

GCSPR_EL0, Guarded Control Stack Pointer (EL0)

The GCSPR_EL0 characteristics are:

Purpose

Contains the Guarded control stack pointer at EL0.

Configuration

This register is present only when FEAT_GCS is implemented. Otherwise, direct accesses to GCSPR_EL0 are undefined.

Attributes

GCSPR_EL0 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
PTR[63:3]																															
PTR[63:3]																															RES0
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

PTR[63:3], bits [63:3]

EL0 Guarded control stack pointer bits [63:3].

The reset behavior of this field is:

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

Bits [2:0]

Reserved, res0.

Accessing GCSPR_EL0

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

MRS <Xt>, GCSPR_EL0

op0	op1	CRn	CRm	op2
0b11	0b011	0b0010	0b0101	0b001

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if PSTATE.EL == EL0 then
    if Halted() && HaveEL(EL3) && EDSCR.SDD == '1'
    && boolean IMPLEMENTATION_DEFINED "EL3 trap priority
when SDD == '1'" && SCR_EL3.GCSEn == '0' then
        UNDEFINED;
    elseif (!EL2Enabled() || HCR_EL2.TGE != '1') &&
GCSCRE0_EL1.nTR == '0' then
        AArch64.SystemAccessTrap(EL1, 0x18);
    elseif EL2Enabled() && HCR_EL2.TGE == '1' &&
GCSCRE0_EL1.nTR == '0' then
        AArch64.SystemAccessTrap(EL2, 0x18);
    elseif EL2Enabled() && HCR_EL2.<E2H,TGE> != '11'
&& IsFeatureImplemented(FEAT_FGT) && (!HaveEL(EL3)
|| SCR_EL3.FGTEn == '1') && HFGTR_EL2.nGCS_EL0 ==
'0' then
        AArch64.SystemAccessTrap(EL2, 0x18);
    elseif HaveEL(EL3) && SCR_EL3.GCSEn == '0' then
        if Halted() && EDSCR.SDD == '1' then
            UNDEFINED;
        else
            AArch64.SystemAccessTrap(EL3, 0x18);
        else
            X[t, 64] = GCSPR_EL0;
elseif PSTATE.EL == EL1 then
    if Halted() && HaveEL(EL3) && EDSCR.SDD == '1'
    && boolean IMPLEMENTATION_DEFINED "EL3 trap priority
when SDD == '1'" && SCR_EL3.GCSEn == '0' then
        UNDEFINED;
    elseif EL2Enabled() &&
IsFeatureImplemented(FEAT_FGT) && (!HaveEL(EL3) ||
SCR_EL3.FGTEn == '1') && HFGTR_EL2.nGCS_EL0 == '0'
then
        AArch64.SystemAccessTrap(EL2, 0x18);
    elseif HaveEL(EL3) && SCR_EL3.GCSEn == '0' then
        if Halted() && EDSCR.SDD == '1' then
            UNDEFINED;
        else
            AArch64.SystemAccessTrap(EL3, 0x18);
        else
            X[t, 64] = GCSPR_EL0;
elseif PSTATE.EL == EL2 then
    if Halted() && HaveEL(EL3) && EDSCR.SDD == '1'
    && boolean IMPLEMENTATION_DEFINED "EL3 trap priority
when SDD == '1'" && SCR_EL3.GCSEn == '0' then
        UNDEFINED;
    elseif HaveEL(EL3) && SCR_EL3.GCSEn == '0' then
        if Halted() && EDSCR.SDD == '1' then
            UNDEFINED;
        else
            AArch64.SystemAccessTrap(EL3, 0x18);
        else
            X[t, 64] = GCSPR_EL0;
elseif PSTATE.EL == EL3 then
    if Halted() && EDSCR.SDD == '1' then
        UNDEFINED;
    else
        AArch64.SystemAccessTrap(EL3, 0x18);
    else
        X[t, 64] = GCSPR_EL0;

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        X[t, 64] = GCSPR_EL0;
    elsif PSTATE.EL == EL3 then
        X[t, 64] = GCSPR_EL0;

```

MSR GCSPR_EL0, <Xt>

op0	op1	CRn	CRm	op2
0b11	0b011	0b0010	0b0101	0b001

```

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.GCSEn == '0' then
        UNDEFINED;
    elsif EL2Enabled() &&
    IsFeatureImplemented(FEAT_FGT) && (!HaveEL(EL3) ||
    SCR_EL3.FGTEn == '1') && HFGWTR_EL2.nGCS_EL0 == '0'
    then
        AArch64.SystemAccessTrap(EL2, 0x18);
    elsif HaveEL(EL3) && SCR_EL3.GCSEn == '0' then
        if Halted() && EDSCR.SDD == '1' then
            UNDEFINED;
        else
            AArch64.SystemAccessTrap(EL3, 0x18);
        else
            GCSPR_EL0 = X[t, 64];
    elsif PSTATE.EL == EL2 then
        if Halted() && HaveEL(EL3) && EDSCR.SDD == '1'
        && boolean IMPLEMENTATION_DEFINED "EL3 trap priority
        when SDD == '1'" && SCR_EL3.GCSEn == '0' then
            UNDEFINED;
        elsif HaveEL(EL3) && SCR_EL3.GCSEn == '0' then
            if Halted() && EDSCR.SDD == '1' then
                UNDEFINED;
            else
                AArch64.SystemAccessTrap(EL3, 0x18);
            else
                GCSPR_EL0 = X[t, 64];
    elsif PSTATE.EL == EL3 then
        GCSPR_EL0 = X[t, 64];

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