

BRBTS_EL1, Branch Record Buffer Timestamp Register

The BRBTS_EL1 characteristics are:

Purpose

Captures the Timestamp value on a BRBE freeze event.

Configuration

This register is present only when FEAT_BRBE is implemented. Otherwise, direct accesses to BRBTS_EL1 are undefined.

Attributes

BRBTS_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
TS																															
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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

TS, bits [63:0]

Timestamp value at the time of a BRBE freeze event.

The reset behavior of this field is:

- On a Warm reset, this field resets to 0.

Accessing BRBTS_EL1

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

MRS <Xt>, BRBTS_EL1

op0	op1	CRn	CRm	op2
0b10	0b001	0b1001	0b0000	0b010

```

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'" && MDCR_EL3.SBRBE != '11' &&
    SCR_EL3.NS == '0' then
        UNDEFINED;
    elsif Halted() && HaveEL(EL3) && EDSCR.SDD ==
    '1' && boolean IMPLEMENTATION_DEFINED "EL3 trap
    priority when SDD == '1'" && MDCR_EL3.SBRBE == 'x0'
    && SCR_EL3.NS == '1' then
        UNDEFINED;
    elsif EL2Enabled() &&
    IsFeatureImplemented(FEAT_FGT) && (!HaveEL(EL3) ||
    SCR_EL3.FGTEn == '1') && HDFGRTR_EL2.nBRBDATA == '0'
    then
        AArch64.SystemAccessTrap(EL2, 0x18);
    elsif HaveEL(EL3) && MDCR_EL3.SBRBE != '11' &&
    SCR_EL3.NS == '0' then
        if Halted() && EDSCR.SDD == '1' then
            UNDEFINED;
        else
            AArch64.SystemAccessTrap(EL3, 0x18);
        elsif HaveEL(EL3) && MDCR_EL3.SBRBE == 'x0' &&
    SCR_EL3.NS == '1' then
            if Halted() && EDSCR.SDD == '1' then
                UNDEFINED;
            else
                AArch64.SystemAccessTrap(EL3, 0x18);
        else
            X[t, 64] = BRBTS_EL1;
    elsif PSTATE.EL == EL2 then
        if Halted() && HaveEL(EL3) && EDSCR.SDD == '1'
        && boolean IMPLEMENTATION_DEFINED "EL3 trap priority
        when SDD == '1'" && MDCR_EL3.SBRBE != '11' &&
        SCR_EL3.NS == '0' then
            UNDEFINED;
        elsif Halted() && HaveEL(EL3) && EDSCR.SDD ==
        '1' && boolean IMPLEMENTATION_DEFINED "EL3 trap
        priority when SDD == '1'" && MDCR_EL3.SBRBE == 'x0'
        && SCR_EL3.NS == '1' then
            UNDEFINED;
        elsif HaveEL(EL3) && MDCR_EL3.SBRBE != '11' &&
    SCR_EL3.NS == '0' then
            if Halted() && EDSCR.SDD == '1' then
                UNDEFINED;
            else
                AArch64.SystemAccessTrap(EL3, 0x18);
        elsif HaveEL(EL3) && MDCR_EL3.SBRBE == 'x0' &&
    SCR_EL3.NS == '1' then
            if Halted() && EDSCR.SDD == '1' then
                UNDEFINED;
            else
                AArch64.SystemAccessTrap(EL3, 0x18);
        else
            X[t, 64] = BRBTS_EL1;
    elsif PSTATE.EL == EL3 then

```

```
X[t, 64] = BRBTS_EL1;
```

MSR BRBTS_EL1, <Xt>

op0	op1	CRn	CRm	op2
0b10	0b001	0b1001	0b0000	0b010

```

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'" && MDCR_EL3.SBRBE != '11' &&
    SCR_EL3.NS == '0' then
        UNDEFINED;
    elsif Halted() && HaveEL(EL3) && EDSCR.SDD ==
    '1' && boolean IMPLEMENTATION_DEFINED "EL3 trap
    priority when SDD == '1'" && MDCR_EL3.SBRBE == 'x0'
    && SCR_EL3.NS == '1' then
        UNDEFINED;
    elsif EL2Enabled() &&
    IsFeatureImplemented(FEAT_FGT) && (!HaveEL(EL3) ||
    SCR_EL3.FGTEn == '1') && HDFGWTR_EL2.nBRBDATA == '0'
    then
        AArch64.SystemAccessTrap(EL2, 0x18);
    elsif HaveEL(EL3) && MDCR_EL3.SBRBE != '11' &&
    SCR_EL3.NS == '0' then
        if Halted() && EDSCR.SDD == '1' then
            UNDEFINED;
        else
            AArch64.SystemAccessTrap(EL3, 0x18);
        elsif HaveEL(EL3) && MDCR_EL3.SBRBE == 'x0' &&
    SCR_EL3.NS == '1' then
            if Halted() && EDSCR.SDD == '1' then
                UNDEFINED;
            else
                AArch64.SystemAccessTrap(EL3, 0x18);
        else
            BRBTS_EL1 = X[t, 64];
    elsif PSTATE.EL == EL2 then
        if Halted() && HaveEL(EL3) && EDSCR.SDD == '1'
        && boolean IMPLEMENTATION_DEFINED "EL3 trap priority
        when SDD == '1'" && MDCR_EL3.SBRBE != '11' &&
        SCR_EL3.NS == '0' then
            UNDEFINED;
        elsif Halted() && HaveEL(EL3) && EDSCR.SDD ==
        '1' && boolean IMPLEMENTATION_DEFINED "EL3 trap
        priority when SDD == '1'" && MDCR_EL3.SBRBE == 'x0'
        && SCR_EL3.NS == '1' then
            UNDEFINED;
        elsif HaveEL(EL3) && MDCR_EL3.SBRBE != '11' &&
    SCR_EL3.NS == '0' then
            if Halted() && EDSCR.SDD == '1' then

```

```

        UNDEFINED;
    else
        AArch64.SystemAccessTrap(EL3, 0x18);
    elsif HaveEL(EL3) && MDCR_EL3.SBRBE == 'x0' &&
SCR_EL3.NS == '1' then
        if Halted() && EDSCR.SDD == '1' then
            UNDEFINED;
        else
            AArch64.SystemAccessTrap(EL3, 0x18);
        else
            BRBTS_EL1 = X[t, 64];
    elsif PSTATE.EL == EL3 then
        BRBTS_EL1 = X[t, 64];

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