BRBTGT<n>_EL1, Branch Record Buffer Target Address Register <n>, n = 0 - 31

The BRBTGT<n>_EL1 characteristics are:

Purpose

The target address of Branch record n + (BRBFCR_EL1.BANK Ã— 32).

Configuration

This register is present only when FEAT_BRBE is implemented. Otherwise, direct accesses to BRBTGT<n>_EL1 are undefined.

Attributes

BRBTGT<n>_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
ADDRESS																															
ADDRESS																															
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

ADDRESS, bits [63:0]

Target virtual address of the Branch record.

When an indirect write occurs with a value with ADDRESS bits [63:P] being other than all zeroes or all ones, an unknown value which is not all zeroes or all ones is written to bits [63:P]. P is defined as the virtual address size supported by the PE, as returned by DebugAddrTop(). The value in bits [P-1:0] is the value written.

When an indirect write occurs with a value with ADDRESS bits [63:P] being all zeroes or all ones, the written value is written to bits [63:0], and a read of the register returns the written value.

The reset behavior of this field is:

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

Accessing this field has the following behavior:

- Access is **RES0** if any of the following are true:
  - BRBINF<n>_EL1.VALID == 0b00
  - BRBINF<n>_EL1.VALID == 0b10
- Otherwise, access to this field is **RO**.

Accessing BRBTGT<n>_EL1

BRBTGT<n>_EL1 is res0 if n + (BRBFCR_EL1.BANK Ã— 32) >= BRBIDR0_EL1.NUMREC.

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

MRS <Xt>, BRBTGT<m>_EL1 ; Where m = 0-31

op0	op1	CRn	CRm	op2
0b10	0b001	0b1000	m[3:0]	m[4]:0b10

```
integer m = UInt(op2<2>:CRm<3:0>);

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);
```

```
    elsif m + (UInt(BRBFCR_EL1.BANK) * 32) >=
NUM_BRBE_RECORDS then
        X[t, 64] = Zeros(64);
    else
        X[t, 64] = BRBTGT_EL1[m];
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);
    elsif m + (UInt(BRBFCR_EL1.BANK) * 32) >=
NUM_BRBE_RECORDS then
        X[t, 64] = Zeros(64);
    else
        X[t, 64] = BRBTGT_EL1[m];
elsif PSTATE.EL == EL3 then
    if m + (UInt(BRBFCR_EL1.BANK) * 32) >=
NUM_BRBE_RECORDS then
        X[t, 64] = Zeros(64);
    else
        X[t, 64] = BRBTGT_EL1[m];
```

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