

(6)

 $R_2 \oplus B$

C1

$$E: R = R + B + 1$$

$$SC = n$$

1

 $R \geq B$

$$R = R + B$$

$$\text{overflow} = 1$$

Overflow

0

 $R < B$

$$R = R + B$$

$$\text{overflow} = 0$$
SHL $E: R_2 \oplus$

1

 $n-1$

$$E: R = R + B + 1$$

0

 n

$$E: R = R + B + 1$$
 $1: R \geq B$

E

 $R < B$

$$A_0 = 0$$

$$R = R + B$$
 $A_0 \geq 1$ $SC = SC - 1$ < 0

SC

 ≥ 0 Quotient = Q Remainder = R $S_Q = S_A \oplus S_B$ $S_R = S_A$

(C)

$-pg = -72 \rightarrow S_A A = 1 \quad 0100 \quad 1000$

$+de = +15 \rightarrow S_B B = 0 \quad 0000 \quad 1111$

$$\begin{array}{r|l} 72 & 15 \\ \hline & 4 \\ \hline 12 & \end{array}$$

$\bar{B}+1 = 0001$

$n = 4$

SC	E	R	Q	B	OP
4	0	0100	1000	1111	init
	0	0101	1000		$R+\bar{B}+1$
	1	0100	1000		overflow = 0
	0	1001	000-		SHL
	0	1010	000-		$R+\bar{B}+1$
	0	1001	0000		restore
3	1	0010	000-		SHL
	1	0011	000-		$R+\bar{B}+1$
	1	0011	0001		$Q_0 = 1$
2	0	0110	001-		SHL
	0	0111	001-		$R+\bar{B}+1$
	1	0110	0010		restore
1	0	1100	010-		SHL
	0	1101	010-		$R+\bar{B}+1$
	1	1100	0100		restore

\Rightarrow ~~Q = 1000~~ at

$Q = 0100$

$R = 1100$

$S_Q = 100 = 1 \rightarrow Q = -4 \checkmark$

$S_R = S_A = 1 \rightarrow R = -12 \checkmark$

$Q = 1 \quad 0100$

$R = 1 \quad 1100$