

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

# Microcode

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

# Microcode

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

# Microcode

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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# Microcode

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?zpaf:zpae	
x	x	x	0	0 svlnd?zpaf:zpae	
	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?zpaj: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	

# Microcode

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

1



ROM												
reset	K	K	PL	1	0	0	0 B	^	0	0	0	0
resetb	K	K	PH	1	0	0	0 B	^	0	0	0	0
resetc	K	K	TL	1	0	0	0 B	^	0	0	0	0
resetd	K	K	TH	1	0	0	0 B	^	0	0	0	0
timer	K	TL	TL	1	0	0	-2 B	B	1	0	0	0
timerb	K	TH	TH	1	0	0	-2 B	B	1	0	0	0
timerc	K	TL	TL	1	0	0	-2 B	B	0	0	0	0
fetcha	PH*	PL*	PL*	1	1	0	0 B	B	1	0	0	0
fetchb	K	PH*	PH*	1	0	0	0 B	B	1	0	0	1
fetchc	K	K	K	0	0	0	0 B	B	0	0	0	1
skipf	PH*	PL*	PL*	1	1	0	0 B	B	1	0	0	0
skipfb	K	PH*	PH*	1	0	0	0 B	B	1	0	0	0
skipfc	K	K	K	0	0	0	0 B	B	0	0	0	0
skip2	K	PL*	PL*	1	0	0	0 B	B	1	0	0	0
skip2b	K	PH*	PH*	1	0	0	0 B	B	1	0	0	0
skip1	K	PL*	PL*	1	0	0	0 B	B	1	0	0	0
skip1b	K	PH*	PH*	1	0	0	0 B	B	1	0	0	0
test	K	K	K	1	0	0	0 B	^	tr	0	0	0
mathrr	S	kD	kD2	1	0	0 mA	B	mL	mCir	0	0	0
call	K	PL*	LL	1	0	0	0 B	B	0	0	0	0
callb	K	PH*	LH	1	0	0	0 B	B	0	0	0	0
jump	PH*	PL*	PL*	1	1	0	0 B	B	1	0	0	0
jumpb	K	K	ML	1	0	0	0 mem	B	0	0	0	0
jumpc	K	K	ML	1	0	0	0 mem	B	0	0	0	0
jumpd	K	PH*	PH*	1	0	0	0 B	B	1	0	0	0
jumpe	PH*	PL*	K	0	1	0	0 B	B	0	0	0	0
jumpf	K	K	PH*	1	0	0	0 mem	B	0	0	0	0
jumpg	K	ML	PL*	1	0	0	0 B	B	0	0	0	0
return	K	LL	PL*	1	0	0	0 B	B	0	0	0	0
returnb	K	LH	PH*	1	0	0	0 B	B	0	0	0	0
mathir	PH*	PL*	PL*	1	1	0	0 B	B	1	0	0	0
mathirb	kD	K	D	1	0	0 mA	mem	mL	mCir	0	0	0
mathirc	kD	K	D	1	0	0 mA	mem	mL	mCir	0	0	0
mathird	K	PH*	PH*	1	0	0	0 B	B	1	0	0	0
zpa	PH*	PL*	PL*	1	1	0	0 B	B	1	0	0	0
zpab	K	K	ZL	1	0	0	0 mem	B	0	0	0	0
zpac	K	K	ZL	1	0	0	0 mem	B	0	0	0	0
zpad	K	PH*	PH*	1	0	0	0 B	B	1	0	0	0
zpaef	ZH	ZL	K	0	1	0	0 B	B	0	0	0	0
zpaef	ZH	ZL	K	0	1	0	0 B	B	0	1	1	0
zpag	K	K	ML	1	0	0	0 mem	B	0	0	0	0
zpah	ZH	ZL	K	0	1	0	0 B	B	0	1	1	0
zpai	K	K	MH	1	0	0	0 mem	B	0	0	0	0
zpaij	K	ML	K	0	0	0	0 B	B	1	0	0	0

# ROM

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

# ROM

label	aAd	bAd	wAd	wReg	rMem	wMem	aSel	bSel	logSel	Cin	sA7	sA0	A0	wIR
-------	-----	-----	-----	------	------	------	------	------	--------	-----	-----	-----	----	-----

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	aSel	bSel	logSel	Cin
4: TL	?	TL	TL				
3: K	K	K	K	x	x	x	tr
2: Y	?	?	kD2	mA	memz	^	mCin
1: X	kD	kD	D		-2 mem	mL	1
0: W	S	reg	reg		0 B	B	0

\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\decode

test	fetch	test	
Math & zs & zf	skip2	useK?\$zpa,mathzzb:\$zpa,mathzz	note: useK will become r
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]

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

## ROM

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

## ROM

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
```



ROM

prevK at the end of this clock cycle