ALU运算器模块测试结果记录表

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| **A= 0x7FFFFFFF B= 0x7FFFFFFF** | | | | |
| ALU\_OP | **运算方式** | Shift\_carry\_out，来自CPSR的CF、VF | F | **NZCV** |
| 0000 | F=A & B | 10\* | 2147483647 | 001N |
| 0001 | F=A ^ B | 00\* | 0 | 010N |
| 0010 | F=A - B | 01\* | 0 | 0100 |
| 0011 | F=B - A | 01\* | 0 | 0100 |
| 0100 | F=A + B | 01\* | 4294967294 | 1001 |
| 0101 | F=A + B +CF | 01\* | 4294967294 | 1001 |
| 0110 | F=A - B + CF - 1 | 01\* | 0 | 0100 |
| 0111 | F=B - A + CF - 1 | 01\* | 0 | 0100 |
| 1000 | F=A | 00\* | 2147483647 | NNNN |
| 1010 | F=A–B + 4 | 01\* | 4 | 0000 |
| 1100 | F=A | B | 10\* | 2147483647 | 001N |
| 1101 | F=B | 00\* | 2147483647 | NNNN |
| 1110 | F=A & (~B) | 10\* | 0 | 011N |
| 1111 | F=~B | 10\* | 2147483648 | 101N |

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| **A= 0x00000001 B= 0xFFFFFFFF** | | | | |
| ALU\_OP | **运算方式** | Shift\_carry\_out，来自CPSR的CF、VF | F | **NZCV** |
| 0000 | F=A & B | 01\* | 1 | 000N |
| 0001 | F=A ^ B | 11\* | 4294967294 | 101N |
| 0010 | F=A - B | 00\* | 2 | 0010 |
| 0011 | F=B - A | 00\* | 4294967294 | 1000 |
| 0100 | F=A + B | 00\* | 0 | 0110 |
| 0101 | F=A + B +CF | 00\* | 0 | 0110 |
| 0110 | F=A - B + CF - 1 | 00\* | 1 | 0010 |
| 0111 | F=B - A + CF - 1 | 00\* | 4294967293 | 1000 |
| 1000 | F=A | 01\* | 1 | NNNN |
| 1010 | F=A–B + 4 | 00\* | 6 | 0010 |
| 1100 | F=A | B | 01\* | 4294967295 | 100N |
| 1101 | F=B | 01\* | 4294967295 | NNNN |
| 1110 | F=A & (~B) | 01\* | 0 | 010N |
| 1111 | F=~B | 01\* | 0 | 010N |

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| **A= 0x55555555 B= 0xAAAAAAAA** | | | | |
| ALU\_OP | **运算方式** | Shift\_carry\_out，来自CPSR的CF、VF | F | **NZCV** |
| 0000 | F=A & B | 10\* | 0 | 011N |
| 0001 | F=A ^ B | 00\* | 4294967295 | 100N |
| 0010 | F=A - B | 01\* | 2863311531 | 1011 |
| 0011 | F=B - A | 01\* | 1431655765 | 0001 |
| 0100 | F=A + B | 01\* | 4294967295 | 1000 |
| 0101 | F=A + B +CF | 01\* | 0 | 0110 |
| 0110 | F=A - B + CF - 1 | 01\* | 2863311531 | 1011 |
| 0111 | F=B - A + CF - 1 | 01\* | 1431655765 | 0001 |
| 1000 | F=A | 00\* | 1431655765 | NNNN |
| 1010 | F=A–B + 4 | 01\* | 2863311535 | 1011 |
| 1100 | F=A | B | 10\* | 4294967295 | 101N |
| 1101 | F=B | 00\* | 2863311530 | NNNN |
| 1110 | F=A & (~B) | 10\* | 1431655765 | 001N |
| 1111 | F=~B | 10\* | 1431655765 | 001N |

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| **A= 0x7FFFFFFF B= 0x00000001** | | | | |
| ALU\_OP | **运算方式** | Shift\_carry\_out，来自CPSR的CF、VF | F | **NZCV** |
| 0000 | F=A & B | 01\* | 1 | 000N |
| 0001 | F=A ^ B | 11\* | 2147483646 | 001N |
| 0010 | F=A - B | 00\* | 2147483646 | 001N |
| 0011 | F=B - A | 00\* | 2147483650 | 1010 |
| 0100 | F=A + B | 00\* | 2147483648 | 1001 |
| 0101 | F=A + B +CF | 00\* | 2147483648 | 1001 |
| 0110 | F=A - B + CF - 1 | 00\* | 2147483645 | 0000 |
| 0111 | F=B - A + CF - 1 | 00\* | 2147483649 | 1010 |
| 1000 | F=A | 01\* | 2147483647 | NNNN |
| 1010 | F=A–B + 4 | 00\* | 2147483650 | 1001 |
| 1100 | F=A | B | 01\* | 2147483647 | 000N |
| 1101 | F=B | 01\* | 1 | NNNN |
| 1110 | F=A & (~B) | 01\* | 2147483646 | 000N |
| 1111 | F=~B | 01\* | 4294967294 | 100N |

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| --- | --- | --- | --- | --- |
| **A= 0x7FFFFFFF B= 0x00000001** | | | | |
| ALU\_OP | **运算方式** | Shift\_carry\_out，来自CPSR的CF、VF | F | **NZCV** |
| 0000 | F=A & B | 10\* | 1 | 001N |
| 0001 | F=A ^ B | 00\* | 2147483646 | 000N |
| 0010 | F=A - B | 01\* | 2147483646 | 0000 |
| 0011 | F=B - A | 01\* | 2147483650 | 1010 |
| 0100 | F=A + B | 01\* | 2147483648 | 1001 |
| 0101 | F=A + B +CF | 01\* | 2147483649 | 1001 |
| 0110 | F=A - B + CF - 1 | 01\* | 2147483646 | 0000 |
| 0111 | F=B - A + CF - 1 | 01\* | 2147483650 | 1010 |
| 1000 | F=A | 00\* | 2147483647 | NNNN |
| 1010 | F=A–B + 4 | 01\* | 2147483650 | 1001 |
| 1100 | F=A | B | 10\* | 2147483647 | 001N |
| 1101 | F=B | 00\* | 1 | NNNN |
| 1110 | F=A & (~B) | 10\* | 2147483646 | 001N |
| 1111 | F=~B | 10\* | 4294967294 | 101N |

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| **A= 0x12345678 B= 0x87654321** | | | | |
| ALU\_OP | **运算方式** | Shift\_carry\_out，来自CPSR的CF、VF | F | **NZCV** |
| 0000 | F=A & B | 01\* | 35930656 | 000N |
| 0001 | F=A ^ B | 11\* | 2505119065 | 101N |
| 0010 | F=A - B | 00\* | 2328826711 | 1011 |
| 0011 | F=B - A | 00\* | 1966140585 | 0001 |
| 0100 | F=A + B | 00\* | 2576980377 | 1000 |
| 0101 | F=A + B +CF | 00\* | 2576980377 | 1000 |
| 0110 | F=A - B + CF - 1 | 00\* | 2328826710 | 1011 |
| 0111 | F=B - A + CF - 1 | 00\* | 1966140584 | 0001 |
| 1000 | F=A | 01\* | 305419896 | NNNN |
| 1010 | F=A–B + 4 | 00\* | 2328826715 | 1011 |
| 1100 | F=A | B | 01\* | 2541049721 | 100N |
| 1101 | F=B | 01\* | 2271560481 | NNNN |
| 1110 | F=A & (~B) | 01\* | 269489240 | 000N |
| 1111 | F=~B | 01\* | 2023406814 | 000N |

桶形移位器和ALU运算器模块联调实验记录表

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| --- | --- | --- | --- | --- | --- | --- | --- |
| SHIFT\_OP | 移位次数Shift\_Num | 被移位数据  Shift\_Data | ALU\_OP | **A** | 来自CPSR的CF、VF | F | **NZCV** |
| 0 | 0 | 103833526 | 0 | 1818587645 |  | 0x04205164 | 0000 |
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