



Instruction Set

Version: 0.5.0

Total Instructions Supported: 73

Operand Size: Up to 2 operands, each of 64-bits



Operand Types

Instructions in SASM accept a variety of operand types:

??? example "Immediate Values"

```
0, 1, 2, 3
```

??? example "Constants"

```
M, N, 0, P
```

??? example "Registers"

```
L0, L1, L2, L3
```



Register Dereferencing

SASM registers are identified by **unique IDs**. Each register can be accessed either as a **reference** or as a **value** using *compile-time functions*.

```
ref(L1) ; reference to register L1  
val(L1) ; value stored in register L1
```

These are **compile-time functions** that tell the assembler how to interpret operands.



Related References

- [Compile-time Functions](#)
- [Register Reference](#)

Instruction Set - Quick Reference

=== "ARITHMETIC"

=== "INTEGER"

OPCODE	INST
13	[ADDI](Arithmetic/Addition.md#ADDI)
14	[SUBI](Arithmetic/Subtraction.md#SUBI)
15	[MULI](Arithmetic/Multiplication.md#MULI)
16	[DIVI](Arithmetic/Division.md#DIVI)
17	[MODI](Arithmetic/Modulus.md#MODI)

=== "UNSIGNED"

OPCODE	INST
18	[ADDU](Arithmetic/Addition.md#ADDU)
19	[SUBU](Arithmetic/Subtraction.md#SUBU)
20	[MULU](Arithmetic/Multiplication.md#MULU)
21	[DIVU](Arithmetic/Division.md#DIVU)
22	[MODU](Arithmetic/Modulus.md#MODU)

=== "FLOAT"

OPCODE	INST
23	[ADDF](Arithmetic/Addition.md#ADDF)
24	[SUBF](Arithmetic/Subtraction.md#SUBF)
25	[MULF](Arithmetic/Multiplication.md#MULF)
26	[DIVF](Arithmetic/Division.md#DIVF)

=== "UNDOCUMENTED"

=== "RELATIONAL"

=== "INTEGER"

OPCODE	INST
35	[EQI](../reference/missing.md#TO_BE_IMPLEMENTED)
36	[GEI](../reference/missing.md#TO_BE_IMPLEMENTED)
37	[GTI](../reference/missing.md#TO_BE_IMPLEMENTED)
38	[LEI](../reference/missing.md#TO_BE_IMPLEMENTED)
39	[LTI](../reference/missing.md#TO_BE_IMPLEMENTED)
40	[NEI](../reference/missing.md#TO_BE_IMPLEMENTED)

=== "UNSIGNED"

OPCODE	INST
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	OPCODE	INST
41	[EQU]	(../reference/missing.md#TO_BE_IMPLEMENTED)
42	[GEU]	(../reference/missing.md#TO_BE_IMPLEMENTED)
43	[GTU]	(../reference/missing.md#TO_BE_IMPLEMENTED)
44	[LEU]	(../reference/missing.md#TO_BE_IMPLEMENTED)
45	[LTU]	(../reference/missing.md#TO_BE_IMPLEMENTED)
46	[NEU]	(../reference/missing.md#TO_BE_IMPLEMENTED)

=== "FLOAT"

	OPCODE	INST
47	[EQF]	(../reference/missing.md#TO_BE_IMPLEMENTED)
48	[GEF]	(../reference/missing.md#TO_BE_IMPLEMENTED)
49	[GTF]	(../reference/missing.md#TO_BE_IMPLEMENTED)
50	[LEF]	(../reference/missing.md#TO_BE_IMPLEMENTED)
51	[LTF]	(../reference/missing.md#TO_BE_IMPLEMENTED)
52	[NEF]	(../reference/missing.md#TO_BE_IMPLEMENTED)

=== "TYPE CASTING"

	OPCODE	INST
57	[I2F]	(../reference/missing.md#TO_BE_IMPLEMENTED)
58	[U2F]	(../reference/missing.md#TO_BE_IMPLEMENTED)
59	[F2I]	(../reference/missing.md#TO_BE_IMPLEMENTED)
60	[F2U]	(../reference/missing.md#TO_BE_IMPLEMENTED)

=== "MEMORY ACCESS"

	OPCODE	INST
61	[READ1U]	(../reference/missing.md#TO_BE_IMPLEMENTED)
62	[READ2U]	(../reference/missing.md#TO_BE_IMPLEMENTED)
63	[READ4U]	(../reference/missing.md#TO_BE_IMPLEMENTED)
64	[READ8U]	(../reference/missing.md#TO_BE_IMPLEMENTED)
65	[READ1I]	(../reference/missing.md#TO_BE_IMPLEMENTED)
66	[READ2I]	(../reference/missing.md#TO_BE_IMPLEMENTED)
67	[READ4I]	(../reference/missing.md#TO_BE_IMPLEMENTED)
68	[READ8I]	(../reference/missing.md#TO_BE_IMPLEMENTED)
69	[WRITE1]	(../reference/missing.md#TO_BE_IMPLEMENTED)
70	[WRITE2]	(../reference/missing.md#TO_BE_IMPLEMENTED)
71	[WRITE4]	(../reference/missing.md#TO_BE_IMPLEMENTED)
72	[WRITE8]	(../reference/missing.md#TO_BE_IMPLEMENTED)

=== "SEQUENCE CONTROL"

	OPCODE	INST
1	[INVOK]	(../reference/missing.md#TO_BE_IMPLEMENTED)
2	[RETVL]	(../reference/missing.md#TO_BE_IMPLEMENTED)
8	[CALL]	(../reference/missing.md#TO_BE_IMPLEMENTED)
9	[LOOP]	(../reference/missing.md#TO_BE_IMPLEMENTED)

```
| **27** | [JMPU](../reference/missing.md#TO_BE_IMPLEMENTED) |
| **28** | [JMPC](../reference/missing.md#TO_BE_IMPLEMENTED) |
| **33** | [RET](../reference/missing.md#TO_BE_IMPLEMENTED) |
```

=== "BINARY OPERATIONS"

```
| OPCODE | INST |
|-----|-----|
| **34** | [NOT](../reference/missing.md#TO_BE_IMPLEMENTED) |
| **53** | [ORB](../reference/missing.md#TO_BE_IMPLEMENTED) |
| **54** | [XOR](../reference/missing.md#TO_BE_IMPLEMENTED) |
| **55** | [SHR](../reference/missing.md#TO_BE_IMPLEMENTED) |
| **56** | [SHL](../reference/missing.md#TO_BE_IMPLEMENTED) |
| **29** | [ANDB](../reference/missing.md#TO_BE_IMPLEMENTED) |
| **30** | [NOTB](../reference/missing.md#TO_BE_IMPLEMENTED) |
```

=== "MISC"

```
| OPCODE | INST |
|-----|-----|
| **0**  | [DONOP](../reference/missing.md#TO_BE_IMPLEMENTED) |
| **3**  | [PUSHR](../reference/missing.md#TO_BE_IMPLEMENTED) |
| **4**  | [SOPR](../reference/missing.md#TO_BE_IMPLEMENTED) |
| **5**  | [SHUTS](../reference/missing.md#TO_BE_IMPLEMENTED) |
| **6**  | [SETR](../reference/missing.md#TO_BE_IMPLEMENTED) |
| **7**  | [GETR](../reference/missing.md#TO_BE_IMPLEMENTED) |
| **10** | [PUSH](../reference/missing.md#TO_BE_IMPLEMENTED) |
| **11** | [SPOP](../reference/missing.md#TO_BE_IMPLEMENTED) |
| **12** | [SWAP](../reference/missing.md#TO_BE_IMPLEMENTED) |
| **31** | [COPY](../reference/missing.md#TO_BE_IMPLEMENTED) |
| **32** | [DUPS](../reference/missing.md#TO_BE_IMPLEMENTED) |
```

INSTRUCTION DOCUMENTATION TEMPLATE:

[OPCODE] — [*OPERATION*] {#[OPCODE]}

=== "[OPCODE] Example"

```
```linenums="1" hl_lines="1 3 5"

...
```
```

=== "[OPCODE] Properties"

| Opcode | Operand Type | Destination |
|--------|--------------|---------------|
| 00 | 64-bit Value | L_ (implicit) |

Identified as mnemonic `[#[OPCODE]](#[OPCODE])`, `[OPCODE]` is used to