SM4EKEY

SM4 Key takes an input as a 128-bit vector from the first source SIMD&FP register and a 128-bit constant from the second SIMD&FP register. It derives four iterations of the output key, in accordance with the SM4 standard, returning the 128-bit result to the destination SIMD&FP register.

This instruction is implemented only when *FEAT_SM4* is implemented.

Advanced SIMD

(FEAT_SM4)

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	1	0	0	1	1	1	0	0	1	1	Rm					1	1	0	0	1	0	Rn					Rd				

```
SM4EKEY <Vd>.4S, <Vn>.4S, <Vm>.4S
```

```
if !IsFeatureImplemented(FEAT_SM4) then UNDEFINED;
integer d = UInt(Rd);
integer n = UInt(Rn);
integer m = UInt(Rm);
```

Assembler Symbols

<Vd> Is the name of the SIMD&FP destination register, encoded in the "Rd" field.

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

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

Operation

```
AArch64.CheckFPAdvSIMDEnabled();

bits(128) Vm = V[m, 128];
bits(32) intval;
bits(32) const;
bits(128) roundresult;

roundresult = V[n, 128];
for index = 0 to 3
    const = Elem[Vm, index, 32];

    intval = roundresult<127:96> EOR roundresult<95:64> EOR roundresult

    for i = 0 to 3
        Elem[intval, i, 8] = Sbox(Elem[intval, i, 8]);

    intval = intval EOR ROL(intval, 13) EOR ROL(intval, 23);
    intval = intval EOR roundresult<31:0>;
    roundresult<31:0> = roundresult<63:32>;
    roundresult<63:32> = roundresult<95:64>;
    roundresult<95:64> = roundresult<127:96>;
    roundresult<127:96> = intval;

V[d, 128] = roundresult;
```

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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