MIDE instruction reference data

Core Instruction Set

R type

Name	Mnemonic	Operation	Sintaxis	OPcode	ALUop
ADD	add	Rd = Rs1 + Rs2	add Rd, Rs1, Rs2	00000	000
Substract	sub	Rd = Rs1 - Rs2	sub Rd, Rs1,Rs2	00000	001
Multiply	mul	Rd = Rs1[15:0]*Rs2[15:0]	mul Rd, Rs1,Rs2	00000	010
Shift Left	sl	Rd = Rs1 << Rs2	sl Rd, Rs1, Rs2	00000	100
And	and	Rd = Rs1 & Rs2	and Rd, Rs1, Rs2	00000	101
Shift Right	sr	Rd = Rs1 >> Rs2	sr Rd, Rs1, Rs2	00000	110
Load Word	ldw	Rd = Mem[Rs1[15:0]]	ldw Rd, Rs1	00010	-
Load Half-Word	ldh	Rd = {16'b0,M[Rs1](15:0)}	ldh Rd, Rs1	00011	-
Store Word	stw	M[Rs2[15:0]] = Rs1	stw Rs1, Rs2	00100	-
Store Half word	sth	M[Rs2[15:0]] = Rs1	sth Rs1, Rs2	00101	-
Jump Register	jr	PC = Rs1	jr Rs1	00110	-

I type

Name	Mnemonic	Operation	Sintaxis	OPcode	ALUop
Add Immediate	addi	Rd = Rs1 + Imm	addi Rd, Rs1, Imm	01000	000
Substract Immediate	subi	Rd = Rs1 - Imm	subi Rd, Rs, Imm	01001	001
Branch on equal	be	if(Rs1 == Rs2) PC + 4 + Imm	be Rs1, Rs2, "label"	01010	-
Branch on greater than	bgt	if(Rs1 > Rs2) PC + 4 + Imm	bgt Rs1, Rs2, "label"	01011	-

J type

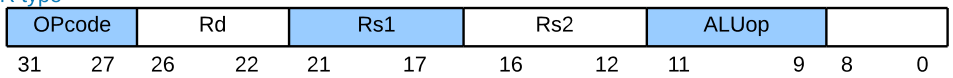
Name	Mnemonic	Operation	Sintaxis	OPcode	ALUop
Jump	jmp	PC = Address	jmp "label"	10000	-
Call function	call	RA = PC; PC = Address	call "label"	10001	-

V type

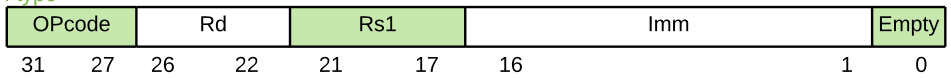
Name	Mnemonic	Operation	sintaxis	OPcode	ALUop
Vector Multiply	vmul	Vd = RVs1[15:0]*RVs2[15:0]	vmul Vd, VRs1, VRs2	11000	010
Vector Shift Right	vsr	Vd = RVs1 >> RVs2	vsr Vd, RVS1, RVs2	11000	111
Vector Substraction	vsub	Vd = RVs1 - RVs2	vsub Vd, RVs1, RVs2	11000	101
Vector Conditional Substraction	vcsub	if (RVs1 >= RVs2) Vd = RVs1 - RVs2	vcsub Vd, RVs1, RVs2	11110	-
Vector Load Half Word	vldh	Vd = {16'b0, M[RVs1](15:0)}	vldh Vd, RVs1	11011	-
Vector Store Byte	vstb	M[Rs2[15:0]] = {24'b0, VRs1(7:0)}	vstb VRs1, VRs2	11101	-
Vector Add	vadd	Vd = RVs1 + RVs2	vadd Rd, RVs1, RVs2	11000	011

Formats

R type

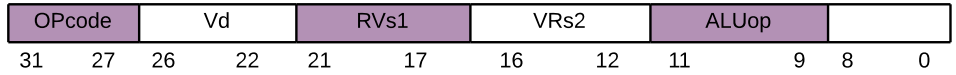


I type



J type

V type



Registers

Name	Number	Use
R0	0	Constant 0
R1-R10	1-10	Scalar General Purpose
VP	11	VRAM Pointer
IC	12	Image Counter
IP	13	Image Pointer
RA	14	Return Address
SP	15	Stack Pointer
V1 - V8	16-23	Vectorial General Purpose

Memory Map

8 bit Hexa	Section name
62000 - 30000	VROM Encrypted
18404 - 404	VRAM Decrypted
400	I/O
3FF - 0	Stack - Instructions

Size and data type

Word	32 bits
Half Word	16 bits
Byte	8 bits
Vectorial Register	Composed by 8 independent words.

Addressing Modes

Instruction	Type	Mode
be	I	PC relative.
bgt	I	PC relative.
jr	R	Register.
jmp	J	Immediate.
call	J	Immediate.

Created and implemented by

Jasson Rodríguez Méndez.

Marco Herrera Valverde.

Kenneth Hernández Salazar.

Edgar Chaves González.