KGP-RISC CPU CONVENTIONS

Register Usage Convention :

Register name	Name	Description	Register Code
0	$zero	the value 0	00000
1-2	$v1 - $v2	(values) from expression evaluation and function results	00001-00010
3-6	$a0 - $a3	(arguments) First four parameters for subroutine. Not preserved across procedure calls	00011-00110
7-14	$t0 - $t10	(temporaries) Caller saved if needed. Subroutines can use w/out saving. Not preserved across procedure calls	00111-01110
15	$gp	Global pointer	01111
16	$sp	Stack pointer	10000
17	$fp	Function pointer	10001
18	$ra	Return address	10010
19	$hi	used to hold the most significant word	10011
20	$lo	used to hold the least significant word	10100
21-28	$s0 - $s6	(saved values) - Callee saved. A subroutine using one of these must save original and restore it before exiting. Preserved across procedure calls	10101-11100
29-31	$t8-$t10	Temporary register	11101-11111

Instruction Format and Encoding:

Class	Instruction	Usage	opcode	func
Arithmetic	Add immediate1	**addi** rs,imm	001	00
	Complement immediate1	**compi** rs,imm		01

	Add	Add rs,rt	000	0011
	Multiply (Unsigned)	Multu rs,rt		1010
	Multiply (Signed)	**mult** rs,rt		1011
	Comp	**comp** rs,rt		0010
Logic	AND	**and** rs,rt		0001
	XOR	**xor** rs,rt		0000
Shift	Shift left logical	**shll** rs, sh		0100
	Shift right logical	**shrl** rs, sh		0101
	Shift left logical variable	**shllv** rs, rt		0110
	Shift right logical variable	**shrlv** rs, rt		0111
	Shift right arithmetic	**shra** rs, sh		1000
	Shift right arithmetic variable	**shrav** rs, rt		1001
Memory	Load Word	**lw** rt,imm(rs)	010	0
	Store Word	**sw** rt,imm(rs)		1
Branch	Unconditional branch	**b** L	011	0000
	Branch on zero	**bz** L		0001
	Branch on not zero	**bnz** L		0010
	Branch on carry	**bcy** L		0011
	Branch on No carry	**bncy** L		0100
	Branch on Sign	**bs** L		0101
	Branch on Not Sign	**bns** L		0110
	Branch on Overflow	**bv** L		0111
	Branch on No Overflow	**bnv** L		1000
	Call	**Call** L		1001
	Return	**Ret**		1010
	Branch Register	**br** rs	100	---

Instruction Format :

- OPCODE - 000

op code	rs	rt	shamt	func	---
3 bits	5 bits	5 bits	5 bits	4 bits	10 bits

- OPCODE - 001

op code	rs	immediate	func
3 bits	5 bits	22 bits	2 bits

- OPCODE - 010

op code	rs	rt	immediate	func
3 bits	5 bits	5 bits	18	1

- OPCODE - 011

op code	L	func
3 bits	25 bits	4 bits

- OPCODE - 100

op code	rs	------
3 bits	5 bits	24 bits