

LDUMAX, LDUMAXA, LDUMAXAL, LDUMAXL

Atomic unsigned maximum on word or doubleword in memory atomically loads a 32-bit word or 64-bit doubleword from memory, compares it against the value held in a register, and stores the larger value back to memory, treating the values as unsigned numbers. The value initially loaded from memory is returned in the destination register.

- If the destination register is not one of WZR or XZR, LDUMAXA and LDUMAXAL load from memory with acquire semantics.
- LDUMAXL and LDUMAXAL store to memory with release semantics.
- LDUMAX has neither acquire nor release semantics.

For more information about memory ordering semantics, see [Load-Acquire, Store-Release](#).

For information about memory accesses, see [Load/Store addressing modes](#). This instruction is used by the alias [STUMAX, STUMAXL](#).

Integer (FEAT_LSE)

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
1	x	1	1	1	0	0	0	A	R	1					Rs		0	1	1	0	0	0				Rn				Rt	
size											opc																				

32-bit LDUMAX (size == 10 && A == 0 && R == 0)

LDUMAX <Ws>, <Wt>, [<Xn|SP>]

32-bit LDUMAXA (size == 10 && A == 1 && R == 0)

LDUMAXA <Ws>, <Wt>, [<Xn|SP>]

32-bit LDUMAXAL (size == 10 && A == 1 && R == 1)

LDUMAXAL <Ws>, <Wt>, [<Xn|SP>]

32-bit LDUMAXL (size == 10 && A == 0 && R == 1)

LDUMAXL <Ws>, <Wt>, [<Xn|SP>]

64-bit LDUMAX (size == 11 && A == 0 && R == 0)

LDUMAX <Xs>, <Xt>, [<Xn|SP>]

64-bit LDUMAXA (size == 11 && A == 1 && R == 0)

LDUMAXA <Xs>, <Xt>, [<Xn|SP>]

64-bit LDUMAXAL (size == 11 && A == 1 && R == 1)

LDUMAXAL <Xs>, <Xt>, [<Xn|SP>]

64-bit LDUMAXL (size == 11 && A == 0 && R == 1)

LDUMAXL <Xs>, <Xt>, [<Xn|SP>]

```
if !IsFeatureImplemented(FEAT_LSE) then UNDEFINED;

integer t = UInt(Rt);
integer n = UInt(Rn);
integer s = UInt(Rs);

constant integer datasize = 8 << UInt(size);
integer regsize = if datasize == 64 then 64 else 32;
boolean acquire = A == '1' && Rt != '11111';
boolean release = R == '1';
boolean tagchecked = n != 31;
```

Assembler Symbols

<Ws>	Is the 32-bit name of the general-purpose register holding the data value to be operated on with the contents of the memory location, encoded in the "Rs" field.
<Wt>	Is the 32-bit name of the general-purpose register to be loaded, encoded in the "Rt" field.
<Xs>	Is the 64-bit name of the general-purpose register holding the data value to be operated on with the contents of the memory location, encoded in the "Rs" field.
<Xt>	Is the 64-bit name of the general-purpose register to be loaded, encoded in the "Rt" field.
<Xn SP>	Is the 64-bit name of the general-purpose base register or stack pointer, encoded in the "Rn" field.

Alias Conditions

Alias	Is preferred when
STUMAX , STUMAXL	A == '0' && Rt == '11111'

Operation

```
bits(64) address;
bits(datasize) value;
bits(datasize) data;
```

```
AccessDescriptor accdesc = CreateAccDescAtomicOp(MemAtomicOp\_UMAX, acqu
value = X[s, datasize];
if n == 31 then
    CheckSPAlignment();
    address = SP[];
else
    address = X[n, 64];

bits(datasize) comparevalue = bits(datasize) UNKNOWN;    // Irrelevant
data = MemAtomic(address, comparevalue, value, accdesc);

if t != 31 then
    X[t, regsize] = ZeroExtend(data, regsize);
```

Operational information

If PSTATE.DIT is 1, the timing of this instruction is insensitive to the value of the data being loaded or stored.

Base Instructions	SIMD&FP Instructions	SVE Instructions	SME Instructions	Index by Encoding	Sh Pseu
Internal version only: isa v33.64, AdvSIMD v29.12, pseudocode no_diffs_2023_09_RC2, sve v2023-06_rel ; Build timestamp: 2023-09-18T17:56					
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