

BRAA, BRAAZ, BRAB, BRABZ

Branch to Register, with pointer authentication. This instruction authenticates the address in the general-purpose register that is specified by $\langle Xn \rangle$, using a modifier and the specified key, and branches to the authenticated address.

The modifier is:

- In the general-purpose register or stack pointer that is specified by $\langle Xm|SP \rangle$ for BRAA and BRAB.
- The value zero, for BRAAZ and BRABZ.

Key A is used for BRAA and BRAAZ. Key B is used for BRAB and BRABZ.

If the authentication passes, the PE continues execution at the target of the branch. For information on behavior if the authentication fails, see [Faulting on pointer authentication](#).

The authenticated address is not written back to the general-purpose register.

Integer (FEAT_PAuth)

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	1	0	1	1	Z	0	0	0	1	1	1	1	1	0	0	0	0	1	M	Rn				Rm					
op																A															

Key A, zero modifier (Z == 0 && M == 0 && Rm == 1111)

BRAAZ $\langle Xn \rangle$

Key A, register modifier (Z == 1 && M == 0)

BRAA $\langle Xn \rangle$, $\langle Xm|SP \rangle$

Key B, zero modifier (Z == 0 && M == 1 && Rm == 1111)

BRABZ $\langle Xn \rangle$

Key B, register modifier (Z == 1 && M == 1)

BRAB $\langle Xn \rangle$, $\langle Xm|SP \rangle$

```
integer n = UInt(Rn);
integer m = UInt(Rm);
boolean use_key_a = (M == '0');
boolean source_is_sp = ((Z == '1') && (m == 31));
```

```

if !IsFeatureImplemented(FEAT_PAuth) then
    UNDEFINED;

if Z == '0' && m != 31 then
    UNDEFINED;

```

Assembler Symbols

- <Xn> Is the 64-bit name of the general-purpose register holding the address to be branched to, encoded in the "Rn" field.
- <Xm|SP> Is the 64-bit name of the general-purpose source register or stack pointer holding the modifier, encoded in the "Rm" field.

Operation

```

bits(64) target = X[n, 64];
bits(64) modifier = if source_is_sp then SP[] else X[m, 64];
if use_key_a then
    target = AuthIA(target, modifier, TRUE);
else
    target = AuthIB(target, modifier, TRUE);

// Value in BTypeNext will be used to set PSTATE.BTYPE
if InGuardedPage then
    if n == 16 || n == 17 then
        BTypeNext = '01';
    else
        BTypeNext = '11';
else
    BTypeNext = '01';
BranchTo(target, BranchType_INDIR, FALSE);

```

[Base
Instructions](#)

[SIMD&FP
Instructions](#)

[SVE
Instructions](#)

[SME
Instructions](#)

[Index by
Encoding](#)

[Sh
Pseudocode](#)

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