TRN1, TRN2 (vectors)

Interleave even or odd elements from two vectors

Interleave alternating even or odd-numbered elements from the first and second source vectors and place in elements of the destination vector. This instruction is unpredicated.

The 128-bit element variant requires that the current vector length is at least 256 bits, and if the current vector length is not an integer multiple of 256 bits then the trailing bits are set to zero. ID_AA64ZFR0_EL1.F64MM indicates whether the 128-bit element variant is implemented. The 128-bit element variant is illegal when executed in Streaming SVE mode, unless FEAT_SME_FA64 is implemented and enabled.

It has encodings from 4 classes: Even , Even (quadwords) , Odd and Odd (quadwords)

Even

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	0	0	0	0	1	0	1	size		1	Zm					0	1	1	1	0	0	Zn					Zd				
																					H										

TRN1 <Zd>.<T>, <Zn>.<T>, <Zm>.<T>

```
if !HaveSVE() && !HaveSME() then UNDEFINED;
constant integer esize = 8 << UInt(size);
integer n = UInt(Zn);
integer m = UInt(Zm);
integer d = UInt(Zd);
integer part = 0;
```

Even (quadwords)

(FEAT_F64MM)

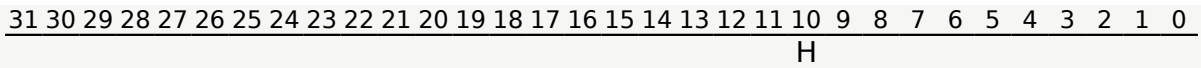
31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	0	0	0	0	1	0	1	1	0	1	Zm					0	0	0	1	1	0	Zn					Zd				
																					H										

TRN1 <Zd>.Q, <Zn>.Q, <Zm>.Q

```
if !HaveSVE() || !HaveSVEFP64MatMulExt() then UNDEFINED;
constant integer esize = 128;
integer n = UInt(Zn);
integer m = UInt(Zm);
integer d = UInt(Zd);
integer part = 0;
```

Odd

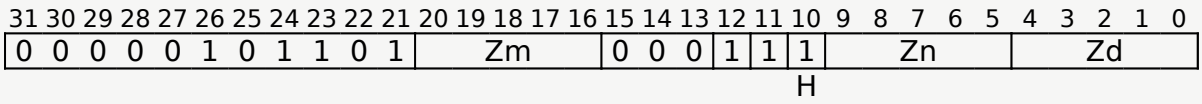
31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	0	0	0	0	1	0	1	size		1	Zm					0	1	1	1	0	1	Zn					Zd				



TRN2 <Zd>.<T>, <Zn>.<T>, <Zm>.<T>

```
if !HaveSVE() && !HaveSME() then UNDEFINED;
constant integer esize = 8 << UInt(size);
integer n = UInt(Zn);
integer m = UInt(Zm);
integer d = UInt(Zd);
integer part = 1;
```

Odd (quadwords)
(FEAT_F64MM)



TRN2 <Zd>.Q, <Zn>.Q, <Zm>.Q

```
if !HaveSVE() || !HaveSVEFP64MatMulExt() then UNDEFINED;
constant integer esize = 128;
integer n = UInt(Zn);
integer m = UInt(Zm);
integer d = UInt(Zd);
integer part = 1;
```

Assembler Symbols

<Zd> Is the name of the destination scalable vector register, encoded in the "Zd" field.

<T> Is the size specifier, encoded in “size”:

size	<T>
00	B
01	H
10	S
11	D

<Zn> Is the name of the first source scalable vector register, encoded in the "Zn" field.

<Zm> Is the name of the second source scalable vector register, encoded in the "Zm" field.

Operation

```
if esize < 128 then CheckSVEEnabled(); else CheckNonStreamingSVEEnabled
constant integer VL = CurrentVL;
if VL < esize * 2 then UNDEFINED;
constant integer pairs = VL DIV (esize * 2);
```

```
bits(VL) operand1 = Z[n, VL];
bits(VL) operand2 = Z[m, VL];
bits(VL) result = Zeros(VL);

for p = 0 to pairs-1
    Elem[result, 2*p+0, esize] = Elem[operand1, 2*p+part, esize];
    Elem[result, 2*p+1, esize] = Elem[operand2, 2*p+part, esize];

Z[d, VL] = result;
```

Operational information

If FEAT_SVE2 is implemented or FEAT_SME is implemented, then 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.

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