GTE Command Reference

July 19, 1996

Version 1.0

Sony Computer Entertainment Inc.

Confidential

Limiters:

During some calculation processing, calculation results, data values in registers, etc., are clipped when they exceed specified upper limit and lower limit values. In other words, data values lower than the lower limit value are converted to the lower limit value, and data values higher than the upper limit value are converted to the upper limit value. Also, the occurrence of such conversions is reflected in out-of-bounds data detection flags in the FLAG register. These functions are referred to as "limiters."

The usage of the various limiters and the codes used to specify them in this documentation are listed below.

Code Specifi cation	Limiter	Out-of- bounds detect bit	Lower limit	Upper limit	Comments
A1S	A1	24	-2^15	2^15-1	
A2S	A2	23	-2^15	2^15-1	
A3S	A3	22	-2^15	2^15-1	
A1U	A1	24	0	2^15-1	
A2U	A2	23	0	2^15-1	
A3U	A3	22	0	2^15-1	
A1C	A1	24	0 or -2^15	2^15-1	Lower limit val is specified using lim argument.
A2C	А3	23	0 or -2^15	2^15-1	Lower limit val is specified using lim argument.
A3C	А3	22	0 or -2^15	2^15-1	Lower limit val is specified using lim argument.
B1	B1	21	0	2^8-1	
B2	B2	20	0	2^8-1	
В3	В3	19	0	2^8-1	
С	С	18	0	2^16-1	
D1	D1	14	-2^10	2^10-1	
D2	D2	13	-2^10	2^10-1	
E	E	12	0	2^12-1	

Calculation error detection:

Overflow and underflow detection are performed only for certain specific calculation operations. In this documentation, the calculation test result flag number is listed between angle brackets < > to the right of calculation operations that are subject to such detection.

Explanation:

Character attributes	Example	Content
Underline	VAL	Intermediate value (No corresponding register)
Emphasis character	OBJ	32-bit value

Code	Meaning
limX()	Limiter application X is the limiter designation code.
<-	FIFO data transfer Example: a <- b <- c <- d; is equivalent to the following: a = b; b = c; c = d;
۸	Power Example: a^b means "a to the power of b".
==	Argument value condition
n=0,1,2 {}	Repeat the process between the curly parentheses {} three times, substituting 0, 1, and 2 for n.
(a.b.c)	Fixed-point number Sign portion: a bits, integer portion: b bits, fractional portion: c bits
(b)	b-bit binary data
<n></n>	Calculation subject to overflow and underflow testing The test result is reflected in cumulative test flag n in the FLAG register.

Descriptor examples:

(A) A = B;

--> A=B is executed for the fixed-point expression (1.15.0).

(B) $(1.15.0) \text{ IR0} = \lim X(SSX);$

Limiter:

limX	-2^15	2^15-1
Code	Lower limit	Upper limit

--> The 32-bit value SSX is rounded using the limiter specified by X. The fixed-point expression (1.12.0) representing the results obtained is substituted for IR1.

```
(C)
n=0,1,2{
   (1.3.12)L1n
        = limA(LL1n);
}
--> For the fixed-point expression (1.3.12),
the following are executed:
L10=limA(LL10);
L11=limA(LL11);
L12=limA(LL12);
(D)
```

sf==0 sf==1 (1.31.0) (1.19.12) A = B;

--> B is substituted for A. However, the value is converted into a 32-bit signed fixed-point number with no fractional part if sf is 0, and with a 12-bit fraction if sf is 1.

Command list:

Command details:

Command details are listed below.

Command	Required	Function	
	cycles		
RTPS	14	Coordinate transformation &	
		perspective transformation	
RTPT	22	Coordinate transformation &	
		perspective transformation	
NCDS	19	Light source calculation	
NCDT	44	Light source calculation	
NCCS	17	Light source calculation	
NCCT	39	Light source calculation	
CDP	13	Light source calculation	
cc	11	Light source calculation	
NCS	14	Light source calculation	
NCT	30	Light source calculation	
MVMVA	8	Matrix calculation	
DCPL	8	Depth cueing	
INTPL	8	Interpolation	
DPCS	8	Depth cueing	
DPCT	17	Depth cueing	
SQR	5	Vector squaring	
AVSZ3	5	Z-averaging	
AVSZ4	6	Z-averaging	
NCLIP		Normal clipping	
OP	6	Outer product	
GPF	5	General purpose interpolation	
GPL	5	General purpose interpolation	

Required cycles:14

Function: Coordinate transformation and perspective transformation_

Calculations:

(1.31. 0)

(1.31.12)	SSX = TRX + R11*VX0 + R12*VY0 + R13*VZ0; <1>
(1.31.12)	SSY = TRY + R21*VX0 + R22*VY0 + R23*VZ0; <2>
(1.31.12)	SSZ = TRZ + R31*VX0 + R32*VY0 + R33*VZ0; <3>
(1.15. 0)	$IR1 = IimA1S(\underline{SSX});$
(1.15. 0)	$IR2 = IimA2S(\underline{SSY});$
(1.15. 0)	$IR3 = IimA3S(\underline{SSZ});$
(0.16. 0)	$SZx(0) \leftarrow SZ0(1) \leftarrow SZ1(2) \leftarrow SZ2(3) \leftarrow IimC(\underline{SSZ});$
(1.27.16)	$\underline{SX} = OFX + IR1*(H/SZ); <4>$
(1.27.16)	$\underline{SY} = OFY + IR2*(H/SZ); <4>$
(1.19.24)	$\mathbf{\underline{P}} = DQB + DQA^*(H/SZ); <4>$
(1. 3.12)	$IR0 = limE(\mathbf{P})$
(1.15. 0)	SX0 <- SX1 <- SX2 <- limD1(SX);
(1.15. 0)	SY0 <- SY1 <- SY2 <- limD2(SY);
(1. 7.24)	$MAC0 = \underline{P};$
(1.31. 0)	MAC1 = <u>SSX</u> ;
(1.31. 0)	$MAC2 = \underline{SSY};$

 $MAC3 = \underline{SSZ};$

Referenced registers:

110101	choca registers	,,
	Data	Control
0	VX0,VY0	R11,R12
1	VZ0	R13,R21
2	VX1,VY1	R22,R23
3	VZ1	R31,R32
4	VX2,VY2	R33,
5	VZ2	TRX
6	RGB CODE	TRY
7	OTZ	TRZ
8	IR0	L11,L12
9	IR1	L13,L21
10	IR2	L22,L23
11	IR3	L31,L32
12	SX0,SY0	L33,
13	SX1,SY1	RBK
14	SX2,SY2	GBK
15	SX2P,SY2P	BBK
16	SZx(0)	LR1,LR2
17	SZ0(1)	LR3,LG1
18	SZ1(2)	LG2,LG3
19	SZ2(3)	LB1,LB2
20	R0 G0 B0	LB3,
21	R1 G1 B1	RFC
22	R2 G2 B2	GFC
23		BFC
24	MAC0	OFX
25	MAC1	OPY
26	MAC2	Н,
27	MAC3	DQA,
28	IRGB	DQB
29	ORGB	ZSF3,
30	DATA32	ZSF4,
31	LZC	FLAG

Modified registers:

	Data	Control
0	VX0,VY0	R11,R12
1	VZ0	R13,R21
2	VX1,VY1	R22,R23
3	VZ1	R31,R32
4	VX2,VY2	R33,
5	VZ2	TRX
6	RGB CODE	TRY
7	OTZ	TRZ
8	IR0	L11,L12
9	IR1	L13,L21
10	IR2	L22,L23
11	IR3	L31,L32
12	SX0,SY0	L33,
13	SX1,SY1	RBK
14	SX2,SY2	GBK
15	SX2P,SY2P	BBK
16	SZx(0)	LR1,LR2
17	SZ0(1)	LR3,LG1
18	SZ1(2)	LG2,LG3
19	SZ2(3)	LB1,LB2
20	R0 G0 B0	LB3,
21	R1 G1 B1	RFC
22	R2 G2 B2	GFC
23		BFC
24	MAC0	OFX
25	MAC1	OPY
26	MAC2	Н,
27	MAC3	DQA,
28	IRGB	DQB
29	ORGB	ZSF3,
30	DATA32	ZSF4,
31	LZC	FLAG

Required cycles:22

Function: Coordinate transformation and perspective transformation_

Calculations:

```
n=0,1,2 {
   (1.31.12) SSXn = TRX + R11*VXn + R12*VYn +R13*VZn; <1>
   (1.31.12) SSYn = TRY + R21*VXn + R22*VYn +R23*VZn; <2>
   (1.31.12) SSZn = TRZ + R31*VXn + R32*VYn +R33*VZn; <3>
   (0.16. \ 0) SZx(0) = SZ2(3);
   (0.16. \ 0) SZ0(1) = \lim C(SSZO);
   (0.16. \ 0) SZO(2) = IimC(SSZ1);
   (0.16. \ 0) SZ0(3) = \lim C(SSZ2);
   (1.27.16) SXn = OFX + IR1*(H/SZ n); <4>
   (1.27.16) SYn = OFY + IR2*(H/SZ n); <4>
   (1.19.24) P = DQB + DQA*(H/SZ2); <4>
   (1. 3.12) IR0 = \lim E(\mathbf{P});
   (1.15. 0) SXn = \lim_{n \to \infty} D1(SXn);
   (1.15. 0) SYn = \lim_{n \to \infty} D2(SYn);
(1.15. 0) IR1 = limA1S(SSX2);
(1.15.0)
          IR2 = IimA2S(SSY2);
(1.15.0)
          IR3 = IimA3S(SSZ2);
(1.7.24)
          MAC0 = P;
(1.31. 0)
          MAC1 = SSX2;
          MAC2 = SSY2;
(1.31.0)
(1.31.0)
          MAC3 = SSZ2;
```

Referenced registers:

Referenced registers:				
	Data	Control		
0	VX0,VY0	R11,R12		
1	VZ0	R13,R21		
2	VX1,VY1	R22,R23		
3	VZ1	R31,R32		
4	VX2,VY2	R33,		
5	VZ2	TRX		
6	RGB CODE	TRY		
7	OTZ	TRZ		
8	IR0	L11,L12		
9	IR1	L13,L21		
10	IR2	L22,L23		
11	IR3	L31,L32		
12	SX0,SY0	L33,		
13	SX1,SY1	RBK		
14	SX2,SY2	GBK		
15	SX2P,SY2P	ввк		
16	SZx(0)	LR1,LR2		
17	SZ0(1)	LR3,LG1		
18	SZ1(2)	LG2,LG3		
19	SZ2(3)	LB1,LB2		
20	R0 G0 B0	LB3,		
21	R1 G1 B1	RFC		
22	R2 G2 B2	GFC		
23		BFC		
24	MAC0	OFX		
25	MAC1	OPY		
26	MAC2	Н,		
27	MAC3	DQA,		
28	IRGB	DQB		
29	ORGB	ZSF3,		
30	DATA32	ZSF4,		
31	LZC	FLAG		

Modified registers:

Data VX0,VY0 VZ0 VX1,VY1 VZ1 VX2,VY2 VZ2 RGB CODE OTZ IR0 IR1 IR2	R11,R12 R13,R21 R22,R23 R31,R32 R33, TRX TRY TRZ L11,L12
VZ0 VX1,VY1 VZ1 VX2,VY2 VZ2 RGB CODE OTZ IR0 IR1	R11,R12 R13,R21 R22,R23 R31,R32 R33, TRX TRY TRY L11,L12
VX1,VY1 VZ1 VX2,VY2 VZ2 RGB CODE OTZ IR0 IR1	R22,R23 R31,R32 R33, TRX TRY TRZ L11,L12
VZ1 VX2,VY2 VZ2 RGB CODE OTZ IR0 IR1	R31,R32 R33, TRX TRY TRZ L11,L12
VX2,VY2 VZ2 RGB CODE OTZ IR0 IR1	R33, TRX TRY TRZ L11,L12
RGB CODE OTZ IR0 IR1	TRX TRY TRZ L11,L12
RGB CODE OTZ IR0 IR1	TRY TRZ L11,L12
OTZ IR0 IR1	TRZ L11,L12
IR0 IR1	L11,L12
IR1	
IR2	L13,L21
	L22,L23
IR3	L31,L32
SX0,SY0	L33,
SX1,SY1	RBK
SX2,SY2	GBK
SX2P,SY2P	BBK
SZx(0)	LR1,LR2
SZ0(1)	LR3,LG1
SZ1(2)	LG2,LG3
SZ2(3)	LB1,LB2
R0 G0 B0	LB3,
R1 G1 B1	RFC
R2 G2 B2	GFC
	BFC
MAC0	OFX
MAC1	OPY
MAC2	Н,
MAC3	DQA,
IRGB	DQB
ORGB	ZSF3,
DATA32	ZSF4,
1.70	FLAG
	SX1,SY1 SX2,SY2 SX2P,SY2P SZx(0) SZ0(1) SZ1(2) SZ2(3) R0 G0 B0 R1 G1 B1 R2 G2 B2 MAC0 MAC1 MAC2 MAC3 IRGB ORGB

Calculations:

- (1.19.24)**<u>LL1</u>**= L11*VX0 + L12*VY0 + L13*VZ0; <1>(1.19.24)**LL2** = L21*VX0 + L22*VY0 + L23*VZ0; <2> (1.19.24)<u>**LL3**</u> = L31*VX0 + L32*VY0 + L33*VZ0; <3> L1 = limA1U(LL1);(1. 3.12)(1. 3.12)L2 = IimA2U(LL2);(1. 3.12)L3 = IimA3U(LL3);(1.19.24)**RRLT** = **RBK** + LR1*L1 + LR2*L2 + LR3*L3; <1> (1.19.24)**GGLT** = **GBK** + LG1*L1 + LG2*L2 + LG3*L3; <2> (1.19.24)**BBLT** = **BBK** + LB1*L1 + LB2*L2 + LB3*L3; <3>
- (1. 3.12) RLT = $\lim_{x \to 0} A1U(RRLT)$; (1. 3.12) GLT = $\lim_{x \to 0} A2U(GGLT)$;
- (1. 3.12) BLT = $\lim A3U(BBLT)$;
- (1.27.16) **RR0** = R*RLT + IR0*limA1S(**RFC** R*RLT); <1>
- (1.27.16) **GG0** = $G^*GLT + IR0^*IimA2S(GFC G^*GLT); <2>$
- (1.27.16) **BB0** = B*BLT + IR0*limA3S(**BFC** B*BLT); <3>
- (1.11. 4) IR1 = IimA1U(**RR0**);
- (1.11. 4) IR2 = IimA2U(**GG0**);
- (1.11. 4) IR3 = ImA3U(**BB0**);
- (-. 8. -) CD0 <- CD1 <- CD2 <- CODE
- (0. 8. 0) $R0 \leftarrow R1 \leftarrow R2 \leftarrow limB1(RR0);$
- (0. 8. 0) G0 <- G1 <- G2 <- limB2(**GG0**);
- (0. 8. 0) B0 <- B1 <- B2 <- limB3(BB0);
- (1.27. 4) **MAC1** = **RR0**;
- (1.27. 4) **MAC2** = **<u>GG0</u>**;
- (1.27. 4) **MAC3** = **BB0**;

Referenced registers:

Referenced registers:				
	Data	Control		
0	VX0,VY0	R11,R12		
1	VZ0	R13,R21		
2	VX1,VY1	R22,R23		
3	VZ1	R31,R32		
4	VX2,VY2	R33,		
5	VZ2	TRX		
6	RGB CODE	TRY		
7	OTZ	TRZ		
8	IR0	L11,L12		
9	IR1	L13,L21		
10	IR2	L22,L23		
11	IR3	L31,L32		
12	SX0,SY0	L33,		
13	SX1,SY1	RBK		
14	SX2,SY2	GBK		
15	SX2P,SY2P	ввк		
16	SZx(0)	LR1,LR2		
17	SZ0(1)	LR3,LG1		
18	SZ1(2)	LG2,LG3		
19	SZ2(3)	LB1,LB2		
20	R0 G0 B0	LB3,		
21	R1 G1 B1	RFC		
22	R2 G2 B2	GFC		
23		BFC		
24	MAC0	OFX		
25	MAC1	OPY		
26	MAC2	Н,		
27	MAC3	DQA,		
28	IRGB	DQB		
29	ORGB	ZSF3,		
30	DATA32	ZSF4,		
31	LZC	FLAG		

Modified registers:

3 VZ1 R31,R32 4 VX2,VY2 R33, 5 VZ2 TRX 6 RGB CODE TRY 7 OTZ TRZ 8 IR0 L11,L12 9 IR1 L13,L21 10 IR2 L22,L23 11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28		eu regionerei	
O VX0,VY0 R11,R12 1 VZ0 R13,R21 2 VX1,VY1 R22,R23 3 VZ1 R31,R32 4 VX2,VY2 R33, 5 VZ2 TRX 6 RGB CODE TRY 7 OTZ TRZ 8 IR0 L11,L12 9 IR1 L13,L21 10 IR2 L22,L23 11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 23 BFC 24 MAC0 OFX 2		Data	Control
2 VX1,VY1 R22,R23 3 VZ1 R31,R32 4 VX2,VY2 R33, 5 VZ2 TRX 6 RGB CODE TRY 7 OTZ TRZ 8 IR0 L11,L12 9 IR1 L13,L21 10 IR2 L22,L23 11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27	0		R11,R12
3 VZ1 R31,R32 4 VX2,VY2 R33, 5 VZ2 TRX 6 RGB CODE TRY 7 OTZ TRZ 8 IR0 L11,L12 9 IR1 L13,L21 10 IR2 L22,L23 11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28	1	VZ0	R13,R21
4 VX2,VY2 R33, 5 VZ2 TRX 6 RGB CODE TRY 7 OTZ TRZ 8 IR0 L11,L12 9 IR1 L13,L21 10 IR2 L22,L23 11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28	2	VX1,VY1	R22,R23
5 VZ2 TRX 6 RGB CODE TRY 7 OTZ TRZ 8 IR0 L11,L12 9 IR1 L13,L21 10 IR2 L22,L23 11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB	3	VZ1	R31,R32
6 RGB CODE TRY 7 OTZ TRZ 8 IR0 L11,L12 9 IR1 L13,L21 10 IR2 L22,L23 11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB	4	VX2,VY2	R33,
7 OTZ TRZ 8 IR0 L11,L12 9 IR1 L13,L21 10 IR2 L22,L23 11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB	5	VZ2	TRX
8 IR0 L11,L12 9 IR1 L13,L21 10 IR2 L22,L23 11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB	6	RGB CODE	TRY
9 IR1 L13,L21 10 IR2 L22,L23 11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB	7	OTZ	TRZ
10 IR2 L22,L23 11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB	8	IR0	L11,L12
11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB	9	IR1	L13,L21
12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB	10	IR2	L22,L23
13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB	11	IR3	L31,L32
14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB	12	SX0,SY0	L33,
15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB	13	SX1,SY1	RBK
16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB	14	SX2,SY2	GBK
17 SZO(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB	15	SX2P,SY2P	BBK
18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB	16	SZx(0)	LR1,LR2
19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB	17	SZ0(1)	LR3,LG1
20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB	18	SZ1(2)	LG2,LG3
21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB	19	SZ2(3)	LB1,LB2
22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB	20	R0 G0 B0	LB3,
23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB	21	R1 G1 B1	RFC
24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB	22	R2 G2 B2	GFC
25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB	23		BFC
26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB	24	MAC0	OFX
27 MAC3 DQA, 28 IRGB DQB	25	MAC1	OPY
28 IRGB DQB	26	MAC2	Н,
	27	MAC3	DQA,
29 ORGB ZSF3 ,	28	IRGB	DQB
	29	ORGB	ZSF3,
30 DATA32 ZSF4 ,	30	DATA32	ZSF4,
31 LZC FLAG	31	LZC	FLAG

Calculations:

```
n=0,1,2 {
   (1.19.24) LL1n = L11*VXn + L12*Vyn + L13*VZn; <1>
   (1.19.24) LL2n = L21*VXn + L22*Vyn + L23*VZn; <2>
   (1.19.24) LL3n = L31*VXn + L32*Vyn + L33*VZn; <3>
   (1. 3.12) L1n = limA1U(LL1n);
   (1. 3.12) L2n = \lim A2U(LL2n);
   (1. 3.12) L3n = \lim A3U(LL3n);
   (1.19.24) RRLTn = RBK + LR1*L1n + LR2*L2n + LR3*L3n; <1>
   (1.19.24) GGLTn = GBK + LG1*L1n + LG2*L2n + LG3*L3n; <2>
   (1.19.24) BBLTn = BBK + LB1*L1n + LB2*L2n + LB3*L3n; <3>
   (1. 3.12) RLTn = limA1U(RRLTn);
   (1. 3.12) GLTn = \lim A2U(\mathbf{GGLTn});
   (1. 3.12) BLTn = \lim A3U(BBLTn);
   (1.27.16) RRn = R*RLTn + IR0*limA1S(RFC - R*RLTn); <1>
   (1.27.16) GGn = G*GLTn + IRO*limA2S(GFC - G*GLTn); <2>
   (1.27.16) BBn = B*BLTn + IRO*limA3S(BFC - B*BLTn); <3>
   (-. 8. -)
              CDn = CODE
   (-. 8. 0)
              Rn = limB1(RRn); Gn = limB2(GGn);
   (-.8.0)
               Bn = IimB3(\underline{BBn});
(1.11. 4) IR1 = \lim_{x \to 0} A1U(RR2);
          IR2 = IimA2U(GG2);
(1.11.4)
          IR3 = IimA3U(BB2);
(1.11.4)
(1.27.4)
          MAC1 = RR2;
          MAC2 = \underline{GG2};
(1.27.4)
(1.27.4)
          MAC3 = BB2;
```

Referenced registers:

neiei	enceu registers).
	Data	Control
0	VX0,VY0	R11,R12
1	VZ0	R13,R21
2	VX1,VY1	R22,R23
3	VZ1	R31,R32
4	VX2,VY2	R33,
5	VZ2	TRX
6	RGB CODE	TRY
7	OTZ	TRZ
8	IR0	L11,L12
9	IR1	L13,L21
10	IR2	L22,L23
11	IR3	L31,L32
12	SX0,SY0	L33,
13	SX1,SY1	RBK
14	SX2,SY2	GBK
15	SX2P,SY2P	ввк
16	SZx(0)	LR1,LR2
17	SZ0(1)	LR3,LG1
18	SZ1(2)	LG2,LG3
19	SZ2(3)	LB1,LB2
20	R0 G0 B0	LB3,
21	R1 G1 B1	RFC
22	R2 G2 B2	GFC
23		BFC
24	MAC0	OFX
25	MAC1	OPY
26	MAC2	Н,
27	MAC3	DQA,
28	IRGB	DQB
29	ORGB	ZSF3,
30	DATA32	ZSF4,
31	LZC	FLAG

Modified registers:

moun	ica registers.	
	Data	Control
0	VX0,VY0	R11,R12
1	VZ0	R13,R21
2	VX1,VY1	R22,R23
3	VZ1	R31,R32
4	VX2,VY2	R33,
5	VZ2	TRX
6	RGB CODE	TRY
7	OTZ	TRZ
8	IR0	L11,L12
9	IR1	L13,L21
10	IR2	L22,L23
11	IR3	L31,L32
12	SX0,SY0	L33,
13	SX1,SY1	RBK
14	SX2,SY2	GBK
15	SX2P,SY2P	ввк
16	SZx(0)	LR1,LR2
17	SZ0(1)	LR3,LG1
18	SZ1(2)	LG2,LG3
19	SZ2(3)	LB1,LB2
20	R0 G0 B0	LB3,
21	R1 G1 B1	RFC
22	R2 G2 B2	GFC
23		BFC
24	MAC0	OFX
25	MAC1	OPY
26	MAC2	Н,
27	MAC3	DQA,
28	IRGB	DQB
29	ORGB	ZSF3,
30	DATA32	ZSF4,
31	LZC	FLAG

Calculations:

(1.27.4)

(1.27.4)

 $MAC2 = \underline{GG0};$

MAC3 = BB0;

(1.19.24)<u>LL1</u> = L11*VX0 + L12*VY0 + L13*VZ0; <1> (1.19.24)**LL2** = L21*VX0 + L22*VY0 + L23*VZ0; <2> (1.19.24)**LL3** = L31*VX0 + L32*VY0 + L33*VZ0; <3> L1 = limA(LL1);(1. 3.12)(1. 3.12)L2 = limA(LL2);(1. 3.12)L3 = IimA(LL3);(1.19.24)**RRLT** = **RBK** + LR1*L1 +LR2*L2 + LR3*L3; <1> (1.19.24)**GGLT** = **GBK** + LG1*L1 +LG2*L2 + LG3*L3; <2> (1.19.24)**BBLT** = **BBK** + LB1*L1 +LB2*L2 + LB3*L3; <3> (1. 3.12)RLT = IimA1U(RRLT);(1. 3.12)GLT = IimA2U(GGLT);(1. 3.12)BLT = IimA3U(BBLT);(1.27.16)RR0 = R*RLT; <1>(1.27.16)**GG0** = G^*GLT ; <2> **BB0** = B*BLT; <3> (1.27.16)(1.11.4)IR1 = IimA1U(RR0);(1.11.4)IR2 = IimA2U(GGO);(1.11.4)IR3 = limA3U(BB0); (-. 8. -) CD0 <- CD1 <- CD2 <- CODE (0.8.0)R0 <- R1 <- R2 <- limB1(**RR0**); G0 <- G1 <- G2 <- limB2(**GG0**); (0.8.0)B0 <- B1 <- B2 <- limB3(**BB0**); (0.8.0)(1.27.4)MAC1 = RR0;

Referenced registers:

neiei	enceu registers).
	Data	Control
0	VX0,VY0	R11,R12
1	VZ0	R13,R21
2	VX1,VY1	R22,R23
3	VZ1	R31,R32
4	VX2,VY2	R33,
5	VZ2	TRX
6	RGB CODE	TRY
7	OTZ	TRZ
8	IR0	L11,L12
9	IR1	L13,L21
10	IR2	L22,L23
11	IR3	L31,L32
12	SX0,SY0	L33,
13	SX1,SY1	RBK
14	SX2,SY2	GBK
15	SX2P,SY2P	BBK
16	SZx(0)	LR1,LR2
17	SZ0(1)	LR3,LG1
18	SZ1(2)	LG2,LG3
19	SZ2(3)	LB1,LB2
20	R0 G0 B0	LB3,
21	R1 G1 B1	RFC
22	R2 G2 B2	GFC
23		BFC
24	MAC0	OFX
25	MAC1	OPY
26	MAC2	Н,
27	MAC3	DQA,
28	IRGB	DQB
29	ORGB	ZSF3,
30	DATA32	ZSF4,
31	LZC	FLAG

Modified registers:

Wioaii	ica registers.	
	Data	Control
0	VX0,VY0	R11,R12
1	VZ0	R13,R21
2	VX1,VY1	R22,R23
3	VZ1	R31,R32
4	VX2,VY2	R33,
5	VZ2	TRX
6	RGB CODE	TRY
7	OTZ	TRZ
8	IR0	L11,L12
9	IR1	L13,L21
10	IR2	L22,L23
11	IR3	L31,L32
12	SX0,SY0	L33,
13	SX1,SY1	RBK
14	SX2,SY2	GBK
15	SX2P,SY2P	ввк
16	SZx(0)	LR1,LR2
17	SZ0(1)	LR3,LG1
18	SZ1(2)	LG2,LG3
19	SZ2(3)	LB1,LB2
20	R0 G0 B0	LB3,
21	R1 G1 B1	RFC
22	R2 G2 B2	GFC
23		BFC
24	MAC0	OFX
25	MAC1	OPY
26	MAC2	Н,
27	MAC3	DQA,
28	IRGB	DQB
29	ORGB	ZSF3,
30	DATA32	ZSF4,
31	LZC	FLAG

Calculations:

```
n=0,1,2 {
                  (1.19.24) LL1n = L11*VXn + L12*VYn + L13*VZn; <1>
                  (1.19.24) LL2n = L21*VXn + L22*VYn + L23*VZn; <2>
                  (1.19.24) LL3n = L31*VXn + L32*VYn + L33*VZn; <3>
                  (1. \ 3.12) L1n = limA1U(LL1n);
                  (1. 3.12) L2n = \lim A2U(LL2n);
                  (1. 3.12) L3n = \lim A3U(LL3n);
                  (1.19.24) RRLTn = RBK + LR1*L1n + LR2*L2n + LR3*L3n; <1>
                  (1.19.24) GGLTn = GBK + LG1*L1n + LG2*L2n + LG3*L3n; <2>
                  (1.19.24) BBLTn = BBK + LB1*L1n + LB2*L2n + LB3*L3n; <3>
                  (1. 3.12) RLTn = \lim_{n \to \infty} A1U(RRLTn);
                  (1. 3.12) GLTn = \lim A2U(\mathbf{GGLTn});
                  (1. 3.12) BLTn = \lim A3U(BBLTn);
                  (1.27.16) RRn = R*RLTn; <1>
                  (1.27.16) GGn = G*GLTn; <2>
                  (1.27.16) BBn = B*BLTn; <3>
                  (-. 8. -)
                                                                            CDn = CODE
                  (0. 8. 0) Rn = limB1(RRn);
                  (0.8.0)
                                                                            Gn = limB2(GGn);
                  (0. 8. 0)
                                                                           Bn = limB3(\underline{BBn});
(1.11. 4) IR1 = \lim_{M \to \infty} 1 \cup \lim_{M \to \infty} 
                                                       IR3 = IimA3U(BB2);
(1.11.4)
(1.27.4)
                                                        MAC1 = RR2; MAC2 = GG2;
(1.27.4)
                                                        MAC3 = BB2;
```

Referenced registers:

Referenced registers:		
	Data	Control
0	VX0,VY0	R11,R12
1	VZ0	R13,R21
2	VX1,VY1	R22,R23
3	VZ1	R31,R32
4	VX2,VY2	R33,
5	VZ2	TRX
6	RGB CODE	TRY
7	OTZ	TRZ
8	IR0	L11,L12
9	IR1	L13,L21
10	IR2	L22,L23
11	IR3	L31,L32
12	SX0,SY0	L33,
13	SX1,SY1	RBK
14	SX2,SY2	GBK
15	SX2P,SY2P	BBK
16	SZx(0)	LR1,LR2
17	SZ0(1)	LR3,LG1
18	SZ1(2)	LG2,LG3
19	SZ2(3)	LB1,LB2
20	R0 G0 B0	LB3,
21	R1 G1 B1	RFC
22	R2 G2 B2	GFC
23		BFC
24	MAC0	OFX
25	MAC1	OPY
26	MAC2	Н,
27	MAC3	DQA,
28	IRGB	DQB
29	ORGB	ZSF3,
30	DATA32	ZSF4,
31	LZC	FLAG

Modified registers:

	Data	Control
0	VX0,VY0	R11,R12
1	VZ0	R13,R21
2	VX1,VY1	R22,R23
3	VZ1	R31,R32
4	VX2,VY2	R33,
5	VZ2	TRX
6	RGB CODE	TRY
7	OTZ	TRZ
8	IR0	L11,L12
9	IR1	L13,L21
10	IR2	L22,L23
11	IR3	L31,L32
12	SX0,SY0	L33,
13	SX1,SY1	RBK
14	SX2,SY2	GBK
15	SX2P,SY2P	BBK
16	SZx(0)	LR1,LR2
17	SZ0(1)	LR3,LG1
18	SZ1(2)	LG2,LG3
19	SZ2(3)	LB1,LB2
20	R0 G0 B0	LB3,
21	R1 G1 B1	RFC
22	R2 G2 B2	GFC
23		BFC
24	MAC0	OFX
25	MAC1	OPY
26	MAC2	Н,
27	MAC3	DQA,
28	IRGB	DQB
29	ORGB	ZSF3,
30	DATA32	ZSF4,
31	LZC	FLAG

Calculations:

(0. 8. 0) (1.27. 4)

(1.27.4)

(1.27.4)

(1.19.24)**RRLT** = **RBK** + LR1*IR1 + LR2*IR2 + LR3*IR3; <1> (1.19.24)**GGLT** = **GBK** + LG1*IR1 + LG2*IR2 + LG3*IR3; <2> (1.19.24)**BBLT** = **BBK** + LB1*IR1 + LB2*IR2 + LB3*IR3; <3> RLT = IimA1U(RRLT);(1. 3.12)(1. 3.12)GLT = IimA2U(GGLT);(1. 3.12)BLT = IimA3U(BBLT);(1.27.16)RR0 = R*RLT + IR0*limA1S(RFC - R*RLT); <1>(1.27.16) $\mathbf{GGO} = G^*GLT + IRO^*IimA2S(\mathbf{GFC} - G^*GLT); <2>$ (1.27.16)BB0 = B*BLT + IR0*limA3S(BFC - B*BLT); <3>(1.11.4)IR1 = IimA1U(RR0);(1.11.4)IR2 = IimA2U(GG0);(1.11.4)IR3 = limA3U(BB0); (-. 8. -) CD0 <- CD1 <- CD2 <- CODE R0 <- R1 <- R2 <- limB1(**RR0**); (0.8.0)(0.8.0)G0 <- G1 <- G2 <- limB2(**GG0**);

B0 <- B1 <- B2 <- limB3(**BB0**);

MAC1 = RR0

MAC2 = GG0;

MAC3 = BB0;

Referenced registers:

Data Control 0 VX0,VY0 R11,R1 1 VZ0 R13,R2 2 VX1,VY1 R22,R2 3 VZ1 R31,R3 4 VX2,VY2 R33, 5 VZ2 TRX 6 RGB CODE TRY 7 OTZ TRZ	1
1 VZ0 R13,R2 2 VX1,VY1 R22,R2 3 VZ1 R31,R3 4 VX2,VY2 R33, 5 VZ2 TRX 6 RGB CODE TRY	1
2 VX1,VY1 R22,R2 3 VZ1 R31,R3 4 VX2,VY2 R33, 5 VZ2 TRX 6 RGB CODE TRY	
2 VX1,VY1 R22,R2 3 VZ1 R31,R3 4 VX2,VY2 R33, 5 VZ2 TRX 6 RGB CODE TRY	
4 VX2,VY2 R33, 5 VZ2 TRX 6 RGB CODE TRY	
5 VZ2 TRX 6 RGB CODE TRY	2
6 RGB CODE TRY	
7 OTZ TRZ	
8 IR0 L11,L1:	2
9 IR1 L13,L2	1
10 IR2 L22,L2 3	3
11 IR3 L31,L3	2
12 SX0,SY0 L33,	
13 SX1,SY1 RBK	
14 SX2,SY2 GBK	
15 SX2P,SY2P BBK	
16 SZx(0) LR1,LR	2
17 SZ0(1) LR3,LG	ì1
18 SZ1(2) LG2,LG	3
19 SZ2(3) LB1,LB	2
20 R0 G0 B0 LB3,	
21 R1 G1 B1 RFC	
22 R2 G2 B2 GFC	
23 BFC	
24 MACO OFX	
25 MAC1 OPY	
26 MAC2 H,	
27 MAC3 DQA ,	
28 IRGB DQB	
29 ORGB ZSF3 ,	
30 DATA32 ZSF4 ,	
31 LZC FLAG	

Modified registers:

	Data	Control
0	VX0,VY0	R11,R12
1	VZ0	R13,R21
2	VX1,VY1	R22,R23
3	VZ1	R31,R32
4	VX2,VY2	R33,
5	VZ2	TRX
6	RGB CODE	TRY
7	OTZ	TRZ
8	IR0	L11,L12
9	IR1	L13,L21
10	IR2	L22,L23
11	IR3	L31,L32
12	SX0,SY0	L33,
13	SX1,SY1	RBK
14	SX2,SY2	GBK
15	SX2P,SY2P	BBK
16	SZx(0)	LR1,LR2
17	SZ0(1)	LR3,LG1
18	SZ1(2)	LG2,LG3
19	SZ2(3)	LB1,LB2
20	R0 G0 B0	LB3,
21	R1 G1 B1	RFC
22	R2 G2 B2	GFC
23		BFC
24	MAC0	OFX
25	MAC1	OPY
26	MAC2	Н,
27	MAC3	DQA,
28	IRGB	DQB
29	ORGB	ZSF3,
30	DATA32	ZSF4,
31	LZC	FLAG

Required cycles: 11

Function: Light source calculation

Calculations:

(1.27.4)

 $MAC3 = \underline{BB0};$

Carcaration	
(1.19.24)	<u>RRLT</u> = RBK + LR1*IR1 + LR2*IR2 + LR3*IR3; <1>
(1.19.24)	GGLT = GBK + LG1*IR1 + LG2*IR2 + LG3*IR3; <2>
(1.19.24)	<u>BBLT</u> = BBK + LB1*IR1 + LB2*IR2 + LB3*IR3; <3>
(1. 3.12)	$RLT = IimA1U(\underline{RRLT});$
(1. 3.12)	$GLT = limA2U(\underline{GGLT});$
(1. 3.12)	BLT = $limA3U(BBLT)$;
(1.27.16)	$\underline{RR0} = R*RLT; <1>$
(1.27.16)	$\mathbf{GG0} = G^*GLT; <2>$
(1.27.16)	$\underline{\mathbf{BB0}} = B*BLT; <3>$
(1.11. 4)	$IR1 = limA1U(\mathbf{RR0});$
(1.11. 4)	IR2 = limA2U(GG0);
(1.11. 4)	IR3 = $limA3U(BB0)$;
(8)	CD0 <- CD1 <- CD2 <- CODE
(0. 8. 0)	R0 <- R1 <- R2 <- limB1(RR0);
(0. 8. 0)	G0 <- G1 <- G2 <- limB2(GG0);
(0. 8. 0)	B0 <- B1 <- B2 <- limB3(BB0);
(1.27. 4)	$MAC1 = \underline{RR0};$
(1.27. 4)	$MAC2 = \underline{GG0};$

Referenced registers:

neierenceu registers.		
	Data	Control
0	VX0,VY0	R11,R12
1	VZ0	R13,R21
2	VX1,VY1	R22,R23
3	VZ1	R31,R32
4	VX2,VY2	R33,
5	VZ2	TRX
6	RGB CODE	TRY
7	OTZ	TRZ
8	IR0	L11,L12
9	IR1	L13,L21
10	IR2	L22,L23
11	IR3	L31,L32
12	SX0,SY0	L33,
13	SX1,SY1	RBK
14	SX2,SY2	GBK
15	SX2P,SY2P	BBK
16	SZx(0)	LR1,LR2
17	SZ0(1)	LR3,LG1
18	SZ1(2)	LG2,LG3
19	SZ2(3)	LB1,LB2
20	R0 G0 B0	LB3,
21	R1 G1 B1	RFC
22	R2 G2 B2	GFC
23		BFC
24	MAC0	OFX
25	MAC1	OPY
26	MAC2	Н,
27	MAC3	DQA,
28	IRGB	DQB
29	ORGB	ZSF3,
30	DATA32	ZSF4,
31	LZC	FLAG

Modified registers:

	Data	Control
0	VX0,VY0	R11,R12
1	VZ0	R13,R21
2	VX1,VY1	R22,R23
3	VZ1	R31,R32
4	VX2,VY2	R33,
5	VZ2	TRX
6	RGB CODE	TRY
7	OTZ	TRZ
8	IR0	L11,L12
9	IR1	L13,L21
10	IR2	L22,L23
11	IR3	L31,L32
12	SX0,SY0	L33,
13	SX1,SY1	RBK
14	SX2,SY2	GBK
15	SX2P,SY2P	BBK
16	SZx(0)	LR1,LR2
17	SZ0(1)	LR3,LG1
18	SZ1(2)	LG2,LG3
19	SZ2(3)	LB1,LB2
20	R0 G0 B0	LB3,
21	R1 G1 B1	RFC
22	R2 G2 B2	GFC
23		BFC
24	MAC0	OFX
25	MAC1	OPY
26	MAC2	Н,
27	MAC3	DQA,
28	IRGB	DQB
29	ORGB	ZSF3,
30	DATA32	ZSF4,
31	LZC	FLAG

Calculations:

 $(0. \ 0. \ 8)$

(1.19.12) MAC1 = RR0; (1.19.12) MAC2 = GG0; (1.19.12) MAC3 = BB0;

ns:
$\underline{LL1}$ = L11*VX0 + L12*VY0 + L13*VZ0; <1>
LL2 = L21*VX0 + L22*VY0 + L23*VZ0; <2>
LL3 = L31*VX0 + L32*VY0 + L33*VZ0; <3>
$L1 = limA1U(\underline{LL1});$
$L2 = limA2U(\underline{LL2});$
L3 = $limA3U(\underline{LL3});$
RR0 = RBK + LR1*L1 + LR2*L2 + LR3*L3; <1>
$\mathbf{GG0} = \mathbf{GBK} + LG1*L1 + LG2*L2 + LG3*L3; <2>$
BB0 = BBK + LB1*L1 + LB2*L2 + LB3*L3; <3>
IR1 = IimA1U(RR0);
$IR2 = IimA2U(\mathbf{GG0});$
IR3 = IimA3U(BB0);
CD0 <- CD1 <- CD2 <- CODE
R0 <- R1 <- R2 <- limB1(RR0);
$G0 \leftarrow G1 \leftarrow G2 \leftarrow IimB2(\underline{GG0});$

B0 <- B1 <- B2 <- limB3(**BB0**);

Referenced registers:

	choca register.	
	Data	Control
0	VX0,VY0	R11,R12
1	VZ0	R13,R21
2	VX1,VY1	R22,R23
3	VZ1	R31,R32
4	VX2,VY2	R33,
5	VZ2	TRX
6	RGB COD	TRY
7	OTZ	TRZ
8	IR0	L11,L12
9	IR1	L13,L21
10	IR2	L22,L23
11	IR3	L31,L32
12	SX0,SY0	L33,
13	SX1,SY1	RBK
14	SX2,SY2	GBK
15	SX2P,SY2P	BBK
16	SZx(0)	LR1,LR2
17	SZ0(1)	LR3,LG1
18	SZ1(2)	LG2,LG3
19	SZ2(3)	LB1,LB2
20	R0 G0 B0	LB3,
21	R1 G1 B1	RFC
22	R2 G2 B2	GFC
23		BFC
24	MAC0	OFX
25	MAC1	OPY
26	MAC2	Н,
27	MAC3	DQA,
28	IRGB	DQB
29	ORGB	ZSF3,
30	DATA32	ZSF4,
31	LZC	FLAG

Modified registers:

	Data	Control
0	VX0,VY0	R11,R12
1	VZ0	R13,R21
2	VX1,VY1	R22,R23
3	VZ1	R31,R32
4	VX2,VY2	R33,
5	VZ2	TRX
6	RGB CODE	TRY
7	OTZ	TRZ
8	IR0	L11,L12
9	IR1	L13,L21
10	IR2	L22,L23
11	IR3	L31,L32
12	SX0,SY0	L33,
13	SX1,SY1	RBK
14	SX2,SY2	GBK
15	SX2P,SY2P	BBK
16	SZx(0)	LR1,LR2
17	SZ0(1)	LR3,LG1
18	SZ1(2)	LG2,LG3
19	SZ2(3)	LB1,LB2
20	R0 G0 B0	LB3,
21	R1 G1 B1	RFC
22	R2 G2 B2	GFC
23		BFC
24	MAC0	OFX
25	MAC1	OPY
26	MAC2	Н,
27	MAC3	DQA,
28	IRGB	DQB
29	ORGB	ZSF3,
30	DATA32	ZSF4,
31	LZC	FLAG

Calculations:

```
n=0,1,2 {
   (1.19.24) <u>LL1n</u> = L11*VXn + L12*VYn + L13*VZn; <1>
   (1.19.24) LL2n = L21*VXn + L22*VYn + L23*VZn; <2>
   (1.19.24) LL3n = L31*VXn + L32*VYn + L33*VZn; <3>
   (1. 3.12) L1n = limA1U(\underline{LL1n});
   (1. 3.12) L2n = limA2U(\underline{LL2n});
   (1. 3.12) L3n = \lim A3U(LL3n);
   (1.19.24) RRn = RBK + LR1*L1n + LR2*L2n + LR3*L3n; <1>
   (1.19.24) GGn = GBK + LG1*L1n + LG2*L2n + LG3*L3n; <2>
   (1.19.24) BBn = BBK + LB1*L1n + LB2*L2n + LB3*L3n; <3>
   (-. 8. -)
              CDn = CODE
   (0. 0. 8) Rn = limB1(RRn);
   (0. 0. 8) Gn = \lim B2(GGn);
   (0. \ 0. \ 8)
              Bn = limB3(\underline{BBn});
(1. 3.12) IR1 = IimA1U(RR2);
(1. 3.12)
          IR2 = IimA2U(GG2);
(1. 3.12)
          IR3 = IimA3U(BB2);
(1.19.12) MAC1 = RR2;
(1.19.12) MAC2 = GG2;
(1.19.12) MAC3 = BB2;
```

Referenced registers:

neiei	enceu registers).
	Data	Control
0	VX0,VY0	R11,R12
1	VZ0	R13,R21
2	VX1,VY1	R22,R23
3	VZ1	R31,R32
4	VX2,VY2	R33,
5	VZ2	TRX
6	RGB COD	TRY
7	отz	TRZ
8	IR0	L11,L12
9	IR1	L13,L21
10	IR2	L22,L23
11	IR3	L31,L32
12	SX0,SY0	L33,
13	SX1,SY1	RBK
14	SX2,SY2	GBK
15	SX2P,SY2P	ввк
16	SZx(0)	LR1,LR2
17	SZ0(1)	LR3,LG1
18	SZ1(2)	LG2,LG3
19	SZ2(3)	LB1,LB2
20	R0 G0 B0	LB3,
21	R1 G1 B1	RFC
22	R2 G2 B2	GFC
23		BFC
24	MAC0	OFX
25	MAC1	OPY
26	MAC2	Н,
27	MAC3	DQA,
28	IRGB	DQB
29	ORGB	ZSF3,
30	DATA32	ZSF4,
31	LZC	FLAG

Modified registers:

	Data	Control
0	VX0,VY0	R11,R12
1	VZ0	R13,R21
2	VX1,VY1	R22,R23
3	VZ1	R31,R32
4	VX2,VY2	R33,
5	VZ2	TRX
6	RGB CODE	TRY
7	OTZ	TRZ
8	IR0	L11,L12
9	IR1	L13,L21
10	IR2	L22,L23
11	IR3	L31,L32
12	SX0,SY0	L33,
13	SX1,SY1	RBK
14	SX2,SY2	GBK
15	SX2P,SY2P	BBK
16	SZx(0)	LR1,LR2
17	SZ0(1)	LR3,LG1
18	SZ1(2)	LG2,LG3
19	SZ2(3)	LB1,LB2
20	R0 G0 B0	LB3,
21	R1 G1 B1	RFC
22	R2 G2 B2	GFC
23		BFC
24	MAC0	OFX
25	MAC1	OPY
26	MAC2	Н,
27	MAC3	DQA,
28	IRGB	DQB
29	ORGB	ZSF3,
30	DATA32	ZSF4,
31	LZC	FLAG

Required cycles: 8

Function: Matrix and vector multiplication

Items specified using arguments:

itomo o	terns specified using arguments:				
Argu- ment	Specified content	Value=0	Value = 1	Value=2	Value = 3
sf	Scaling format	Scale large	Scale small	Not valid	Not valid
mx	Multiplication array (MX) (1.3.12)	R	L	LR	Not valid
v	Multiplication vector (V) (1.m.n)	Vp0 p=X/Y/Z	Vp1 p=X/Y/Z	Vp2 p=X/Y/Z	IRp p=0/1/2
cv	Addition vector (CV) (1.16+m. n)	TRp p=X/Y/Z	pBK p=R/B/G	pFC p=R/B/G	0
lm	Limiter A1/2/3 lower limit	-2^15	0	Not valid	Not valid

* Data formats

The multiplication matrix data format is fixed.

The other data formats are determined by the multiplication vector data format.

Calculations: (m and n are determined by the multiplication vector data format.)

(1.16+m.n+12)	MT1 = CV1 + MX11*V1 + MX12*V2 + MX13*V3; <1>
(1.16+m.n+12)	MT2 = CV2 + MX21*V1 + MX22*V2 + MX23*V3; <2>
(1.16+m.n+12)	<u>MT3</u> = CV3 + MX31*V1 + MX32*V2 + MX33*V3; <3>
(1.16+m.n)	MAC1 = <u>MT1</u>

(1.16+m.n) MAC1 = MT1 (1.16+m.n) MAC2 = MT2 (1.16+m.n) MAC3 = MT3

 $\begin{array}{lll} sf == 0 & sf == 1 \\ (1.m-12.n+12) & (1.m.n) & IR1 = limA1C(\underline{\textbf{MT1}}); \\ (1.m-12.n+12) & (1.m.n) & IR2 = limA2C(\underline{\textbf{MT2}}); \\ (1.m-12.n+12) & (1.m.n) & IR3 = limA3C(\underline{\textbf{MT3}}) \end{array}$

Referenced registers:

Referenced registers:			
	Data	Control	
0	VX0,VY0	R11,R12	
1	VZ0	R13,R21	
2	VX1,VY1	R22,R23	
3	VZ1	R31,R32	
4	VX2,VY2	R33,	
5	VZ2	TRX	
6	RGB CODE	TRY	
7	OTZ	TRZ	
8	IR0	L11,L12	
9	IR1	L13,L21	
10	IR2	L22,L23	
11	IR3	L31,L32	
12	SX0,SY0	L33,	
13	SX1,SY1	RBK	
14	SX2,SY2	GBK	
15	SX2P,SY2P	ввк	
16	SZx(0)	LR1,LR2	
17	SZ0(1)	LR3,LG1	
18	SZ1(2)	LG2,LG3	
19	SZ2(3)	LB1,LB2	
20	R0 G0 B0	LB3,	
21	R1 G1 B1	RFC	
22	R2 G2 B2	GFC	
23		BFC	
24	MAC0	OFX	
25	MAC1	OPY	
26	MAC2	Н,	
27	MAC3	DQA,	
28	IRGB	DQB	
29	ORGB	ZSF3,	
30	DATA32	ZSF4,	
31	LZC	FLAG	

Modified registers:

Modif	ied registers:	
	Data	Control
0	VX0,VY0	R11,R12
1	VZ0	R13,R21
2	VX1,VY1	R22,R23
3	VZ1	R31,R32
4	VX2,VY2	R33,
5	VZ2	TRX
6	RGB CODE	TRY
7	OTZ	TRZ
8	IR0	L11,L12
9	IR1	L13,L21
10	IR2	L22,L23
11	IR3	L31,L32
12	SX0,SY0	L33,
13	SX1,SY1	RBK
14	SX2,SY2	GBK
15	SX2P,SY2P	ввк
16	SZx(0)	LR1,LR2
17	SZ0(1)	LR3,LG1
18	SZ1(2)	LG2,LG3
19	SZ2(3)	LB1,LB2
20	R0 G0 B0	LB3,
21	R1 G1 B1	RFC
22	R2 G2 B2	GFC
23		BFC
24	MAC0	OFX
25	MAC1	OPY
26	MAC2	н,
27	MAC3	DQA,
28	IRGB	DQB
29	ORGB	ZSF3,
30	DATA32	ZSF4,
31	LZC	FLAG
-		

DCPL

Required cycles: 8

Function: Depth cueing

Calculations:

(1.27.16)	$\mathbf{RR0} = R^*IR1 + IR0^*limA1S(\mathbf{RFC} - R^*IR1); <1>$
(1.27.16)	$\mathbf{\underline{GG0}} = G^*IR2 + IR0^*IimA2S(\mathbf{GFC} - G^*IR2); <2>$
(1.27.16)	$\underline{\mathbf{BB0}} = B*IR3 + IR0*limA3S(\mathbf{BFC} - B*IR3); <3>$
(1.11. 4)	$IR1 = IimA1S(\underline{RR0});$
(1.11. 4)	$IR2 = IimA2S(\underline{GG0});$
(1.11. 4)	$IR3 = IimA3S(\underline{BB0});$
(8)	CD0 <- CD1 <- CD2 <- CODE
(0. 8. 0)	R0 <- R1 <- R2 <- limB1(<u>RR0</u>);
(0. 8. 0)	G0 <- G1 <- G2 <- limB2(GG0);
(0. 8. 0)	B0 <- B1 <- B2 <- limB3(<u>BB0</u>);
(1.27. 4)	$MAC1 = \underline{RR0};$
(1.27. 4)	$MAC2 = \underline{GG0};$
(1.27. 4)	$MAC3 = \underline{BB0};$

Referenced registers:

HOICH	choca registers	<i>,</i> ,
	Data	Control
0	VX0,VY0	R11,R12
1	VZ0	R13,R21
2	VX1,VY1	R22,R23
3	VZ1	R31,R32
4	VX2,VY2	R33,
5	VZ2	TRX
6	RGB CODE	TRY
7	OTZ	TRZ
8	IR0	L11,L12
9	IR1	L13,L21
10	IR2	L22,L23
11	IR3	L31,L32
12	SX0,SY0	L33,
13	SX1,SY1	RBK
14	SX2,SY2	GBK
15	SX2P,SY2P	ввк
16	SZx(0)	LR1,LR2
17	SZ0(1)	LR3,LG1
18	SZ1(2)	LG2,LG3
19	SZ2(3)	LB1,LB2
20	R0 G0 B0	LB3,
21	R1 G1 B1	RFC
22	R2 G2 B2	GFC
23		BFC
24	MAC0	OFX
25	MAC1	OPY
26	MAC2	Н,
27	MAC3	DQA,
28	IRGB	DQB
29	ORGB	ZSF3,
30	DATA32	ZSF4,
31	LZC	FLAG

Modified registers:

	Data	Control
0	VX0,VY0	R11,R12
1	VZ0	R13,R21
2	VX1,VY1	R22,R23
3	VZ1	R31,R32
4	VX2,VY2	R33,
5	VZ2	TRX
6	RGB CODE	TRY
7	OTZ	TRZ
8	IR0	L11,L12
9	IR1	L13,L21
10	IR2	L22,L23
11	IR3	L31,L32
12	SX0,SY0	L33,
13	SX1,SY1	RBK
14	SX2,SY2	GBK
15	SX2P,SY2P	BBK
16	SZx(0)	LR1,LR2
17	SZ0(1)	LR3,LG1
18	SZ1(2)	LG2,LG3
19	SZ2(3)	LB1,LB2
20	R0 G0 B0	LB3,
21	R1 G1 B1	RFC
22	R2 G2 B2	GFC
23		BFC
24	MAC0	OFX
25	MAC1	OPY
26	MAC2	Н,
27	MAC3	DQA,
28	IRGB	DQB
29	ORGB	ZSF3,
30	DATA32	ZSF4,
31	LZC	FLAG

Function: Interpolation

Calculations: (m and n request the data format of IRp(p=1,2,3) as (1.m.n).)

```
(1.16+m.n+12) IPL1 = 1.0*IR1 + IR0*ImA1S(RFC-1.0*IR1); <1>
(1.16+m.n+12) <u>IPL2</u> = 1.0*IR2 + IR0*ImA2S(GFC-1.0*IR2); <2>
(1.16+m.n+12) IPL3 = 1.0*IR3 + IR0*IimA3S(BFC-1.0*IR3); <3>
(1. m. n)
                IR1 = IimA1S(IPL1);
(1. m. n)
                IR2 = IimA2S(IPL2);
(1. m. n)
               IR3 = IimA3S(IPL3);
(-. 8. -)
                CD0 <- CD1 = CD2 = CODE
               R0 <- R1 <- R2 <- limB1(IPL1);
(0.12-n. n-4)
               G0 <- G1 <- G2 <- limB2(IPL2);
(0.12-n. n-4)
(0.12-n. n-4)
                B0 <- B1 <- B2 <- limB3(IPL3);
               MAC1 = IPL1;
(1.16+m. n)
                MAC2 = IPL2;
(1.16+m. n)
                MAC3 = IPL3;
(1.16+m. n)
```

Referenced registers:

Data Control 0 VX0,VY0 R11,R12 1 VZ0 R13,R21 2 VX1,VY1 R22,R23 3 VZ1 R31,R32 4 VX2,VY2 R33, 5 VZ2 TRX 6 RGB COD TRY 7 OTZ TRZ 8 IR0 L11,L12 9 IR1 L13,L21 10 IR2 L22,L23 11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2	neier	enceu i	egistera).
Tyzo R13,R21 2 VX1,VY1 R22,R23 3 VZ1 R31,R32 4 VX2,VY2 R33, 5 VZ2 TRX 6 RGB COD TRY 7 OTZ TRZ 8 IRO L11,L12 9 IR1 L13,L21 10 IR2 L22,L23 11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2		Data		Control
2 VX1,VY1 R22,R23 3 VZ1 R31,R32 4 VX2,VY2 R33, 5 VZ2 TRX 6 RGB COD TRY 7 OTZ TRZ 8 IR0 L11,L12 9 IR1 L13,L21 10 IR2 L22,L23 11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA,	0	VX0,VY0		R11,R12
R31,R32 4 VX2,VY2 R33, 5 VZ2 TRX 6 RGB COD TRY 7 OTZ TRZ 8 IR0 L11,L12 9 IR1 L13,L21 10 IR2 L22,L23 11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29	1	VZ0		R13,R21
R31,R32 4 VX2,VY2 R33, 5 VZ2 TRX 6 RGB COD TRY 7 OTZ TRZ 8 IR0 L11,L12 9 IR1 L13,L21 10 IR2 L22,L23 11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29	2	VX1,V	Y1	R22,R23
5 VZ2 TRX 6 RGB COD TRY 7 OTZ TRZ 8 IR0 L11,L12 9 IR1 L13,L21 10 IR2 L22,L23 11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB		VZ1		R31,R32
6 RGB COD TRY 7 OTZ TRZ 8 IR0 L11,L12 9 IR1 L13,L21 10 IR2 L22,L23 11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	4	VX2,V	Y2	R33,
7 OTZ TRZ 8 IR0 L11,L12 9 IR1 L13,L21 10 IR2 L22,L23 11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	5	VZ2		TRX
8 IR0 L11,L12 9 IR1 L13,L21 10 IR2 L22,L23 11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	6	RGB	COD	TRY
9 IR1 L13,L21 10 IR2 L22,L23 11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	7	OTZ		TRZ
10 IR2 L22,L23 11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	8	IR0		L11,L12
11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	9	IR1		L13,L21
12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	10	IR2		L22,L23
13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	11	IR3		L31,L32
14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	12	SX0,S	Y0	L33,
15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	13	SX1,S	Y1	RBK
16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	14	SX2,S	Y2	GBK
17 SZO(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	15			BBK
18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	16	SZx(0)		LR1,LR2
19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	17			LR3,LG1
20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	18	SZ1(2)	1	LG2,LG3
21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	19	SZ2(3)		LB1,LB2
22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	20	R0 G0	В0	LB3,
23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	21	R1 G1	B1	RFC
24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	22	R2 G2	B2	GFC
25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	23			BFC
25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	24	MAC0		OFX
27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,		MAC1		OPY
27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	26			Н,
29 ORGB ZSF3, 30 DATA32 ZSF4,		MAC3		DQA,
30 DATA32 ZSF4,	28	IRGB		DQB
	29	ORGB		ZSF3,
31 LZC FLAG	30	DATA	32	ZSF4,
I = A G	31	LZC		FLAG

Modified registers:

	Data	Control
0	VX0,VY0	R11,R12
1	VZ0	R13,R21
2	VX1,VY1	R22,R23
3	VZ1	R31,R32
4	VX2,VY2	R33,
5	VZ2	TRX
6	RGB CODE	TRY
7	OTZ	TRZ
8	IR0	L11,L12
9	IR1	L13,L21
10	IR2	L22,L23
11	IR3	L31,L32
12	SX0,SY0	L33,
13	SX1,SY1	RBK
14	SX2,SY2	GBK
15	SX2P,SY2P	ввк
16	SZx(0)	LR1,LR2
17	SZ0(1)	LR3,LG1
18	SZ1(2)	LG2,LG3
19	SZ2(3)	LB1,LB2
20	R0 G0 B0	LB3,
21	R1 G1 B1	RFC
22	R2 G2 B2	GFC
23		BFC
24	MAC0	OFX
25	MAC1	OPY
26	MAC2	Н,
27	MAC3	DQA,
28	IRGB	DQB
29	ORGB	ZSF3,
30	DATA32	ZSF4,
31	LZC	FLAG

DPCS

Required cycles: 8

Function: Depth cueing

Calculations:

(1.27.4)

(1.27.16)	$RR0 = R^*1.0 + IR0^*IimA1S(RFC-R^*1.0); <1>$
(1.27.16)	$\mathbf{GG0} = G^*1.0 + IR0*limA2S(\mathbf{GFC}-G^*1.0); <2>$
(1.27.16)	BB0 = B*1.0 + IR0*IimA3S(BFC-B*1.0); <3>
(1.11. 4)	IR1 = limA1S(RRO);
(1.11. 4)	$IR2 = IimA2S(\underline{GG0});$
(1.11. 4)	IR3 = limA3S(BB0);
(8)	CD0 <- CD1 <- CD2 <- CODE
(0. 8. 0)	R0 <- R1 <- R2 <- limB1(RR0);
(0. 8. 0)	G0 <- G1 <- G2 <- limB2(GG0);
(0. 8. 0)	B0 <- B1 <- B2 <- limB3(BB0);
(1.27. 4)	$MAC1 = \underline{RR0};$
(1.27. 4)	$MAC2 = \underline{GG0};$

MAC3 = BB0;

Referenced registers:

	choca registers	<i>7</i> 1
	Data	Control
0	VX0,VY0	R11,R12
1	VZ0	R13,R21
2	VX1,VY1	R22,R23
3	VZ1	R31,R32
4	VX2,VY2	R33,
5	VZ2	TRX
6	RGB CODE	TRY
7	отz	TRZ
8	IR0	L11,L12
9	IR1	L13,L21
10	IR2	L22,L23
11	IR3	L31,L32
12	SX0,SY0	L33,
13	SX1,SY1	RBK
14	SX2,SY2	GBK
15	SX2P,SY2P	ввк
16	SZx(0)	LR1,LR2
17	SZ0(1)	LR3,LG1
18	SZ1(2)	LG2,LG3
19	SZ2(3)	LB1,LB2
20	R0 G0 B0	LB3,
21	R1 G1 B1	RFC
22	R2 G2 B2	GFC
23		BFC
24	MAC0	OFX
25	MAC1	OPY
26	MAC2	Н,
27	MAC3	DQA,
28	IRGB	DQB
29	ORGB	ZSF3,
30	DATA32	ZSF4,
31	LZC	FLAG

Modified registers:

	Data	Control
0	VX0,VY0	R11,R12
1	VZ0	R13,R21
2	VX1,VY1	R22,R23
3	VZ1	R31,R32
4	VX2,VY2	R33,
5	VZ2	TRX
6	RGB CODE	TRY
7	OTZ	TRZ
8	IR0	L11,L12
9	IR1	L13,L21
10	IR2	L22,L23
11	IR3	L31,L32
12	SX0,SY0	L33,
13	SX1,SY1	RBK
14	SX2,SY2	GBK
15	SX2P,SY2P	ввк
16	SZx(0)	LR1,LR2
17	SZ0(1)	LR3,LG1
18	SZ1(2)	LG2,LG3
19	SZ2(3)	LB1,LB2
20	R0 G0 B0	LB3,
21	R1 G1 B1	RFC
22	R2 G2 B2	GFC
23		BFC
24	MAC0	OFX
25	MAC1	OPY
26	MAC2	Н,
27	MAC3	DQA,
28	IRGB	DQB
29	ORGB	ZSF3,
30	DATA32	ZSF4,
31	LZC	FLAG

DPCT

Required cycles: 17

Function: Depth cueing

Calculations:

```
n=0,1,2 {
   (1.27.16) RRn = Rn*1.0 + IR0*limA1S(RFC-R*1.0); <1>
   (1.27.16) GGn = Gn*1.0 + IR0*limA2S(GFC-G*1.0); <2>
   (1.27.16) BBn = Bn*1.0 + IR0*limA3S(BFC-B*1.0); <3>
   (1.11. 4) IR1 = IimA1S(RR2);
   (1.11. 4) IR2 = IimA2S(GG2);
   (1.11. 4) IR3 = IimA3S(BB2);
   (-. 8. -) CDn = CODE
   (0. 8. 0) Rn = limB1(\mathbf{RRn});
   (0. 8. 0) Gn = IimB2(GGn);
   (0. 8. 0)
              Bn = IimB3(\underline{BBn});
(1.27.4)
           MAC1 = RR2
          MAC2 = \underline{GG2};
(1.27.4)
(1.27. 4) MAC3 = BB2;
```

Referenced registers:

110101	chicca registers	<i>,</i> ,
	Data	Control
0	VX0,VY0	R11,R12
1	VZ0	R13,R21
2	VX1,VY1	R22,R23
3	VZ1	R31,R32
4	VX2,VY2	R33,
5	VZ2	TRX
6	RGB CODE	TRY
7	отz	TRZ
8	IR0	L11,L12
9	IR1	L13,L21
10	IR2	L22,L23
11	IR3	L31,L32
12	SX0,SY0	L33,
13	SX1,SY1	RBK
14	SX2,SY2	GBK
15	SX2P,SY2P	BBK
16	SZx(0)	LR1,LR2
17	SZ0(1)	LR3,LG1
18	SZ1(2)	LG2,LG3
19	SZ2(3)	LB1,LB2
20	R0 G0 B0	LB3,
21	R1 G1 B1	RFC
22	R2 G2 B2	GFC
23		BFC
24	MAC0	OFX
25	MAC1	OPY
26	MAC2	Н,
27	MAC3	DQA,
28	IRGB	DQB
29	ORGB	ZSF3,
30	DATA32	ZSF4,
31	LZC	FLAG

Modified registers:

	Data	Control
0	VX0,VY0	R11,R12
1	VZ0	R13,R21
2	VX1,VY1	R22,R23
3	VZ1	R31,R32
4	VX2,VY2	R33,
5	VZ2	TRX
6	RGB CODE	TRY
7	OTZ	TRZ
8	IR0	L11,L12
9	IR1	L13,L21
10	IR2	L22,L23
11	IR3	L31,L32
12	SX0,SY0	L33,
13	SX1,SY1	RBK
14	SX2,SY2	GBK
15	SX2P,SY2P	BBK
16	SZx(0)	LR1,LR2
17	SZ0(1)	LR3,LG1
18	SZ1(2)	LG2,LG3
19	SZ2(3)	LB1,LB2
20	R0 G0 B0	LB3,
21	R1 G1 B1	RFC
22	R2 G2 B2	GFC
23		BFC
24	MAC0	OFX
25	MAC1	OPY
26	MAC2	Н,
27	MAC3	DQA,
28	IRGB	DQB
29	ORGB	ZSF3,
30	DATA32	ZSF4,
31	LZC	FLAG

Function: Vector squaring

Items specified using arguments:

Argu ment	Specified content	Value =0	Value=1
sf	Output format	-	Performs calculations on data shifted 12 bits to the left in the IRn register.

Calculations: (m and n request the data format of IRp(p=1,2,3) as (1.m.n).)

sf == 0	sf == 1	
(1.m+28.n)	(1.m+16.n+12)	<u>L1</u> = IR1*IR1; <1>
(1.m+28.n)	(1.m+16.n+12)	L2 = IR2*IR2; <2>
(1.m+28.n)	(1.m+16.n+12)	L3 = IR3*IR3; <3>
(1.m .n)	(1.m+16.n+12)	$IR1 = IimA1U(\mathbf{L1});$
(1.m .n)	(1.m+16.n+12)	$IR2 = IimA2U(\underline{L2});$
(1.m .n)	(1.m+16.n+12)	$IR3 = IimA3U(\underline{L3});$
(1.m+16.0)	(1.m+16.n+12)	$MAC1 = \underline{L1};$
(1.m+16.0)	(1.m+16.n+12)	$MAC2 = \underline{L2};$
(1.m+16.0)	(1.m+16.n+12)	$MAC3 = \underline{L3};$

Referenced registers:

neiei	enceu registers).
	Data	Control
0	VX0,VY0	R11,R12
1	VZ0	R13,R21
2	VX1,VY1	R22,R23
3	VZ1	R31,R32
4	VX2,VY2	R33,
5	VZ2	TRX
6	RGB CODE	TRY
7	OTZ	TRZ
8	IR0	L11,L12
9	IR1	L13,L21
10	IR2	L22,L23
11	IR3	L31,L32
12	SX0,SY0	L33,
13	SX1,SY1	RBK
14	SX2,SY2	GBK
15	SX2P,SY2P	ввк
16	SZx(0)	LR1,LR2
17	SZ0(1)	LR3,LG1
18	SZ1(2)	LG2,LG3
19	SZ2(3)	LB1,LB2
20	R0 G0 B0	LB3,
21	R1 G1 B1	RFC
22	R2 G2 B2	GFC
23		BFC
24	MAC0	OFX
25	MAC1	OPY
26	MAC2	Н,
27	MAC3	DQA,
28	IRGB	DQB
29	ORGB	ZSF3,
30	DATA32	ZSF4,
31	LZC	FLAG

Modified registers:

	Data	Control
0	VX0,VY0	R11,R12
1	VZ0	R13,R21
2	VX1,VY1	R22,R23
3	VZ1	R31,R32
4	VX2,VY2	R33,
5	VZ2	TRX
6	RGB CODE	TRY
7	OTZ	TRZ
8	IR0	L11,L12
9	IR1	L13,L21
10	IR2	L22,L23
11	IR3	L31,L32
12	SX0,SY0	L33,
13	SX1,SY1	RBK
14	SX2,SY2	GBK
15	SX2P,SY2P	BBK
16	SZx(0)	LR1,LR2
17	SZ0(1)	LR3,LG1
18	SZ1(2)	LG2,LG3
19	SZ2(3)	LB1,LB2
20	R0 G0 B0	LB3,
21	R1 G1 B1	RFC
22	R2 G2 B2	GFC
23		BFC
24	MAC0	OFX
25	MAC1	OPY
26	MAC2	Н,
27	MAC3	DQA,
28	IRGB	DQB
29	ORGB	ZSF3,
30	DATA32	ZSF4,
31	LZC	FLAG

Function: Z-averaging

Calculations:

(0.16. 0) OTZ = $\lim C(OOTZ)$; (1.31. 0) **MAC0** = OOTZ; Referenced registers:

Referenced registers:			
	Data	Control	
0	VX0,VY0	R11,R12	
1	VZ0	R13,R21	
2	VX1,VY1	R22,R23	
3	VZ1	R31,R32	
4	VX2,VY2	R33,	
5	VZ2	TRX	
6	RGB CODE	TRY	
7	OTZ	TRZ	
8	IR0	L11,L12	
9	IR1	L13,L21	
10	IR2	L22,L23	
11	IR3	L31,L32	
12	SX0,SY0	L33,	
13	SX1,SY1	RBK	
14	SX2,SY2	GBK	
15	SX2P,SY2P	BBK	
16	SZx(0)	LR1,LR2	
17	SZ0(1)	LR3,LG1	
18	SZ1(2)	LG2,LG3	
19	SZ2(3)	LB1,LB2	
20	R0 G0 B0	LB3,	
21	R1 G1 B1	RFC	
22	R2 G2 B2	GFC	
23		BFC	
24	MAC0	OFX	
25	MAC1	OPY	
26	MAC2	Н,	
27	MAC3	DQA,	
28	IRGB	DQB	
29	ORGB	ZSF3,	
30	DATA32	ZSF4,	
31	LZC	FLAG	

Modified registers:

vioaii	ica registers.	
	Data	Control
0	VX0,VY0	R11,R12
1	VZ0	R13,R21
2	VX1,VY1	R22,R23
3	VZ1	R31,R32
4	VX2,VY2	R33,
5	VZ2	TRX
6	RGB CODE	TRY
7	OTZ	TRZ
8	IR0	L11,L12
9	IR1	L13,L21
10	IR2	L22,L23
11	IR3	L31,L32
12	SX0,SY0	L33,
13	SX1,SY1	RBK
14	SX2,SY2	GBK
15	SX2P,SY2P	BBK
16	SZx(0)	LR1,LR2
17	SZ0(1)	LR3,LG1
18	SZ1(2)	LG2,LG3
19	SZ2(3)	LB1,LB2
20	R0 G0 B0	LB3,
21	R1 G1 B1	RFC
22	R2 G2 B2	GFC
23		BFC
24	MAC0	OFX
25	MAC1	OPY
26	MAC2	Н,
27	MAC3	DQA,
28	IRGB	DQB
29	ORGB	ZSF3,
30	DATA32	ZSF4,
31	LZC	FLAG

Function: Z-averaging

Calculations:

(1.31. 0)

 $MAC0 = \underline{OOTZ};$

Referenced registers:

	Data	Control
0	VX0,VY0	R11,R12
1	VZ0	R13,R21
2	VX1,VY1	R22,R23
3	VZ1	R31,R32
4	VX2,VY2	R33,
5	VZ2	TRX
6	RGB CODE	TRY
7	OTZ	TRZ
8	IR0	L11,L12
9	IR1	L13,L21
10	IR2	L22,L23
11	IR3	L31,L32
12	SX0,SY0	L33,
13	SX1,SY1	RBK
14	SX2,SY2	GBK
15	SX2P,SY2P	ввк
16	SZx(0)	LR1,LR2
17	SZ0(1)	LR3,LG1
18	SZ1(2)	LG2,LG3
19	SZ2(3)	LB1,LB2
20	R0 G0 B0	LB3,
21	R1 G1 B1	RFC
22	R2 G2 B2	GFC
23		BFC
24	MAC0	OFX
25	MAC1	OPY
26	MAC2	Н,
27	MAC3	DQA,
28	IRGB	DQB
29	ORGB	ZSF3,
30	DATA32	ZSF4,
31	LZC	FLAG

Modified registers:

1 VZO R13,R21 2 VX1,VY1 R22,R23 3 VZ1 R31,R32 4 VX2,VY2 R33, 5 VZ2 TRX 6 RGB CODE TRY 7 OTZ TRZ 8 IRO L11,L12 9 IR1 L13,L21 10 IR2 L22,L23 11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25<	viouii	ica registers.	
1 VZO R13,R21 2 VX1,VY1 R22,R23 3 VZ1 R31,R32 4 VX2,VY2 R33, 5 VZ2 TRX 6 RGB CODE TRY 7 OTZ TRZ 8 IRO L11,L12 9 IR1 L13,L21 10 IR2 L22,L23 11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26		Data	Control
2 VX1,VY1 R22,R23 3 VZ1 R31,R32 4 VX2,VY2 R33, 5 VZ2 TRX 6 RGB CODE TRY 7 OTZ TRZ 8 IR0 L11,L12 9 IR1 L13,L21 10 IR2 L22,L23 11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 <th>0</th> <th>VX0,VY0</th> <th>R11,R12</th>	0	VX0,VY0	R11,R12
3 VZ1 R31,R32 4 VX2,VY2 R33, 5 VZ2 TRX 6 RGB CODE TRY 7 OTZ TRZ 8 IR0 L11,L12 9 IR1 L13,L21 10 IR2 L22,L23 11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28	1	VZ0	R13,R21
4 VX2,VY2 R33, 5 VZ2 TRX 6 RGB CODE TRY 7 OTZ TRZ 8 IR0 L11,L12 9 IR1 L13,L21 10 IR2 L22,L23 11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28	2	VX1,VY1	R22,R23
4 VX2,VY2 R33, 5 VZ2 TRX 6 RGB CODE TRY 7 OTZ TRZ 8 IR0 L11,L12 9 IR1 L13,L21 10 IR2 L22,L23 11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28	3	VZ1	R31,R32
6 RGB CODE TRY 7 OTZ TRZ 8 IR0 L11,L12 9 IR1 L13,L21 10 IR2 L22,L23 11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30	4	VX2,VY2	R33,
7 OTZ TRZ 8 IR0 L11,L12 9 IR1 L13,L21 10 IR2 L22,L23 11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	5	VZ2	TRX
8 IR0 L11,L12 9 IR1 L13,L21 10 IR2 L22,L23 11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	6	RGB CODE	TRY
9 IR1 L13,L21 10 IR2 L22,L23 11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	7	OTZ	TRZ
10 IR2 L22,L23 11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	8	IR0	L11,L12
11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	9	IR1	L13,L21
12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	10	IR2	L22,L23
13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	11	IR3	L31,L32
14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	12	SX0,SY0	L33,
15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	13	SX1,SY1	RBK
16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	14	SX2,SY2	GBK
17 SZO(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	15	SX2P,SY2P	ввк
18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	16	SZx(0)	LR1,LR2
19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	17	SZ0(1)	LR3,LG1
20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	18	SZ1(2)	LG2,LG3
21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	19	SZ2(3)	LB1,LB2
22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	20	R0 G0 B0	LB3,
23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	21	R1 G1 B1	RFC
24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	22	R2 G2 B2	GFC
25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	23		BFC
26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	24	MAC0	OFX
27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	25	MAC1	OPY
28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	26	MAC2	Н,
29 ORGB ZSF3, 30 DATA32 ZSF4,	27	MAC3	DQA,
30 DATA32 ZSF4 ,	28	IRGB	DQB
	29	ORGB	ZSF3,
31 LZC FLAG	30	DATA32	ZSF4,
	31	LZC	FLAG

Function: Normal clipping

Calculations:

(1.43. 0) OPZ = SX0*SY1 + SX1*SY2 + SX2*SY0

- SX0*SY2 - SX1*SY0 - SX2*SY1; <4>

(1.31. 0) **MAC0** = **<u>OPZ</u>**;

Referenced registers:

Refer	encea registers	; <u> </u>
	Data	Control
0	VX0,VY0	R11,R12
1	VZ0	R13,R21
2	VX1,VY1	R22,R23
3	VZ1	R31,R32
4	VX2,VY2	R33,
5	VZ2	TRX
6	RGB CODE	TRY
7	OTZ	TRZ
8	IR0	L11,L12
9	IR1	L13,L21
10	IR2	L22,L23
11	IR3	L31,L32
12	SX0,SY0	L33,
13	SX1,SY1	RBK
14	SX2,SY2	GBK
15	SX2P,SY2P	BBK
16	SZx(0)	LR1,LR2
17	SZ0(1)	LR3,LG1
18	SZ1(2)	LG2,LG3
19	SZ2(3)	LB1,LB2
20	R0 G0 B0	LB3,
21	R1 G1 B1	RFC
22	R2 G2 B2	GFC
23		BFC
24	MAC0	OFX
25	MAC1	OPY
26	MAC2	Н,
27	MAC3	DQA,
28	IRGB	DQB
29	ORGB	ZSF3,
30	DATA32	ZSF4,
31	LZC	FLAG

Modified registers:

	Data	Control
0	VX0,VY0	R11,R12
1	VZ0	R13,R21
2	VX1,VY1	R22,R23
3	VZ1	R31,R32
4	VX2,VY2	R33,
5	VZ2	TRX
6	RGB CODE	TRY
7	OTZ	TRZ
8	IR0	L11,L12
9	IR1	L13,L21
10	IR2	L22,L23
11	IR3	L31,L32
12	SX0,SY0	L33,
13	SX1,SY1	RBK
14	SX2,SY2	GBK
15	SX2P,SY2P	BBK
16	SZx(0)	LR1,LR2
17	SZ0(1)	LR3,LG1
18	SZ1(2)	LG2,LG3
19	SZ2(3)	LB1,LB2
20	R0 G0 B0	LB3,
21	R1 G1 B1	RFC
22	R2 G2 B2	GFC
23		BFC
24	MAC0	OFX
25	MAC1	OPY
26	MAC2	Н,
27	MAC3	DQA,
28	IRGB	DQB
29	ORGB	ZSF3,
30	DATA32	ZSF4,
31	LZC	FLAG

Function: Outer product

Items specified using arguments:

Argu ment	Specified content	Value =0	Value=1
sf	Output format	_	Performs calculations on data shifted 12 bits to the left in the IRn register.

Calculations: : (m and n request the data format of IRp(p=1,2,3) as (1.m.n).)

(1.m.n).)		
sf == 0	sf == 1	
(1.m+28.n)	(1.m+16.n+12)	$\underline{OPX} = DY1(R22)*DZ2(IR3)$
		- DZ1(R33)*DY2(IR2); <1>
(1.m+28.n)	(1.m+16.n+12)	$\underline{OPY} = DZ1(R33)*DX2(IR1)$
		- DX1(R11)*DZ2(IR3); <2>
(1.m+28.n)	(1.m+16.n+12)	$\underline{OPZ} = DX1(R11)*DY2(IR2)$
		- DY1(R22)*DX2(IR1); <3>
(1.m .n)	(1.m .n)	$IR1 = IimA1S(\underline{OPX});$
(1.m .n)	(1.m .n)	$IR2 = IimA2S(\underline{OPY});$
(1.m .n)	(1.m .n)	IR3 = $limA3S(\underline{OPZ});$
(1.m+16.n)	(1.m+16.n)	$MAC1 = \underline{OPX};$
(1.m+16.n)	(1.m+16.n)	$MAC2 = \underline{OPY};$
(1.m+16.n)	(1.m+16.n)	$MAC3 = \underline{OPZ};$

Referenced registers:

Referenced registers:			
	Data	Control	
0	VX0,VY0	R11,R12	
1	VZ0	R13,R21	
2	VX1,VY1	R22,R23	
3	VZ1	R31,R32	
4	VX2,VY2	R33,	
5	VZ2	TRX	
6	RGB CODE	TRY	
7	OTZ	TRZ	
8	IR0	L11,L12	
9	IR1	L13,L21	
10	IR2	L22,L23	
11	IR3	L31,L32	
12	SX0,SY0	L33,	
13	SX1,SY1	RBK	
14	SX2,SY2	GBK	
15	SX2P,SY2P	ввк	
16	SZx(0)	LR1,LR2	
17	SZ0(1)	LR3,LG1	
18	SZ1(2)	LG2,LG3	
19	SZ2(3)	LB1,LB2	
20	R0 G0 B0	LB3,	
21	R1 G1 B1	RFC	
22	R2 G2 B2	GFC	
23		BFC	
24	MAC0	OFX	
25	MAC1	OPY	
26	MAC2	Н,	
27	MAC3	DQA,	
28	IRGB	DQB	
29	ORGB	ZSF3,	
30	DATA32	ZSF4,	
31	LZC	FLAG	

Modified registers:

moun	ica registers.	
	Data	Control
0	VX0,VY0	R11,R12
1	VZ0	R13,R21
2	VX1,VY1	R22,R23
3	VZ1	R31,R32
4	VX2,VY2	R33,
5	VZ2	TRX
6	RGB CODE	TRY
7	OTZ	TRZ
8	IR0	L11,L12
9	IR1	L13,L21
10	IR2	L22,L23
11	IR3	L31,L32
12	SX0,SY0	L33,
13	SX1,SY1	RBK
14	SX2,SY2	GBK
15	SX2P,SY2P	BBK
16	SZx(0)	LR1,LR2
17	SZ0(1)	LR3,LG1
18	SZ1(2)	LG2,LG3
19	SZ2(3)	LB1,LB2
20	R0 G0 B0	LB3,
21	R1 G1 B1	RFC
22	R2 G2 B2	GFC
23		BFC
24	MAC0	OFX
25	MAC1	OPY
26	MAC2	Н,
27	MAC3	DQA,
28	IRGB	DQB
29	ORGB	ZSF3,
30	DATA32	ZSF4,
31	LZC	FLAG

Function: General purpose interpolation

Items specified using arguments:

Argu ment	Specified content	Value =0	Value=1
sf	Output format	_	Performs calculations on data shifted 12 bits to the left in the IRn register.

Calculations: : (m and n request the data format of IRp(p=1,2,3) as (1.m.n).)

sf == 0sf == 1 (1.m+28.n) (1.m+16.n+12) IPX = IR0*IR1; <1>(1.m+28.n) (1.m+16.n+12) IPY = IR0*IR2; <2>(1.m+28.n) (1.m+16.n+12)IPZ = IR0*IR3; <3>(1.m .n) IR1 = IimA1S(IPX);(1.m .n) (1.m .n) (1.m .n) R2 = IimA2S(IPY);(1.m .n) (1.m .n) IR3 = IimA3S(IPZ);(1.m+16.n) (1.m+16.n) MAC1 = IPX;(1.m+16.n) (1.m+16.n) MAC2 = IPY;MAC3 = IPZ;(1.m+16.n) (1.m+16.n)

(-. 8. -) CD0 <- CD1 <- CD2 <- CODE (0. 0. 8) R0 <- R1 <- R2 <- limB1(**IPX**); (0. 0. 8) G0 <- G1 <- G2 <- limB2(**IPY**); (0. 0. 8) B0 <- B1 <- B2 <- limB3(**IPZ**); Referenced registers:

Refer	encea registers	5:
	Data	Control
0	VX0,VY0	R11,R12
1	VZ0	R13,R21
2	VX1,VY1	R22,R23
3	VZ1	R31,R32
4	VX2,VY2	R33,
5	VZ2	TRX
6	RGB COD	TRY
7	OTZ	TRZ
8	IR0	L11,L12
9	IR1	L13,L21
10	IR2	L22,L23
11	IR3	L31,L32
12	SX0,SY0	L33,
13	SX1,SY1	RBK
14	SX2,SY2	GBK
15	SX2P,SY2P	ввк
16	SZx(0)	LR1,LR2
17	SZ0(1)	LR3,LG1
18	SZ1(2)	LG2,LG3
19	SZ2(3)	LB1,LB2
20	R0 G0 B0	LB3,
21	R1 G1 B1	RFC
22	R2 G2 B2	GFC
23		BFC
24	MAC0	OFX
25	MAC1	OPY
26	MAC2	Н,
27	MAC3	DQA,
28	IRGB	DQB
29	ORGB	ZSF3,
30	DATA32	ZSF4,
31	LZC	FLAG

Modified registers:

Data Control 0 VX0,VY0 R11,R12 1 VZ0 R13,R21 2 VX1,VY1 R22,R23 3 VZ1 R31,R32 4 VX2,VY2 R33, 5 VZ2 TRX 6 RGB CODE TRY 7 OTZ TRZ 8 IR0 L11,L12 9 IR1 L13,L21 10 IR2 L22,L23 11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC		ica registers.	
1 VZ0 R13,R21 2 VX1,VY1 R22,R23 3 VZ1 R31,R32 4 VX2,VY2 R33, 5 VZ2 TRX 6 RGB CODE TRY 7 OTZ TRZ 8 IR0 L11,L12 9 IR1 L13,L21 10 IR2 L22,L23 11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25<		Data	Control
2 VX1,VY1 R22,R23 3 VZ1 R31,R32 4 VX2,VY2 R33, 5 VZ2 TRX 6 RGB CODE TRY 7 OTZ TRZ 8 IR0 L11,L12 9 IR1 L13,L21 10 IR2 L22,L23 11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 <th>0</th> <th>VX0,VY0</th> <th>R11,R12</th>	0	VX0,VY0	R11,R12
3 VZ1 R31,R32 4 VX2,VY2 R33, 5 VZ2 TRX 6 RGB CODE TRY 7 OTZ TRZ 8 IR0 L11,L12 9 IR1 L13,L21 10 IR2 L22,L23 11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27	1	VZ0	R13,R21
4 VX2,VY2 R33, 5 VZ2 TRX 6 RGB CODE TRY 7 OTZ TRZ 8 IR0 L11,L12 9 IR1 L13,L21 10 IR2 L22,L23 11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3,	2	VX1,VY1	R22,R23
4 VX2,VY2 R33, 5 VZ2 TRX 6 RGB CODE TRY 7 OTZ TRZ 8 IR0 L11,L12 9 IR1 L13,L21 10 IR2 L22,L23 11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28	3	VZ1	R31,R32
6 RGB CODE TRY 7 OTZ TRZ 8 IR0 L11,L12 9 IR1 L13,L21 10 IR2 L22,L23 11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30	4		
7 OTZ TRZ 8 IR0 L11,L12 9 IR1 L13,L21 10 IR2 L22,L23 11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	5	VZ2	TRX
8 IR0 L11,L12 9 IR1 L13,L21 10 IR2 L22,L23 11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	6	RGB CODE	TRY
9 IR1 L13,L21 10 IR2 L22,L23 11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	7	OTZ	TRZ
10 IR2 L22,L23 11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	8	IR0	L11,L12
11 IR3 L31,L32 12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	9	IR1	L13,L21
12 SX0,SY0 L33, 13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	10	IR2	L22,L23
13 SX1,SY1 RBK 14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	11	IR3	L31,L32
14 SX2,SY2 GBK 15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	12	SX0,SY0	L33,
15 SX2P,SY2P BBK 16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	13	SX1,SY1	RBK
16 SZx(0) LR1,LR2 17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	14	SX2,SY2	GBK
17 SZ0(1) LR3,LG1 18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	15	SX2P,SY2P	BBK
18 SZ1(2) LG2,LG3 19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	16	SZx(0)	LR1,LR2
19 SZ2(3) LB1,LB2 20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	17	SZ0(1)	LR3,LG1
20 R0 G0 B0 LB3, 21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	18	SZ1(2)	LG2,LG3
21 R1 G1 B1 RFC 22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	19	SZ2(3)	LB1,LB2
22 R2 G2 B2 GFC 23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	20	R0 G0 B0	LB3,
23 BFC 24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	21	R1 G1 B1	RFC
24 MAC0 OFX 25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	22	R2 G2 B2	GFC
25 MAC1 OPY 26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	23		BFC
26 MAC2 H, 27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	24	MAC0	OFX
27 MAC3 DQA, 28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	25	MAC1	OPY
28 IRGB DQB 29 ORGB ZSF3, 30 DATA32 ZSF4,	26	MAC2	Н,
29 ORGB ZSF3, 30 DATA32 ZSF4,	27	MAC3	DQA,
30 DATA32 ZSF4 ,	28	IRGB	DQB
	29	ORGB	ZSF3,
01 170 5140	30	DATA32	ZSF4,
SI ILZU FLAG	31	LZC	FLAG

Function: General purpose interpolation

Items specified using arguments:

Argu ment	Specified content	Value =0	Value=1
sf	Output format	_	Performs calculations on data shifted 12 bits to the left in the IRn register.

Calculations: : (m and n request the data format of IRp(p=1,2,3) as (1.m.n).)

sf == 0sf == 1 (1.m+28.n) (1.m+16.n+12) IPX = MAC1 + IR0*IR1; <1>(1.m+28.n) (1.m+16.n+12) IPY = MAC2 + IR0*IR2; <2>(1.m+28.n) (1.m+16.n+12)IPZ = MAC3 + IR0*IR3; <3>(1.m .n) IR1 = IimA1S(IPX);(1.m .n) (1.m .n) (1.m .n) IR2 = IimA2S(IPY);(1.m .n) (1.m .n) IR3 = IimA3S(IPZ);(1.m+16.n) (1.m+16.n) MAC1 = IPX;(1.m+16.n) (1.m+16.n) MAC2 = IPY;MAC3 = IPZ;(1.m+16.n) (1.m+16.n) CD0 <- CD1 <- CD2 <- CODE (-. 8. -)

(0. 0. 8) R0 <- R1 <- R2 <- limB1(**IPX**); (0. 0. 8) G0 <- G1 <- G2 <- limB2(**IPY**); (0. 0. 8) B0 <- B1 <- B2 <- limB3(**IPZ**); Referenced registers:

Referenced registers:							
	Data	Control					
0	VX0,VY0	R11,R12					
1	VZ0	R13,R21					
2	VX1,VY1	R22,R23					
3	VZ1	R31,R32					
4	VX2,VY2	R33,					
5	VZ2	TRX					
6	RGB COD	TRY					
7	OTZ	TRZ					
8	IR0	L11,L12					
9	IR1	L13,L21					
10	IR2	L22,L23					
11	IR3	L31,L32					
12	SX0,SY0	L33,					
13	SX1,SY1	RBK					
14	SX2,SY2	GBK					
15	SX2P,SY2P	ввк					
16	SZx(0)	LR1,LR2					
17	SZ0(1)	LR3,LG1					
18	SZ1(2)	LG2,LG3					
19	SZ2(3)	LB1,LB2					
20	R0 G0 B0	LB3,					
21	R1 G1 B1	RFC					
22	R2 G2 B2	GFC					
23		BFC					
24	MAC0	OFX					
25	MAC1	OPY					
26	MAC2	Н,					
27	MAC3	DQA,					
28	IRGB	DQB					
29	ORGB	ZSF3,					
30	DATA32	ZSF4,					
31	LZC	FLAG					

Modified registers:

	ieu registers.		
	Data	Control	
0	VX0,VY0	R11,R12	
1	VZ0	R13,R21	
2	VX1,VY1	R22,R23	
3	VZ1	R31,R32	
4	VX2,VY2	R33,	
5	VZ2	TRX	
6	RGB CODE	TRY	
7	OTZ	TRZ	
8	IR0	L11,L12	
9	IR1	L13,L21	
10	IR2	L22,L23	
11	IR3	L31,L32	
12	SX0,SY0	L33,	
13	SX1,SY1	RBK	
14	SX2,SY2	GBK	
15	SX2P,SY2P	ввк	
16	SZx(0)	LR1,LR2	
17	SZ0(1)	LR3,LG1	
18	SZ1(2)	LG2,LG3	
19	SZ2(3)	LB1,LB2	
20	R0 G0 B0	LB3,	
21	R1 G1 B1	RFC	
22	R2 G2 B2	GFC	
23		BFC	
24	MAC0	OFX	
25	MAC1	OPY	
26	MAC2	Н,	
27	MAC3	DQA,	
28	IRGB	DQB	
29	ORGB	ZSF3,	
30	DATA32	ZSF4,	
31	LZC	FLAG	