

SABAL, SABAL2

Signed Absolute difference and Accumulate Long. This instruction subtracts the vector elements in the lower or upper half of the second source SIMD&FP register from the corresponding vector elements of the first source SIMD&FP register, and accumulates the absolute values of the results into the vector elements of the destination SIMD&FP register. The destination vector elements are twice as long as the source vector elements. The SABAL instruction extracts each source vector from the lower half of each source register. The SABAL2 instruction extracts each source vector from the upper half of each source register.

Depending on the settings in the [CPACR_EL1](#), [CPTR_EL2](#), and [CPTR_EL3](#) registers, and the current Security state and Exception level, an attempt to execute the instruction might be trapped.

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

SABAL{2} <Vd>.<Ta>, <Vn>.<Tb>, <Vm>.<Tb>

```
integer d = UInt (Rd);
integer n = UInt (Rn);
integer m = UInt (Rm);

if size == '11' then UNDEFINED;
constant integer esize = 8 << UInt (size);
constant integer datasize = 64;
integer part = UInt (Q);
integer elements = datasize DIV esize;

boolean accumulate = (op == '0');
boolean unsigned = (U == '1');
```

Assembler Symbols

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Is the second and upper half specifier. If present it causes the operation to be performed on the upper 64 bits of the registers holding the narrower elements, and is encoded in “Q”:

Q	2
0	[absent]
1	[present]

<Vd>

Is the name of the SIMD&FP destination register, encoded in the “Rd” field.

<Ta>

Is an arrangement specifier, encoded in "size":

size	<Ta>
00	8H
01	4S
10	2D
11	RESERVED

<Vn>

Is the name of the first SIMD&FP source register, encoded in the "Rn" field.

<Tb>

Is an arrangement specifier, encoded in "size:Q":

size	Q	<Tb>
00	0	8B
00	1	16B
01	0	4H
01	1	8H
10	0	2S
10	1	4S
11	x	RESERVED

<Vm>

Is the name of the second SIMD&FP source register, encoded in the "Rm" field.

Operation

```
CheckFPAdvSIMDEnabled64();
bits(datasize) operand1 = Vpart[n, part, datasize];
bits(datasize) operand2 = Vpart[m, part, datasize];
bits(2*datasize) result;
integer element1;
integer element2;
bits(2*esize) absdiff;

result = if accumulate then V[d, 2*datasize] else Zeros(2 * datasize);
for e = 0 to elements-1
    element1 = Int(Elem[operand1, e, esize], unsigned);
    element2 = Int(Elem[operand2, e, esize], unsigned);
    absdiff = Abs(element1-element2)<2*esize-1:0>;
    Elem[result, e, 2*esize] = Elem[result, e, 2*esize] + absdiff;
V[d, 2*datasize] = result;
```

Operational information

If PSTATE.DIT is 1:

- The execution time of this instruction is independent of:
 - The values of the data supplied in any of its registers.
 - The values of the NZCV flags.

- The response of this instruction to asynchronous exceptions does not vary based on:
 - The values of the data supplied in any of its registers.
 - The values of the NZCV flags.

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Internal version only: isa v33.64, AdvSIMD v29.12, pseudocode
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