

APIAKeyLo_EL1, Pointer Authentication Key A for Instruction (bits[63:0])

The APIAKeyLo_EL1 characteristics are:

Purpose

Holds bits[63:0] of key A used for authentication of instruction pointer values.

Note

The term APIAKey_EL1 is used to describe the concatenation of [APIAKeyHi_EL1](#): [APIAKeyLo_EL1](#).

Configuration

This register is present only when FEAT_PAuth is implemented. Otherwise, direct accesses to APIAKeyLo_EL1 are undefined.

Attributes

APIAKeyLo_EL1 is a 64-bit register.

Field descriptions

63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
64 bit value, bits[63:0] of the 128 bit pointer authentication key value																															
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

Bits [63:0]

64 bit value, bits[63:0] of the 128 bit pointer authentication key value.

The reset behavior of this field is:

- On a Warm reset, this field resets to an architecturally unknown value.

Accessing APIAKeyLo_EL1

Accesses to this register use the following encodings in the System register encoding space:

MRS <Xt>, APIAKeyLo_EL1

op0	op1	CRn	CRm	op2
0b11	0b000	0b0010	0b0001	0b000

```
if PSTATE.EL == EL0 then
    UNDEFINED;
elsif PSTATE.EL == EL1 then
    if Halted() && HaveEL(EL3) && EDSCR.SDD == '1'
    && boolean IMPLEMENTATION_DEFINED "EL3 trap priority
    when SDD == '1'" && SCR_EL3.APK == '0' then
        UNDEFINED;
    elsif EL2Enabled() && HCR_EL2.APK == '0' then
        AArch64.SystemAccessTrap(EL2, 0x18);
    elsif EL2Enabled() &&
    IsFeatureImplemented(FEAT_FGT) && (!HaveEL(EL3) ||
    SCR_EL3.FGTEn == '1') && HFGTR_EL2.APIAKey == '1'
    then
        AArch64.SystemAccessTrap(EL2, 0x18);
    elsif HaveEL(EL3) && SCR_EL3.APK == '0' then
        if Halted() && EDSCR.SDD == '1' then
            UNDEFINED;
        else
            AArch64.SystemAccessTrap(EL3, 0x18);
        else
            X[t, 64] = APIAKeyLo_EL1;
    elsif PSTATE.EL == EL2 then
        if Halted() && HaveEL(EL3) && EDSCR.SDD == '1'
        && boolean IMPLEMENTATION_DEFINED "EL3 trap priority
        when SDD == '1'" && SCR_EL3.APK == '0' then
            UNDEFINED;
        elsif HaveEL(EL3) && SCR_EL3.APK == '0' then
            if Halted() && EDSCR.SDD == '1' then
                UNDEFINED;
            else
                AArch64.SystemAccessTrap(EL3, 0x18);
            else
                X[t, 64] = APIAKeyLo_EL1;
    elsif PSTATE.EL == EL3 then
        X[t, 64] = APIAKeyLo_EL1;
```

MSR APIAKeyLo_EL1, <Xt>

op0	op1	CRn	CRm	op2
0b11	0b000	0b0010	0b0001	0b000

```
if PSTATE.EL == EL0 then
    UNDEFINED;
elseif PSTATE.EL == EL1 then
    if Halted() && HaveEL(EL3) && EDSCR.SDD == '1'
    && boolean IMPLEMENTATION_DEFINED "EL3 trap priority
    when SDD == '1'" && SCR_EL3.APK == '0' then
        UNDEFINED;
    elseif EL2Enabled() && HCR_EL2.APK == '0' then
        AArch64.SystemAccessTrap(EL2, 0x18);
    elseif EL2Enabled() &&
    IsFeatureImplemented(FEAT_FGT) && (!HaveEL(EL3) ||
    SCR_EL3.FGTEn == '1') && HFGWTR_EL2.APIAKey == '1'
    then
        AArch64.SystemAccessTrap(EL2, 0x18);
    elseif HaveEL(EL3) && SCR_EL3.APK == '0' then
        if Halted() && EDSCR.SDD == '1' then
            UNDEFINED;
        else
            AArch64.SystemAccessTrap(EL3, 0x18);
        else
            APIAKeyLo_EL1 = X[t, 64];
    elseif PSTATE.EL == EL2 then
        if Halted() && HaveEL(EL3) && EDSCR.SDD == '1'
        && boolean IMPLEMENTATION_DEFINED "EL3 trap priority
        when SDD == '1'" && SCR_EL3.APK == '0' then
            UNDEFINED;
        elseif HaveEL(EL3) && SCR_EL3.APK == '0' then
            if Halted() && EDSCR.SDD == '1' then
                UNDEFINED;
            else
                AArch64.SystemAccessTrap(EL3, 0x18);
            else
                APIAKeyLo_EL1 = X[t, 64];
    elseif PSTATE.EL == EL3 then
        APIAKeyLo_EL1 = X[t, 64];
```

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