



APPENDIX A INSTRUCTION SET LISTINGS

This appendix lists the instruction set implemented in the RCPU, sorted by mnemonic. Reserved bits are shaded.

Table A-1 Complete Instruction List Sorted by Mnemonic

Name	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
addx	0x1F				D				A				B				OE		0x10A								Rc					
addcx	0x1F				D				A				B				OE		0xA								Rc					
addex	0x1F				D				A				B				OE		0x8A								Rc					
addi	0x0E				D				A				SIMM																			
addic	0x0C				D				A				SIMM																			
addic.	0x0D				D				A				SIMM																			
addis	0x0F				D				A				SIMM																			
addmex	0x1F				D				A				0 0 0 0 0				OE		0xEA								Rc					
addzex	0x1F				D				A				0 0 0 0 0				OE		0xCA								Rc					
andx	0x1F				S				A				B				0x1C								Rc							
andcx	0x1F				S				A				B				0x3C								Rc							
andi.	0x1C				S				A				UIMM																			
andis.	0x1D				S				A				UIMM																			
bx	0x12				LI																										AA	LK
bcx	0x10				BO				BI				BD																		AA	LK
bcctrx	0x13				BO				BI				0 0 0 0 0				0x210								LK							
bclrx	0x13				BO				BI				0 0 0 0 0				0x10								LK							
cmp	0x1F				crfD		0	L	A				B				0 0 0 0 0 0 0 0 0 0														0	
cmpi	0x0B				crfD		0	L	A				SIMM																			
cmpl	0x1F				crfD		0	L	A				B				0x20								0							
cmpli	0x0A				crfD		0	L	A				UIMM																			
cntlzwx	0x1F				S				A				0 0 0 0 0				0x1A								Rc							
crand	0x13				crbD				crbA				crbB				0x101								0							
crandc	0x13				crbD				crbA				crbB				0x81								0							



Name	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
creqv	0x13					crbD					crbA					crbB					0x121											0	
crnand	0x13					crbD					crbA					crbB					0xE1											0	
crnor	0x13					crbD					crbA					crbB					0x13											0	
cror	0x13					crbD					crbA					crbB					0x1C1											0	
crorc	0x13					crbD					crbA					crbB					0x1A1											0	
crxor	0x13					crbD					crbA					crbB					0xC1											0	
divwx	0x1F					D					A					B					OE	0x1EB											Rc
divwux	0x1F					D					A					B					OE	0x1CB											Rc
eieio	0x1F					0 0 0 0 0					0 0 0 0 0					0 0 0 0 0					0x356											0	
eqvx	0x1F					S					A					B					0x11C											Rc	
extsbx	0x1F					S					A					0 0 0 0 0					0x3BA											Rc	
extshx	0x1F					S					A					0 0 0 0 0					0x39A											Rc	
fabsx	0x3F					D					0 0 0 0 0					B					0x108											Rc	
faddx	0x3F					D					A					B					0 0 0 0 0					0x15					Rc		
faddsx	0x3B					D					A					B					0 0 0 0 0					0x15					Rc		
fcmpo	0x3F					crfD		0 0			A					B					0x20											0	
fcmpu	0x3F					crfD		0 0			A					B					0 0 0 0 0 0 0 0 0 0											0	
fctiwx	0x3F					D					0 0 0 0 0					B					0x0E											Rc	
fctiwzx	0x3F					D					0 0 0 0 0					B					0x0F											Rc	
fdivx	0x3F					D					A					B					0 0 0 0 0					0x12					Rc		
fdivsx	0x3B					D					A					B					0 0 0 0 0					0x12					Rc		
fmaddx	0x3F					D					A					B					C					0x1D					Rc		
fmaddsx	0x3B					D					A					B					C					0x1D					Rc		
fmrx	0x3F					D					0 0 0 0 0					B					0x48											Rc	
fmsubx	0x3F					D					A					B					C					0x1C					Rc		
fmsubsx	0x3B					D					A					B					C					0x1C					Rc		
fmulx	0x3F					D					A					0 0 0 0 0					C					0x19					Rc		
fmulsx	0x3B					D					A					0 0 0 0 0					C					0x19					Rc		
fnabsx	0x3F					D					0 0 0 0 0					B					0x88											Rc	
fnegx	0x3F					D					0 0 0 0 0					B					0x28											Rc	
fnmaddx	0x3F					D					A					B					C					0x1F					Rc		
fnmaddsx	0x3B					D					A					B					C					0x1F					Rc		
fnmsubx	0x3F					D					A					B					C					0x1E					Rc		

Name 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31



fnmsubsx	0x3B	D	A	B	C	0x1E	Rc
frsp_x	0x3F	D	0 0 0 0 0	B	0x0C		Rc
fsub_x	0x3F	D	A	B	0 0 0 0 0	0x14	Rc
fsubsx	0x3B	D	A	B	0 0 0 0 0	0x14	Rc
icbi	0x1F	0 0 0 0 0	A	B	0x3D6		0
isync	0x13	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0x90		0
lbz	0x22	D	A	d			
lbzu	0x23	D	A	d			
lbzux	0x1F	D	A	B	0x77		0
lbzx	0x1F	D	A	B	0x57		0
lfd	0x32	D	A	d			
lfdu	0x33	D	A	d			
lfd_{ux}	0x1F	D	A	B	0x277		0
lfd_x	0x1F	D	A	B	0x257		0
lfs	0x30	D	A	d			
lfsu	0x31	D	A	d			
lfs_{ux}	0x1F	D	A	B	0x237		0
lfs_x	0x1F	D	A	B	0x217		0
lha	0x2A	D	A	d			
lhau	0x2B	D	A	d			
lhaux	0x1F	D	A	B	0x177		0
lhax	0x1F	D	A	B	0x157		0
lhbr_x	0x1F	D	A	B	0x316		0
lhz	0x28	D	A	d			
lhzu	0x29	D	A	d			
lhz_{ux}	0x1F	D	A	B	0x137		0
lhz_x	0x1F	D	A	B	0x117		0
lmw	0x2E	D	A	d			
lswi	31	D	A	NB	0x255		0
lsw_x	31	D	A	B	0x215		0
lwar_x	31	D	A	B	0x14		0
lwbr_x	31	D	A	B	0x216		0
lwz	32	D	A	d			

Name 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31



lwzu	33	D		A		d						
lwzux	31	D		A		B		0x37			0	
lwzx	31	D		A		B		0x17			0	
mcrf	19	crfD	0 0	crfS	0 0	0 0 0 0 0		0 0 0 0 0 0 0 0 0 0				0
mcrfs	63	crfD	0 0	crfS	0 0	0 0 0 0 0		0x40			0	
mcrxr	31	crfS	0 0	0 0 0 0 0		0 0 0 0 0		0x200			0	
mfcrr	31	D		0 0 0 0 0		0 0 0 0 0		0x13			0	
mffsrx	63	D		0 0 0 0 0		0 0 0 0 0		0x247			Rc	
mfmsr	31	D		0 0 0 0 0		0 0 0 0 0		0x53			0	
mfspr	31	D		SPR				0x153			0	
mftb	31	D		TBR				0x173			0	
mtcrf	31	S		0	CRM			0	0x90			0
mtfsb0x	63	crbD		0 0 0 0 0		0 0 0 0 0		0x46			Rc	
mtfsb1x	63	crbD		0 0 0 0 0		0 0 0 0 0		0x26			Rc	
mtfsfx	31	0	FM			0	frB		0x2C7			Rc
mtfsfix	63	crbD	0 0	0 0 0 0 0		IMM		0	0x86			Rc
mtmsr	31	S		0 0 0 0 0		0 0 0 0 0		0x92			0	
mtspr	31	D		SPR				0x1D3			0	
mulhwrx	0x1F	D		A		B		0	0x4B			Rc
mulhwux	0x1F	D		A		B		0	0x0B			Rc
mullwrx	0x1F	D		A		B		OE	0xEB			Rc
mulli	0x07	D		A		SIMM						
nandrx	0x1F	S		A		B		0x1DC			Rc	
negrx	0x1F	D		A		0 0 0 0 0		OE	0x68			Rc
norx	0x1F	S		A		B		0x7C			Rc	
orx	0x1F	S		A		B		0x1BC			Rc	
orcx	0x1F	S		A		B		0x19C			Rc	
ori	0x18	S		A		UIMM						
oris	0x19	S		A		UIMM						
rfi	0x13	0 0 0 0 0		0 0 0 0 0		0 0 0 0 0		0x32			0	
rlwimrx	0x14	S		A		SH		MB		ME		Rc
rlwinmx	0x15	S		A		SH		MB		ME		Rc
rlwnmx	0x17	S		A		B		MB		ME		Rc

Name 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31



sc	0x11	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0										1	0		
slwx	0x1F	S	A	B	0x18										Rc		
srawx	0x1F	S	A	B	0x318										Rc		
srawix	0x1F	S	A	SH	0x338										Rc		
srwx	0x1F	S	A	B	0x218										Rc		
stb	0x26	S	A	d													
stbu	0x27	S	A	d													
stbux	0x1F	S	A	B	0xF7										0		
stbx	0x1F	S	A	B	0xD7										0		
stfd	0x36	frS	A	d													
stfdu	0x37	frS	A	d													
stfdux	0x1F	frS	A	B	0x2F7										0		
stfdx	0x1F	frS	A	B	0x2D7										0		
stfiwx	0x1F	frS	A	B	0x3D7										0		
stfs	0x34	frS	A	d													
stfsu	0x35	frS	A	d													
stfsux	0x1F	frS	A	B	0x2B7										0		
stfsx	0x1F	frS	A	B	0x297										0		
sth	0x2C	S	A	d													
sthbrx	0x1F	S	A	B	0x396										0		
sthu	0x2D	S	A	d													
sthux	0x1F	S	A	B	0x1B7										0		
sthx	0x1F	S	A	B	0x197										0		
stmw	0x2F	S	A	d													
stswi	0x1F	S	A	NB	0x205										0		
stswx	0x1F	S	A	B	0x295										0		
stw	0x24	S	A	d													
stwbrx	0x1F	S	A	B	0x96										0		
stwcx.	31	S	A	B	0x96										1		
stwu	0x25	S	A	d													
stwux	0x1F	S	A	B	0xB7										0		
stwx	0x1F	S	A	B	0x97										0		
subfx	0x1F	D	A	B	OE	0x28										Rc	



Name	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
subfcx	0x1F					D					A					B					OE	0x08					Rc					
subfex	0x1F					D					A					B					OE	0x88					Rc					
subfic	0x08					D					A					SIMM																
subfmex	0x1F					D					A					0 0 0 0 0					OE	0xE8					Rc					
subfzex	0x1F					D					A					0 0 0 0 0					OE	0xC8					Rc					
sync	0x1F					0 0 0 0 0					0 0 0 0 0					0 0 0 0 0					0x256					0						
tw	0x1F					TO					A					B					0x04					0						
twi	0x03					TO					A					SIMM																
xorx	0x1F					S					A					B					0x13C					Rc						
xori	0x1A					S					A					UIMM																
xoris	0x1B					S					A					UIMM																