

SULLIVAN48 Reference Data

Name, Mnemonic	<i>For-mat</i>	Operation (in SystemVerilog)	Funct
Add	ADD	D $R[rd] = R[rs] + R[rt]$	001000
Add immediate	ADDI	DI $R[rd] = R[rs] + \text{SignExtImm}$	(1) 101000
Subtract	SUB	D $R[rd] = R[rs] - R[rt]$	000100
Subtract immediate	SUBI	DI $R[rd] = R[rs] - \text{SignExtImm}$	(1) 100100
Multiply	MUL	D $R[rd] = R[rs] \times R[rt]$	000010
Multiply immediate	MULI	DI $R[rd] = R[rs] \times \text{SignExtImm}$	(1) 100010
Compare	CMP	D $R[rs] - R[rt] \stackrel{?}{=} 0$	011111
Compare immediate	CMPI	DI $R[rs] - \text{SignExtImm} \stackrel{?}{=} 0$	(1) 111111
Vectorial sum	VES	D $R\{rd[47:32]\} = R\{rs[47:32]\} + R\{rt[47:32]\}$ $R\{rd[31:16]\} = R\{rs[31:16]\} + R\{rt[31:16]\}$ $R\{rd[15:0]\} = R\{rs[15:0]\} + R\{rt[15:0]\}$	000000
Concatenation	CNC	D $R[rd] = \text{ConcatRegister}$ $R\{rd[47:32]\} = R\{rs[47:32]\} \times R[rt]$	(2) 000110
Escalated vector	SCL	D $R\{rd[31:16]\} = R\{rs[31:16]\} \times R[rt]$ $R\{rd[15:0]\} = R\{rs[15:0]\} \times R[rt]$ $R[rd] = R\{rs[47:32]\} \times R\{rt[47:32]\}$	011000
Dot Product	DOT	D $+ R\{rs[31:16]\} \times R\{rt[31:16]\}$ $+ R\{rs[15:0]\} \times R\{rt[15:0]\}$	011010
Read value from kernel memory	REK	D $R[rd] = M[\text{ConcatRegister}]$ $R\{rd[47:32]\} = M\{\text{ConcatRegister}\}[47:32]$	(2) 000110
Read vector from kernel memory	RKM	D $R\{rd[31:16]\} = M\{\text{ConcatRegister}\}[31:16]$ $R\{rd[15:0]\} = M\{\text{ConcatRegister}\}[15:0]$	(2) 100110
Reads pixel vector from picture ROM	REP	D $R[rd] = M[\text{ConcatRegister}]$	(2) 000110
Saves new pixel in picture RAM	SAP	D $M[R[rd]] = R[rs]$	001000
Branch	B	C $PC = PC + 8 + \text{BranchAddr}$	(3) 000000
Branch on equal	BEQ	C $PC = (Z \stackrel{?}{=} 0)? PC + 8 + \text{BranchAddr} : PC$	(3) 100000

(1) SignExtImm = {36{Immediate[11]}, Immediate[11:0]}

(2) ConcatRegister = $\{16'b0, R[rs](15:0), R[rt](15:0)\}$

(3) BranchAddr = {22{Immediate[23]}, Immediate[23:0], 2'b0}

Basic Instruction Formats

