χ
Χ
     Χ
                  0
                      0 C?zpak:zpal
Χ
     Χ
```

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

sA7 sA0 A0 wIR wFL next

Z?(TZ?fetcha:timerb):timer C?b:c useK|tr?fetch:skipf svInd?b:c prevK?(C?mathizd:mathize):(C?mathizb:mathizc) \$zpa,mathzzb rtn decode decodeSkip 1

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