

4 3 2 1 0 LABEL K DST FCT RS C A B SHFT SP PC S E BD BS COMMENT

USED REGS

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*
* INTERPRETER          VERSION 13.2          12.6.81
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      NIKLAUS WIRTH  WERNER WINIGER
      INSTITUT FUER INFORMATIK
      ETH ZENTRUM
      CH-8092 ZUERICH

      M-CODE INTERPRETER
      BOOTSTRAP/DUMP
      DISPLAY HANDLING PROCEDURES
      REAL OPERATIONS
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- 7.0 IO WITH REARRANGED DELAY
  - DIVISION WITH CORRECT REMAINDER
  - BOOTSTRAP/DUMP FROM/TO DISK
  - SPEED CATEGORIES INTRODUCED
- 8.0 FOR2 CORRECTED
  - FREE LOCATIONS ASSEMBLED BEFORE LI0
  - INTERRUPT LOCATIONS NEWLY DISTRIBUTED
- 8.1 BOOTSTRAP CORRECTED
  - PUT TO DISK SLOWN DOWN
- 9.0 P-REGISTER INTRODUCED
  - PRIORITY HANDLING (M-REGISTER) ENHANCED
  - INSTRUCTIONS REORDERED
  - CODE FRAME TABLE REMOVED
- 9.1 SHL CORRECTED
  - NEW MAP CONCEPT ADAPTED
- 10.0 INSTRUCTION SET EXTENDED
  - CHECKS ADDED
  - TRAP NUMBERS CHANGED
- 10.1 REAL ARITHMETIC ADDED
- 11.0 MULTIPLICATION CORRECTED
  - 128K DUMP
  - FIXED DISK BOOT
- 12.0 REALS CORRECTED
  - MAP PROM ADDRESSED LOCATIONS ASSEMBLED CONTIGUOUS
- 12.1 PUT/GET SLOWN DOWN
- 13.0 MUL10 REMOVED
  - DMUL, DDIV, DMUL2, DDIV2, ESC INSERTED
- 13.1 NEG (TRAP) CORRECTED
- 13.2 ERRORS IN REPLICATE CORRECTED. SYS;5 -> 1

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USED REGS

. DEFINITION OF THE SPEED CATEGORIES:

. SLOW A : JMAP

. B : CONDITIONAL JUMP & JSR <

. C : UNCONDITIONAL JUMP & JSR <

. D : RETURN <

. > DISABLED

. E : BUS SOURCE = MD <

. F : BUS DESTINATION = MAR <

. G : BUS SOURCE = IR/IR4/IR\* <

. SLOW H : PUT (DISK)

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4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED	REGS		
.MAP 0, 1, 2, 3, 4, 5, 6, 7, 10, 11, 12, 13, 14, 15, 16, 17																								
10	4D	7F	EC	40	0F	LI0	1	B*	OR	ZQ	0	T	T	-	-	-	S	0	PSH	-	T -> STK, Q -> T	T	Q	
11	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q	
.MAP 20																								
12	4F	FF	EC	40	04	LIB	1	B*	OR	DZ	0	T	T	-	-	-	S	0	ALU	IR	T -> STK, IR -> T	T		
13	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q	
.MAP 21 NOT USED																								
.MAP 22																								
14	4F	FF	E4	48	04	LIW	1	B*	OR	DZ	0	T	T	R	10	-	-	S	0	ALU	IR	T->STK, (IR+10) -> T	T	
15	6E	FF	EC	60	04		1	B	OR	DA	0	T	T	-	-	-	-	0	ALU	IR	IR OR T -> T	T		
16	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q	
.MAP 23																								
17	4F	FF	E4	48	04	LID	1	B*	OR	DZ	0	T	T	R	10	-	-	S	0	ALU	IR	T->STK, (IR+10) -> T	T	
18	6E	FF	EC	60	04		1	B	OR	DA	0	T	T	-	-	-	-	0	ALU	IR	IR OR T -> T	T		
19	4F	FF	E4	48	04		1	B*	OR	DZ	0	T	T	R	10	-	-	S	0	ALU	IR	T->STK, (IR+10) -> T	T	
1A	6E	FF	EC	60	04		1	B	OR	DA	0	T	T	-	-	-	-	0	ALU	IR	IR OR T -> T	T		
1B	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q	
.MAP 24																								
1C	4F	FF	EC	40	04	LLA	1	B*	OR	DZ	0	T	T	-	-	-	S	0	ALU	IR	T -> STK, IR -> T	T		
1D	60	FD	EC	60	FF		1	B	+	AB	0	L	T	-	-	-	-	0	-	-	L+T -> T	L	T	
1E	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q	
.MAP 25																								
1F	4F	FF	EC	40	04	LGA	1	B*	OR	DZ	0	T	T	-	-	-	S	0	ALU	IR	T -> STK, IR -> T	T		
20	60	FB	EC	60	FF		1	B	+	AB	0	G	T	-	-	-	-	0	-	-	G+T -> T	G	T	
21	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q	
.MAP 26																								
22	62	FF	EC	60	04	LSA	1	B	+	DA	0	T	T	-	-	-	-	0	ALU	IR	IR+T -> T	T		
23	3E	22	07	20	0F		0	TRAP(5)		C											TRAP IF OVERFLOW			
24	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q	
.MAP 27																								
25	6F	E0	0C	60	04	LEA	1	B	OR	DZ	0	-	0	-	-	-	-	0	ALU	IR	IR -> R0	0		
26	62	E0	0C	70	20		1	B	+	DA	0	0	0	-	-	-	-	1	40		40 + R0 -> R0	0		
27	2E	60	0C	60	30		1	-	OR	ZA	0	0	-	-	-	-	-	0	MAR	ALU	R0 -> MAR	0		
28	4F	FE	0C	40	04		1	B*	OR	DZ	0	T	0	-	-	-	S	0	ALU	IR	IR -> R0, T -> STK	0	T	
29	62	E1	EC	60	01		1	B	+	DA	0	0	T	-	-	-	-	0	ALU	MD	MD + R0 -> T	0	T	
2A	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q	

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4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED	REGS		
.MAP 30																								
2B	2E	7E	0C	60	FF	JPC	1	-	OR	ZA	0	T	-	-	-	-	0	-	-	T		T		
2C	04	19	07	20	0F		0	#SKIP2		-Z					-	JMP				JMP IF #0				
2D	6F	E1	EC	40	FF		1	B	OR	DZ	0	-	T	-	-	-	S	0	POP	-	STK -> T		T	
.MAP 31																								
2E	6F	E0	0C	60	02	JP	1	B	OR	DZ	0	-	0	-	-	-	-	0	ALU	PC	PC -> R0		0	
2F	62	E0	04	68	04		1	B	+	DA	0	0	0	R	10	-	-	-	0	ALU	IR	(IR+10)+R0 -> R0		0
30	62	E0	0C	60	06		1	B	+	DA	0	0	0	-	-	-	-	0	ALU	IR*	R0+IR -> R0		0	
31	2E	60	0C	60	20		1	-	OR	ZA	0	0	-	-	-	-	-	0	PC	ALU	R0 -> PC		0	
32	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP		Q
.MAP 32																								
33	2E	7E	0C	60	FF	JPFC	1	-	OR	ZA	0	T	-	-	-	-	0	-	-	T		T		
34	04	29	07	20	0F		0	#SKIP1		-Z					-	JMP				JMP IF #0				
35	6F	E1	EC	40	FF		1	B	OR	DZ	0	-	T	-	-	-	S	0	POP	-	STK -> T		T	
.MAP 33																								
36	6F	E0	0C	60	02	JPF	1	B	OR	DZ	0	-	0	-	-	-	-	0	ALU	PC	PC -> R0		0	
37	62	E0	0C	60	06		1	B	+	DA	0	0	0	-	-	-	-	0	ALU	IR*	R0+IR -> R0		0	
38	2E	60	0C	60	20		1	-	OR	ZA	0	0	-	-	-	-	-	0	PC	ALU	R0 -> PC		0	
39	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP		Q
.MAP 34																								
3A	2E	7E	0C	60	FF	JPBC	1	-	OR	ZA	0	T	-	-	-	-	0	-	-	T		T		
3B	04	29	07	20	0F		0	#SKIP1		-Z					-	JMP				JMP IF #0				
3C	6F	E1	EC	40	FF		1	B	OR	DZ	0	-	T	-	-	-	S	0	POP	-	STK -> T		T	
.MAP 35																								
3D	6F	E0	0C	60	02	JPB	1	B	OR	DZ	0	-	0	-	-	-	-	0	ALU	PC	PC -> R0		0	
3E	66	C0	0C	60	06		1	B	++	DA	1	0	0	-	-	-	-	0	ALU	IR*	R0-IR -> R0		0	
3F	2E	60	0C	60	20		1	-	OR	ZA	0	0	-	-	-	-	-	0	PC	ALU	R0 -> PC		0	
40	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP		Q
41	2D	60	0C	60	F4	#SKIP2	1	-	OR	ZQ	0	-	-	-	-	-	-	0	-	IR	IR		Q	
42	6F	E1	EC	40	F4	#SKIP1	1	B	OR	DZ	0	-	T	-	-	-	S	0	POP	IR	IR, STK -> T		T	
43	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP		Q
.MAP 36																								
44	2E	7E	0C	60	FF	ORJP	1	-	OR	ZA	0	T	-	-	-	-	0	-	-	T		T		
45	04	A1	07	20	0F		0	#OR1		Z					-	JMP				IF T = 0				
46	6F	E0	0C	60	02	#AND1	1	B	OR	DZ	0	-	0	-	-	-	-	0	ALU	PC	PC -> R0		0	
47	62	E0	0C	60	06		1	B	+	DA	0	0	0	-	-	-	-	0	ALU	IR*	IR + R0 -> R0		0	
48	2E	60	0C	60	20		1	-	OR	ZA	0	0	-	-	-	-	-	0	PC	ALU	R0 -> PC		0	
49	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP		Q
4A	63	C0	0C	60	02	#OR1	1	B	+	DZ	1	-	0	-	-	-	-	0	ALU	PC	PC + 1 -> R0		0	
4B	4F	E1	EC	40	20		1	B*	OR	DZ	0	0	T	-	-	-	S	0	PC	ALU	R0 -> PC, STK -> T		0 T	
4C	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP		Q
.MAP 37																								
4D	2E	7E	0C	60	FF	ANDJP	1	-	OR	ZA	0	T	-	-	-	-	0	-	-	T		T		
4E	04	61	07	20	0F		0	#AND1		Z					-	JMP				IF T = 0				
4F	63	C0	0C	60	02		1	B	+	DZ	1	-	0	-	-	-	-	0	ALU	PC	PC + 1 -> R0		0	
50	4F	E1	EC	40	20		1	B*	OR	DZ	0	0	T	-	-	-	S	0	PC	ALU	R0 -> PC, STK -> T		0 T	
51	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP		Q

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4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED REGS				
.MAP 40																									
52	62	FC	0C	60	04	LLW	1	B	+	DA	0	L	0	-	-	-	-	0	ALU	IR	IR+L -> R0	0 L			
53	2E	60	0C	60	30		1	-	OR	ZA	0	0	-	-	-	-	-	0	MAR	ALU	R0 -> MAR	0			
54	4F	FF	EC	40	01		1	B*	OR	DZ	0	T	T	-	-	-	-	S	0	ALU	MD	T -> STK, MD -> T	T		
55	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q
.MAP 41																									
56	62	FC	0C	60	04	LLD	1	B	+	DA	0	L	0	-	-	-	-	0	ALU	IR	IR+L -> R0	0 L			
57	42	40	0C	60	30		1	B*	+	ZA	1	0	0	-	-	-	-	0	MAR	ALU	R0 -> MAR, R0+1 ->R0	0			
58	4F	FF	EC	40	01		1	B*	OR	DZ	0	T	T	-	-	-	-	S	0	ALU	MD	T -> STK, MD -> T	T		
59	2E	60	0C	60	30		1	-	OR	ZA	0	0	-	-	-	-	-	0	MAR	ALU	R0 -> MAR	0			
5A	4F	FF	EC	40	01		1	B*	OR	DZ	0	T	T	-	-	-	-	S	0	ALU	MD	T -> STK, MD -> T	T		
5B	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q
.MAP 42																									
5C	6F	E0	0C	60	04	LEW	1	B	OR	DZ	0	-	0	-	-	-	-	0	ALU	IR	IR -> R0	0			
5D	62	E0	0C	70	20		1	B	+	DA	0	0	0	-	-	-	-	1	40		40 + R0 -> R0	0			
5E	2E	60	0C	60	30		1	-	OR	ZA	0	0	-	-	-	-	-	0	MAR	ALU	R0 -> MAR	0			
5F	6F	E0	0C	60	04		1	B	OR	DZ	0	-	0	-	-	-	-	0	ALU	IR	IR -> R0	0			
60	62	E0	0C	60	01		1	B	+	DA	0	0	0	-	-	-	-	0	ALU	MD	MD + R0 -> R0	0			
61	2E	60	0C	60	30		1	-	OR	ZA	0	0	-	-	-	-	-	0	MAR	ALU	R0 -> MAR	0			
62	4F	FF	EC	40	01		1	B*	OR	DZ	0	T	T	-	-	-	-	S	0	ALU	MD	T -> STK, MD -> T	T		
63	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q
.MAP 43																									
64	6F	E0	0C	60	04	LED	1	B	OR	DZ	0	-	0	-	-	-	-	0	ALU	IR	IR -> R0	0			
65	62	E0	0C	70	20		1	B	+	DA	0	0	0	-	-	-	-	1	40		40 + R0 -> R0	0			
66	2E	60	0C	60	30		1	-	OR	ZA	0	0	-	-	-	-	-	0	MAR	ALU	R0 -> MAR	0			
67	6F	E0	0C	60	04		1	B	OR	DZ	0	-	0	-	-	-	-	0	ALU	IR	IR -> R0	0			
68	62	E0	0C	60	01		1	B	+	DA	0	0	0	-	-	-	-	0	ALU	MD	MD + R0 -> R0	0			
69	2E	60	0C	60	30		1	-	OR	ZA	0	0	-	-	-	-	-	0	MAR	ALU	R0 -> MAR	0			
6A	4F	FF	EC	40	01		1	B*	OR	DZ	0	T	T	-	-	-	-	S	0	ALU	MD	T -> STK, MD -> T	T		
6B	22	40	0C	60	30		1	-	+	ZA	1	0	-	-	-	-	-	0	MAR	ALU	R0 + 1 -> MAR	0			
6C	4F	FF	EC	40	01		1	B*	OR	DZ	0	T	T	-	-	-	-	S	0	ALU	MD	T -> STK, MD -> T	T		
6D	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q
.MAP 44, 45, 46, 47, 50, 51, 52, 53, 54, 55, 56, 57																									
6E	20	7C	0C	60	30	LLW4	1	-	+	AQ	0	L	-	-	-	-	-	0	MAR	ALU	L+Q -> MAR	L Q			
6F	4F	FF	EC	40	01		1	B*	OR	DZ	0	T	T	-	-	-	-	S	0	ALU	MD	T -> STK, MD -> T	T		
70	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q
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4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED REGS				
.MAP 60																									
71	62	FC	0C	60	04	SLW	1	B	+	DA	0	L	0	-	-	-	-	0	ALU	IR	IR+L -> R0	0 L			
72	4F	FF	EC	40	10		1	B*	OR	DZ	0	T	T	-	-	-	-	S	0	MD	ALU	T -> MD, STK -> T	T		
73	2E	60	0C	60	30		1	-	OR	ZA	0	0	-	-	-	-	-	0	MAR	ALU	R0 -> MAR	0			
74	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q
.MAP 61																									
75	62	FC	0C	60	04	SLD	1	B	+	DA	0	L	0	-	-	-	-	0	ALU	IR	IR+L -> R0	0 L			
76	2F	E0	0C	40	10		1	-	OR	DZ	0	-	-	-	-	-	-	S	0	MD	ALU	STK -> MD			
77	2E	60	0C	60	30		1	-	OR	ZA	0	0	-	-	-	-	-	0	MAR	ALU	R0 -> MAR	0			
78	4F	FF	EC	40	10		1	B*	OR	DZ	0	T	T	-	-	-	-	S	0	MD	ALU	T -> MD, STK -> T	T		
79	22	40	0C	60	30		1	-	+	ZA	1	0	-	-	-	-	-	0	MAR	ALU	R0+1 -> MAR	0			
7A	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q
.MAP 62																									
7B	6F	E0	0C	60	04	SEW	1	B	OR	DZ	0	-	0	-	-	-	-	0	ALU	IR	IR -> R0	0			
7C	62	E0	0C	70	20		1	B	+	DA	0	0	0	-	-	-	-	-	1	40		40 + R0 -> R0	0		
7D	2E	60	0C	60	30		1	-	OR	ZA	0	0	-	-	-	-	-	0	MAR	ALU	R0 -> MAR	0			
7E	6F	E0	0C	60	04		1	B	OR	DZ	0	-	0	-	-	-	-	0	ALU	IR	IR -> R0	0			
7F	62	E0	0C	60	01		1	B	+	DA	0	0	0	-	-	-	-	0	ALU	MD	MD + R0 -> R0	0			
80	4F	FF	EC	40	10		1	B*	OR	DZ	0	T	T	-	-	-	-	S	0	MD	ALU	T -> MD, STK -> T	T		
81	2E	60	0C	60	30		1	-	OR	ZA	0	0	-	-	-	-	-	0	MAR	ALU	R0 -> MAR	0			
82	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q
.MAP 63																									
83	6F	E0	0C	60	04	SED	1	B	OR	DZ	0	-	0	-	-	-	-	0	ALU	IR	IR -> R0	0			
84	62	E0	0C	70	20		1	B	+	DA	0	0	0	-	-	-	-	-	1	40		40 + R0 -> R0	0		
85	2E	60	0C	60	30		1	-	OR	ZA	0	0	-	-	-	-	-	0	MAR	ALU	R0 -> MAR	0			
86	6F	E0	0C	60	04		1	B	OR	DZ	0	-	0	-	-	-	-	0	ALU	IR	IR -> R0	0			
87	62	E0	0C	60	01		1	B	+	DA	0	0	0	-	-	-	-	0	ALU	MD	MD + R0 -> R0	0			
88	4F	FF	EC	40	10		1	B*	OR	DZ	0	T	T	-	-	-	-	S	0	MD	ALU	T -> MD, STK -> T	T		
89	22	40	0C	60	30		1	-	+	ZA	1	0	-	-	-	-	-	0	MAR	ALU	R0 + 1 -> MAR	0			
8A	4F	FF	EC	40	10		1	B*	OR	DZ	0	T	T	-	-	-	-	S	0	MD	ALU	T -> MD, STK -> T	T		
8B	2E	60	0C	60	30		1	-	OR	ZA	0	0	-	-	-	-	-	0	MAR	ALU	R0 -> MAR	0			
8C	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q
.MAP 64,65,66,67,70,71,72,73,74,75,76,77																									
8D	4F	FF	EC	40	10	SLW4	1	B*	OR	DZ	0	T	T	-	-	-	-	S	0	MD	ALU	T -> MD, STK -> T	T		
8E	20	7C	0C	60	30		1	-	+	AQ	0	L	-	-	-	-	-	0	MAR	ALU	L+Q -> MAR	L Q			
8F	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q

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4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED	REGS					
.MAP 100																											
90	62	FA	0C	60	04	LGW	1	B	+	DA	0	G	0	-	-	-	-	0	ALU	IR	IR+G	->	R0	0	G		
91	2E	60	0C	60	30		1	-	OR	ZA	0	0	-	-	-	-	-	0	MAR	ALU	R0	->	MAR	0			
92	4F	FF	EC	40	01		1	B*	OR	DZ	0	T	T	-	-	-	-	S	0	ALU	MD	T	->	STK, MD	->	T	
93	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q		
.MAP 101																											
94	62	FA	0C	60	04	LGD	1	B	+	DA	0	G	0	-	-	-	-	0	ALU	IR	IR+G	->	R0	0	G		
95	2E	60	0C	60	30		1	-	OR	ZA	0	0	-	-	-	-	-	0	MAR	ALU	R0	->	MAR	0			
96	4F	FF	EC	40	01		1	B*	OR	DZ	0	T	T	-	-	-	-	S	0	ALU	MD	T	->	STK, MD	->	T	
97	22	40	0C	60	30		1	-	+	ZA	1	0	-	-	-	-	-	0	MAR	ALU	R0	+	1	->	MAR	0	
98	4F	FF	EC	40	01		1	B*	OR	DZ	0	T	T	-	-	-	-	S	0	ALU	MD	T	->	STK, MD	->	T	
99	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q		
.MAP 102,103,104,105,106,107,110,111,112,113,114,115,116,117																											
9A	20	7A	0C	60	30	LGW2	1	-	+	AQ	0	G	-	-	-	-	-	0	MAR	ALU	G+Q	->	MAR	G	Q		
9B	4F	FF	EC	40	01		1	B*	OR	DZ	0	T	T	-	-	-	-	S	0	ALU	MD	T	->	STK, MD	->	T	
9C	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q		
.MAP 120																											
9D	62	FA	0C	60	04	SGW	1	B	+	DA	0	G	0	-	-	-	-	0	ALU	IR	IR+G	->	R0	0	G		
9E	4F	FF	EC	40	10		1	B*	OR	DZ	0	T	T	-	-	-	-	S	0	MD	ALU	T	->	MD, STK	->	T	
9F	2E	60	0C	60	30		1	-	OR	ZA	0	0	-	-	-	-	-	0	MAR	ALU	R0	->	MAR	0			
A0	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q		
.MAP 121																											
A1	62	FA	0C	60	04	SGD	1	B	+	DA	0	G	0	-	-	-	-	0	ALU	IR	IR+G	->	R0	0	G		
A2	4F	FF	EC	40	10		1	B*	OR	DZ	0	T	T	-	-	-	-	S	0	MD	ALU	T	->	MD, STK	->	T	
A3	22	40	0C	60	30		1	-	+	ZA	1	0	-	-	-	-	-	0	MAR	ALU	R0	+	1	->	MAR	0	
A4	4F	FF	EC	40	10		1	B*	OR	DZ	0	T	T	-	-	-	-	S	0	MD	ALU	T	->	MD, STK	->	T	
A5	2E	60	0C	60	30		1	-	OR	ZA	0	0	-	-	-	-	-	0	MAR	ALU	R0	->	MAR	0			
A6	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q		
.MAP 122,123,124,125,126,127,130,131,132,133,134,135,136,137																											
A7	4F	FF	EC	40	10	SGW2	1	B*	OR	DZ	0	T	T	-	-	-	-	S	0	MD	ALU	T	->	MD, STK	->	T	
A8	20	7A	0C	60	30		1	-	+	AQ	0	G	-	-	-	-	-	0	MAR	ALU	G+Q	->	MAR	G	Q		
A9	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q		

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4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED	REGS	
AA	6F	E0	0C	60	01	TRAP5	1	B	OR	DZ	0	-	0	-	-	-	-	0	ALU MD	MD -> R0 !DUMMY"	0		
AB	3E	28	07	20	0F		0	TRAP(5)		T										- JMP	TRAP(5)		
.MAP 140																							
AC	42	5F	EC	60	30	LSW0	1	B*	+	ZA	1	T	T	-	-	-	-	0	MAR ALU	T -> MAR, T+1 -> T	T		
AD	0A	A1	07	20	0F		0	TRAP5		Z										- JMP	TRAP IF NIL		
AE	6F	E1	EC	60	01		1	B	OR	DZ	0	-	T	-	-	-	-	0	ALU MD	MD -> T	T		
AF	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU IR4	JMAP	Q	
.MAP 141,142,143,144,145,146,147,150,151,152,153,154,155,156,157																							
B0	20	7E	0C	60	30	LSW1	1	-	+	AQ	0	T	-	-	-	-	-	0	MAR ALU	T+Q -> MAR	T	Q	
B1	0A	A2	07	20	0F		0	TRAP5		C										- JMP	TRAP IF OVERFLOW		
B2	6F	E1	EC	60	01		1	B	OR	DZ	0	-	T	-	-	-	-	0	ALU MD	MD -> T	T		
B3	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU IR4	JMAP	Q	
.MAP 160																							
B4	63	C0	0C	40	FF	SSW0	1	B	+	DZ	1	-	0	-	-	-	-	S	0	POP -	STK + 1 -> R0	0	
B5	3E	21	07	20	0F		0	TRAP(5)		Z										- JMP	TRAP IF NIL		
B6	4F	FF	EC	40	10		1	B*	OR	DZ	0	T	T	-	-	-	-	S	0	MD ALU	T -> MD, STK -> T	T	
B7	26	60	0C	60	30		1	-	++	ZA	0	0	-	-	-	-	-	0	MAR ALU	R0 - 1 -> MAR	0		
B8	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU IR4	JMAP	Q	
.MAP 161,162,163,164,165,166,167,170,171,172,173,174,175,176,177																							
B9	63	60	0C	40	FF	SSW1	1	B	+	DQ	0	-	0	-	-	-	-	S	0	POP -	STK + Q -> R0	0	Q
BA	3E	22	07	20	0F		0	TRAP(5)		C										- JMP	TRAP IF OVERFLOW		
BB	4F	FF	EC	40	10		1	B*	OR	DZ	0	T	T	-	-	-	-	S	0	MD ALU	T -> MD, STK -> T	T	
BC	2E	60	0C	60	30		1	-	OR	ZA	0	0	-	-	-	-	-	0	MAR ALU	R0 -> MAR	0		
BD	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU IR4	JMAP	Q	
.MAP 200																							
BE	62	FE	0C	60	04	LSW	1	B	+	DA	0	T	0	-	-	-	-	0	ALU IR	IR+T -> R0	0	T	
BF	3E	22	07	20	0F		0	TRAP(5)		C										- JMP	TRAP IF OVERFLOW		
C0	2E	60	0C	60	30		1	-	OR	ZA	0	0	-	-	-	-	-	0	MAR ALU	R0 -> MAR	0		
C1	6F	E1	EC	60	01		1	B	OR	DZ	0	-	T	-	-	-	-	0	ALU MD	MD -> T	T		
C2	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU IR4	JMAP	Q	
.MAP 201																							
C3	62	FE	0C	60	04	LSD	1	B	+	DA	0	T	0	-	-	-	-	0	ALU IR	IR+T -> R0	0	T	
C4	3E	22	07	20	0F		0	TRAP(5)		C										- JMP	TRAP IF OVERFLOW		
C5	42	40	0C	60	30		1	B*	+	ZA	1	0	0	-	-	-	-	0	MAR ALU	R0 -> MAR, R0+1 ->R0	0		
C6	0A	A2	07	20	0F		0	TRAP5		C										- JMP	TRAP IF OVERFLOW		
C7	4F	FF	EC	60	01		1	B*	OR	DZ	0	T	T	-	-	-	-	0	ALU MD	MD -> T	T		
C8	2E	60	0C	60	30		1	-	OR	ZA	0	0	-	-	-	-	-	0	MAR ALU	R0 -> MAR	0		
C9	4F	FF	EC	40	01		1	B*	OR	DZ	0	T	T	-	-	-	-	S	0	ALU MD	T -> STK, MD -> T	T	
CA	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU IR4	JMAP	Q	
.MAP 202																							
CB	42	5E	0C	60	30	LSD0	1	B*	+	ZA	1	T	0	-	-	-	-	0	MAR ALU	T -> MAR, T+1 -> R0	0	T	
CC	0A	A2	07	20	0F		0	TRAP5		C										- JMP	TRAP IF OVERFLOW		
CD	6F	E1	EC	60	01		1	B	OR	DZ	0	-	T	-	-	-	-	0	ALU MD	MD -> T	T		
CE	2E	60	0C	60	30		1	-	OR	ZA	0	0	-	-	-	-	-	0	MAR ALU	R0 -> MAR	0		
CF	4F	FF	EC	40	01		1	B*	OR	DZ	0	T	T	-	-	-	-	S	0	ALU MD	T -> STK, MD -> T	T	
D0	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU IR4	JMAP	Q	

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	4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED	REGS	
.MAP 203																								
D1	03	E0	0C	40	FF	LXFW	1	Q	+	DZ	0	-	-	-	-	-	S	0	POP	-	STK -> Q	Q		
D2	C3	E0	0C	70	00		1	BQL	+	DZ	0	-	0	-	-	-	-	1	0		[0,Q] * 2 -> [R0,Q]	0	Q	
D3	C2	60	0C	60	FF		1	BQL	+	ZA	0	0	0	-	-	-	-	0	-	-	[R0,Q] * 2 -> [R0,Q]	0	Q	
D4	60	7E	2C	60	FF		1	B	+	AQ	0	T	1	-	-	-	-	0	-	-	T + Q -> R1	1	T Q	
D5	62	00	0C	60	D0		1	B	+	ZA	C	0	0	-	-	-	-	0	BNK	ALU	R0 + C -> R0 -> BNK	0		
D6	2E	62	0C	60	30		1	-	OR	ZA	0	1	-	-	-	-	-	0	MAR	ALU	R1 -> MAR	1		
D7	26	C0	0C	70	04		1	-	++	DA	1	0	-	-	-	-	-	1	4		R0 - 4	0		
D8	0A	A1	07	20	0F		0	TRAP5		Z											TRAP IF BNK = 4			
D9	6F	E1	EC	60	01		1	B	OR	DZ	0	-	T	-	-	-	-	0	ALU	MD	MD -> T	T		
DA	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q	
.MAP 204																								
DB	6F	E0	0C	70	02	LSTA	1	B	OR	DZ	0	-	0	-	-	-	-	1	2		2 -> R0	0		
DC	20	FA	0C	60	30		1	-	+	AB	0	G	0	-	-	-	-	0	MAR	ALU	G + R0 -> MAR	0	G	
DD	4F	FE	0C	40	04		1	B*	OR	DZ	0	T	0	-	-	-	S	0	ALU	IR	T -> STK, IR -> R0	0	T	
DE	62	E1	EC	60	01		1	B	+	DA	0	0	T	-	-	-	-	0	ALU	MD	MD + R0 -> T	0	T	
DF	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q	
.MAP 205																								
E0	82	7F	EC	60	FF	LXB	1	BQR	+	ZA	0	T	T	-	-	-	-	0	-	-	[T,Q]/2 -> [T,Q]	T	Q	
E1	22	FE	0C	40	30		1	-	+	DA	0	T	-	-	-	-	S	0	MAR	ALU	STK + T -> MAR	T		
E2	0A	A2	07	20	0F		0	TRAP5		C											TRAP IF OVERFLOW			
E3	6F	E0	2C	60	01		1	B	OR	DZ	0	-	1	-	-	-	-	0	ALU	MD	MD -> R1	1		
E4	21	60	0C	60	FF		1	-	+	ZQ	0	-	-	-	-	-	-	0	-	-	Q	Q		
E5	0E	70	47	20	0F		0	#LXB1		F											IF ODD(INDEX)			
E6	4F	E2	24	68	00		1	B*	OR	DZ	0	1	1	R	10	-	-	0	ALU	ALU	R1+10 -> R1	1		
E7	72	E3	EC	70	FF	#LXB1	1	B	&	DA	0	1	T	-	-	-	-	1	377		377 & R1 -> T	1	T	
E8	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q	
.MAP 206																								
E9	22	FE	0C	40	30	LXW	1	-	+	DA	0	T	-	-	-	-	S	0	MAR	ALU	STK + T -> MAR	T		
EA	0A	A2	07	20	0F		0	TRAP5		C											TRAP IF OVERFLOW			
EB	6F	E1	EC	60	01		1	B	OR	DZ	0	-	T	-	-	-	-	0	ALU	MD	MD -> T	T		
EC	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q	
.MAP 207																								
ED	60	FF	EC	60	FF	LXD	1	B	+	AB	0	T	T	-	-	-	-	0	-	-	T + T -> T	T		
EE	3E	22	07	20	0F		0	TRAP(5)		C											TRAP IF OVERFLOW			
EF	62	FE	0C	40	30		1	B	+	DA	0	T	0	-	-	-	S	0	MAR	ALU	STK + T -> MAR -> R0	0	T	
F0	0A	A2	07	20	0F		0	TRAP5		C											TRAP IF OVERFLOW			
F1	6F	E1	EC	60	01		1	B	OR	DZ	0	-	T	-	-	-	-	0	ALU	MD	MD -> T	T		
F2	22	40	0C	60	30		1	-	+	ZA	1	0	-	-	-	-	-	0	MAR	ALU	R0 + 1 -> MAR	0		
F3	0A	A2	07	20	0F		0	TRAP5		C											TRAP IF OVERFLOW			
F4	4F	FF	EC	40	01		1	B*	OR	DZ	0	T	T	-	-	-	S	0	ALU	MD	T -> STK, MD -> T	T		
F5	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q	

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4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED	REGS		
.MAP 210																								
F6	6F	E0	2C	40	FF	DADD	1	B	OR	DZ	0	-	1	-	-	-	-	S	0	POP	-	STK -> R1 !YH"	1	
F7	62	FF	EC	40	FF		1	B	+	DA	0	T	T	-	-	-	-	S	0	POP	-	STK+T -> T !ZL"	T	
F8	62	82	2C	40	FF		1	B	+	DA	C	1	1	-	-	-	-	S	0	POP	-	STK+R1 -> R1	1	
F9	2E	62	0C	40	0F		1	-	OR	ZA	0	1	-	-	-	-	-	S	0	PSH	-	R1 -> STK !ZH"	1	
FA	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	-	-	S	JMP	-	0	ALU IR4	JMAP	Q
.MAP 211																								
FB	6F	E0	2C	40	FF	DSUB	1	B	OR	DZ	0	-	1	-	-	-	-	S	0	POP	-	STK -> R1 !YH"	1	
FC	6A	DF	EC	40	FF		1	B	-	DA	1	T	T	-	-	-	-	S	0	POP	-	STK-T -> T !ZL"	T	
FD	6A	82	2C	40	FF		1	B	-	DA	C	1	1	-	-	-	-	S	0	POP	-	STK-R1 -> R1	1	
FE	2E	62	0C	40	0F		1	-	OR	ZA	0	1	-	-	-	-	-	S	0	PSH	-	R1 -> STK !ZH"	1	
FF	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	-	-	S	JMP	-	0	ALU IR4	JMAP	Q
. MAP 212 DMUL																								
. MAP 213 DDIV																								
. TO BE FOUND ON PAGE 36																								
. MAP 216 DSHL																								
. MAP 217 DSHR																								
. MAP 214,215 NOT USED																								
\$																								

	4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED	REGS	
.MAP 220																								
100	6F	E0	0C	40	FF	SSW	1	B	OR	DZ	0	-	0	-	-	-	S	0	POP	-	STK -> R0	0		
101	62	E0	0C	60	04		1	B	+	DA	0	0	0	-	-	-	-	0	ALU	IR	R0 + IR -> R0	0		
102	3E	22	07	20	0F		0	TRAP(5)		C											TRAP IF OVERFLOW			
103	4F	FF	EC	40	10		1	B*	OR	DZ	0	T	T	-	-	-	S	0	MD	ALU	T -> MD, STK -> T	T		
104	2E	60	0C	60	30		1	-	OR	ZA	0	0	-	-	-	-	-	0	MAR	ALU	R0 -> MAR	0		
105	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q	
.MAP 221																								
106	6F	E0	2C	40	FF	SSD	1	B	OR	DZ	0	-	1	-	-	-	S	0	POP	-	STK -> R1	1		
107	6F	E0	0C	40	FF		1	B	OR	DZ	0	-	0	-	-	-	S	0	POP	-	STK -> R0	0		
108	62	E0	0C	60	04		1	B	+	DA	0	0	0	-	-	-	-	0	ALU	IR	IR+R0 -> R0	0		
109	3E	22	07	20	0F		0	TRAP(5)		C											TRAP IF OVERFLOW			
10A	2E	62	0C	60	10		1	-	OR	ZA	0	1	-	-	-	-	-	0	MD	ALU	R1 -> MD	1		
10B	42	40	0C	60	30		1	B*	+	ZA	1	0	0	-	-	-	-	0	MAR	ALU	R0 -> MAR, R0 + 1 -> R0	0		
10C	3E	22	07	20	0F		0	TRAP(5)		C											TRAP IF OVERFLOW			
10D	4F	FF	EC	40	10		1	B*	OR	DZ	0	T	T	-	-	-	S	0	MD	ALU	T -> MD, STK -> T	T		
10E	2E	60	0C	60	30		1	-	OR	ZA	0	0	-	-	-	-	-	0	MAR	ALU	R0 -> MAR	0		
10F	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q	
.MAP 222																								
110	6F	E0	2C	40	FF	SSD0	1	B	OR	DZ	0	-	1	-	-	-	S	0	POP	-	STK -> R1	1		
111	63	C0	0C	40	FF		1	B	+	DZ	1	-	0	-	-	-	S	0	POP	-	STK + 1 -> R0	0		
112	3E	21	07	20	0F		0	TRAP(5)		Z											TRAP IF NIL			
113	2E	62	0C	60	10		1	-	OR	ZA	0	1	-	-	-	-	-	0	MD	ALU	R1 -> MD	1		
114	26	60	0C	60	30		1	-	++	ZA	0	0	-	-	-	-	-	0	MAR	ALU	R0 - 1 -> MAR	0		
115	4F	FF	EC	40	10		1	B*	OR	DZ	0	T	T	-	-	-	S	0	MD	ALU	T -> MD, STK -> T	T		
116	2E	60	0C	60	30		1	-	OR	ZA	0	0	-	-	-	-	-	0	MAR	ALU	R0 -> MAR	0		
117	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q	
.MAP 223																								
118	6F	E0	6C	40	FF	SXFW	1	B	OR	DZ	0	-	3	-	-	-	S	0	POP	-	STK -> R3	3		
119	03	E0	0C	40	FF		1	Q	+	DZ	0	-	-	-	-	-	S	0	POP	-	STK -> Q	Q		
11A	C3	E0	4C	70	00		1	BQL	+	DZ	0	-	2	-	-	-	-	1	0		[0,Q] * 2 -> [R2,Q]	2	Q	
11B	C2	64	4C	60	FF		1	BQL	+	ZA	0	2	2	-	-	-	-	0	-	-	[R2,Q] * 2 -> [R2,Q]	2	Q	
11C	60	66	6C	60	FF		1	B	+	AQ	0	3	3	-	-	-	-	0	-	-	R3 + Q -> R3	3	Q	
11D	62	04	4C	60	FF		1	B	+	ZA	C	2	2	-	-	-	-	0	-	-	R2 + C -> R2	2		
11E	26	C4	0C	70	04		1	-	++	DA	1	2	-	-	-	-	-	1	4		R2 - 4	2		
11F	3E	21	07	20	0F		0	TRAP(5)		Z											TRAP IF OVERFLOW			
120	4F	FF	EC	40	10		1	B*	OR	DZ	0	T	T	-	-	-	S	0	MD	ALU	T -> MD, STK -> T	T		
121	2E	64	0C	60	D0		1	-	OR	ZA	0	2	-	-	-	-	-	0	BNK	ALU	R2 -> BNK	2		
122	2E	66	0C	60	30		1	-	OR	ZA	0	3	-	-	-	-	-	0	MAR	ALU	R3 -> MAR	3		
123	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q	
.MAP 224																								
124	6E	7E	0C	60	30	TS	1	B	OR	ZA	0	T	0	-	-	-	-	0	MAR	ALU	T -> R0 -> MAR	0	T	
125	6F	E0	2C	70	01		1	B	OR	DZ	0	-	1	-	-	-	-	1	1		1 -> R1	1		
126	6F	E1	EC	60	01		1	B	OR	DZ	0	-	T	-	-	-	-	0	ALU	MD	MD -> T	T		
127	2E	62	0C	60	10		1	-	OR	ZA	0	1	-	-	-	-	-	0	MD	ALU	R1 -> MD	1		
128	2E	60	0C	60	30		1	-	OR	ZA	0	0	-	-	-	-	-	0	MAR	ALU	R0 -> MAR	0		
129	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q	

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	4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED	REGS	
.MAP 225																								
12A	83	E0	0C	40	FF	SXB	1	BQR	+	DZ	0	-	0	-	-	-	S	0	POP	-	[STK,Q]/2 -> [R0,Q]	0	Q	
12B	62	E0	0C	40	30		1	B	+	DA	0	0	0	-	-	-	S	0	MAR	ALU	STK+R0 -> R0 -> MAR	0		
12C	0A	A2	07	20	0F		0	TRAP5		C											TRAP IF OVERFLOW			
12D	6F	E0	2C	60	01		1	B	OR	DZ	0	-	1	-	-	-	-	0	ALU	MD	MD -> R1	1		
12E	6F	E0	4C	70	FF		1	B	OR	DZ	0	-	2	-	-	-	-	1	377		377 -> R2	2		
12F	70	E5	EC	60	FF		1	B	&	AB	0	2	T	-	-	-	-	0	-	-	R2 & T -> T	2	T	
130	21	60	0C	60	FF		1	-	+	ZQ	0	-	-	-	-	-	-	0	-	-	Q	Q		
131	13	40	47	20	0F		0	#SXB1		F											IF LOW-BYTE			
132	4F	E4	44	68	00		1	B*	OR	DZ	0	2	2	R	10	-	-	0	ALU	ALU	R2+10 -> R2	2		
133	4F	FF	E4	68	00		1	B*	OR	DZ	0	T	T	R	10	-	-	-	0	ALU	ALU	T+10 -> T	T	
134	74	E4	2C	60	FF	#SXB1	1	B	-&	AB	0	2	1	-	-	-	-	0	-	-	-R2 & R1 -> R1	1	2	
135	2C	E3	EC	60	10		1	-	OR	AB	0	1	T	-	-	-	-	0	MD	ALU	T OR R1 -> MD	1	T	
136	4F	E1	EC	40	30		1	B*	OR	DZ	0	0	T	-	-	-	-	0	MAR	ALU	R0 -> MAR, STK -> T	0	T	
137	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q	
.MAP 226																								
138	6F	E0	0C	40	FF	SXW	1	B	OR	DZ	0	-	0	-	-	-	S	0	POP	-	STK -> R0	0		
139	62	E0	0C	40	FF		1	B	+	DA	0	0	0	-	-	-	S	0	POP	-	R0 + STK -> R0	0		
13A	3E	22	07	20	0F		0	TRAP(5)		C											TRAP IF OVERFLOW			
13B	4F	FF	EC	40	10		1	B*	OR	DZ	0	T	T	-	-	-	S	0	MD	ALU	T -> MD, STK -> T	T		
13C	2E	60	0C	60	30		1	-	OR	ZA	0	0	-	-	-	-	-	0	MAR	ALU	R0 -> MAR	0		
13D	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q	
.MAP 227																								
13E	6F	E0	2C	40	FF	SXD	1	B	OR	DZ	0	-	1	-	-	-	S	0	POP	-	STK -> R1	1		
13F	6F	E0	0C	40	FF		1	B	OR	DZ	0	-	0	-	-	-	S	0	POP	-	STK -> R0	0		
140	60	E0	0C	60	FF		1	B	+	AB	0	0	0	-	-	-	-	0	-	-	R0 + R0 -> R0	0		
141	3E	22	07	20	0F		0	TRAP(5)		C											TRAP IF OVERFLOW			
142	62	C0	0C	40	FF		1	B	+	DA	1	0	0	-	-	-	S	0	POP	-	R0+STK+1 -> R0	0		
143	3E	22	07	20	0F		0	TRAP(5)		C											TRAP IF OVERFLOW			
144	2E	62	0C	60	10		1	-	OR	ZA	0	1	-	-	-	-	-	0	MD	ALU	R1 -> MD	1		
145	26	60	0C	60	30		1	-	-+	ZA	0	0	-	-	-	-	-	0	MAR	ALU	R0 - 1 -> MAR	0		
146	4F	FF	EC	40	10		1	B*	OR	DZ	0	T	T	-	-	-	S	0	MD	ALU	T -> MD, STK -> T	T		
147	2E	60	0C	60	30		1	-	OR	ZA	0	0	-	-	-	-	-	0	MAR	ALU	R0 -> MAR	0		
148	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q	

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	4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED REGS	
.MAP 240																							
157	6F	E0	AC	40	FF	READ	1	B	OR	DZ	0	-	5	-	-	-	S	0	POP	-	STK -> R5	5	
158	46	48	03	20	0F		0	#GET		T											GET(R5,R6)		
159	2E	6C	0C	60	10		1	-	OR	ZA	0	6	-	-	-	-	0	MD	ALU		R6 -> MD	6	
15A	4F	FF	EC	40	30		1	B*	OR	DZ	0	T	T	-	-	-	S	0	MAR	ALU	T -> MAR, STK -> T	T	
15B	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q
.MAP 241																							
15C	6E	7E	CC	60	FF	WRITE	1	B	OR	ZA	0	T	6	-	-	-	-	0	-	-	T -> R6	6 T	
15D	6F	E0	AC	40	FF		1	B	OR	DZ	0	-	5	-	-	-	S	0	POP	-	STK -> R5	5	
15E	6F	E1	EC	40	FF		1	B	OR	DZ	0	-	T	-	-	-	S	0	POP	-	STK -> T	T	
15F	46	A8	03	20	0F		0	#PUT		T											PUT(R5,R6)		
160	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q
.MAP 242																							
161	47	C8	03	20	0F	DSKR	0	#CLRADDR		T											CLRADDR		
162	6F	E0	2C	70	80		1	B	OR	DZ	0	-	1	-	-	-	-	1	200		128 -> R1	1	
163	6F	E0	0C	70	08		1	B	OR	DZ	0	-	0	-	-	-	-	1	10		8 -> R0	0	
164	2E	60	0C	60	60		1	-	OR	ZA	0	0	-	-	-	-	-	0	IOA	ALU	R0 -> IO-ADDRESS	0	
165	2D	60	0C	60	FF	#DR	1	-	OR	ZQ	0	-	-	-	-	-	-	0	-	-	IO-DATA -> DUMMY +IOD WHEN HARDWARE READY	Q	
166	2D	60	0C	60	F7		1	-	OR	ZQ	0	-	-	-	-	-	-	0	-	IOD	IO-DATA -> DUMMY	Q	
167	2D	60	0C	60	17		1	-	OR	ZQ	0	-	-	-	-	-	-	0	MD	IOD	IO-DATA -> MD	Q	
168	2D	60	0C	60	F7		1	-	OR	ZQ	0	-	-	-	-	-	-	0	-	IOD	IO-DATA -> DUMMY	Q	
169	2D	60	0C	60	F7		1	-	OR	ZQ	0	-	-	-	-	-	-	0	-	IOD	IO-DATA -> DUMMY	Q	
16A	42	5F	EC	60	30		1	B*	+	ZA	1	T	T	-	-	-	-	0	MAR	ALU	T -> MAR, T+1 -> T	T	
16B	66	62	2C	60	FF		1	B	++	ZA	0	1	1	-	-	-	-	0	-	-	R1 - 1 -> R1	1	
16C	16	59	07	20	0F		0	#DR		-Z											IF > 0		
16D	6F	E1	EC	40	FF		1	B	OR	DZ	0	-	T	-	-	-	S	0	POP	-	STK -> T	T	
16E	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q
.MAP 243																							
16F	47	F8	03	20	0F	DSKW	0	#INITWRIT		T											INITWRIT		
170	6F	E0	2C	70	80		1	B	OR	DZ	0	-	1	-	-	-	-	1	200		128 -> R1	1	
171	6F	E0	AC	70	08		1	B	OR	DZ	0	-	5	-	-	-	-	1	10		10 -> R5	5	
172	2E	6A	0C	60	60		1	-	OR	ZA	0	5	-	-	-	-	-	0	IOA	ALU	R5 -> IO-ADDRESS	5	
173	42	5F	EC	60	30	#DW	1	B*	+	ZA	1	T	T	-	-	-	-	0	MAR	ALU	T -> MAR, T+1 -> T	T	
174	2D	60	0C	60	F1		1	-	OR	ZQ	0	-	-	-	-	-	-	0	-	MD	MD -> IO-DATA +IOD WHEN HARDWARE READY	Q	
175	2D	60	0C	60	71		1	-	OR	ZQ	0	-	-	-	-	-	-	0	IOD	MD	MD -> IO-DATA	Q	
176	2D	60	0C	60	71		1	-	OR	ZQ	0	-	-	-	-	-	-	0	IOD	MD	MD -> IO-DATA	Q	
177	2D	60	0C	60	71		1	-	OR	ZQ	0	-	-	-	-	-	-	0	IOD	MD	MD -> IO-DATA	Q	
178	2D	60	0C	60	71		1	-	OR	ZQ	0	-	-	-	-	-	-	0	IOD	MD	MD -> IO-DATA	Q	
179	66	62	2C	60	FF		1	B	++	ZA	0	1	1	-	-	-	-	0	-	-	R1 - 1 -> R1	1	
17A	17	39	07	20	0F		0	#DW		-Z											IF > 0		
17B	6F	E1	EC	40	FF		1	B	OR	DZ	0	-	T	-	-	-	S	0	POP	-	STK -> T	T	
17C	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q
.MAP 244																							
17D	2E	74	0C	40	0F	SETRK	1	-	OR	ZA	0	P	-	-	-	-	S	0	PSH	-	P -> STK	P	
17E	6E	7F	4C	60	FF		1	B	OR	ZA	0	T	12	-	-	-	-	0	-	-	T -> R12	P T	
17F	49	08	03	20	0F		0	#SETTRACK		T											SETTRACK(T)		
180	6F	E1	4C	40	FF		1	B	OR	DZ	0	-	P	-	-	-	S	0	POP	-	STK -> P	P	
181	6F	E1	EC	40	FF		1	B	OR	DZ	0	-	T	-	-	-	S	0	POP	-	STK -> T	T	
182	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q

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	4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED	REGS	
.MAP 245																								
183	6E	7E	4C	60	FF	UCHK	1	B	OR	ZA	0	T	2	-	-	-	-	0	-	-	T -> R2 !HI"	2	T	
184	6F	E0	2C	40	FF		1	B	OR	DZ	0	-	1	-	-	-	S	0	POP	-	STK -> R1 !LOW"	1		
185	6F	E1	EC	40	FF		1	B	OR	DZ	0	-	T	-	-	-	S	0	POP	-	STK -> T !X"	T		
186	28	DE	2C	60	FF		1	-	-	AB	1	T	1	-	-	-	-	0	-	-	T - R1	1	T	
187	3E	0A	07	20	0F		0	TRAP(4)		-C											TRAP IF X < LOW			
188	28	C5	EC	60	FF		1	-	-	AB	1	2	T	-	-	-	-	0	-	-	R2 - T	2	T	
189	3E	0A	07	20	0F		0	TRAP(4)		-C											TRAP IF HI < X			
18A	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q	
.MAP 247																								
18B	6F	E0	0C	60	04	SYS	1	B	OR	DZ	0	-	0	-	-	-	-	0	ALU	IR	IR -> R0	0		
18C	4E	A1	07	20	0F		0	BOOT		Z											IF IR=0			
18D	66	60	0C	60	FF		1	B	--	ZA	0	0	0	-	-	-	-	0	-	-	R0 - 1 -> R0	0		
18E	19	59	07	20	0F		0	>1		-Z											IF IR<>1			
18F	2E	72	0C	40	0F		1	-	OR	ZA	0	M	-	-	-	-	S	0	PSH	-	M -> STK	M		
190	2E	74	0C	40	0F		1	-	OR	ZA	0	P	-	-	-	-	S	0	PSH	-	P -> STK	P		
191	4B	A8	03	20	0F		0	DUMP		T											DUMP			
192	6F	E1	4C	40	FF		1	B	OR	DZ	0	-	P	-	-	-	S	0	POP	-	STK -> R3	P		
193	6F	E1	2C	40	FF		1	B	OR	DZ	0	-	M	-	-	-	S	0	POP	-	STK -> R0	M		
194	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q	
195	66	60	0C	60	FF	>1	1	B	--	ZA	0	0	0	-	-	-	-	0	-	-	R0 - 1 -> R0	0		
196	19	A9	07	20	0F		0	>2		-Z											IF IR<>2			
197	2E	7E	0C	40	0F		1	-	OR	ZA	0	T	-	-	-	-	S	0	PSH	-	T -> STK	T		
198	6E	75	EC	60	FF		1	B	OR	ZA	0	P	T	-	-	-	-	0	-	-	P -> T	P	T	
199	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q	
19A	66	60	0C	60	FF	>2	1	B	--	ZA	0	0	0	-	-	-	-	0	-	-	R0 - 1 -> R0	0		
19B	1A	19	07	20	0F		0	>3		-Z											IF IR<>3			
19C	66	DF	6C	70	18		1	B	--	DA	1	T	H	-	-	-	-	1	30		T - 30 -> H	H	T	
19D	6F	E0	0C	70	05		1	B	OR	DZ	0	-	0	-	-	-	-	1	5		5 -> R0	0		
19E	4F	FF	EC	40	10		1	B*	OR	DZ	0	T	T	-	-	-	S	0	MD	ALU	T -> MD, STK -> T	T		
19F	20	E1	4C	60	30		1	-	+	AB	0	0	P	-	-	-	-	0	MAR	ALU	R0 + P -> MAR	0	P	
1A0	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q	
1A1	66	60	0C	60	FF	>3	1	B	--	ZA	0	0	0	-	-	-	-	0	-	-	R0 - 1 -> R0	0		
1A2	3F	99	07	20	0F		0	>4		-Z											IF IR<>4			
1A3	02	F6	0C	70	18		1	Q	+	DA	0	H	-	-	-	-	-	1	30		H + 30 -> Q	H	Q	
1A4	4D	7F	EC	40	0F		1	B*	OR	ZQ	0	T	T	-	-	-	S	0	PSH	-	T -> STK, Q -> T	T	Q	
1A5	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q	

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	4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED REGS		
.MAP 250																								
1A6	6F	E0	2C	60	04	ENTP	1	B	OR	DZ	0	-	1	-	-	-	-	0	ALU	IR	IR -> R1	1		
1A7	26	C2	0C	70	10		1	-	--	DA	1	1	-	-	-	-	-	1	20		R1 - 16	1		
1A8	1A	E1	07	20	0F		0	ENTP1		Z											IF R1 = 16			
1A9	2E	62	0C	60	40		1	-	OR	ZA	0	1	-	-	-	-	-	0	SR	ALU	R1 -> SR	1		
1AA	6F	E0	3C	70	00		1	B	OR	DZ	0	-	1	MR	-	-	-	-	1	0	MSK(0,SR) -> R1	1		
1AB	28	C3	2C	60	FF		1	-	-	AB	1	1	M	-	-	-	-	0	-	-	R1 - M	1 M		
1AC	1A	F2	07	20	0F		0	ENTP2		C											IF R1 >= M			
1AD	3D	C8	07	20	0F		0	TRAP(2)		T											TRAP(2)			
1AE	68	E2	2C	60	FF	ENTP1	1	B	-	AB	0	1	1	-	-	-	-	0	-	-	-1 -> R1	1		
1AF	6F	E0	0C	70	03	ENTP2	1	B	OR	DZ	0	-	0	-	-	-	-	1	3		3 -> R0	0		
1B0	2E	72	0C	60	10		1	-	OR	ZA	0	M	-	-	-	-	-	0	MD	ALU	M -> MD	M		
1B1	20	E1	CC	60	30		1	-	+	AB	0	0	L	-	-	-	-	0	MAR	ALU	R0 + L -> MAR	0 L		
1B2	2E	60	0C	60	30		1	-	OR	ZA	0	0	-	-	-	-	-	0	MAR	ALU	R0 -> MAR !DEV.STATUS"	0		
1B3	6E	63	2C	60	FF		1	B	OR	ZA	0	1	M	-	-	-	-	0	-	-	R1 -> M	1 M		
1B4	6E	E2	2C	60	01		1	B	OR	DA	0	1	1	-	-	-	-	0	ALU	MD	MD OR R1 -> R1	1		
1B5	2E	62	0C	60	80		1	-	OR	ZA	0	1	-	-	-	-	-	0	INM	ALU	R1 -> INM	1		
1B6	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q
.MAP 251																								
1B7	6F	E0	0C	70	03	EXP	1	B	OR	DZ	0	-	0	-	-	-	-	1	3		3 -> R0	0		
1B8	20	E1	CC	60	30		1	-	+	AB	0	0	L	-	-	-	-	0	MAR	ALU	R0 + L -> MAR	0 L		
1B9	6F	E1	2C	60	01		1	B	OR	DZ	0	-	M	-	-	-	-	0	ALU	MD	MD -> M	M		
1BA	2E	60	0C	60	30		1	-	OR	ZA	0	0	-	-	-	-	-	0	MAR	ALU	R0 -> MAR !DEV.STATUS"	0		
1BB	6F	E0	0C	60	01		1	B	OR	DZ	0	-	0	-	-	-	-	0	ALU	MD	MD -> R0	0		
1BC	2C	E1	2C	60	80		1	-	OR	AB	0	0	M	-	-	-	-	0	INM	ALU	R0 OR M -> INM	0 M		
1BD	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q
.MAP 252																								
1BE	2A	DE	0C	40	FF	ULSS	1	-	-	DA	1	T	-	-	-	-	S	0	POP	-	STK-T	T		
1BF	2A	BA	07	20	0F		0	#PUSH1		-C											IF STK < T			
1C0	71	61	EC	60	FF		1	B	&	ZQ	0	-	T	-	-	-	-	0	-	-	0 -> T	T Q		
1C1	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q
.MAP 253																								
1C2	2A	FE	0C	40	FF	ULEQ	1	-	-	DA	0	T	-	-	-	-	S	0	POP	-	STK-T-1	T		
1C3	29	C2	07	20	0F		0	#PUSH0		C											IF STK > T			
1C4	6F	E1	EC	70	01		1	B	OR	DZ	0	-	T	-	-	-	-	1	1		1 -> T	T		
1C5	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q
.MAP 254																								
1C6	2A	FE	0C	40	FF	UGTR	1	-	-	DA	0	T	-	-	-	-	S	0	POP	-	STK-T-1	T		
1C7	2A	B2	07	20	0F		0	#PUSH1		C											IF STK > T			
1C8	71	61	EC	60	FF		1	B	&	ZQ	0	-	T	-	-	-	-	0	-	-	0 -> T	T Q		
1C9	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q
.MAP 255																								
1CA	2A	DE	0C	40	FF	UGEQ	1	-	-	DA	1	T	-	-	-	-	S	0	POP	-	STK-T	T		
1CB	29	CA	07	20	0F		0	#PUSH0		-C											IF STK < T			
1CC	6F	E1	EC	70	01		1	B	OR	DZ	0	-	T	-	-	-	-	1	1		1 -> T	T		
1CD	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q

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4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED REGS		
.MAP 260																							
.\$T-																							
1DC	0E	7E	0C	40	FF	LODFW	1	Q	OR	ZA	0	T	-	-	-	-	S	0	POP	-	T -> Q, STK -> DUMMY	T Q	
.\$T+																							
1DD	45	48	03	20	0F		0	#RESTRSTK	T											- JSR	LOAD EXPR STACK		
1DE	4D	7F	EC	40	0F		1	B*	OR	ZQ	0	T	T	-	-	-	S	0	PSH	-	T -> STK, Q -> T	T Q	
1DF	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q
.MAP 261																							
1E0	0E	7E	0C	60	FF	LODFD	1	Q	OR	ZA	0	T	-	-	-	-	0	-	-		T -> Q	T Q	
1E1	6F	E0	2C	40	FF		1	B	OR	DZ	0	-	1	-	-	-	S	0	POP	-	STK -> R1	1	
1E2	6F	E1	EC	40	FF		1	B	OR	DZ	0	-	T	-	-	-	S	0	POP	-	STK -> T	T	
0 #RESTRSTK T - JSR LOAD EXPR STACK																							
1E3	45	48	03	20	0F		1	B*	OR	ZQ	0	T	T	-	-	-	S	0	PSH	-	T -> STK, Q -> T	T Q	
1E4	4D	7F	EC	40	0F		1	-	OR	ZA	0	1	-	-	-	-	S	0	PSH	-	R1 -> STK	1	
1E5	2E	62	0C	40	0F		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q
1E6	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q
.MAP 262																							
1E7	66	D6	0C	70	11	STORE	1	B	--	DA	1	H	0	-	-	-	-	1	21		H - 17 -> R0	0 H	
1E8	28	C1	8C	60	FF		1	-	-	AB	1	0	S	-	-	-	-	0	-	-	R0 - S	0 S	
1E9	3D	EA	07	20	0F		0	TRAP(3)	-C												IF R0 < S		
1EA	45	C8	03	20	0F		0	#SAVESTK	T												STORE EXPR STACK		
1EB	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q
.MAP 263																							
1EC	0E	7E	0C	60	FF	STOFV	1	Q	OR	ZA	0	T	-	-	-	-	0	-	-		T -> Q	T Q	
1ED	6F	E1	EC	40	FF		1	B	OR	DZ	0	-	T	-	-	-	S	0	POP	-	STK -> T	T	
1EE	66	D6	0C	70	11		1	B	--	DA	1	H	0	-	-	-	-	1	21		H - 17 -> R0	0 H	
1EF	28	C1	8C	60	FF		1	-	-	AB	1	0	S	-	-	-	-	0	-	-	R0 - S	0 S	
1F0	3D	EA	07	20	0F		0	TRAP(3)	-C												IF R0 < S		
1F1	45	C8	03	20	0F		0	#SAVESTK	T												STORE EXPR STACK		
1F2	2D	60	0C	60	10		1	-	OR	ZQ	0	-	-	-	-	-	0	MD	ALU		Q -> MD	Q	
1F3	42	59	8C	60	30		1	B*	+	ZA	1	S	S	-	-	-	-	0	MAR	ALU	S -> MAR, S+1 -> S	S	
1F4	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q
.MAP 264																							
1F5	4F	FF	EC	40	10	STOT	1	B*	OR	DZ	0	T	T	-	-	-	S	0	MD	ALU	T -> MD, STK -> T	T	
1F6	42	59	8C	60	30		1	B*	+	ZA	1	S	S	-	-	-	-	0	MAR	ALU	S -> MAR, S+1 -> S	S	
1F7	28	D9	6C	60	FF		1	-	-	AB	1	S	H	-	-	-	-	0	-	-	S - H	H S	
1F8	3D	E2	07	20	0F		0	TRAP(3)	C												TRAP(3) IF S >= H		
1F9	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q
.MAP 265																							
1FA	2E	7E	0C	40	0F	COPT	1	-	OR	ZA	0	T	-	-	-	-	S	0	PSH	-	T -> STK	T	
1FB	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q
.MAP 266																							
1FC	66	79	8C	60	FF	DECS	1	B	--	ZA	0	S	S	-	-	-	-	0	-	-	S-1 -> S	S	
1FD	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q
\$																							

4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED REGS				
.MAP 267																									
1FE	6F	E0	0C	60	04	PCOP	1	B	OR	DZ	0	-	0	-	-	-	-	0	ALU	IR	IR -> R0	0			
1FF	2E	78	0C	60	10		1	-	OR	ZA	0	S	-	-	-	-	-	0	MD	ALU	S -> MD	S			
200	20	E1	CC	60	30		1	-	+	AB	0	0	L	-	-	-	-	0	MAR	ALU	R0 + L -> MAR	0 L			
201	00	F9	EC	60	FF		1	Q	+	AB	0	S	T	-	-	-	-	0	-	-	S + T -> Q	S T Q			
202	3D	E2	07	20	0F		0	TRAP(3)		C											IF OVERFLOW				
203	28	56	0C	60	FF		1	-	-	AQ	1	H	-	-	-	-	-	0	-	-	H - Q	H Q			
204	3D	EA	07	20	0F		0	TRAP(3)		-C											IF H < Q				
205	6F	E0	2C	40	FF		1	B	OR	DZ	0	-	1	-	-	-	-	S	0	POP	-	STK -> R1	1		
206	2E	7E	0C	60	FF		1	-	OR	ZA	0	T	-	-	-	-	-	0	-	-	T	T			
207	20	D1	07	20	0F		0	PCOP2		Z											IF T=0				
208	42	42	2C	60	30	PCOP1	1	B*	+	ZA	1	1	1	-	-	-	-	0	MAR	ALU	R1 -> MAR, R1+1 -> R1	1			
209	2D	60	0C	60	11		1	-	OR	ZQ	0	-	-	-	-	-	-	0	MD	MD	MD -> MD	Q			
20A	42	59	8C	60	30		1	B*	+	ZA	1	S	S	-	-	-	-	0	MAR	ALU	S -> MAR, S+1 -> S	S			
20B	66	7F	EC	60	FF		1	B	-+	ZA	0	T	T	-	-	-	-	0	-	-	T - 1 -> T	T			
20C	20	89	07	20	0F		0	PCOP1		-Z											IF <> 0				
20D	6F	E1	EC	40	FF	PCOP2	1	B	OR	DZ	0	-	T	-	-	-	-	S	0	POP	-	STK -> T	T		
20E	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q
\$																									



	4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED REGS	
.MAP 270																							
20F	62	FF	EC	40	FF	UADD	1	B	+	DA	0	T	T	-	-	-	S	0	POP	-	T+STK -> T	T	
210	3E	62	03	20	0F		0	TRAP(7)		C											IF OVERFLOW		
211	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q
.MAP 271																							
212	6A	DF	EC	40	FF	USUB	1	B	-	DA	1	T	T	-	-	-	S	0	POP	-	STK-T -> T	T	
213	3E	6A	03	20	0F		0	TRAP(7)		-C											IF OVERFLOW		
214	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q
.MAP 272																							
215	0F	E0	0C	40	FF	UMUL	1	Q	OR	DZ	0	-	-	-	-	S	0	POP	-		STK -> Q	Q	
216	3C	98	03	20	0F		0	#MUL16		T											T * Q -> [R2,Q]		
217	2E	64	0C	60	FF		1	-	OR	ZA	0	2	-	-	-	-	0	-	-		R2	2	
218	3E	69	03	20	0F		0	TRAP(7)		-Z											IF OVERFLOW		
219	6D	61	EC	60	FF		1	B	OR	ZQ	0	-	T	-	-	-	0	-	-		Q -> T	T Q	
21A	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q
.MAP 273																							
21B	2E	7E	0C	60	FF	UDIV	1	-	OR	ZA	0	T	-	-	-	-	0	-	-		T	T	
21C	3E	61	03	20	0F		0	TRAP(7)		Z											IF ZERODIVIDE		
21D	0F	E0	0C	40	FF		1	Q	OR	DZ	0	-	-	-	-	S	0	POP	-		STK -> Q	Q	
21E	3A	58	03	20	0F		0	#DIVIDE		T											Q DIV T -> Q		
21F	6D	61	EC	60	FF		1	B	OR	ZQ	0	-	T	-	-	-	0	-	-		Q -> T	T Q	
220	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q
.MAP 274																							
221	2E	7E	0C	60	FF	UMOD	1	-	OR	ZA	0	T	-	-	-	-	0	-	-		T	T	
222	3E	61	03	20	0F		0	TRAP(7)		Z											IF ZEROMOD		
223	0F	E0	0C	40	FF		1	Q	OR	DZ	0	-	-	-	-	S	0	POP	-		STK -> Q	Q	
224	3A	58	03	20	0F		0	#DIVIDE		T											Q MOD T -> R2		
225	6E	65	EC	60	FF		1	B	OR	ZA	0	2	T	-	-	-	0	-	-		R2 -> T	2 T	
226	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q
.MAP 275																							
227	4F	FF	EC	40	40	ROR	1	B*	OR	DZ	0	T	T	-	-	-	S	0	SR	ALU	T -> SR, STK -> T	T	
228	4F	FF	F4	60	00		1	B*	OR	DZ	0	T	T	RR	-	-	-	0	ALU	ALU	(T+SR) -> T	T	
229	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q
.MAP 276 SHL(X,N MOD 16)																							
22A	4F	FE	0C	40	40	SHL	1	B*	OR	DZ	0	T	0	-	-	-	S	0	SR	ALU	T -> SR, STK -> R0	0 T	
22B	76	E0	1C	70	00		1	B	-&	DA	0	0	0	MR	-	-	-	1	0		~MSK(0,SR) & R0 -> R0	0	
22C	2A	5E	0C	60	40		1	-	-	ZA	1	T	-	-	-	-	0	SR	ALU		-T -> SR	T	
22D	4F	E1	F4	60	00		1	B*	OR	DZ	0	0	T	RR	-	-	-	0	ALU	ALU	(R0+SR) -> T	0 T	
22E	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q
.MAP 277 SHR(X,N MOD 16)																							
22F	4F	FF	EC	40	40	SHR	1	B*	OR	DZ	0	T	T	-	-	-	S	0	SR	ALU	T -> SR, STK -> T	T	
230	1F	E0	1C	70	00		1	Q	-XR	DZ	0	-	-	MR	-	-	-	1	0		~M(0,SR) -> Q	Q	
231	53	7F	F4	60	00		1	B*	&	DQ	0	T	T	RR	-	-	-	0	ALU	ALU	(T+SR) & Q -> T	T Q	
232	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q

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4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED	REGS	
.MAP 300																							
233	6F	E0	0C	40	FF	FOR1	1	B	OR	DZ	0	-	0	-	-	-	S	0	POP	-	STK -> R0	0	
234	6F	E0	2C	40	FF		1	B	OR	DZ	0	-	1	-	-	-	S	0	POP	-	STK -> R1	1	
235	6F	E0	6C	60	04		1	B	OR	DZ	0	-	3	-	-	-	-	0	ALU	IR	IR -> R3	3	
236	6F	E0	44	68	04		1	B	OR	DZ	0	-	2	R	10	-	-	0	ALU	IR	IR+10 -> R2	2	
237	6E	E4	4C	60	04		1	B	OR	DA	0	2	2	-	-	-	-	0	ALU	IR	IR OR R2 -> R2	2	
238	08	C1	EC	60	FF		1	Q	-	AB	1	0	T	-	-	-	-	0	-	-	R0 - T -> Q	0 T Q	
239	2E	66	0C	60	FF		1	-	OR	ZA	0	3	-	-	-	-	-	0	-	-	R3	3	
23A	23	C1	07	20	0F		0	#UP1		Z				-	JMP						GOTO UP1 IF R3=0		
23B	09	40	0C	60	FF		1	Q	-	ZQ	1	-	-	-	-	-	-	0	-	-	-Q -> Q	Q	
23C	2D	60	0C	60	FF	#UP1	1	-	OR	ZQ	0	-	-	-	-	-	-	0	-	-	Q	Q	
23D	24	79	47	20	0F		0	#EXIT		-FZ				-	JMP						GOTO EXIT IF Q>0		
23E	2E	60	0C	60	10		1	-	OR	ZA	0	0	-	-	-	-	-	0	MD	ALU	R0 -> MD	0	
23F	2E	62	0C	60	30		1	-	OR	ZA	0	1	-	-	-	-	-	0	MAR	ALU	R1 -> MAR	1	
240	2E	62	0C	60	10		1	-	OR	ZA	0	1	-	-	-	-	-	0	MD	ALU	R1 -> MD	1	
241	42	59	8C	60	30		1	B*	+	ZA	1	S	S	-	-	-	-	0	MAR	ALU	S -> MAR, S+1 -> S	S	
242	28	D9	6C	60	FF		1	-	-	AB	1	S	H	-	-	-	-	0	-	-	S - H	H S	
243	3D	E2	07	20	0F		0	TRAP(3)		C				-	JMP						TRAP(3) IF S >= H		
244	4F	FF	EC	40	10		1	B*	OR	DZ	0	T	T	-	-	-	-	S	0	MD	ALU	T -> MD, STK -> T	T
245	42	59	8C	60	30		1	B*	+	ZA	1	S	S	-	-	-	-	0	MAR	ALU	S -> MAR, S+1 -> S	S	
246	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q	
247	62	E4	4C	60	02	#EXIT	1	B	+	DA	0	2	2	-	-	-	-	0	ALU	PC	PC + R2 -> R2	2	
248	66	C4	4C	70	02		1	B	--	DA	1	2	2	-	-	-	-	1	2		R2 - 2 -> R2	2	
249	4F	E5	EC	40	20		1	B*	OR	DZ	0	2	T	-	-	-	-	S	0	PC	ALU	R2 -> PC, STK -> T	2 T
24A	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q	
.MAP 301																							
24B	66	78	8C	60	30	FOR2	1	B	--	ZA	0	S	4	-	-	-	-	0	MAR	ALU	S-1 -> R4 -> MAR	4 S	
24C	6F	E0	4C	60	04		1	B	OR	DZ	0	-	2	-	-	-	-	0	ALU	IR	IR -> R2	2	
24D	24	F8	17	20	0F		0	#POS		-H				-	JMP						GOTO POS IF -H		
24E	6E	E4	44	78	FF		1	B	OR	DA	0	2	2	R	10	-	-	1	377		(377+10) OR R2 -> R2	2	
24F	6F	E0	0C	60	01	#POS	1	B	OR	DZ	0	-	0	-	-	-	-	0	ALU	MD	MD -> R0	0	
250	26	68	0C	60	30		1	-	--	ZA	0	4	-	-	-	-	-	0	MAR	ALU	R4 - 1 -> MAR	4	
251	6F	E0	64	68	04		1	B	OR	DZ	0	-	3	R	10	-	-	0	ALU	IR	IR+10 -> R3	3	
252	6E	E6	6C	60	04		1	B	OR	DA	0	3	3	-	-	-	-	0	ALU	IR	IR OR R3 -> R3	3	
253	6F	E0	2C	60	01		1	B	OR	DZ	0	-	1	-	-	-	-	0	ALU	MD	MD -> R1	1	
254	2E	62	0C	60	30		1	-	OR	ZA	0	1	-	-	-	-	-	0	MAR	ALU	R1 -> MAR	1	
255	62	E4	8C	60	01		1	B	+	DA	0	2	4	-	-	-	-	0	ALU	MD	MD + R2 -> R4	2 4	
256	26	30	87	20	0F		0	#TERM		V				-	JMP						IF OVERFLOW		
257	68	C8	0C	60	FF		1	B	-	AB	1	4	0	-	-	-	-	0	-	-	R4 - R0 -> R0	0 4	
258	2E	64	0C	60	FF		1	-	OR	ZA	0	2	-	-	-	-	-	0	-	-	R2	2	
259	25	B8	47	20	0F		0	#UP2		-F				-	JMP						GOTO UP2 IF R2>=0		
25A	6A	40	0C	60	FF		1	B	-	ZA	1	0	0	-	-	-	-	0	-	-	-R0 -> R0	0	
25B	2E	60	0C	60	FF	#UP2	1	-	OR	ZA	0	0	-	-	-	-	-	0	-	-	R0	0	
25C	26	39	47	20	0F		0	#TERM		-FZ				-	JMP						GOTO TERM IF R0>0		
25D	2E	68	0C	60	10		1	-	OR	ZA	0	4	-	-	-	-	-	0	MD	ALU	R4 -> MD	4	
25E	2E	62	0C	60	30		1	-	OR	ZA	0	1	-	-	-	-	-	0	MAR	ALU	R1 -> MAR	1	
25F	62	E6	6C	60	02		1	B	+	DA	0	3	3	-	-	-	-	0	ALU	PC	PC + R3 -> R3	3	
260	66	C6	6C	70	02		1	B	--	DA	1	3	3	-	-	-	-	1	2		R3 - 2 -> R3	3	
261	2E	66	0C	60	20		1	-	OR	ZA	0	3	-	-	-	-	-	0	PC	ALU	R3 -> PC	3	
262	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q	
263	66	D9	8C	70	02	#TERM	1	B	--	DA	1	S	S	-	-	-	-	1	2		S - 2 -> S	S	
264	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q	

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4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED REGS			
.MAP 302																								
265	6F	E0	0C	60	02	ENTC	1	B	OR	DZ	0	-	0	-	-	-	-	0	ALU	PC	PC -> R0	0		
266	62	E0	04	68	04		1	B	+	DA	0	0	0	R	10	-	-	-	0	ALU	IR	IR+10 + R0 -> R0	0	
267	62	E0	0C	60	04		1	B	+	DA	0	0	0	-	-	-	-	-	0	ALU	IR	IR + R0 -> R0	0	
268	2E	60	0C	60	20		1	-	OR	ZA	0	0	-	-	-	-	-	-	0	PC	ALU	R0 -> PC	0	
269	6F	E0	04	68	04		1	B	OR	DZ	0	-	0	R	10	-	-	-	0	ALU	IR	IR+10 -> R0	0	
26A	6E	E0	0C	60	04		1	B	OR	DA	0	0	0	-	-	-	-	-	0	ALU	IR	IR OR R0 -> R0	0	
26B	6F	E0	24	68	04		1	B	OR	DZ	0	-	1	R	10	-	-	-	0	ALU	IR	IR+10 -> R1	1	
26C	6E	E2	2C	60	04		1	B	OR	DA	0	1	1	-	-	-	-	-	0	ALU	IR	IR OR R1 -> R1	1	
26D	08	C2	0C	60	FF		1	Q	-	AB	1	1	0	-	-	-	-	-	0	-	-	R1 - R0 -> Q	0 1 Q	
26E	63	60	4C	70	02		1	B	+	DQ	0	-	2	-	-	-	-	-	1	2	-	Q + 2 -> R2	2 Q	
26F	60	E4	4C	60	FF		1	B	+	AB	0	2	2	-	-	-	-	-	0	-	-	R2 + R2 -> R2	2	
270	62	E4	4C	60	02		1	B	+	DA	0	2	2	-	-	-	-	-	0	ALU	PC	PC + R2 -> R2	2	
271	2E	64	0C	60	10		1	-	OR	ZA	0	2	-	-	-	-	-	-	0	MD	ALU	R2 -> MD	2	
272	42	59	8C	60	30		1	B*	+	ZA	1	S	S	-	-	-	-	-	0	MAR	ALU	S -> MAR, S+1 -> S	S	
273	28	D9	6C	60	FF		1	-	-	AB	1	S	H	-	-	-	-	-	0	-	-	S - H	H S	
274	3D	E2	07	20	0F		0	TRAP(3)			C											JMP	TRAP(3) IF S >= H	
275	68	DE	0C	60	FF		1	B	-	AB	1	T	0	-	-	-	-	-	0	-	-	T - R0 -> R0	0 T	
276	27	D0	27	20	0F		0	#ENTC1			S											JMP	IF T < R0	
277	28	DE	2C	60	FF		1	-	-	AB	1	T	1	-	-	-	-	-	0	-	-	T - R1	1 T	
278	27	D9	27	20	0F		0	#ENTC1			-SZ											JMP	IF T > R1	
279	62	40	0C	60	FF		1	B	+	ZA	1	0	0	-	-	-	-	-	0	-	-	R0 + 1 -> R0	0	
27A	60	E0	0C	60	FF		1	B	+	AB	0	0	0	-	-	-	-	-	0	-	-	R0 + R0 -> R0	0	
27B	62	E0	0C	60	02		1	B	+	DA	0	0	0	-	-	-	-	-	0	ALU	PC	PC + R0 -> R0	0	
27C	2E	60	0C	60	20		1	-	OR	ZA	0	0	-	-	-	-	-	-	0	PC	ALU	R0 -> PC	0	
27D	6F	E0	0C	60	02		#ENTC1	1	B	OR	DZ	0	-	0	-	-	-	-	0	ALU	PC	PC -> R0	0	
27E	62	E0	04	68	04			1	B	+	DA	0	0	0	R	10	-	-	-	0	ALU	IR	IR+10 + R0 -> R0	0
27F	62	E0	0C	60	04			1	B	+	DA	0	0	0	-	-	-	-	-	0	ALU	IR	IR + R0 -> R0	0
280	4F	E1	EC	40	20			1	B*	OR	DZ	0	0	T	-	-	-	-	S	0	PC	ALU	R0 -> PC, STK -> T	0 T
281	0F	E0	0F	E0	03			1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q
.MAP 303																								
282	66	79	8C	60	30		EXC	1	B	-+	ZA	0	S	S	-	-	-	-	0	MAR	ALU	S - 1 -> S -> MAR	S	
283	2D	60	0C	60	21			1	-	OR	ZQ	0	-	-	-	-	-	-	0	PC	MD	MD -> PC	Q	
284	0F	E0	0F	E0	03			1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q

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	4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED	REGS	
.MAP 320																								
2B6	6E	FF	EC	40	FF	OR	1	B	OR	DA	0	T	T	-	-	-	S	0	POP	-	STK OR T -> T	T		
2B7	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q	
.MAP 321																								
2B8	7A	FF	EC	40	FF	XOR	1	B	XOR	DA	0	T	T	-	-	-	S	0	POP	-	STK XOR T -> T	T		
2B9	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q	
.MAP 322																								
2BA	72	FF	EC	40	FF	AND	1	B	&	DA	0	T	T	-	-	-	S	0	POP	-	STK & T -> T	T		
2BB	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q	
.MAP 323																								
2BC	7E	7F	EC	60	FF	COM	1	B	-XR	ZA	0	T	T	-	-	-	-	0	-	-	-(0 XOR T) -> T	T		
2BD	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q	
.MAP 324																								
2BE	63	C0	0C	40	40	IN	1	B	+	DZ	1	-	0	-	-	-	S	0	SR	ALU	STK+1 -> R0 -> SR	0		
2BF	26	C0	0C	70	11		1	-	--	DA	1	0	-	-	-	-	-	1	21		R0 - 21	0		
2C0	29	C2	07	20	0F		0	#PUSH0		C											IF R0 > 16			
2C1	72	FF	F4	70	01		1	B	&	DA	0	T	T	RR	-	-	-	1	1		(1+SR) & T -> T	T		
2C2	2A	B9	07	20	0F		0	#PUSH1		-Z											GOTO PUSH1 IF #0			
2C3	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q	
.MAP 325																								
2C4	5C	FF	EC	40	0F	LINIL	1	B*	-XR	AB	0	T	T	-	-	-	S	0	PSH	-	T -> STK, -1 -> T	T		
2C5	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q	
.MAP 326																								
2C6	2E	7E	0C	60	40	MSK	1	-	OR	ZA	0	T	-	-	-	-	-	0	SR	ALU	T -> SR	T		
2C7	6F	E1	FC	70	00		1	B	OR	DZ	0	-	T	MR	-	-	-	1	0		MSK(SR) -> T	T		
2C8	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q	
.MAP 327																								
2C9	7A	FF	EC	70	01	NOT	1	B	XOR	DA	0	T	T	-	-	-	-	1	1		1 XOR T -> T	T		
2CA	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q	

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	4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED REGS	
.MAP 330																							
2CB	62	FF	EC	40	FF	ADD	1	B	+	DA	0	T	T	-	-	-	S	0	POP	-	T+STK -> T	T	
2CC	3E	80	83	20	0F		0	TRAP(10)		V											- JSR	IF OVERFLOW	
2CD	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q
.MAP 331																							
2CE	6A	DF	EC	40	FF	SUB	1	B	-	DA	1	T	T	-	-	-	S	0	POP	-	STK-T -> T	T	
2CF	3E	80	83	20	0F		0	TRAP(10)		V											- JSR	IF OVERFLOW	
2D0	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q
.MAP 332																							
2D1	0F	E0	0C	40	FF	MUL	1	Q	OR	DZ	0	-	-	-	-	S	0	POP	-		STK -> Q	Q	
2D2	78	7E	6C	60	FF		1	B	XOR	AQ	0	T	3	-	-	-	-	0	-	-	T XOR Q -> R3	3 T Q	
2D3	2D	60	0C	60	FF		1	-	OR	ZQ	0	-	-	-	-	-	0	-	-		Q	Q	
2D4	2D	68	47	20	0F		0	QPOS		-F											- JMP	IF >= 0	
2D5	09	40	0C	60	FF		1	Q	-	ZQ	1	-	-	-	-	-	0	-	-		-Q -> Q	Q	
2D6	2E	7E	0C	60	FF	QPOS	1	-	OR	ZA	0	T	-	-	-	-	0	-	-		T	T	
2D7	2D	98	47	20	0F		0	TPOS		-F											- JMP	IF >= 0	
2D8	6A	5F	EC	60	FF		1	B	-	ZA	1	T	T	-	-	-	-	0	-	-	-T -> T	T	
2D9	3C	98	03	20	0F	TPOS	0	#MUL16				T									- JSR	Q * T -> [R2,Q]	
2DA	2E	64	0C	60	FF		1	-	OR	ZA	0	2	-	-	-	-	0	-	-		R2	2	
2DB	2D	E1	07	20	0F		0	NO-OV		Z											- JMP	IF R2=0	
2DC	3E	88	03	20	0F		0	TRAP(10)		T											- JSR	IF OVERFLOW	
2DD	2E	08	07	20	0F		0	NO.OVER		T											- JMP	IF MASKED	
2DE	2D	60	0C	60	FF	NO-OV	1	-	OR	ZQ	0	-	-	-	-	-	0	-	-		Q	Q	
2DF	3E	80	43	20	0F		0	TRAP(10)		F											- JSR	IF OVERFLOW	
2E0	2E	66	0C	60	FF	NO.OVER	1	-	OR	ZA	0	3	-	-	-	-	0	-	-		R3	3	
2E1	2E	38	47	20	0F		0	RESPOS		-F											- JMP	JMP IF >=0	
2E2	09	40	0C	60	FF		1	Q	-	ZQ	1	-	-	-	-	-	0	-	-		-Q -> Q	Q	
2E3	6D	61	EC	60	FF	RESPOS	1	B	OR	ZQ	0	-	T	-	-	-	0	-	-		Q -> T	T Q	
2E4	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q
.MAP 333																							
2E5	0F	E0	0C	40	FF	DIV	1	Q	OR	DZ	0	-	-	-	-	S	0	POP	-		STK -> Q	Q	
2E6	78	7E	6C	60	FF		1	B	XOR	AQ	0	T	3	-	-	-	-	0	-	-	T XOR Q -> R3	3 T Q	
2E7	2D	60	0C	60	FF		1	-	OR	ZQ	0	-	-	-	-	-	0	-	-		Q	Q	
2E8	2E	A8	47	20	0F		0	D.QPOS		-F											- JMP	JMP IF >=0	
2E9	09	40	0C	60	FF		1	Q	-	ZQ	1	-	-	-	-	-	0	-	-		-Q -> Q	Q	
2EA	2E	7E	0C	60	FF	D.QPOS	1	-	OR	ZA	0	T	-	-	-	-	0	-	-		T	T	
2EB	3E	81	03	20	0F		0	TRAP(10)		Z											- JSR	IF ZERODIVIDE	
2EC	2F	28	47	20	0F		0	D.TPOS		-F											- JMP	IF > 0	
2ED	6A	5F	EC	60	FF		1	B	-	ZA	1	T	T	-	-	-	-	0	-	-	-T -> T	T	
2EE	2D	60	0C	60	FF		1	-	OR	ZQ	0	-	-	-	-	-	0	-	-		Q	Q	
2EF	2F	28	47	20	0F		0	D.TPOS		-F											- JMP	GOTO #D3 IF >=0	
2F0	26	7E	0C	60	FF		1	-	++	ZA	0	T	-	-	-	-	0	-	-		T - 1	T	
2F1	3E	81	03	20	0F		0	TRAP(10)		Z											- JSR	IF OV !MININT DIV -1"	
2F2	3A	58	03	20	0F	D.TPOS	0	#DIVIDE		T											- JSR	Q DIV T -> Q	
2F3	2E	66	0C	60	FF		1	-	OR	ZA	0	3	-	-	-	-	0	-	-		R3	3	
2F4	2F	68	47	20	0F		0	D.RESPOS		-F											- JMP	JMP IF >=0	
2F5	09	40	0C	60	FF		1	Q	-	ZQ	1	-	-	-	-	-	0	-	-		-Q -> Q	Q	
2F6	6D	61	EC	60	FF	D.RESPOS	1	B	OR	ZQ	0	-	T	-	-	-	0	-	-		Q -> T	T Q	
2F7	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q

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	4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED	REGS
						.MAP 334																	
						.MAP 335																	
2F8	22	5E	0C	60	40	BIT	1	-	+	ZA	1	T	-	-	-	-	-	0	SR	ALU	T+1 -> SR	T	
2F9	6F	E1	F4	70	01		1	B	OR	DZ	0	-	T	RR	-	-	-	1	1		(1+SR) -> T	T	
						.MAP 336																	
						NOP																	
2FA	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q
						.MAP 337																	
2FB	6F	E0	2C	40	FF	MOVF	1	B	OR	DZ	0	-	1	-	-	-	-	S	0	POP	-	STK -> R1 !FROM OFFS	1
2FC	03	E0	0C	40	FF		1	Q	+	DZ	0	-	-	-	-	-	-	S	0	POP	-	STK -> Q !FROM FP"	Q
2FD	C3	E0	0C	70	00		1	BQL	+	DZ	0	-	0	-	-	-	-	1	0		[0,Q]*2 -> [R0,Q]	0	Q
2FE	C2	60	0C	60	FF		1	BQL	+	ZA	0	0	0	-	-	-	-	0	-		[R0,Q]*2 -> [R0,Q]	0	Q
2FF	60	62	2C	60	FF		1	B	+	AQ	0	1	1	-	-	-	-	0	-		R1 + Q -> R1 !FROM ADDR	1	Q
300	62	00	0C	60	FF		1	B	+	ZA	C	0	0	-	-	-	-	0	-		R0 + C -> R0 !FROM BNK"	0	
301	26	C0	0C	70	04		1	-	++	DA	1	0	-	-	-	-	-	1	4		R0 - 4	0	
302	3E	21	07	20	0F		0	TRAP(5)		Z											- JMP	IF BNK = 4	
303	6F	E0	6C	40	FF		1	B	OR	DZ	0	-	3	-	-	-	-	S	0	POP	-	STK -> R3 !TO OFFS"	3
304	03	E0	0C	40	FF		1	Q	+	DZ	0	-	-	-	-	-	-	S	0	POP	-	STK -> Q !TO FP"	Q
305	C3	E0	4C	70	00		1	BQL	+	DZ	0	-	2	-	-	-	-	1	0		(0,Q)*2 -> (R2,Q)	2	Q
306	C2	64	4C	60	FF		1	BQL	+	ZA	0	2	2	-	-	-	-	0	-		(R2,Q)*2 -> (R2,Q)	2	Q
307	60	66	6C	60	FF		1	B	+	AQ	0	3	3	-	-	-	-	0	-		R3 + Q -> R3 !TO ADDR"	3	Q
308	62	04	4C	60	FF		1	B	+	ZA	C	2	2	-	-	-	-	0	-		R2 + C -> R2 !TO BNK"	2	
309	20	E7	EC	60	FF		1	-	+	AB	0	3	T	-	-	-	-	0	-		R3 + T	3	T
30A	62	04	8C	60	FF		1	B	+	ZA	C	2	4	-	-	-	-	0	-		R2 + C -> R4	2	4
30B	26	C8	0C	70	04		1	-	++	DA	1	4	-	-	-	-	-	1	4		R4 - 4	4	
30C	3E	22	07	20	0F		0	TRAP(5)		C											- JMP	IF OVERFLOW	
30D	2E	7E	0C	60	FF		1	-	OR	ZA	0	T	-	-	-	-	-	0	-		T	T	
30E	31	71	07	20	0F		0	MOV2		Z											- JMP	IF T=0	
30F	2E	60	0C	60	D0	MOV1	1	-	OR	ZA	0	0	-	-	-	-	-	0	BNK	ALU	R0 -> BNK	0	
310	42	42	2C	60	30		1	B*	+	ZA	1	1	1	-	-	-	-	0	MAR	ALU	R1 -> MAR, R1 + 1 -> R1	1	
311	62	00	0C	60	FF		1	B	+	ZA	C	0	0	-	-	-	-	0	-		R0 + C -> R0	0	
312	62	46	6C	60	11		1	B	+	ZA	1	3	3	-	-	-	-	0	MD	MD	MD -> MD, R3 + 1 -> R3	3	
313	42	04	4C	60	D0		1	B*	+	ZA	C	2	2	-	-	-	-	0	BNK	ALU	R2 -> BNK, R2 + C -> R2	2	
314	26	66	0C	60	30		1	-	++	ZA	0	3	-	-	-	-	-	0	MAR	ALU	R3 - 1 -> MAR	3	
315	66	7F	EC	60	FF		1	B	++	ZA	0	T	T	-	-	-	-	0	-		T - 1 -> T	T	
316	30	F9	07	20	0F		0	MOV1		-Z											- JMP	IF <> 0	
317	6F	E1	EC	40	FF	MOV2	1	B	OR	DZ	0	-	T	-	-	-	-	S	0	POP	-	STK -> T	T
318	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q

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	4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED	REGS			
						.MAP 342																				
339	4F	A8	07	20	0F		0	DDT			T															
						.MAP 343																				
33A	68	F8	07	20	0F		0	REPL			T															
						.MAP 344																				
33B	5D	28	07	20	0F		0	BBLT			T															
						.MAP 345																				
33C	51	F8	07	20	0F		0	DCH			T															
						.MAP 346																				
33D	67	E0	0C	40	40	UNPACK	1	B	++	DZ	0	-	0	-	-	-	S	0	SR	ALU	-STK-1	->	R0	->	SR	0
33E	4F	FF	F4	60	00		1	B*	OR	DZ	0	T	T	RR	-	-	-	0	ALU	ALU	T+SR	->	T		T	
33F	22	E0	0C	40	40		1	-	+	DA	0	0	-	-	-	-	S	0	SR	ALU	STK + R0	->	SR		0	
340	76	FF	FC	70	00		1	B	-&	DA	0	T	T	MR	-	-	-	1	0		MSK(0,SR) & T	->	T		T	
341	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP			Q	
						.MAP 347																				
342	63	C0	6C	40	FF	PACK	1	B	+	DZ	1	-	3	-	-	-	S	0	POP	-	STK + 1	->	R3		3	
343	2A	C6	0C	40	40		1	-	-	DA	1	3	-	-	-	-	S	0	SR	ALU	STK - R3	->	SR		3	
344	6F	E0	4C	40	30		1	B	OR	DZ	0	-	2	-	-	-	S	0	MAR	ALU	STK ->	R2	->	MAR	2	
345	6F	E0	1C	70	00		1	B	OR	DZ	0	-	0	MR	-	-	-	1	0		MSK(0,SR)	->	R0		0	
346	2E	66	0C	60	40		1	-	OR	ZA	0	3	-	-	-	-	0	SR	ALU	R3	->	SR		3		
347	4F	E0	14	60	00		1	B*	OR	DZ	0	0	0	RR	-	-	-	0	ALU	ALU	(R0+SR)	->	R0		0	
348	72	E0	2C	60	01		1	B	&	DA	0	0	1	-	-	-	-	0	ALU	MD	MD & R0	->	R1		0 1	
349	4F	FF	F4	60	00		1	B*	OR	DZ	0	T	T	RR	-	-	-	0	ALU	ALU	(T+SR)	->	T		T	
34A	74	E1	EC	60	FF		1	B	-&	AB	0	0	T	-	-	-	-	0	-	-	~R0 & T	->	T		0 T	
34B	2C	E3	EC	60	10		1	-	OR	AB	0	1	T	-	-	-	-	0	MD	ALU	R1 OR T	->	MD		1 T	
34C	4F	E5	EC	40	30		1	B*	OR	DZ	0	2	T	-	-	-	S	0	MAR	ALU	R2 ->	MAR, STK	->	T	2 T	
34D	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP			Q	

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	4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED	REGS	
						.MAP 360																		
394	2E	7C	0C	60	10	CL	1	-	OR	ZA	0	L	-	-	-	-	-	0	MD	ALU	L -> MD	L		
395	6F	E0	4C	60	06		1	B	OR	DZ	0	-	2	-	-	-	-	0	ALU	IR*	IR -> R2	2		
396	39	98	07	20	0F		0	#MARK		T											MARK(IR)			
						.MAP 361,362,363,364,365,366,367,370,371,372,373,374,375,376,377																		
397	2E	7C	0C	60	10	CL1	1	-	OR	ZA	0	L	-	-	-	-	-	0	MD	ALU	L -> MD	L		
398	6D	60	4C	60	FF		1	B	OR	ZQ	0	-	2	-	-	-	-	0	-	-	Q -> R2	2	Q	
																					MARK(Q)			
399	6E	78	2C	60	30	#MARK	1	B	OR	ZA	0	S	1	-	-	-	-	0	MAR	ALU	S -> R1 -> MAR	1	S	
39A	41	DD	8C	60	10		1	B*	+	ZB	1	L	S	-	-	-	-	0	MD	ALU	L -> MD, S+1 -> S	S	L	
39B	42	59	8C	60	30		1	B*	+	ZA	1	S	S	-	-	-	-	0	MAR	ALU	S -> MAR, S+1 -> S	S		
39C	2D	60	0C	60	12		1	-	OR	ZQ	0	-	-	-	-	-	-	0	MD	PC	PC -> MD	Q		
39D	2E	78	0C	60	30		1	-	OR	ZA	0	S	-	-	-	-	-	0	MAR	ALU	S -> MAR	S		
39E	62	F9	8C	70	02		1	B	+	DA	0	S	S	-	-	-	-	1	2		S + 2 -> S	S		
39F	6E	63	CC	60	FF		1	B	OR	ZA	0	1	L	-	-	-	-	0	-	-	R1 -> L	1	L	
3A0	20	E4	4C	60	20		1	-	+	AB	0	2	2	-	-	-	-	0	PC	ALU	R2 + R2 -> PC	2		
3A1	6F	E0	24	68	04		1	B	OR	DZ	0	-	1	R	10	-	-	0	ALU	IR	IR+10 -> R1	1		
3A2	6E	E2	2C	60	06		1	B	OR	DA	0	1	1	-	-	-	-	0	ALU	IR*	IR OR R1 -> R1	1		
3A3	2E	62	0C	60	20		1	-	OR	ZA	0	1	-	-	-	-	-	0	PC	ALU	R1 -> PC	1		
3A4	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q	

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4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED	REGS	
Q DIV T -> Q, Q MOD T -> R2																							
3A5	D1	E0	4C	60	FF	#DIVIDE	1	BQL	&	ZB	0	-	2	-	-	-	-	0	-	-	[0,Q]*2 -> [R2,Q]	2	Q
3A6	64	DE	4C	60	FF	#DIVIDE+1	1	B	--+	AB	1	T	2	-	-	-	-	0	-	-	R2-T -> R2	2	T
3A7	C0	FE	4C	60	5F		1	BQL	+	AB	0	T	2	-	-	-	-	0	MDS	-	DIV STEP	2	T Q
3A8	64	DE	4C	60	FF		1	B	--+	AB	1	T	2	-	-	-	-	0	-	-	R2-T -> R2	2	T
3A9	C0	FE	4C	60	5F		1	BQL	+	AB	0	T	2	-	-	-	-	0	MDS	-	DIV STEP	2	T Q
3AA	64	DE	4C	60	FF		1	B	--+	AB	1	T	2	-	-	-	-	0	-	-	R2-T -> R2	2	T
3AB	C0	FE	4C	60	5F		1	BQL	+	AB	0	T	2	-	-	-	-	0	MDS	-	DIV STEP	2	T Q
3AC	64	DE	4C	60	FF		1	B	--+	AB	1	T	2	-	-	-	-	0	-	-	R2-T -> R2	2	T
3AD	C0	FE	4C	60	5F		1	BQL	+	AB	0	T	2	-	-	-	-	0	MDS	-	DIV STEP	2	T Q
3AE	64	DE	4C	60	FF		1	B	--+	AB	1	T	2	-	-	-	-	0	-	-	R2-T -> R2	2	T
3AF	C0	FE	4C	60	5F		1	BQL	+	AB	0	T	2	-	-	-	-	0	MDS	-	DIV STEP	2	T Q
3B0	64	DE	4C	60	FF		1	B	--+	AB	1	T	2	-	-	-	-	0	-	-	R2-T -> R2	2	T
3B1	C0	FE	4C	60	5F		1	BQL	+	AB	0	T	2	-	-	-	-	0	MDS	-	DIV STEP	2	T Q
3B2	64	DE	4C	60	FF		1	B	--+	AB	1	T	2	-	-	-	-	0	-	-	R2-T -> R2	2	T
3B3	C0	FE	4C	60	5F		1	BQL	+	AB	0	T	2	-	-	-	-	0	MDS	-	DIV STEP	2	T Q
3B4	64	DE	4C	60	FF		1	B	--+	AB	1	T	2	-	-	-	-	0	-	-	R2-T -> R2	2	T
3B5	C0	FE	4C	60	5F		1	BQL	+	AB	0	T	2	-	-	-	-	0	MDS	-	DIV STEP	2	T Q
3B6	64	DE	4C	60	FF		1	B	--+	AB	1	T	2	-	-	-	-	0	-	-	R2-T -> R2	2	T
3B7	C0	FE	4C	60	5F		1	BQL	+	AB	0	T	2	-	-	-	-	0	MDS	-	DIV STEP	2	T Q
3B8	64	DE	4C	60	FF		1	B	--+	AB	1	T	2	-	-	-	-	0	-	-	R2-T -> R2	2	T
3B9	C0	FE	4C	60	5F		1	BQL	+	AB	0	T	2	-	-	-	-	0	MDS	-	DIV STEP	2	T Q
3BA	64	DE	4C	60	FF		1	B	--+	AB	1	T	2	-	-	-	-	0	-	-	R2-T -> R2	2	T
3BB	C0	FE	4C	60	5F		1	BQL	+	AB	0	T	2	-	-	-	-	0	MDS	-	DIV STEP	2	T Q
3BC	64	DE	4C	60	FF		1	B	--+	AB	1	T	2	-	-	-	-	0	-	-	R2-T -> R2	2	T
3BD	C0	FE	4C	60	5F		1	BQL	+	AB	0	T	2	-	-	-	-	0	MDS	-	DIV STEP	2	T Q
3BE	64	DE	4C	60	FF		1	B	--+	AB	1	T	2	-	-	-	-	0	-	-	R2-T -> R2	2	T
3BF	C0	FE	4C	60	5F		1	BQL	+	AB	0	T	2	-	-	-	-	0	MDS	-	DIV STEP	2	T Q
3C0	64	DE	4C	60	FF		1	B	--+	AB	1	T	2	-	-	-	-	0	-	-	R2-T -> R2	2	T
3C1	C0	FE	4C	60	5F		1	BQL	+	AB	0	T	2	-	-	-	-	0	MDS	-	DIV STEP	2	T Q
3C2	64	DE	4C	60	FF		1	B	--+	AB	1	T	2	-	-	-	-	0	-	-	R2-T -> R2	2	T
3C3	C0	FE	4C	60	5F		1	BQL	+	AB	0	T	2	-	-	-	-	0	MDS	-	DIV STEP	2	T Q
3C4	64	DE	4C	60	FF		1	B	--+	AB	1	T	2	-	-	-	-	0	-	-	R2-T -> R2	2	T
3C5	3C	82	07	20	0F		0	#DIV1		C										JMP	GOTO DIV1 IF C		
3C6	C0	FE	8C	60	5F		1	BQL	+	AB	0	T	4	-	-	-	-	0	MDS	-	DIV STEP !WITHOUT CHANGING R2"	4	T Q
3C7	60	FE	49	60	FF		1	B	+	AB	0	T	2	-	-	-	RTN	0	-	-	T + R2 -> R2, RTN	2	T
3C8	C0	FE	89	60	5F	#DIV1	1	BQL	+	AB	0	T	4	-	-	-	RTN	0	MDS	-	DIV STEP !R2 UNCHANGED"	4	T Q
Q * T -> [R2,Q] (N STEPS)																							
3C9	71	E0	4C	60	FF	#MUL16	1	B	&	ZB	0	-	2	-	-	-	-	0	-	-	0 -> R2	2	
3CA	80	FE	4C	60	5F		1	BQR	+	AB	0	T	2	-	-	-	-	0	MDS	-	MUL STEP	2	T Q
3CB	80	FE	4C	60	5F		1	BQR	+	AB	0	T	2	-	-	-	-	0	MDS	-	MUL STEP	2	T Q
3CC	80	FE	4C	60	5F		1	BQR	+	AB	0	T	2	-	-	-	-	0	MDS	-	MUL STEP	2	T Q
3CD	80	FE	4C	60	5F		1	BQR	+	AB	0	T	2	-	-	-	-	0	MDS	-	MUL STEP	2	T Q
3CE	80	FE	4C	60	5F		1	BQR	+	AB	0	T	2	-	-	-	-	0	MDS	-	MUL STEP	2	T Q
3CF	80	FE	4C	60	5F		1	BQR	+	AB	0	T	2	-	-	-	-	0	MDS	-	MUL STEP	2	T Q
3D0	80	FE	4C	60	5F		1	BQR	+	AB	0	T	2	-	-	-	-	0	MDS	-	MUL STEP	2	T Q
3D1	80	FE	4C	60	5F		1	BQR	+	AB	0	T	2	-	-	-	-	0	MDS	-	MUL STEP	2	T Q
3D2	80	FE	4C	60	5F		1	BQR	+	AB	0	T	2	-	-	-	-	0	MDS	-	MUL STEP	2	T Q
3D3	80	FE	4C	60	5F		1	BQR	+	AB	0	T	2	-	-	-	-	0	MDS	-	MUL STEP	2	T Q
3D4	80	FE	4C	60	5F		1	BQR	+	AB	0	T	2	-	-	-	-	0	MDS	-	MUL STEP	2	T Q
3D5	80	FE	4C	60	5F		1	BQR	+	AB	0	T	2	-	-	-	-	0	MDS	-	MUL STEP	2	T Q
3D6	80	FE	4C	60	5F		1	BQR	+	AB	0	T	2	-	-	-	-	0	MDS	-	MUL STEP	2	T Q
3D7	80	FE	4C	60	5F		1	BQR	+	AB	0	T	2	-	-	-	-	0	MDS	-	MUL STEP	2	T Q
3D8	80	FE	4C	60	5F		1	BQR	+	AB	0	T	2	-	-	-	-	0	MDS	-	MUL STEP	2	T Q
3D9	80	FE	49	60	5F		1	BQR	+	AB	0	T	2	-	-	-	RTN	0	MDS	-	MUL STEP	2	T Q

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4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED	REGS	
3DA	6F	E0	0C	70	01	TRAP(1)	1	B	OR	DZ	0	-	0	-	-	-	-	1	1	1 -> R0	0		
3DB	3E	F8	07	20	0F		0	TRAP(R0)	T				-	JMP						TRAP(R0)			
3DC	6F	E0	0C	70	02	TRAP(2)	1	B	OR	DZ	0	-	0	-	-	-	-	1	2	2 -> R0	0		
3DD	3E	F8	07	20	0F		0	TRAP(R0)	T				-	JMP						TRAP(R0)			
3DE	6F	E0	0C	70	03	TRAP(3)	1	B	OR	DZ	0	-	0	-	-	-	-	1	3	3 -> R0	0		
3DF	3E	F8	07	20	0F		0	TRAP(R0)	T				-	JMP						TRAP(R0)			
3E0	6F	E0	0C	70	04	TRAP(4)	1	B	OR	DZ	0	-	0	-	-	-	-	1	4	4 -> R0	0		
3E1	3E	F8	07	20	0F		0	TRAP(R0)	T				-	JMP						TRAP(R0)			
3E2	6F	E0	0C	70	05	TRAP(5)	1	B	OR	DZ	0	-	0	-	-	-	-	1	5	5 -> R0	0		
3E3	3E	F8	07	20	0F		0	TRAP(R0)	T				-	JMP						TRAP(R0)			
3E4	6F	E0	0C	70	06	TRAP(6)	1	B	OR	DZ	0	-	0	-	-	-	-	1	6	6 -> R0	0		
3E5	3E	F8	07	20	0F		0	TRAP(R0)	T				-	JMP						TRAP(R0)			
3E6	6F	E0	0C	70	07	TRAP(7)	1	B	OR	DZ	0	-	0	-	-	-	-	1	7	7 -> R0	0		
3E7	3E	98	07	20	0F		0	TRAP(N)	T				-	JMP						TRAP(N)			
3E8	6F	E0	0C	70	08	TRAP(10)	1	B	OR	DZ	0	-	0	-	-	-	-	1	10	10 -> R0	0		
							0	TRAP(N)	T				-	JMP						TRAP(N)			
. MASKABLE TRAPS:																							
3E9	6F	E0	AC	70	07	TRAP(N)	1	B	OR	DZ	0	-	5	-	-	-	-	1	7	7 -> R5 !TRAP MSK"	5		
3EA	20	EB	4C	60	30		1	-	+	AB	0	5	P	-	-	-	-	0	MAR	ALU	R5 + P -> MAR	5	P
3EB	2A	40	0C	60	40		1	-	-	ZA	1	0	-	-	-	-	-	0	SR	ALU	-R0 -> SR	0	
3EC	6F	E0	B4	60	01		1	B	OR	DZ	0	-	5	RR	-	-	-	0	ALU	MD	(MD+SR) -> R5	5	
3ED	00	00	41	20	0F		0	0		F				-	RTN					RTN IF N IN R5			
3EE	00	08	00	20	0F		0	0		T				-	POP					ADJUST 2911-STACK			
. NOT MASKABLE TRAPS:																							
3EF	2E	60	0C	60	10	TRAP(R0)	1	-	OR	ZA	0	0	-	-	-	-	-	0	MD	ALU	R0 -> MD !TRAP NR"	0	
3F0	6F	E0	2C	70	06		1	B	OR	DZ	0	-	1	-	-	-	-	1	6	6 -> R1	1		
3F1	20	E3	4C	60	30		1	-	+	AB	0	1	P	-	-	-	-	0	MAR	ALU	R1 + P -> MAR	1	P
3F2	6F	E0	4C	70	03		1	B	OR	DZ	0	-	2	-	-	-	-	1	3	3 -> R2	2		
3F3	2E	64	0C	60	30		1	-	OR	ZA	0	2	-	-	-	-	-	0	MAR	ALU	R2 -> MAR	2	
3F4	6F	E0	2C	70	07		1	B	OR	DZ	0	-	1	-	-	-	-	1	7	7 -> R1	1		
3F5	6F	E0	64	78	01		1	B	OR	DZ	0	-	3	R	10	-	-	1	1	(1+10) -> R3	3		
3F6	32	E6	0C	60	01		1	-	&	DA	0	3	-	-	-	-	-	0	ALU	MD	MD & R3	3	
3F7	42	41	07	20	0F		0	INTERRUPT	Z					-	JMP					IF NOT 7 IN M[3]			
3F8	3F	88	07	20	0F	#LOOP	0	#LOOP	T					-	JMP					LOOP END			
. EXTENSION TO THE SYS INSTRUCTION:																							
3F9	66	60	0C	60	FF	>4	1	B	-+	ZA	0	0	0	-	-	-	-	0	-	-	R0 - 1 -> R0	0	
3FA	40	09	07	20	0F		0	ILL.INSTR	-Z					-	JMP					IF IR<>5			
3FB	4F	FF	E4	78	00		1	B*	OR	DZ	0	T	T	R	10	-	-	1	0	T -> STK, (0+10) -> T	T		
. VERSION CODE OF 13.2: 1																							
3FC	6E	FF	EC	70	01		1	B	OR	DA	0	T	T	-	-	-	-	1	1	1 OR T -> T	T		
3FD	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q	

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4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED	REGS	
					.ORG 2000																		
					. ILLEGAL INSTRUCTIONS:																		
					.MAP 214,215																		
					.MAP 21,334																		
400	3D	A8	07	20	0F	ILL.INSTR	0	TRAP(1)			T									- JMP	TRAP(1)		
					.MAP 212																		
401	0F	E0	0C	40	FF	DMUL	1	Q	OR	DZ	0	-	-	-	-	-	S	0	POP	-	STK -> Q	Q	
402	3C	98	03	20	0F		0	#MUL16		T										- JSR	T * Q -> [R2,Q]		
403	4D	65	EC	40	0F		1	B*	OR	ZQ	0	2	T	-	-	-	S	0	PSH	-	Q -> T, R2 -> STK	2 T Q	
404	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q
					.MAP 213																		
405	2E	7E	0C	60	FF	DDIV	1	-	OR	ZA	0	T	-	-	-	-	0	-	-		T	T	
406	3E	61	03	20	0F		0	TRAP(7)		Z										- JSR	IF ZERODIVIDE		
407	0F	E0	0C	40	FF		1	Q	OR	DZ	0	-	-	-	-	S	0	POP	-		STK -> Q	Q	
408	CF	E0	4C	40	FF		1	BQ	OR	DZ	0	-	2	-	-	-	S	0	POP	-	[STK,Q]*2 -> [R2,Q]	2 Q	
409	3A	68	03	20	0F		0	#DIVIDE+1		T										- JSR	[STK,Q] DIV T -> [R2,T]		
40A	4D	65	EC	40	0F		1	B*	OR	ZQ	0	2	T	-	-	-	S	0	PSH	-	Q -> T, R2 -> STK	2 T Q	
40B	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q	
					.MAP 216																		
40C	6F	E0	4C	40	FF	DSHL	1	B	OR	DZ	0	-	2	-	-	-	S	0	POP	-	STK -> R2	2	
40D	60	FF	EC	60	FF		1	B	+	AB	0	T	T	-	-	-	0	-	-		T + T -> T	T	
40E	20	84	4C	40	0F		1	-	+	AB	C	2	2	-	-	-	S	0	PSH	-	R2 + R2 + C -> STK	2	
40F	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q	
					.MAP 217																		
410	6F	E0	4C	40	FF	DSHR	1	B	OR	DZ	0	-	2	-	-	-	S	0	POP	-	STK -> R2	2	
411	0E	7E	0C	60	FF		1	Q	OR	ZA	0	T	-	-	-	-	0	-	-		T -> Q	T Q	
412	82	64	4C	60	FF		1	BQR	+	ZA	0	2	2	-	-	-	0	-	-		[R2,Q] DIV 2 -> [R2,Q]	2 Q	
413	4D	65	EC	40	0F		1	B*	OR	ZQ	0	2	T	-	-	-	S	0	PSH	-	Q -> T, R2 -> STK	2 T Q	
414	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q	
					\$																		





	4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED REGS	
424	60	E2	2C	60	FF	INTERRUPT	1	B	+	AB	0	1	1	-	-	-	-	0	-	-	R1 + R1 -> R1	1	
425	62	42	4C	60	FF		1	B	+	ZA	1	1	2	-	-	-	-	0	-	-	R1 + 1 -> R2	1 2	
426	6F	E0	6C	70	01		1	B	OR	DZ	0	-	3	-	-	-	-	1	1	-	1 -> R3	3	
							0	TRANSFER			T										TRANSFER(TRUE,R1,R2)		
427	2E	62	0C	60	30	TRANSFER	1	-	OR	ZA	0	1	-	-	-	-	-	0	MAR	ALU	R1 -> MAR	1	
428	6F	E0	2C	60	01		1	B	OR	DZ	0	-	1	-	-	-	-	0	ALU	MD	MD -> R1	1	
429	42	F8	03	20	0F		0	#SAVEREGS			T										SAVE		
42A	2E	74	0C	60	10		1	-	OR	ZA	0	P	-	-	-	-	-	0	MD	ALU	P -> MD	P	
42B	2E	64	0C	60	30		1	-	OR	ZA	0	2	-	-	-	-	-	0	MAR	ALU	R2 -> MAR	2	
42C	6E	63	4C	60	FF		1	B	OR	ZA	0	1	P	-	-	-	-	0	-	-	R1 -> P	1 P	
42D	43	E8	03	20	0F		0	#RESTREGS			T										RESTORE		
42E	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q
42F	45	C8	03	20	0F	#SAVEREGS	0	#SAVESTK			T										SAVE EXPR STACK		
430	2E	7A	0C	60	10		1	-	OR	ZA	0	G	-	-	-	-	-	0	MD	ALU	G -> MD	G	
431	42	55	4C	60	30		1	B*	+	ZA	1	P	P	-	-	-	-	0	MAR	ALU	P -> MAR, P+1 -> P	P	
432	2E	7C	0C	60	10		1	-	OR	ZA	0	L	-	-	-	-	-	0	MD	ALU	L -> MD	L	
433	42	55	4C	60	30		1	B*	+	ZA	1	P	P	-	-	-	-	0	MAR	ALU	P -> MAR, P+1 -> P	P	
434	2D	60	0C	60	12		1	-	OR	ZQ	0	-	-	-	-	-	-	0	MD	PC	PC -> MD	Q	
435	42	55	4C	60	30		1	B*	+	ZA	1	P	P	-	-	-	-	0	MAR	ALU	P -> MAR, P+1 -> P	P	
436	2E	72	0C	60	10		1	-	OR	ZA	0	M	-	-	-	-	-	0	MD	ALU	M -> MD	M	
437	42	55	4C	60	30		1	B*	+	ZA	1	P	P	-	-	-	-	0	MAR	ALU	P -> MAR, P+1 -> P	P	
438	2E	78	0C	60	10		1	-	OR	ZA	0	S	-	-	-	-	-	0	MD	ALU	S -> MD	S	
439	42	55	4C	60	30		1	B*	+	ZA	1	P	P	-	-	-	-	0	MAR	ALU	P -> MAR, P+1 -> P	P	
43A	62	F7	6C	70	18		1	B	+	DA	0	H	H	-	-	-	-	1	30		30 + H -> H	H	
43B	2E	76	0C	60	10		1	-	OR	ZA	0	H	-	-	-	-	-	0	MD	ALU	H -> MD	H	
43C	2E	74	0C	60	30		1	-	OR	ZA	0	P	-	-	-	-	-	0	MAR	ALU	P -> MAR	P	
43D	66	D5	49	70	05		1	B	--	DA	1	P	P	-	-	-	RTN	-	1	5	P - 5 -> P, RTN	P	

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4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED REGS			
43E	42	55	4C	60	30	#RESTREGS	1	B*	+	ZA	1	P	P	-	-	-	-	0	MAR	ALU	P -> MAR, P + 1 -> P	P		
43F	6F	E1	AC	60	01		1	B	OR	DZ	0	-	G	-	-	-	-	0	ALU	MD	MD -> G	G		
440	2E	7A	0C	60	30		1	-	OR	ZA	0	G	-	-	-	-	-	0	MAR	ALU	G -> MAR	G		
441	2D	60	0C	60	E1		1	-	OR	ZQ	0	-	-	-	-	-	-	0	F	MD	MD -> F	Q		
442	42	55	4C	60	30		1	B*	+	ZA	1	P	P	-	-	-	-	0	MAR	ALU	P -> MAR, P + 1 -> P	P		
443	6F	E1	CC	60	01		1	B	OR	DZ	0	-	L	-	-	-	-	0	ALU	MD	MD -> L	L		
444	42	55	4C	60	30		1	B*	+	ZA	1	P	P	-	-	-	-	0	MAR	ALU	P -> MAR, P + 1 -> P	P		
445	2D	60	0C	60	21		1	-	OR	ZQ	0	-	-	-	-	-	-	0	PC	MD	MD -> PC	Q		
446	2E	66	0C	60	FF		1	-	OR	ZA	0	3	-	-	-	-	-	0	-	-	R3	3		
447	44	E1	07	20	0F		0	#REST		Z											- JMP	GOTO REST IF R3=0		
448	2E	74	0C	60	30		1	-	OR	ZA	0	P	-	-	-	-	-	0	MAR	ALU	P -> MAR	P		
449	6F	E0	2C	70	03		1	B	OR	DZ	0	-	1	-	-	-	-	1	3		3 -> R1	1		
44A	6F	E1	2C	60	01		1	B	OR	DZ	0	-	M	-	-	-	-	0	ALU	MD	MD -> M	M		
44B	2E	62	0C	60	30		1	-	OR	ZA	0	1	-	-	-	-	-	0	MAR	ALU	R1 -> MAR	1		
44C	6F	E0	2C	60	01		1	B	OR	DZ	0	-	1	-	-	-	-	0	ALU	MD	MD -> R1	1		
44D	2C	E3	2C	60	80		1	-	OR	AB	0	1	M	-	-	-	-	0	INM	ALU	R1 OR M -> INM	1 M		
44E	62	55	4C	60	30	#REST	1	B	+	ZA	1	P	P	-	-	-	-	0	MAR	ALU	P + 1 -> P -> MAR	P		
44F	6F	E1	8C	60	01		1	B	OR	DZ	0	-	S	-	-	-	-	0	ALU	MD	MD -> S	S		
450	22	54	0C	60	30		1	-	+	ZA	1	P	-	-	-	-	-	0	MAR	ALU	P + 1 -> MAR	P		
451	66	D5	4C	70	04		1	B	-+	DA	1	P	P	-	-	-	-	1	4		P - 4 -> P	P		
452	6F	E1	6C	60	01		1	B	OR	DZ	0	-	H	-	-	-	-	0	ALU	MD	MD -> H	H		
453	66	D7	6C	70	18		1	B	-+	DA	1	H	H	-	-	-	-	1	30		H - 30 -> H	H		
							0	#RESTRSTK		T												- JMP	RESTORE EXPR STACK	
454	66	79	8C	60	30	#RESTRSTK	1	B	-+	ZA	0	S	S	-	-	-	-	0	MAR	ALU	S-1 -> S -> MAR	S		
455	6F	E0	0C	60	01		1	B	OR	DZ	0	-	0	-	-	-	-	0	ALU	MD	MD -> R0	0		
456	00	01	01	20	0F		0	0		Z												- RTN	IF =0	
457	66	79	8C	60	30	#RSTK	1	B	-+	ZA	0	S	S	-	-	-	-	0	MAR	ALU	S-1 -> S -> MAR	S		
458	4F	FF	EC	40	01		1	B*	OR	DZ	0	T	T	-	-	-	-	S	0	ALU	MD	T -> STK, MD -> T	T	
459	66	60	0C	60	FF		1	B	-+	ZA	0	0	0	-	-	-	-	0	-	-	R0-1 -> R0	0		
45A	45	79	07	20	0F		0	#RSTK		-Z												- JMP	IF R0 > 0	
45B	00	08	01	20	0F		0	0		T												- RTN	RETURN	
45C	6F	E0	0C	70	00	#SAVESTK	1	B	OR	DZ	0	-	0	-	-	-	-	1	0		0 -> R0	0		
45D	46	20	0F	20	0F		0	#SAVED		E												- JMP	IF STK EMPTY	
45E	4F	FF	EC	40	10	#SSTK	1	B*	OR	DZ	0	T	T	-	-	-	-	S	0	MD	ALU	T -> MD, STK -> T	T	
45F	42	59	8C	60	30		1	B*	+	ZA	1	S	S	-	-	-	-	0	MAR	ALU	S -> MAR, S+1 -> S	S		
460	62	40	0C	60	FF		1	B	+	ZA	1	0	0	-	-	-	-	0	-	-	R0 + 1 -> R0	0		
461	45	E8	0F	20	0F		0	#SSTK		-E												- JMP	IF NOT STK EMPTY	
462	2E	60	0C	60	10	#SAVED	1	-	OR	ZA	0	0	-	-	-	-	-	0	MD	ALU	R0 -> MD	0		
463	42	59	89	60	30		1	B*	+	ZA	1	S	S	-	-	-	-	0	MAR	ALU	S -> MAR, S+1 -> S	S		

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4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED	REGS	
. DISK INPUT/OUTPUT																							
464	2E	6A	0C	60	60	#GET	1	-	OR	ZA	0	5	-	-	-	-	-	0	IOA	ALU	R5 -> IO-ADDRESS	5	
465	2D	60	0C	E0	F7		1	-	OR	ZQ	0	-	-	-	-	S	-	-	0	-	IOD	IO-DATA -> DUMMY	Q
466	2D	60	0C	E0	F7		1	-	OR	ZQ	0	-	-	-	-	S	-	-	0	-	IOD	IO-DATA -> DUMMY	Q
467	6F	E0	CC	E0	07		1	B	OR	DZ	0	-	6	-	-	S	-	-	0	ALU	IOD	IO-DATA -> R6	6
468	2D	60	0C	E0	F7		1	-	OR	ZQ	0	-	-	-	-	S	-	-	0	-	IOD	IO-DATA -> DUMMY	Q
469	2D	60	09	E0	F7		1	-	OR	ZQ	0	-	-	-	-	S	RTN	-	0	-	IOD	IO-DATA -> DUMMY, RTN	Q
46A	2E	6A	0C	60	60	#PUT	1	-	OR	ZA	0	5	-	-	-	-	-	0	IOA	ALU	R5 -> IO-ADDRESS	5	
46B	2E	6C	0C	E0	70		1	-	OR	ZA	0	6	-	-	-	S	-	-	0	IOD	ALU	R6 -> IO-DATA	6
46C	2E	6C	0C	E0	70		1	-	OR	ZA	0	6	-	-	-	S	-	-	0	IOD	ALU	R6 -> IO-DATA	6
46D	2E	6C	0C	E0	70		1	-	OR	ZA	0	6	-	-	-	S	-	-	0	IOD	ALU	R6 -> IO-DATA	6
46E	2E	6C	0C	E0	70		1	-	OR	ZA	0	6	-	-	-	S	-	-	0	IOD	ALU	R6 -> IO-DATA	6
46F	2E	6C	09	E0	70		1	-	OR	ZA	0	6	-	-	-	S	RTN	-	0	IOD	ALU	R6 -> IO-DATA, RTN	6
470	6F	E0	AC	70	09	#WAIT	1	B	OR	DZ	0	-	5	-	-	-	-	-	1	11		11 -> R5	5
471	2E	6A	0C	60	60		1	-	OR	ZA	0	5	-	-	-	-	-	-	0	IOA	ALU	R5 -> IO-ADDRESS	5
472	72	E6	CC	60	07	#W	1	B	&	DA	0	3	6	-	-	-	-	-	0	ALU	IOD	IO-DATA & R3 -> R6	3 6
473	00	09	01	20	0F		0	0														RTN IF R3 IN IO-DATA	
474	47	28	07	20	0F		0	#W		T												GOTO W	
475	6F	E0	AC	70	09	#RESETDSK	1	B	OR	DZ	0	-	5	-	-	-	-	-	1	11		11 -> R5	5
476	6F	E0	CC	70	06		1	B	OR	DZ	0	-	6	-	-	-	-	-	1	6		6 -> R6	6
477	46	A8	03	20	0F		0	#PUT		T												PUT(DISK,FAULTRESET)	
478	6F	E0	CC	70	07		1	B	OR	DZ	0	-	6	-	-	-	-	-	1	7		7 -> R6	6
479	46	A8	03	20	0F	ERRESET	0	#PUT		T												PUT(DISK,R6)	
47A	6F	E0	6C	70	80		1	B	OR	DZ	0	-	3	-	-	-	-	-	1	200		200 -> R3	3
47B	47	08	07	20	0F		0	#WAIT		T												WAIT(RDYSRW)	
47C	6F	E0	AC	70	09	#CLRADDR	1	B	OR	DZ	0	-	5	-	-	-	-	-	1	11		11 -> R5	5
47D	6F	E0	CC	70	05		1	B	OR	DZ	0	-	6	-	-	-	-	-	1	5		5 -> R6	6
47E	46	A8	07	20	0F		0	#PUT		T												PUT(STATUS,CLR)	
\$																							

	4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED	REGS	
47F	47	C8	03	20	0F	#INITWRIT	0	#CLRADDR	T												- JSR	CLRADDR		
480	6F	E0	2C	70	03		1	B	OR	DZ	0	-	1	-	-	-	-	1	3		3 -> R1	1		
481	6F	E0	AC	70	08		1	B	OR	DZ	0	-	5	-	-	-	-	1	10		10 -> R5	5		
482	72	6C	CC	60	FF		1	B	&	ZA	0	6	6	-	-	-	-	0	-	-	0 -> R6	6		
483	46	A8	03	20	0F	#IW	0	#PUT	T												- JSR	PUT(DISK,0)		
484	66	62	2C	60	FF		1	B	++	ZA	0	1	1	-	-	-	-	0	-	-	R1 - 1 -> R1	1		
485	48	39	07	20	0F		0	#IW		-Z											- JMP	IF > 0		
486	6F	E0	CC	70	A6		1	B	OR	DZ	0	-	6	-	-	-	-	1	246		A6H -> R6	6		
487	4E	EC	C4	68	00		1	B*	OR	DA	0	6	6	R	10	-	-	0	ALU	ALU	R6+10 OR R6 -> R6	6		
488	46	A8	07	20	0F		0	#PUT	T												- JMP	PUT(DISK,SYNC)		
489	6F	E0	AC	70	01	#READCH	1	B	OR	DZ	0	-	5	-	-	-	-	1	1		1 -> R5	5		
48A	46	48	03	20	0F	#RCH	0	#GET	T												- JSR	GET(KBSTATUS,R6)		
48B	32	EC	0C	70	01		1	-	&	DA	0	6	-	-	-	-	-	1	1		R6 & 1	6		
48C	48	A1	07	20	0F		0	#RCH	Z												- JMP	IF NOT 15 IN R6		
48D	6F	E0	AC	70	02		1	B	OR	DZ	0	-	5	-	-	-	-	1	2		2 -> R5	5		
48E	46	48	03	20	0F		0	#GET	T												- JSR	GET(KBDATA,R6)		
48F	72	EC	C9	70	FF		1	B	&	DA	0	6	6	-	-	-	RTN	-	1	377	R6 & 377 -> R6, RTN	6		
490	72	F4	6C	76	00	#SETTRACK	1	B	&	DA	0	12	3	M	6	-	-	-	1	0		MSK(0,6) & R12 -> R3	3	P
491	76	F4	8C	76	00		1	B	-&	DA	0	12	4	M	6	-	-	-	1	0		MSK(0,6) & R12 -> R4	4	P
492	4F	E8	84	61	00		1	B*	OR	DZ	0	4	4	R	1	-	-	0	ALU	ALU	(R4+1) -> R4	4		
493	49	58	47	20	0F		0	#SETRK	-F												- JMP	IF >= 0		
494	7A	E8	84	77	41		1	B	XOR	DA	0	4	4	R	7	-	-	-	1	101	(101+7) XOR R4 -> R4	4		
495	6C	E6	8C	60	FF	#SETRK	1	B	OR	AB	0	3	4	-	-	-	-	0	-	-	R3 OR R4 -> R4	3	4	
496	6F	E0	6C	70	04		1	B	OR	DZ	0	-	3	-	-	-	-	1	4		4 -> R3	3		
497	47	08	03	20	0F		0	#WAIT	T												- JSR	WAIT(RDYSEEK)		
498	6F	E0	AC	70	0A		1	B	OR	DZ	0	-	5	-	-	-	-	1	12		12 -> R5	5		
499	4F	E8	C4	68	00		1	B*	OR	DZ	0	4	6	R	10	-	-	0	ALU	ALU	(R4+10) -> R6	4	6	
49A	46	A8	03	20	0F		0	#PUT	T												- JSR	PUT(TRACKH,R4 DIV 100H)		
49B	62	4A	AC	60	FF		1	B	+	ZA	1	5	5	-	-	-	-	0	-	-	R5 + 1 -> R5	5		
49C	6E	68	CC	60	FF		1	B	OR	ZA	0	4	6	-	-	-	-	0	-	-	R4 -> R6	4	6	
49D	46	A8	07	20	0F		0	#PUT	T												- JMP	PUT(TRACKL,R4 MOD 100H)		

\$

4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED REGS
. SECTOR(Q): Q=100 <=> PUT; Q=200 <=> GET																					
49E	66	D3	2C	70	2C	#SECTOR	1	B	--	DA	1	11	11	-	-	-	-	1	54	R11 - 54 -> R11	M
49F	4A	71	47	20	0F	0 #SECT1	FZ							-	JMP					GOTO SECT1 IF <= 0	
4A0	26	D2	0C	70	03	1 - --	DA	1	11	-	-	-	-	-	-	-	1	3		R11 - 3	M
4A1	4A	89	07	20	0F	0 #SECT2	-Z							-	JMP					GOTO #SECT2 IF #0	
4A2	67	C1	2C	70	2F	1 B --	DZ	1	-	11	-	-	-	-	-	-	1	57		-47Z -> R11	M
4A3	62	55	4C	60	FF	1 B +	ZA	1	12	12	-	-	-	-	-	0	-	-		R12 + 1 -> R12	P
4A4	49	08	03	20	0F	0 #SETTRACK	T							-	JSR					SETTRACK(R12)	
4A5	6F	E0	6C	70	80	1 B OR	DZ	0	-	3	-	-	-	-	-	-	1	200		200 -> R3	3
4A6	47	08	03	20	0F	0 #WAIT	T							-	JSR					WAIT(RDYSRW)	
4A7	62	F3	2C	70	2F	#SECT1	1	B	+	DA	0	11	11	-	-	-	-	1	57	R11 + 47 -> R11	M
4A8	60	72	CC	60	FF	#SECT2	1	B	+	AQ	0	11	6	-	-	-	-	0	-	R11 + Q -> R6	6 M Q
4A9	6F	E0	AC	70	0C	#SECT48	1	B	OR	DZ	0	-	5	-	-	-	-	1	14	14 -> R5	5
4AA	46	A8	03	20	0F	0 #PUT	T							-	JSR					PUT(SECTOR,R6)	
4AB	6F	E0	6C	70	41	1 B OR	DZ	0	-	3	-	-	-	-	-	-	1	101		101 -> R3	3
4AC	47	08	03	20	0F	0 #WAIT	T							-	JSR					WAIT(XFERCOMPL OR BADSECTOR)	
BAD SECTOR HANDLING:																					
4AD	32	EC	0C	70	01	1 - &	DA	0	6	-	-	-	-	-	-	-	1	1		R6 & 1	6
4AE	47	C1	07	20	0F	0 #CLRADDR	Z							-	JMP					GOTO CLRADDR IF Z	
4AF	6F	E0	AC	70	09	1 B OR	DZ	0	-	5	-	-	-	-	-	-	1	11		11 -> R5	5
4B0	6F	E0	CC	70	04	1 B OR	DZ	0	-	6	-	-	-	-	-	-	1	4		4 -> R6	6
4B1	47	98	03	20	0F	0 ERRESET	T							-	JSR					ERRESET	
4B2	63	60	CC	70	30	1 B +	DQ	0	-	6	-	-	-	-	-	-	1	60		48Z + Q -> R6	6 Q
4B3	4A	98	07	20	0F	0 #SECT48	T							-	JMP					GOTO SECT48	
4B4	62	51	0C	60	FF	#GETWORD	1	B	+	ZA	1	10	10	-	-	-	-	0	-	R10 + 1 -> R10	8
4B5	72	F1	0C	70	7F	1 B &	DA	0	10	10	-	-	-	-	-	-	1	177		R10 & 177 -> R10	8
4B6	49	E1	03	20	0F	0 #SECTOR	Z							-	JSR					SECTOR(GET) IF =0	
4B7	6F	E0	AC	70	08	1 B OR	DZ	0	-	5	-	-	-	-	-	-	1	10		10 -> R5	5
4B8	46	48	03	20	0F	0 #GET	T							-	JSR					GET(DISK,R6)	
4B9	6E	6C	E9	60	FF	1 B OR	ZA	0	6	7	-	-	-	-	-	-	0	-	-	R6 -> R7, RTN	6 7
4BA	72	71	0C	60	FF	DUMP	1	B	&	ZA	0	10	10	-	-	-	-	0	-	0 -> R10	8
4BB	6F	E1	2C	70	2F	1 B OR	DZ	0	-	11	-	-	-	-	-	-	1	57		57 -> R11	M
4BC	6F	E1	4C	70	03	1 B OR	DZ	0	-	12	-	-	-	-	-	-	1	3		3 -> R12	P
4BD	6F	E0	4C	70	00	1 B OR	DZ	0	-	2	-	-	-	-	-	-	1	0		0 -> R2	2
4BE	0F	E0	0C	70	40	1 Q OR	DZ	0	-	-	-	-	-	-	-	-	1	100		100 -> Q	Q
4BF	6F	E0	0C	70	00	1 B OR	DZ	0	-	0	-	-	-	-	-	-	1	0		0 -> R0	0
4C0	2E	60	0C	60	D0	DUMPWORD	1	-	OR	ZA	0	0	-	-	-	-	0	BNK	ALU	R0 -> BNK	0
4C1	2E	64	0C	60	30	1 -	OR	ZA	0	2	-	-	-	-	-	-	0	MAR	ALU	R2 -> MAR	2
4C2	2E	70	0C	60	FF	#PUTWORD	1	-	OR	ZA	0	10	-	-	-	-	0	-	-	R10	8
4C3	47	F1	03	20	0F	0 #INITWRIT	Z							-	JSR					INITWRIT IF =0	
4C4	6F	E0	AC	70	08	1 B OR	DZ	0	-	5	-	-	-	-	-	-	1	10		10 -> R5	5
4C5	6F	E0	CC	60	01	1 B OR	DZ	0	-	6	-	-	-	-	-	-	0	ALU	MD	MD -> R6	6
4C6	46	A8	03	20	0F	0 #PUT	T							-	JSR					PUT(DISK,R6)	
4C7	62	51	0C	60	FF	1 B +	ZA	1	10	10	-	-	-	-	-	-	0	-	-	R10 + 1 -> R10	8
4C8	72	F1	0C	70	7F	1 B &	DA	0	10	10	-	-	-	-	-	-	1	177		R10 & 177 -> R10	8
4C9	49	E1	03	20	0F	0 #SECTOR	Z							-	JSR					SECTOR(PUT) IF =0	
4CA	62	44	4C	60	FF	1 B +	ZA	1	2	2	-	-	-	-	-	-	0	-	-	R2 + 1 -> R2	2
4CB	4C	0A	07	20	0F	0 DUMPWORD	-C							-	JMP					IF R2 <= FFFF	
4CC	62	40	0C	60	FF	1 B +	ZA	1	0	0	-	-	-	-	-	-	0	-	-	R0 + 1 -> R0	0



4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED	REGS
. BOOTSTRAP SEQUENCE:																						
4D0	42	F8	03	20	0F	START	0	#SAVEREGS	T													
4D1	6F	E0	0C	70	05		1	B	OR	DZ	0	-	0	-	-	-	-	-	1	5		
4D2	2E	74	0C	60	10		1	-	OR	ZA	0	P	-	-	-	-	-	0	MD	ALU	P	-> MD
4D3	2E	60	0C	60	30		1	-	OR	ZA	0	0	-	-	-	-	-	0	MAR	ALU	R0	-> MAR
. CLEAR KEYBOARD DATA REGISTER:																						
4D4	6F	E0	AC	70	02		1	B	OR	DZ	0	-	5	-	-	-	-	-	1	2		
4D5	46	48	03	20	0F		0	#GET	T													
4D6	47	58	03	20	0F		0	#RESETDSK	T													
4D7	48	98	03	20	0F		0	#READCH	T													
4D8	2A	CC	0C	70	04		1	-	-	DA	1	6	-	-	-	-	-	-	1	4		
4D9	4D	D9	07	20	0F		0	NODUMP	-Z													
4DA	4B	A8	03	20	0F		0	DUMP	T													
4DB	47	58	03	20	0F		0	#RESETDSK	T													
4DC	48	98	03	20	0F		0	#READCH	T													
4DD	52	7F	EC	40	0F	NODUMP	1	B*	&	ZA	0	T	T	-	-	-	-	S	0	PSH	-	T -> STK, 0 -> T
4DE	26	6C	0C	60	FF		1	-	-+	ZA	0	6	-	-	-	-	-	0	-	-		
4DF	4E	29	07	20	0F		0	BOOT1	-Z													
4E0	6F	E1	EC	70	1A		1	B	OR	DZ	0	-	T	-	-	-	-	-	1	32		
4E1	4E	A8	07	20	0F		0	BOOT	T													
4E2	26	CC	0C	70	06	BOOT1	1	-	-+	DA	1	6	-	-	-	-	-	-	1	6		
4E3	4E	69	07	20	0F		0	BOOT2	-Z													
4E4	6F	E1	E4	72	01		1	B	OR	DZ	0	-	T	R	2	-	-	-	1	1		
4E5	4E	A8	07	20	0F		0	BOOT	T													
4E6	26	CC	0C	70	13	BOOT2	1	-	-+	DA	1	6	-	-	-	-	-	-	1	23		
4E7	4E	A9	07	20	0F		0	BOOT	-Z													
4E8	6F	E1	E4	72	01		1	B	OR	DZ	0	-	T	R	2	-	-	-	1	1		
4E9	62	FF	EC	70	1A		1	B	+	DA	0	T	T	-	-	-	-	-	1	32		
4EA	6F	E1	0C	70	7F	BOOT	1	B	OR	DZ	0	-	10	-	-	-	-	-	1	177		
4EB	6F	E1	2C	70	2F		1	B	OR	DZ	0	-	11	-	-	-	-	-	1	57		
4EC	66	7F	4C	60	FF		1	B	-+	ZA	0	T	12	-	-	-	-	0	-	-		
4ED	6F	E1	EC	40	FF		1	B	OR	DZ	0	-	T	-	-	-	-	S	0	POP	-	STK -> T
4EE	0F	E0	0C	70	80		1	Q	OR	DZ	0	-	-	-	-	-	-	-	1	200		
4EF	4B	48	03	20	0F	BLOCK	0	#GETWORD	T													
4F0	66	6E	0C	60	FF		1	B	-+	ZA	0	7	0	-	-	-	-	0	-	-		
4F1	00	10	47	20	0F		0	#RESTART	F													
4F2	4B	48	03	20	0F		0	#GETWORD	T													
4F3	6E	6E	2C	60	FF		1	B	OR	ZA	0	7	1	-	-	-	-	0	-	-		
4F4	4B	48	03	20	0F	DATA	0	#GETWORD	T													
4F5	2E	6E	0C	60	10		1	-	OR	ZA	0	7	-	-	-	-	-	0	MD	ALU	R7	-> MD
4F6	42	42	2C	60	30		1	B*	+	ZA	1	1	1	-	-	-	-	0	MAR	ALU	R1	-> MAR, R1+1 -> R1
4F7	66	60	0C	60	FF		1	B	-+	ZA	0	0	0	-	-	-	-	0	-	-		
4F8	4F	49	07	20	0F		0	DATA	-Z													
4F9	4E	F8	07	20	0F		0	BLOCK	T													

\$



4 3 2 1 0 LABEL K DST FCT RS C A B SHFT SP PC S E BD BS COMMENT USED REGS

```
* MODULE DISPLAYHANDLER;
* EXPORT BBLT,REPL,DCH,DDT;
*
* (* PARAMETERS FOR THE BITHANDLING MACROINSTRUCTIONS ON THE EXPRESSION STACK:
*
```

```
* BBLT:          I          I
* =====      +-----+
*                I SRCBMD I ↑      REPL:      I          I
*                +-----+ I      =====      +-----+ ↑
*                I DESTBLD I I      I DESTBLD I I
*                +-----+ I      +-----+ I
*                I SRCBLD I I      I SOURCE I I
*                +-----+ I      +-----+ I
*                I DESTBMD I I      I BMD I I
*                +-----+
*                I MODE I          I MODE I
*                +-----+
```

```
* DCH:           I          I          DDT:      I          I
* =====      +-----+      =====      +-----+
*                I CH I ↑          I Y I
*                +-----+ I      +-----+
*                I DESTBLD I I      I X I
*                +-----+ I      +-----+
*                I FONTADDR I I      I BMD I
*                +-----+ I      +-----+
*                I BMD I          I MODE I
*                +-----+
```

\*)

```
* TYPE
* BMDESCR = RECORD
*   ADDR,
*   WIDTH,HEIGHT : CARDINAL;
*   WORD4 : PACKED RECORD
*   INVERT : BOOLEAN;
*   WPRIM : [0..63];
*   HPRIM : [0..511];
* END;
*
* BLOCKDESCR = RECORD
*   X,Y,
*   WIDTH,HEIGHT : CARDINAL;
* END;
*
* PATTERN = RECORD
*   COUNT : CARDINAL;
*   DOTS : ARRAY [1..COUNT] OF BITSET;
* END;
*
* FONT = RECORD
*   HEIGHT : CARDINAL;
*   CHAR : ARRAY [0..255] OF POINTER TO CHARACTER; (* SELF RELATIV *)
*   PSEUDOCHAR : ARRAY [256..MAXCHAR] OF POINTER TO CHARACTER;
* END;
*
* CHARACTER = RECORD
```

```
4 3 2 1 0 LABEL    K DST FCT RS C  A  B  SHFT SP PC S E BD  BS  COMMENT          USED REGS
*   DOTS          : ARRAY [1..HEIGHT] OF BITSET;
*   CASE EXTENDED OF
*     FALSE : WIDTH      : CARDINAL;
*     TRUE  : PSEUDOCHR  : INTEGER; (* -INDEX TO THE ARRAY PSEUDOCHAR *)
*   END;
*   SKIP,HEIGHT  : 0..255;
*   END;
*
* VAR
*   SRCBMD,DESTBMD,
*   BMD          : BMDESCR;
*   DESTBLD, SRCBLD : BLOCKDESCR;
*   SOURCE       : PATTERN;
*   FONTADDR     : POINTER TO FONT;
*
*
*
*
```

4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED	REGS			
* PROCEDURE DDT; (* NW 7.80																									
* ===== *)																									
*																									
4FA	6F	E0	0C	40	FF	DDT	1	B	OR	DZ	0	-	0	-	-	-	S	0	POP	-	STK -> R0	!X"	0		
4FB	6F	E0	2C	40	30		1	B	OR	DZ	0	-	1	-	-	-	S	0	MAR	ALU	STK -> R1 -> MAR	!BMD"	1		
4FC	6F	E0	6C	60	01		1	B	OR	DZ	0	-	3	-	-	-	-	0	ALU	MD	MD -> R3		3		
4FD	72	E6	8C	70	03		1	B	&	DA	0	3	4	-	-	-	-	1	3		3 & R3 -> R4	!BANK"	3 4		
4FE	76	E6	6C	70	03		1	B	-&	DA	0	3	3	-	-	-	-	1	3		3 & R3 -> R3	!BMA"	3		
4FF	62	42	2C	60	30		1	B	+	ZA	1	1	1	-	-	-	-	0	MAR	ALU	R1+1 -> R1 -> MAR		1		
500	0F	E0	0C	60	01		1	Q	OR	DZ	0	-	-	-	-	-	-	0	ALU	MD	MD -> Q	!W"	Q		
501	6D	60	4C	60	FF		1	B	OR	ZQ	0	-	2	-	-	-	-	0	-	-	Q -> R2		2 Q		
502	4F	E4	44	6C	00		1	B*	OR	DZ	0	2	2	R	14	-	-	0	ALU	ALU	(R2+14) -> R2		2		
503	28	C0	4C	60	FF		1	-	-	AB	1	0	2	-	-	-	-	0	-	-	R0 - R2		0 2		
504	3E	02	07	20	0F		0	TRAP(4)		C											TRAP(4) IF 16*W<=R0				
505	22	42	0C	60	30		1	-	+	ZA	1	1	-	-	-	-	-	0	MAR	ALU	R1 + 1 -> MAR		1		
506	63	C0	2C	60	01		1	B	+	DZ	1	-	1	-	-	-	-	0	ALU	MD	MD+1 -> R1	!H+1"	1		
507	68	C3	EC	60	FF		1	B	-	AB	1	1	T	-	-	-	-	0	-	-	R1 - T -> T	!H+1-Y"	1 T		
508	22	5E	0C	60	FF		1	-	+	ZA	1	T	-	-	-	-	-	0	-	-	T + 1		T		
509	3E	01	47	20	0F		0	TRAP(4)		FZ											TRAP(4) IF H<=Y				
50A	3C	98	03	20	0F		0	#MUL16		T											Q * T -> [R2,Q] !..*W"				
50B	60	66	6C	60	FF		1	B	+	AQ	0	3	3	-	-	-	-	0	-	-	Q + R3 -> R3	!..+BMA"	3 Q		
50C	4F	E0	24	64	00		1	B*	OR	DZ	0	0	1	R	4	-	-	0	ALU	ALU	R0+4 -> R1	!X DIV 16"	0 1		
50D	76	E2	2C	74	00		1	B	-&	DA	0	1	1	M	4	-	-	1	0		MSK(0,4) & R1 -> R1		1		
50E	2E	68	0C	60	D0		1	-	OR	ZA	0	4	-	-	-	-	-	0	BNK	ALU	R4 -> BNK		4		
50F	60	E2	6C	60	30		1	B	+	AB	0	1	3	-	-	-	-	0	MAR	ALU	R1+R3 -> R3 -> MAR		1 3		
510	22	40	0C	60	40		1	-	+	ZA	1	0	-	-	-	-	-	0	SR	ALU	R0+1->SCR	!(X+1)MOD16"	0		
511	6F	E0	4C	60	01		1	B	OR	DZ	0	-	2	-	-	-	-	0	ALU	MD	MD -> R2		2		
512	6F	E0	34	70	01		1	B	OR	DZ	0	-	1	RR	-	-	-	1	1		1+SR -> R1		1		
513	6F	E0	0C	40	FF		1	B	OR	DZ	0	-	0	-	-	-	-	S	0	POP	-	STK -> R0	!M"	0	
514	26	C0	0C	70	02		1	-	--	DA	1	0	-	-	-	-	-	1	2		R0 - 2		0		
515	51	91	07	20	0F		0	#INV		Z											IF R0=2				
516	51	B0	27	20	0F		0	#SET		S											IF R0<2				
517	34	E2	4C	60	10	#CLR	1	-	-&	AB	0	1	2	-	-	-	-	0	MD	ALU	TR1 & R2 -> MD		1 2		
518	51	C8	07	20	0F		0	#DD		T											- JMP				
519	38	E2	4C	60	10	#INV	1	-	XOR	AB	0	1	2	-	-	-	-	0	MD	ALU	R1 XOR R2 -> MD		1 2		
51A	51	C8	07	20	0F		0	#DD		T											- JMP				
51B	2C	E2	4C	60	10	#SET	1	-	OR	AB	0	1	2	-	-	-	-	0	MD	ALU	R1 OR R2 -> MD		1 2		
51C	2E	68	0C	60	D0	#DD	1	-	OR	ZA	0	4	-	-	-	-	-	0	BNK	ALU	R4 -> BNK		4		
51D	4F	E7	EC	40	30		1	B*	OR	DZ	0	3	T	-	-	-	-	S	0	MAR	ALU	R3 -> MAR, STK -> T		3 T	
51E	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q
\$																									

4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED REGS		
* PROCEDURE DCH; (* WW 27.3.79 *) * ===== * POP(CH); T : CH * POP(DESTBLD); L : DESTBLD * POP(FONTADDR); 3 : FONTADDR * POP(BMD); 4 : BMD * DX := DESTBLD.X; 8 : DX * PUSH(M); * DY := DESTBLD.Y; M : DY																							
51F	0F	E0	0C	40	30	DCH	1	Q	OR	DZ	0	-	-	-	-	S	0	MAR	ALU	STK -> Q -> MAR	Q		
520	6F	E0	6C	40	FF		1	B	OR	DZ	0	-	3	-	-	S	0	POP	-	STK -> R3	3		
521	6F	E0	8C	40	FF		1	B	OR	DZ	0	-	4	-	-	S	0	POP	-	STK -> R4	4		
522	6F	E1	0C	60	01		1	B	OR	DZ	0	-	10	-	-	-	0	ALU	MD	MD -> R10	8		
523	21	40	0C	60	30		1	-	+	ZQ	1	-	-	-	-	-	0	MAR	ALU	Q+1 -> MAR	Q		
524	4F	F3	2C	40	01		1	B*	OR	DZ	0	M	11	-	-	-	S	0	ALU	MD	M -> STK, MD -> R11	M	
* BMA := BMD.ADDR; 5 : BMA * PUSH(H); * BMWIDTH := BMD.WIDTH; 6 : BMWIDTH * PUSH(S); * BMHEIGHT := BMD.HEIGHT + 1 0 : BMHEIGHT																							
525	2E	68	0C	60	30		1	-	OR	ZA	0	4	-	-	-	-	0	MAR	ALU	R4 -> MAR	4		
526	4F	F4	AC	40	01		1	B*	OR	DZ	0	P	5	-	-	-	S	0	ALU	MD	P -> STK, MD -> R5	5 P	
527	62	48	8C	60	30		1	B	+	ZA	1	4	4	-	-	-	-	0	MAR	ALU	R4+1 -> R4 -> MAR	4	
528	4F	F6	CC	40	01		1	B*	OR	DZ	0	H	6	-	-	-	S	0	ALU	MD	H -> STK, MD -> R6	6 H	
529	22	48	0C	60	30		1	-	+	ZA	1	4	-	-	-	-	0	MAR	ALU	R4+1 -> MAR	4		
52A	43	D8	0C	40	01		1	B*	+	DZ	1	S	0	-	-	-	S	0	ALU	MD	S -> STK, MD+1 -> R0	0 S	
* BLOCKWIDTH := 0; S : BLOCKWIDTH * PUSH(G); * PUSH(L); * DWORD := BMHEIGHT - DY; M : DWORD * CH := CH MOD 377; M : CH * DWORD := BMWIDTH * DWORD; Q : DWORD																							
52B	52	7B	8C	40	0F		1	B*	&	ZA	0	G	S	-	-	-	S	0	PSH	-	G -> STK, 0 -> S	S G	
52C	4D	7D	CC	40	0F		1	B*	OR	ZQ	0	L	L	-	-	-	S	0	PSH	-	L -> STK, Q -> L	L Q	
52D	68	C1	2C	60	FF		1	B	-	AB	1	0	11	-	-	-	-	0	-	-	R0 - R11 -> R11	0 M	
52E	22	52	0C	40	0F		1	-	+	ZA	1	11	-	-	-	-	S	0	PSH	-	R11 + 1 -> STK	M	
52F	0E	72	0C	60	FF		1	Q	OR	ZA	0	11	-	-	-	-	-	0	-	-	R11 -> Q	M Q	
530	72	FF	2C	70	FF		1	B	&	DA	0	T	11	-	-	-	-	1	377	-	T & 377 -> R11	M T	
531	6E	6D	EC	60	FF		1	B	OR	ZA	0	6	T	-	-	-	-	0	-	-	R6 -> T	6 T	
532	3C	98	03	20	0F		0	#MUL16		T											Q * T -> Q (-2-)		
* DWORD := DWORD + BMA + (DX DIV 16); 1 : DWORD * BITADDR := DX MOD 16; 0 : BITADDR * FBANK := FONTADDR MOD 4; H : FBANK * BANK := BMA MOD 4; 2 : BANK																							
533	4F	F0	24	64	00		1	B*	OR	DZ	0	10	1	R	4	-	-	0	ALU	ALU	R10+4 -> R1	1 8	
534	76	E2	2C	74	00		1	B	-&	DA	0	1	1	M	4	-	-	-	1	0	-	-MSK(0,4) & R1 -> R1	1
535	60	62	2C	60	FF		1	B	+	AQ	0	1	1	-	-	-	-	0	-	-	R1 + Q -> R1	1 Q	
536	72	EA	4C	70	03		1	B	&	DA	0	5	2	-	-	-	-	-	1	3	-	3 & R5 -> R2	2 5
537	76	EA	AC	70	03		1	B	-&	DA	0	5	5	-	-	-	-	-	1	3	-	~3 & R5 -> R5	5
538	4F	E6	64	6E	00		1	B*	OR	DZ	0	3	3	R	16	-	-	-	0	ALU	ALU	(R3+16) -> R3	3
539	72	E7	6C	70	03		1	B	&	DA	0	3	H	-	-	-	-	-	1	3	-	3 & R3 -> H	3 H
53A	76	E6	6C	70	03		1	B	-&	DA	0	3	3	-	-	-	-	-	1	3	-	~3 & R3 -> R3	3
53B	60	EA	2C	60	FF		1	B	+	AB	0	5	1	-	-	-	-	-	0	-	-	R1 + R5 -> R1	1 5

	4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED	REGS	
53C	72	F0	0C	70	0F		1	B	&	DA	0	10	0	-	-	-	-	1	17		R10 & 17 -> R0	0	8	
53D	6E	71	EC	60	FF		1	B	OR	ZA	0	10	T	-	-	-	-	0	-	-	R10 -> T	8	T	
						*															CONVERT(CH);			
						*															POP(L);			
						*															POP(G);			
						*															DESTBLD.X := DESTBLD.X + BLOCKWIDTH;			
						*															DESTBLD.W := DESTBLD.W + BLOCKWIDTH;			
						*															POP(S);			
						*															POP(F);			
						*															POP(H);			
						*															POP(P);			
						*															POP(M);			
						*															POP(T);			
						*															END DCH;			
53E	55	48	03	20	0F		0	#	CONVERT				T	-						JSR	CONVERT(R11)			
53F	6E	7C	4C	60	30		1	B	OR	ZA	0	L	2	-	-	-	-	0		MAR	ALU	L -> MAR -> R2	2	L
540	62	F8	0C	60	01		1	B	+	DA	0	S	0	-	-	-	-	0		ALU	MD	MD + S -> R0	0	S
541	2E	60	0C	60	10		1	-	OR	ZA	0	0	-	-	-	-	-	0		MD	ALU	R0 -> MD	0	
542	42	44	4C	60	30		1	B*	+	ZA	1	2	2	-	-	-	-	0		MAR	ALU	R2 -> MAR, R2 + 1 -> R2	2	
543	22	44	0C	60	30		1	-	+	ZA	1	2	-	-	-	-	-	0		MAR	ALU	R2 + 1 => MAR	2	
544	6A	D8	0C	60	01		1	B	-	DA	1	S	0	-	-	-	-	0		ALU	MD	MD - S -> R0	0	S
545	2E	60	0C	60	10		1	-	OR	ZA	0	0	-	-	-	-	-	0		MD	ALU	R0 -> MD	0	
546	22	44	0C	60	30		1	-	+	ZA	1	2	-	-	-	-	-	0		MAR	ALU	R2 + 1 -> MAR	2	
547	54	C8	03	20	0F		0	EXITDCH		T				-						JSR	RESTORE REGS			
548	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q	
549	00	08	00	20	0F	TRAPDCH	0	0			T			-						POP	FIX 2911 STACK			
54A	54	C8	03	20	0F		0	EXITDCH		T				-						JSR	RESTORE REGS			
54B	3E	08	07	20	0F		0	TRAP(4)		T				-						JMP	TRAP(4)			
54C	6F	E0	0C	40	FF	EXITDCH	1	B	OR	DZ	0	-	0	-	-	-	-	S	0	POP	-	STK -> DUMMY	0	
54D	6F	E1	CC	40	FF		1	B	OR	DZ	0	-	L	-	-	-	-	S	0	POP	-	STK -> L	L	
54E	6F	E1	AC	40	FF		1	B	OR	DZ	0	-	G	-	-	-	-	S	0	POP	-	STK -> G	G	
54F	6F	E1	8C	40	FF		1	B	OR	DZ	0	-	S	-	-	-	-	S	0	POP	-	STK -> S	S	
550	6F	E1	6C	40	FF		1	B	OR	DZ	0	-	H	-	-	-	-	S	0	POP	-	STK -> H	H	
551	6F	E1	4C	40	FF		1	B	OR	DZ	0	-	P	-	-	-	-	S	0	POP	-	STK -> P	P	
552	6F	E1	2C	40	FF		1	B	OR	DZ	0	-	M	-	-	-	-	S	0	POP	-	STK -> M	M	
553	6F	E1	E9	40	FF		1	B	OR	DZ	0	-	T	-	-	-	-	RTN	S	0	POP	-	STK -> T	T

\$

4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED	REGS		
* PROCEDURE CONVERT (CH:CHARACTER);																								
* -----																								
* CHAR := FONTADDR + CH; 9 : CHAR																								
* CHARPTR := CHAR + M[CHAR]; 9 : CHARPTR																								
* PSEUDOCHAR := 0; G : PSEUDOCHAR																								
* WIDTH := CHARPTR↑.WIDTH; 7 : WIDTH																								
554	2E	76	0C	60	D0	#CONVERT	1	-	OR	ZA	0	H	-	-	-	-	-	0	BNK	ALU	H ->	BNK	H	
555	60	E7	2C	60	30		1	B	+	AB	0	3	11	-	-	-	-	0	MAR	ALU	R3 + R11 ->	R11 ->	MAR	3 M
556	62	F3	2C	60	01		1	B	+	DA	0	11	11	-	-	-	-	0	ALU	MD	MD + R11 ->	R11	M	
557	2E	76	0C	60	D0		1	-	OR	ZA	0	H	-	-	-	-	-	0	BNK	ALU	H ->	BNK	H	
558	52	73	AC	60	30		1	B*	&	ZA	0	11	15	-	-	-	-	0	MAR	ALU	R11 ->	MAR, 0 ->	G	M G
559	6F	E0	EC	60	01		1	B	OR	DZ	0	-	7	-	-	-	-	0	ALU	MD	MD ->	R7	7	
* IF WIDTH < 0 THEN (* CHARACTER WIDER THAN 16 BITS *)																								
* PSEUDOCHAR := COMPL(WIDTH);																								
* WIDTH := 16;																								
* END;																								
55A	55	D8	47	20	0F		0	#CNV1		-F										JMP	GOTO #CNV1 IF >=0			
55B	6A	6F	AC	60	FF		1	B	-	ZA	0	7	G	-	-	-	-	0	-	-	T	R7 ->	G	7 G
55C	6F	E0	EC	70	10		1	B	OR	DZ	0	-	7	-	-	-	-	1	20		16 ->	R7	7	
* BLOCKWIDTH := BLOCKWIDTH + WIDTH; S : BLOCKWIDTH																								
* HEIGHT := CHARPTR↑.HEIGHT; Q : HEIGHT																								
* NEXTBITADDR := BITADDR + WIDTH; 7 : NEXTBITADDR																								
55D	60	EF	EC	60	FF	#CNV1	1	B	+	AB	0	7	T	-	-	-	-	0	-	-	R7 + T ->	T	7 T	
55E	54	92	07	20	0F		0	TRAPDCH		C											JMP	TRAP IF OVERFLOW		
55F	4F	EC	A4	6C	00		1	B*	OR	DZ	0	6	5	R	14	-	-	0	ALU	ALU	(R6+14) ->	R5	5 6	
560	28	CB	EC	60	FF		1	-	-	AB	1	5	T	-	-	-	-	0	-	-	R5 - T		5 T	
561	54	9A	07	20	0F		0	TRAPDCH		-C											JMP	TRAP IF 16*BMW < T		
562	60	EF	8C	60	FF		1	B	+	AB	0	7	S	-	-	-	-	0	-	-	R7 + S ->	S	7 S	
563	2E	76	0C	60	D0		1	-	OR	ZA	0	H	-	-	-	-	-	0	BNK	ALU	H ->	BNK	H	
564	22	52	0C	60	30		1	-	+	ZA	1	11	-	-	-	-	-	0	MAR	ALU	R11+1 ->	MAR	M	
565	40	E0	EC	60	40		1	B*	+	AB	0	0	7	-	-	-	-	0	SR	ALU	R0 ->	SR, R0+R7 ->	R7	0 7
566	6F	E1	0C	60	01		1	B	OR	DZ	0	-	10	-	-	-	-	0	ALU	MD	MD ->	R10	8	
567	12	F0	0C	70	FF		1	Q	&	DA	0	10	-	-	-	-	-	1	377		R10 & 377 ->	Q	8 Q	
* IF HEIGHT = 0																								
* THEN																								
* IF NEXTBITADDR >= 16 THEN																								
* NEXTBITADDR := NEXTBITADDR - 16;																								
* INC(DWORD);																								
* END;																								
568	56	C9	07	20	0F		0	#CNV10		-Z											JMP	GOTO #CNV10 IF #0		
569	26	CE	0C	70	10		1	-	-+	DA	1	7	-	-	-	-	-	1	20		R7 - 16		7	
56A	5A	00	27	20	0F		0	#CNV6		S											JMP	GOTO CNV6 IF <0		
56B	59	E8	07	20	0F		0	#CNV50		T											JMP	GOTO CNV50		
* ELSE																								
* CURRENTWORDADDR := DWORD; 4 : CURRENTWORDADDR																								
* SKIP := CHARPTR↑.SKIP; 8 : SKIP																								
56C	6E	62	8C	60	FF	#CNV10	1	B	OR	ZA	0	1	4	-	-	-	-	0	-	-	R1 ->	R4	1 4	
56D	4F	F1	04	68	00		1	B*	OR	DZ	0	10	10	R	10	-	-	0	ALU	ALU	R10+10 ->	R10	8	
* WHILE SKIP > 0 DO																								

	4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED REGS	
						*																	
						*																	
						*																	
						*																	
56E	72	F1	0C	70	FF		1	B	&	DA	0	10	10	-	-	-	-	1	377		R10 & 377 -> R10	8	
56F	6F	E0	AC	40	FF		1	B	OR	DZ	0	-	5	-	-	-	S	0	POP	-	STK -> R5	5	
570	2E	6A	0C	40	0F		1	-	OR	ZA	0	5	-	-	-	-	S	0	PSH	-	R5 -> STK	5	
571	64	D0	AC	60	FF		1	B	-+	AB	1	10	5	-	-	-	-	0	-	-	R5 - R10 -> R5	5 8	
572	54	9A	07	20	0F		0	TRAPDCH		-C											TRAP IF R5<R10		
573	28	4A	0C	60	FF		1	-	-	AQ	1	5	-	-	-	-	-	0	-	-	R5 - Q	5 Q	
574	54	9A	07	20	0F		0	TRAPDCH		-C											TRAP IF R5<Q		
575	2E	70	0C	60	FF		1	-	OR	ZA	0	10	-	-	-	-	-	0	-	-	R10	8	
576	57	A1	07	20	0F		0	#CNV3		Z											GOTO #CNV3 IF =0		
577	64	CC	8C	60	FF	#CNV2	1	B	-+	AB	1	6	4	-	-	-	-	0	-	-	R4 - R6 -> R4	4 6	
578	66	71	0C	60	FF		1	B	-+	ZA	0	10	10	-	-	-	-	0	-	-	R10-1 -> R10	8	
579	57	79	07	20	0F		0	#CNV2		-Z											GOTO #CNV2 IF #0		
						*															8 : HEIGHT		
						*																	
						*																	
						*																	
						*																	
57A	6D	61	0C	60	FF	#CNV3	1	B	OR	ZQ	0	-	10	-	-	-	-	0	-	-	Q -> R10	8 Q	
57B	60	EC	8C	60	FF		1	B	+	AB	0	6	4	-	-	-	-	0	-	-	R4 + R6 -> R4	4 6	
57C	26	CE	0C	70	10		1	-	-+	DA	1	7	-	-	-	-	-	1	20		R7 - 16	7	
57D	58	A8	27	20	0F		0	#CNV5		-S											GOTO #CNV5 IF >=0		
						*																	
						*																	
						*																	
						*																	
						*																	
57E	2E	76	0C	60	D0	#CNV4	1	-	OR	ZA	0	H	-	-	-	-	-	0	BNK	ALU	H -> BNK	H	
57F	66	73	2C	60	30		1	B	-+	ZA	0	11	11	-	-	-	-	0	MAR	ALU	R11-1 -> R11 -> MAR	M	
580	6F	E0	B4	60	01		1	B	OR	DZ	0	-	5	RR	-	-	-	0	ALU	MD	MD+SR -> R5	5	
581	2E	64	0C	60	D0		1	-	OR	ZA	0	2	-	-	-	-	-	0	BNK	ALU	R2 -> BNK	2	
582	64	CC	8C	60	30		1	B	-+	AB	1	6	4	-	-	-	-	0	MAR	ALU	R4 - R6 -> R4 -> MAR	4 6	
583	6E	EA	AC	60	01		1	B	OR	DA	0	5	5	-	-	-	-	0	ALU	MD	MD OR R5 -> R5	5	
584	2E	6A	0C	60	10		1	-	OR	ZA	0	5	-	-	-	-	-	0	MD	ALU	R5 -> MD	5	
585	2E	64	0C	60	D0		1	-	OR	ZA	0	2	-	-	-	-	-	0	BNK	ALU	R2 -> BNK	2	
586	2E	68	0C	60	30		1	-	OR	ZA	0	4	-	-	-	-	-	0	MAR	ALU	R4 -> MAR	4	
587	66	71	0C	60	FF		1	B	-+	ZA	0	10	10	-	-	-	-	0	-	-	R10-1 -> R10	8	
588	57	E9	07	20	0F		0	#CNV4		-Z											GOTO #CNV4 IF #0		
589	5A	08	07	20	0F		0	#CNV6		T											GOTO #CNV6		
						*																	
						*																	
						*																	
						*																	
58A	2E	76	0C	60	D0	#CNV5	1	-	OR	ZA	0	H	-	-	-	-	-	0	BNK	ALU	H -> BNK	H	
58B	66	73	2C	60	30		1	B	-+	ZA	0	11	11	-	-	-	-	0	MAR	ALU	R11-1 -> R11 -> MAR	M	
58C	6F	E0	B4	60	01		1	B	OR	DZ	0	-	5	RR	-	-	-	0	ALU	MD	MD+SR -> R5	5	
58D	7F	E1	5C	70	00		1	B	-XR	DZ	0	-	12	MR	-	-	-	1	0		-MSK(0,SR) -> R12	P	

	4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED	REGS	
58E	70	EB	4C	60	FF		1	B	&	AB	0	5	12	-	-	-	-	0	-	-	R5 & R12 -> R12	5	P	
58F	2E	64	0C	60	D0		1	-	OR	ZA	0	2	-	-	-	-	-	0	BNK	ALU	R2 -> BNK	2		
590	64	CC	8C	60	30		1	B	++	AB	1	6	4	-	-	-	-	0	MAR	ALU	R4 - R6 -> R4 -> MAR	4	6	
591	6E	F5	4C	60	01		1	B	OR	DA	0	12	12	-	-	-	-	0	ALU	MD	MD OR R12 -> R12	P		
592	2E	74	0C	60	10		1	-	OR	ZA	0	12	-	-	-	-	-	0	MD	ALU	R12 -> MD	P		
593	2E	64	0C	60	D0		1	-	OR	ZA	0	2	-	-	-	-	-	0	BNK	ALU	R2 -> BNK	2		
594	2E	68	0C	60	30		1	-	OR	ZA	0	4	-	-	-	-	-	0	MAR	ALU	R4 -> MAR	4		
* R5 := ROT(CHARPTR+.DOTS[I],BITADDR); 5 : R5 * C.W.A. := C.W.A. - BMWIDTH; * M[C.W.A.] := M[C.W.A.] OR (R5 MOD 2**BITADDR); * END;																								
595	72	EA	BC	70	00		1	B	&	DA	0	5	5	MR	-	-	-	-	1	0	MSK(0,SR) & R5 -> R5	5		
596	2E	64	0C	60	D0		1	-	OR	ZA	0	2	-	-	-	-	-	0	BNK	ALU	R2 -> BNK	2		
597	22	48	0C	60	30		1	-	+	ZA	1	4	-	-	-	-	-	0	MAR	ALU	R4 + 1 -> MAR	4		
598	6E	EA	AC	60	01		1	B	OR	DA	0	5	5	-	-	-	-	0	ALU	MD	MD OR R5 -> R5	5		
599	2E	6A	0C	60	10		1	-	OR	ZA	0	5	-	-	-	-	-	0	MD	ALU	R5 -> MD	5		
59A	2E	64	0C	60	D0		1	-	OR	ZA	0	2	-	-	-	-	-	0	BNK	ALU	R2 -> BNK	2		
59B	22	48	0C	60	30		1	-	+	ZA	1	4	-	-	-	-	-	0	MAR	ALU	R4 + 1 -> MAR	4		
59C	66	71	0C	60	FF		1	B	++	ZA	0	10	10	-	-	-	-	0	-	-	R10 - 1 -> R10	8		
59D	58	A9	07	20	0F		0	#CNV5				-Z									JMP	GOTO #CNV5 IF #0		
* NEXTBITADDR := N.B.A. - 16; * INC(DWORD); * END;																								
59E	66	CE	EC	70	10	#CNV50	1	B	++	DA	1	7	7	-	-	-	-	-	1	20	R7 - 16 -> R7	7		
59F	62	42	2C	60	FF		1	B	+	ZA	1	1	1	-	-	-	-	0	-	-	R1 + 1 -> R1	1		
* BITADDR := NEXTBITADDR; 0 : BITADDR * END; * CH := PSEUDOCHAR; * IF CH # 0 THEN CONVERT(CH); END; * END CONVERT;																								
5A0	6E	6E	0C	60	FF	#CNV6	1	B	OR	ZA	0	7	0	-	-	-	-	0	-	-	R7 -> R0	0	7	
5A1	6E	7B	2C	60	FF		1	B	OR	ZA	0	G	11	-	-	-	-	0	-	-	G -> R11	M	G	
5A2	55	49	07	20	0F		0	#CONVERT				-Z									JMP	JMP CONVERT IF #0		
5A3	00	08	01	20	0F		0	0				T									RTN	RETURN		
* * * * \$																								



4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED REGS		
* PROCEDURE INIT; (* WW 29.2.79																							
* ----- *)																							
* POP(DESTBLD); T : DESTBLD																							
* POP(SRCBLD); P : SRCBLD																							
* [REPL: POP(SOURCE); P : SOURCE]																							
* POP(BMD); Q : BMD																							
* POP(MODE); Ø : MODE																							
* PUSH(M);																							
5A4	6F	E0	6C	40	FF	#INIT	1	B	OR	DZ	Ø	-	3	-	-	-	-	S	Ø	POP	-	STK -> R3	3
5A5	0F	E0	0C	40	FF		1	Q	OR	DZ	Ø	-	-	-	-	-	-	S	Ø	POP	-	STK -> Q	Q
5A6	6F	E0	0C	40	FF		1	B	OR	DZ	Ø	-	Ø	-	-	-	-	S	Ø	POP	-	STK -> R0	Ø
5A7	2E	72	0C	40	0F		1	-	OR	ZA	Ø	M	-	-	-	-	-	S	Ø	PSH	-	M -> STK	M
* PUSH(L);																							
* DX := DESTBLD.X; 6 : DX																							
* PUSH(G);																							
* DY := DESTBLD.Y; 8 : DY																							
* PUSH(H);																							
* DW := DESTBLD.WIDTH; H : DW																							
* PUSH(P);																							
* DH := DESTBLD.HEIGHT; M : DH																							
* T : BMD																							
5A8	42	5F	EC	60	30		1	B*	+	ZA	1	T	T	-	-	-	-	-	Ø	MAR	ALU	T -> MAR, T+1 -> T	T
5A9	4F	FC	CC	40	01		1	B*	OR	DZ	Ø	L	6	-	-	-	-	S	Ø	ALU	MD	L -> STK, MD -> R6	6 L
5AA	42	5F	EC	60	30		1	B*	+	ZA	1	T	T	-	-	-	-	-	Ø	MAR	ALU	T -> MAR, T+1 -> T	T
5AB	4F	FB	0C	40	01		1	B*	OR	DZ	Ø	G	10	-	-	-	-	S	Ø	ALU	MD	G -> STK, MD -> R10	8 G
5AC	42	5F	EC	60	30		1	B*	+	ZA	1	T	T	-	-	-	-	-	Ø	MAR	ALU	T -> MAR, T+1 -> T	T
5AD	4F	F7	6C	40	01		1	B*	OR	DZ	Ø	H	H	-	-	-	-	S	Ø	ALU	MD	H -> STK, MD -> H	H
5AE	4D	7F	EC	60	30		1	B*	OR	ZQ	Ø	T	T	-	-	-	-	-	Ø	MAR	ALU	T -> MAR, Q -> T	T Q
5AF	4F	F5	2C	40	01		1	B*	OR	DZ	Ø	P	11	-	-	-	-	S	Ø	ALU	MD	P -> STK, MD -> R11	M P
* PUSH(S);																							
* BMA := BMD.ADDR; S : BMA																							
* BMWIDTH := BMD.WIDTH; 4 : BMWIDTH																							
* BMHEIGHT := BMD.HEIGHT + 2; 2 : BMHEIGHT																							
* IF (DX+DW >= 2**16)																							
* OR (DX+DW > 16*BMWIDTH)																							
* OR (DY+DH >= 2**16)																							
* OR (DY+DH > BMHEIGHT)																							
* THEN TRAP END;																							
* SX := SRCBLD.X; 5 : SX																							
* [REPL: LENGTH := SOURCE.COUNT; 5 : LENGTH]																							
* END INIT; Q : 'FFF'																							
5B0	42	5F	EC	60	30		1	B*	+	ZA	1	T	T	-	-	-	-	-	Ø	MAR	ALU	T -> MAR, T+1 -> T	T
5B1	4F	F9	8C	40	01		1	B*	OR	DZ	Ø	S	S	-	-	-	-	S	Ø	ALU	MD	S -> STK, MD -> S	S
5B2	42	5F	EC	60	30		1	B*	+	ZA	1	T	T	-	-	-	-	-	Ø	MAR	ALU	T -> MAR, T+1 -> T	T
5B3	6F	E0	8C	60	01		1	B	OR	DZ	Ø	-	4	-	-	-	-	-	Ø	ALU	MD	MD -> R4	4
5B4	2E	7E	0C	60	30		1	-	OR	ZA	Ø	T	-	-	-	-	-	-	Ø	MAR	ALU	T -> MAR	T
5B5	6F	E0	4C	60	01		1	B	OR	DZ	Ø	-	2	-	-	-	-	-	Ø	ALU	MD	MD -> R2	2
5B6	62	E4	4C	70	02		1	B	+	DA	Ø	2	2	-	-	-	-	-	1	2		2 + R2 -> R2	2
5B7	6E	6C	AC	60	FF		1	B	OR	ZA	Ø	6	5	-	-	-	-	-	Ø	-	-	R6 -> R5	5 6
5B8	60	F6	AC	60	FF		1	B	+	AB	Ø	H	5	-	-	-	-	-	Ø	-	-	H + R5 -> R5	5 H
5B9	5C	52	07	20	0F		Ø	TRAPBB		C												TRAP IF OVERFLOW	
5BA	4F	E9	44	6C	00		1	B*	OR	DZ	Ø	4	P	R	14	-	-	-	Ø	ALU	ALU	(R4+14) -> P	4 P
5BB	28	D4	AC	60	FF		1	-	-	AB	1	P	5	-	-	-	-	-	Ø	-	-	P - R5	5 P
5BC	5C	5A	07	20	0F		Ø	TRAPBB		-C												TRAP IF P<R5	

4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED	REGS	
5BD	6E	70	AC	60	FF	1	B	OR	ZA	0	10	5	-	-	-	-	0	-	-	R10 -> R5	5	8	
5BE	60	F2	AC	60	FF	1	B	+	AB	0	M	5	-	-	-	-	0	-	-	M + R5 -> R5	5	M	
5BF	5C	52	07	20	0F	0	TRAPBB		C											TRAP IF OVERFLOW			
5C0	28	C4	AC	60	FF	1	-	-	AB	1	2	5	-	-	-	-	0	-	-	R2 - R5	2	5	
5C1	5C	5A	07	20	0F	0	TRAPBB		-C											TRAP IF R2<R5			
5C2	42	47	4C	60	30	1	B*	+	ZA	1	3	12	-	-	-	-	0		MAR	ALU	R3 -> MAR, R3+1 -> R12	3	P
5C3	6F	E0	AC	60	01	1	B	OR	DZ	0	-	5	-	-	-	-	0		ALU	MD	MD -> R5	5	
5C4	1F	E0	09	74	00	1	Q	-XR	DZ	0	-	-	M	4	-	RTN	-	1	0	MSK(0,4) -> Q, RTN	Q		
5C5	00	08	00	20	0F	TRAPBB	0	0		T										- POP	FIX 2911 STACK		
5C6	5C	A8	03	20	0F	0	EXITREPL		T											- JSR	RESTORE REGS		
5C7	3E	08	07	20	0F	0	TRAP(4)		T											- JMP	TRAP(4)		
5C8	2F	E0	0C	40	FF	EXITBBLT	1	-	OR	DZ	0	-	-	-	-	-	S	0	POP	-	STK -> DUMMY		
5C9	2F	E0	0C	40	FF		1	-	OR	DZ	0	-	-	-	-	-	S	0	POP	-	STK -> DUMMY		
5CA	6F	E1	8C	40	FF	EXITREPL	1	B	OR	DZ	0	-	S	-	-	-	S	0	POP	-	STK -> S	S	
5CB	6F	E1	4C	40	FF		1	B	OR	DZ	0	-	P	-	-	-	S	0	POP	-	STK -> P	P	
5CC	6F	E1	6C	40	FF		1	B	OR	DZ	0	-	H	-	-	-	S	0	POP	-	STK -> H	H	
5CD	6F	E1	AC	40	FF		1	B	OR	DZ	0	-	G	-	-	-	S	0	POP	-	STK -> G	G	
5CE	6F	E1	CC	40	FF		1	B	OR	DZ	0	-	L	-	-	-	S	0	POP	-	STK -> L	L	
5CF	6F	E1	2C	40	FF		1	B	OR	DZ	0	-	M	-	-	-	S	0	POP	-	STK -> M	M	
5D0	6F	E1	E9	40	FF		1	B	OR	DZ	0	-	T	-	-	RTN	S	0	POP	-	STK -> T	T	
5D1	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU	IR4	JMAP	Q

\$

4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED	REGS
* PROCEDURE BBLT; (* BLOCK TO BLOCK TRANSFER * ===== *) * POP(SBMD); 1 : SBMD * INIT; * DBMW := DBMWIDTH; 3 : DBMW * SY := SRCBLD.Y; 7 : SY * SBMW := SBMD.W; P : SBMW																						
5D2	6E	7E	2C	60	FF	BBLT	1	B	OR	ZA	0	T	1	-	-	-	-	0	-	T -> R1	1	T
5D3	6F	E1	EC	40	FF		1	B	OR	DZ	0	-	T	-	-	-	S	0	POP	STK -> T		T
5D4	5A	48	03	20	0F		0	#INIT	T										JSR	INIT		
5D5	2E	74	0C	60	30		1	-	OR	ZA	0	12	-	-	-	-	0	MAR	ALU	R12 -> MAR		P
5D6	6E	68	6C	60	FF		1	B	OR	ZA	0	4	3	-	-	-	0	-	-	R4 -> R3	3	4
5D7	6F	E0	EC	60	01		1	B	OR	DZ	0	-	7	-	-	-	0	ALU	MD	MD -> R7		7
5D8	62	42	2C	60	30		1	B	+	ZA	1	1	1	-	-	-	0	MAR	ALU	R1 + 1 -> MAR -> R1		1
5D9	6F	E1	4C	60	01		1	B	OR	DZ	0	-	12	-	-	-	0	ALU	MD	MD -> R12		P
* (* COMPUTE MASKS, INCREMENT-STEPS AND BITPOSITION (FOR ALIGNEMENT) *) * IF SY > DY * THEN (* DOWN MOVE, THE TRANSFER STARTS WITH THE BOTTOM * LINE OF THE BLOCK, ..* (BMW < 0) *) * DBMW := -DBMW; * SBMW := -SBMW; * SRCY := SY + 1; 7 : SRCY * DSTY := DY + 1; 8 : DSTY																						
5DA	28	CF	0C	60	FF		1	-	-	AB	1	7	10	-	-	-	0	-	-	R7-R10	7	8
5DB	5E	10	27	20	0F		0	#UP	S										JMP	GOTO UP IF <0		
5DC	6A	46	6C	60	FF		1	B	-	ZA	1	3	3	-	-	-	0	-	-	-R3 -> R3		3
5DD	6A	55	4C	60	FF		1	B	-	ZA	1	12	12	-	-	-	0	-	-	-R12 -> R12		P
5DE	62	4E	EC	60	FF		1	B	+	ZA	1	7	7	-	-	-	0	-	-	R7+1 -> R7		7
5DF	62	51	0C	60	FF		1	B	+	ZA	1	10	10	-	-	-	0	-	-	R10+1 -> R10		8
5E0	5E	38	07	20	0F		0	#HORIZ	T										JMP	GOTO HORIZ		
* ELSE (* UP MOVE, START WITH THE TOP LINE OF THE BLOCK * (BMW > 0) *) * SRCY := SY + DH; 7 : SRCY * DSTY := DY + DH; 8 : DSTY * END;																						
5E1	60	F2	EC	60	FF	#UP	1	B	+	AB	0	11	7	-	-	-	0	-	-	R11+R7 -> R7	7	M
5E2	60	F3	0C	60	FF		1	B	+	AB	0	11	10	-	-	-	0	-	-	R11+R10 -> R10	8	M
\$																						



4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED REGS
<pre> *           ELSE      (* LEFT MOVE, THE LEFTMOST WORD OF THE LINES IN THE *                   BLOCK ARE TRANSFERED FIRST (HORIZ = 1)          *) *           HORIZ := 1;                                           3 : HORIZ *           SBIT := SX;                                           5 : SBIT *           DBIT := DX;                                           6 : DBIT *           MASK3 := MSK(0,(DBIT+DW) MOD 16);                      7 : MASK3 *           IF MASK3 = 0 THEN MASK3 := FFFF; *           MASK1 := COMPL(MSK(0,DBIT MOD 16));                   G : MASK1 *           SR := (DBIT-SBIT) MOD 16; *           MASK2 := COMPL(MSK(0,SR));                             L : MASK2 *           WORDS := ((DW + (DBIT MOD 16) - 1) *                   DIV 16);                                       H : WORDS *           END; 5FA 6F E0 6C 70 01 #LEFT 1 B OR DZ 0 - 3 - - - - - 1 1 1 -&gt; R3 3 5FB 20 ED 6C 60 40 1 - + AB 0 6 H - - - - - 0 SR ALU R6+H -&gt; SR 6 H 5FC 6F E0 FC 70 00 1 B OR DZ 0 - 7 MR - - - - - 1 0 MSK(0,SR) -&gt; 7 7 5FD 5F F9 07 20 0F 0 #L -Z - - - - - JMP IF 7 &lt;&gt; 0 5FE 66 6E EC 60 FF 1 B --+ ZA 0 7 7 - - - - - 0 - - 7 - 1 -&gt; 7 7 5FF 2E 6C 0C 60 40 #L 1 - OR ZA 0 6 - - - - - 0 SR ALU R6 -&gt; SR 6 600 7F E1 BC 70 00 1 B -XR DZ 0 - G MR - - - - - 1 0 MSK(0,SR) -&gt; G G 601 28 CC AC 60 40 1 - - AB 1 6 5 - - - - - 0 SR ALU R6-R5 -&gt; SR 5 6 602 7F E1 DC 70 00 1 B -XR DZ 0 - L MR - - - - - 1 0 MSK(0,SR) -&gt; L L  603 72 ED 4C 70 0F 1 B &amp; DA 0 6 12 - - - - - 1 17 17 &amp; R6 -&gt; R12 6 P 604 60 F5 6C 60 FF 1 B + AB 0 12 H - - - - - 0 - - R12 + H -&gt; H P H 605 66 77 6C 60 FF 1 B --+ ZA 0 H H - - - - - 0 - - H - 1 -&gt; H H 606 53 77 64 64 00 1 B* &amp; DQ 0 H H R 4 - - - 0 ALU ALU (H+4) &amp; Q -&gt; H H Q  *           SWORD := SBMA * SBIT DIV 16 + 1 : SWORD *           SBMH * SBMWIDTH; *           (* SOURCE-WORD-address, WHERE THE TRANSFER STARTS *) *           DWORD := DBMA + DBIT DIV 16 + 2 : DWORD *           DBMH * DBMWIDTH; *           (* CORRESPONDING DESTINATION-WORD-ADDRESS *) *           SBANK := SBMA MOD 4; 4 : SBANK *           DBANK := DBMA MOD 4; T : DBANK  607 2E 62 0C 60 30 #ENDIF 1 - OR ZA 0 1 - - - - - 0 MAR ALU R1 -&gt; MAR 1 608 0F E0 0C 60 01 1 Q OR DZ 0 - - - - - 0 ALU MD MD -&gt; Q Q 609 26 62 0C 60 30 1 - --+ ZA 0 1 - - - - - 0 MAR ALU R1 - 1 -&gt; MAR 1 60A 3C 98 03 20 0F 0 #MUL16 T - - - - - JSR Q * T -&gt; Q (-2-) 60B 6F E1 4C 60 01 1 B OR DZ 0 - P - - - - - 0 ALU MD MD -&gt; P P 60C 75 F4 2C 70 03 1 B -&amp; DA 0 P 1 - - - - - 1 3 3 &amp; P -&gt; R1 1 P 60D 00 62 0C 60 FF 1 Q + AQ 0 1 - - - - - 0 - - R1 + Q -&gt; Q 1 Q 60E 76 EA AC 70 0F 1 B -&amp; DA 0 5 5 - - - - - 1 17 ~17 &amp; R5 -&gt; R5 5 60F 43 6A 24 64 00 1 B* + DQ 0 5 1 R 4 - - - 0 ALU ALU (R5+4) + Q -&gt; R1 1 5 Q  610 6E 71 EC 60 FF 1 B OR ZA 0 10 T - - - - - 0 - - R10 -&gt; T 8 T 611 0E 68 0C 60 FF 1 Q OR ZA 0 4 - - - - - 0 - - R4 -&gt; Q 4 Q 612 3C 98 03 20 0F 0 #MUL16 T - - - - - JSR Q * T -&gt; Q (-2-) 613 72 F9 EC 70 03 1 B &amp; DA 0 S T - - - - - 1 3 3 &amp; S -&gt; T S T 614 72 F4 8C 70 03 1 B &amp; DA 0 P 4 - - - - - 1 3 3 &amp; P -&gt; R4 4 P 615 76 F9 8C 70 03 1 B -&amp; DA 0 S S - - - - - 1 3 ~3 &amp; S -&gt; S S 616 00 78 0C 60 FF 1 Q + AQ 0 S - - - - - 0 - - S + Q -&gt; Q S Q 617 76 EC CC 70 0F 1 B -&amp; DA 0 6 6 - - - - - 1 17 ~17 &amp; R6 -&gt; R6 6 618 43 6C 44 64 00 1 B* + DQ 0 6 2 R 4 - - - 0 ALU ALU (R6+4)+Q -&gt; R2 2 6 Q </pre>																					
<p>\$</p>																					

4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED	REGS
<pre> *           WHILE DH &gt; 0 DO (* LOOP FOR THE LINES OF THE BLOCK *) *           DEC(DH); *           W := WORDS;                B : W *           SA := SWORD; (* SRC-ADDRESS *)    P : SA *           DA := DWORD; (* DEST-ADDRESS *)   S : DA *           STK1 := M[DA]; </pre>																						
619	66	73	2C	60	FF	#WHILE.DH	1	B	--	ZA	0	11	11	-	-	-	-	0	-	R11-1 -> R11	M	
61A	68	D0	47	20	0F		0	#ENDBBLT	F											JMP	JMP END IF < 0	
61B	2E	7E	0C	60	D0		1	-	OR	ZA	0	T	-	-	-	-	0	0	BNK	ALU	T -> BNK	T
61C	6E	65	8C	60	30		1	B	OR	ZA	0	2	S	-	-	-	0	0	MAR	ALU	R2 -> S -> MAR	2 S
61D	6E	77	0C	60	FF		1	B	OR	ZA	0	H	10	-	-	-	0	-	-		H -> R10	8 H
61E	6E	63	4C	60	FF		1	B	OR	ZA	0	1	12	-	-	-	0	-	-		R1 -> R12	1 P
61F	2F	E0	0C	40	01		1	-	OR	DZ	0	-	-	-	-	S	0	0	ALU	MD	MD -> STK	
620	31	60	0C	40	0F		1	-	&	ZQ	0	-	-	-	-	S	0	0	PSH	-	0 -> STK	Q
<pre> *           IF (MASK1 OR MASK2) &lt;&gt; MASK2 *           THEN STK0 := ROT(M[SA],SR) AND NOT MASK2; *           SA := SA + HORIZ; *           ELSE STK0 := 0 END; </pre>																						
621	0C	FD	AC	60	FF		1	Q	OR	AB	0	L	G	-	-	-	0	-	-	L OR G -> Q	G L Q	
622	28	5C	0C	60	FF		1	-	-	AQ	1	L	-	-	-	-	0	-	-	L - Q	L Q	
623	62	91	07	20	0F		0	#ELSE	Z											JMP	IF = 0	
624	2E	68	0C	60	D0		1	-	OR	ZA	0	4	-	-	-	-	0	0	BNK	ALU	R4 -> BNK	4
625	4F	F4	CC	40	30		1	B*	OR	DZ	0	12	6	-	-	-	S	0	MAR	ALU	R12 -> MAR, STK -> R6 (DUMMY)	6 P
626	60	E7	4C	60	FF		1	B	+	AB	0	3	12	-	-	-	0	-	-	R3+R12 -> R12	3 P	
627	1E	7C	0C	60	FF		1	Q	-XR	ZA	0	L	-	-	-	-	0	-	-	L -> Q	L Q	
628	33	60	14	40	01		1	-	&	DQ	0	-	-	RR	-	-	S	0	ALU	MD	(MD+SR) & Q -> STK	Q
<pre> *           R6 := ROT(M[SA],SR);                6 : R6 *           R5 := (STK0 OR (MASK2 AND R6)) AND MASK1; 5 : R5 </pre>																						
629	2E	68	0C	60	D0	#ELSE	1	-	OR	ZA	0	4	-	-	-	-	0	0	BNK	ALU	R4 -> BNK	4
62A	2E	74	0C	60	30		1	-	OR	ZA	0	12	-	-	-	-	0	0	MAR	ALU	R12 -> MAR	P
62B	6F	E0	D4	60	01		1	B	OR	DZ	0	-	6	RR	-	-	0	0	ALU	MD	(MD+SR) -> R6	6
62C	10	FC	CC	60	FF		1	Q	&	AB	0	L	6	-	-	-	0	-	-	L&R6 -> Q	6 L Q	
62D	6F	60	AC	40	FF		1	B	OR	DQ	0	-	5	-	-	-	S	0	POP	-	STK OR Q -> R5	5 Q
62E	70	FA	AC	60	FF		1	B	&	AB	0	G	5	-	-	-	0	-	-	G AND R5 -> R5	5 G	
<pre> *           CASE MODE OF </pre>																						
62F	26	C0	0C	70	02		1	-	--	DA	1	0	-	-	-	-	1	2			R0-2	0
630	65	F1	07	20	0F		0	#INVERT	Z											JMP	JMP INVERT IF =0	
631	67	28	47	20	0F		0	#ERASE	-F											JMP	JMP ERASE IF >0	
632	2E	60	0C	60	FF		1	-	OR	ZA	0	0	-	-	-	-	0	-	-		R0	0
633	64	C9	07	20	0F		0	#PAINT	-Z											JMP	JMP PAINT IF #0	

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	4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED REGS	
	*																						
	*																						
	*																						
	*																						
	*																						
634	1E	7A	0C	60	FF		1	Q	-XR	ZA	0	G	-	-	-	-	-	0	-	-	TG -> Q	G Q	
635	13	60	0C	40	FF		1	Q	&	DQ	0	-	-	-	-	-	S	0	POP	-	STK & Q -> Q	Q	
636	6C	6A	AC	60	FF		1	B	OR	AQ	0	5	5	-	-	-	-	0	-	-	R5 OR Q -> R5	5 Q	
637	2E	70	0C	60	FF		1	-	OR	ZA	0	10	-	-	-	-	-	0	-	-	R10	8	
638	64	51	07	20	0F		0	#ENDLP0		Z											JMP	JMP ENDLP0 IF =0	
639	2E	6A	0C	60	10	#REPLACE	1	-	OR	ZA	0	5	-	-	-	-	-	0	MD	ALU	R5 -> MD	5	
63A	2E	7E	0C	60	D0		1	-	OR	ZA	0	T	-	-	-	-	-	0	BNK	ALU	T -> BNK	T	
63B	2E	78	0C	60	30		1	-	OR	ZA	0	S	-	-	-	-	-	0	MAR	ALU	S -> MAR	S	
63C	60	E7	8C	60	FF		1	B	+	AB	0	3	S	-	-	-	-	0	-	-	R3+S -> S	3 S	
	*																						
	*																						
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	*																						
	*																						
63D	2E	68	0C	60	D0		1	-	OR	ZA	0	4	-	-	-	-	-	0	BNK	ALU	R4 -> BNK	4	
63E	60	E7	4C	60	30		1	B	+	AB	0	3	12	-	-	-	-	0	MAR	ALU	R3+R12 -> R12 -> MAR	3 P	
63F	34	FC	CC	40	0F		1	-	-&	AB	0	L	6	-	-	-	-	S	0	PSH	-	L & R6 -> STK	6 L
640	6F	E0	D4	60	01		1	B	OR	DZ	0	-	6	RR	-	-	-	-	0	ALU	MD	(MD+SR) -> R6	6
641	10	ED	CC	60	FF		1	Q	&	AB	0	6	L	-	-	-	-	-	0	-	-	R6 & L -> Q	6 L Q
642	6F	60	AC	40	FF		1	B	OR	DQ	0	-	5	-	-	-	-	S	0	POP	-	STK OR Q -> R5	5 Q
643	66	71	0C	60	FF		1	B	-+	ZA	0	10	10	-	-	-	-	-	0	-	-	R10-1 -> R10	8
644	63	99	07	20	0F		0	#REPLACE		-Z											JMP	GOTO REPLACE IF #0	
	*																						
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	*																						
645	70	EE	AC	60	FF	#ENDLP0	1	B	&	AB	0	7	5	-	-	-	-	-	0	-	-	7 & R5 -> R5	5 7
646	2E	7E	0C	60	D0		1	-	OR	ZA	0	T	-	-	-	-	-	-	0	BNK	ALU	T -> BNK	T
647	2E	78	0C	60	30		1	-	OR	ZA	0	S	-	-	-	-	-	-	0	MAR	ALU	S -> MAR	S
648	1E	6E	0C	60	FF		1	Q	-XR	ZA	0	7	-	-	-	-	-	-	0	-	-	T7 -> Q	7 Q
649	73	60	CC	60	01		1	B	&	DQ	0	-	6	-	-	-	-	-	0	ALU	MD	MD & Q -> R6	6 Q
64A	2C	EA	CC	60	10		1	-	OR	AB	0	5	6	-	-	-	-	-	0	MD	ALU	R5 OR R6 -> MD	5 6
64B	68	68	07	20	0F		0	#ENDCASE		T											JMP	GOTO ENDCASE	

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4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED REGS		
* 1: (* PAINT, DEST := DEST OR SOURCE *) * WHILE W > 0 DO (* LOOP OVER THE WORDS OF A LINE *) * M[DA] := STK1 OR R5; * DA := DA + HORIZ; * STK1 := M[DA];																							
64C	2E	70	0C	60	FF	#PAINT	1	-	OR	ZA	0	10	-	-	-	-	-	0	-	R10	8		
64D	65	C1	07	20	0F	0 #ENDLP1	Z													GOTO ENDLP1 IF =0			
64E	2E	EA	0C	40	10	#WHILE1	1	-	OR	DA	0	5	-	-	-	-	S	0	MD	ALU	STK OR R5 -> MD	5	
64F	2E	7E	0C	60	D0		1	-	OR	ZA	0	T	-	-	-	-	-	0	BNK	ALU	T -> BNK	T	
650	2E	78	0C	60	30		1	-	OR	ZA	0	S	-	-	-	-	-	0	MAR	ALU	S -> MAR	S	
651	2E	7E	0C	60	D0		1	-	OR	ZA	0	T	-	-	-	-	-	0	BNK	ALU	T -> BNK	T	
652	60	E7	8C	60	30		1	B	+	AB	0	3	S	-	-	-	-	0	MAR	ALU	R3+S -> S -> MAR	3 S	
653	2F	E0	0C	40	01		1	-	OR	DZ	0	-	-	-	-	-	-	S	0	ALU	MD	MD -> STK	
* STK0 := NOT MASK2 AND R6; * SA := SA + HORIZ; * R6 := ROT(M[SA],SR); * R5 := STK0 OR (R6 AND MASK2); * W := W - 1; * END; (* WHILE *)																							
654	2E	68	0C	60	D0		1	-	OR	ZA	0	4	-	-	-	-	-	0	BNK	ALU	R4 -> BNK	4	
655	60	E7	4C	60	30		1	B	+	AB	0	3	12	-	-	-	-	0	MAR	ALU	R3+R12 -> R12 -> MAR	3 P	
656	34	FC	CC	40	0F		1	-	-&	AB	0	L	6	-	-	-	-	S	0	PSH	-	T & R6 -> STK	6 L
657	6F	E0	D4	60	01		1	B	OR	DZ	0	-	6	RR	-	-	-	-	0	ALU	MD	(MD+SR) -> R6	6
658	10	ED	CC	60	FF		1	Q	&	AB	0	6	L	-	-	-	-	-	0	-	-	R6 & L -> Q	6 L Q
659	6F	60	AC	40	FF		1	B	OR	DQ	0	-	5	-	-	-	-	S	0	POP	-	STK OR Q -> R5	5 Q
65A	66	71	0C	60	FF		1	B	-+	ZA	0	10	10	-	-	-	-	-	0	-	-	R10-1 -> R10	8
65B	64	E9	07	20	0F	0 #WHILE1	-Z														GOTO WHILE1 IF #0		
* M[DA] := STK1 OR (R5 AND MASK3) /																							
65C	70	EE	AC	60	FF	#ENDLP1	1	B	&	AB	0	7	5	-	-	-	-	-	0	-	-	R7 & R5 -> R5	5 7
65D	2E	EA	0C	40	10		1	-	OR	DA	0	5	-	-	-	-	-	S	0	MD	ALU	STK OR R5 -> MD	5
65E	68	68	07	20	0F	0 #ENDCASE	T														GOTO ENDCASE		

\$



4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED REGS		
* 2: (* INVERT, DEST := DEST XOR SOURCE *) * WHILE W > 0 DO (* LOOP OVER THE WORDS OF A LINE *) * M[DA] := STK1 XOR R5; * DA := DA + HORIZ; * STK1 := M[DA];																							
65F	2E	70	0C	60	FF	#INVERT	1	-	OR	ZA	0	10	-	-	-	-	-	0	-	R10	8		
660	66	F1	07	20	0F	0 #ENDLP2	Z													- JMP	GOTO ENDLP2 IF =0		
661	3A	EA	0C	40	10	#WHILE2	1	-	XOR	DA	0	5	-	-	-	-	S	0	MD	ALU	STK XOR R5 -> MD	5	
662	2E	7E	0C	60	D0		1	-	OR	ZA	0	T	-	-	-	-	-	0	BNK	ALU	T -> BNK	T	
663	2E	78	0C	60	30		1	-	OR	ZA	0	S	-	-	-	-	-	0	MAR	ALU	S -> MAR	S	
664	2E	7E	0C	60	D0		1	-	OR	ZA	0	T	-	-	-	-	-	0	BNK	ALU	T -> BNK	T	
665	60	E7	8C	60	30		1	B	+	AB	0	3	S	-	-	-	-	0	MAR	ALU	R3+S -> S -> MAR	3 S	
666	2F	E0	0C	40	01		1	-	OR	DZ	0	-	-	-	-	-	-	S	0	ALU	MD	MD -> STK	
* SA := SA + HORIZ; * STK0 := NOT MASK2 AND R6; * R6 := ROT(M[SA],SR); * R5 := STK0 OR (R6 AND MASK2); * W := W - 1; * END; (* WHILE *)																							
667	2E	68	0C	60	D0		1	-	OR	ZA	0	4	-	-	-	-	-	0	BNK	ALU	R4 -> BNK	4	
668	60	E7	4C	60	30		1	B	+	AB	0	3	12	-	-	-	-	0	MAR	ALU	R3+R12 -> R12 -> MAR	3 P	
669	34	FC	CC	40	0F		1	-	-&	AB	0	L	6	-	-	-	-	S	0	PSH	-	T L & R6 -> STK	6 L
66A	6F	E0	D4	60	01		1	B	OR	DZ	0	-	6	RR	-	-	-	-	0	ALU	MD	(MD+SR) -> R6	6
66B	10	ED	CC	60	FF		1	Q	&	AB	0	6	L	-	-	-	-	-	0	-	-	R6 & L -> Q	6 L Q
66C	6F	60	AC	40	FF		1	B	OR	DQ	0	-	5	-	-	-	-	S	0	POP	-	STK OR Q -> R5	5 Q
66D	66	71	0C	60	FF		1	B	-+	ZA	0	10	10	-	-	-	-	-	0	-	-	R10-1 -> R10	8
66E	66	19	07	20	0F		0	#WHILE2	-Z												- JMP	GOTO WHILE2 IF #0	
* M[DA] := STK1 XOR (R5 AND MASK3) /																							
66F	70	EE	AC	60	FF	#ENDLP2	1	B	&	AB	0	7	5	-	-	-	-	-	0	-	-	R7 & R5 -> R5	5 7
670	3A	EA	0C	40	10		1	-	XOR	DA	0	5	-	-	-	-	-	S	0	MD	ALU	STK XOR R5 -> MD	5
671	68	68	07	20	0F		0	#ENDCASE	T												- JMP	GOTO ENDCASE	
\$																							







4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED REGS	
* PROCEDURE REPL; (* PATTERN TO BLOCK TRANSFER																						
* ===== *)																						
* INIT;																						
* MASK3 := MSK(0,(DX+DW) MOD 16);																		T : MASK3				
* SR := DX MOD 16;																		TEMPORARY: 7		3 : DX MOD 16(10)		
* MASK1 := COMPL(MSK(0,SR));																		G : MASK1				
68F	5A	48	03	20	0F	REPL	0	#INIT	T													
690	2E	6A	0C	60	FF		1	-	OR	ZA	0	5	-	-	-	-	-	0	-		INIT	
691	7F	21	07	20	0F		0	#ENDREPL	Z												R5	5
692	20	ED	6C	60	40		1	-	+	AB	0	6	H	-	-	-	-	0	SR	ALU	R6 + H -> SR	6 H
693	6F	E0	FC	70	00		1	B	OR	DZ	0	-	7	MR	-	-	-	-	1	0	MSK(0,SR) -> 7	7
694	72	EC	6C	70	0F		1	B	&	DA	0	6	3	-	-	-	-	-	1	17	R6 & 17 -> R3	3 6
695	2E	66	0C	60	40		1	-	OR	ZA	0	3	-	-	-	-	-	0	SR	ALU	R3 -> SR	3
696	7F	E1	BC	70	00		1	B	-XR	DZ	0	-	G	MR	-	-	-	-	1	0	MSK(0,SR) -> G	G
* WORDS := (DW + (DX MOD 16)) DIV 16; H : WORDS																						
* DWORD := BMA + DX DIV 16 +																		L : DWORD				
* (BMHEIGHT-DH-DY) * BMWIDTH;																						
* ENDWORD := DWORD + (DH-1)*BMWIDTH;																		9 : ENDWORD				
* CW := SOURCE.COUNT*BMWIDTH;																		7 : CW				
* DBANK := BMA MOD 4;																		2 : DBANK				
697	60	E7	6C	60	FF		1	B	+	AB	0	3	H	-	-	-	-	0	-		R3 + H -> H	3 H
698	53	77	64	64	00		1	B*	&	DQ	0	H	H	R	4	-	-	0	ALU	ALU	(H+4) & Q -> H	H Q
699	53	6C	24	64	00		1	B*	&	DQ	0	6	1	R	4	-	-	0	ALU	ALU	(R6+4) & Q -> R1	1 6 Q
69A	16	F8	0C	70	03		1	Q	-&	DA	0	S	-	-	-	-	-	1	3		3 & S -> Q	S Q
69B	60	62	2C	60	FF		1	B	+	AQ	0	1	1	-	-	-	-	0	-		Q + R1 -> R1	1 Q
69C	68	C5	0C	60	FF		1	B	-	AB	1	2	10	-	-	-	-	0	-		R2 - R10 -> R10	2 8
69D	08	D1	2C	60	FF		1	Q	-	AB	1	10	11	-	-	-	-	0	-		R10 - R11 -> Q	8 M Q
69E	6E	69	EC	60	FF		1	B	OR	ZA	0	4	T	-	-	-	-	0	-		R4 -> T	4 T
69F	3C	98	03	20	0F		0	#MUL16	T												Q * T -> Q (-2-)	
6A0	60	63	CC	60	FF		1	B	+	AQ	0	1	L	-	-	-	-	0	-		R1 + Q -> L	1 L Q
6A1	06	72	0C	60	FF		1	Q	--	ZA	0	11	-	-	-	-	-	0	-		R11 - 1 -> Q	M Q
6A2	3C	98	03	20	0F		0	#MUL16	T												Q * T -> Q (-2-)	
6A3	60	7D	2C	60	FF		1	B	+	AQ	0	L	11	-	-	-	-	0	-		L + Q -> R11	M L Q
6A4	0E	6A	0C	60	FF		1	Q	OR	ZA	0	5	-	-	-	-	-	0	-		R5 -> Q	5 Q
6A5	3C	98	03	20	0F		0	#MUL16	T												Q * T -> Q (-2-)	
6A6	6E	6F	EC	60	FF		1	B	OR	ZA	0	7	T	-	-	-	-	0	-		R7 -> T	7 T
6A7	6D	60	EC	60	FF		1	B	OR	ZQ	0	-	7	-	-	-	-	0	-		Q -> R7	7 Q
6A8	72	F8	4C	70	03		1	B	&	DA	0	S	2	-	-	-	-	-	1	3	3 & S -> R2	2 S

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4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED REGS	
* FOR I := 1 TO LENGTH DO (* LOOP OVER THE WORDS OF THE PATTERN *) * BITPAT := ROT(SOURCE.DOTS[I],SR); 3 : BITPAT * DWD := DWORD; 1 : DWD																						
6A9	42	55	4C	60	30	#FORI	1	B*	+	ZA	1	12	12	-	-	-	-	0	MAR	ALU	R12 -> MAR, R12+1 -> R1	P
6AA	6F	E0	74	60	01		1	B	OR	DZ	0	-	3	RR	-	-	-	0	ALU	MD	(MD+SR) -> R3	3
6AB	6E	7C	2C	60	FF		1	B	OR	ZA	0	L	1	-	-	-	-	0	-	-	L -> R1	1 L
* WHILE DWD <= ENDWORD DO (* LOOP OVER THE LINES OF THE DEST BLOC * CORRESPONDING TO THE ACTUAL PATTERN WORD * * DA := DWD; S : DA * W := WORDS; 8 : W * R6 := BITPAT AND MASK1; 6 : R6 * Q : M[DA]																						
6AC	28	E3	2C	60	FF	#WHILE	1	-	-	AB	0	1	11	-	-	-	-	0	-	-	R1 - R11 - 1	1 M
6AD	6F	62	07	20	0F		0	#ENDWHILE	C												GOTO ENDWHILE IF > 0	
6AE	2E	64	0C	60	D0		1	-	OR	ZA	0	2	-	-	-	-	-	0	BNK	ALU	R2 -> BNK	2
6AF	6E	63	8C	60	30		1	B	OR	ZA	0	1	S	-	-	-	-	0	MAR	ALU	R1 -> S -> MAR	1 S
* H -> R10																						
6B0	6E	66	CC	60	FF		1	B	OR	ZA	0	3	6	-	-	-	-	0	-	-	R3 -> R6	3 6
6B1	70	FA	CC	60	FF		1	B	&	AB	0	G	6	-	-	-	-	0	-	-	G & R6 -> R6	6 G
6B2	0F	E0	0C	60	01		1	Q	OR	DZ	0	-	-	-	-	-	-	0	ALU	MD	MD -> Q	Q
* CASE MODE OF																						
6B3	26	C0	0C	70	02		1	-	++	DA	1	0	-	-	-	-	-	1	2		R0 - 2	0
6B4	6D	71	07	20	0F		0	#INVERT2	Z												GOTO INVERT2 IF =0	
6B5	6E	58	47	20	0F		0	#ERASE2	-F												GOTO ERASE2 IF >0	
6B6	2E	60	0C	60	FF		1	-	OR	ZA	0	0	-	-	-	-	-	0	-	-	R0	0
6B7	6C	99	07	20	0F		0	#PAINT2	-Z												GOTO PAINT2 IF #0	
* 0: (* REPLACE, DEST := PATTERN *) * R6 := R6 OR (NOT MASK1 AND M[DA]); * WHILE W > 0 DO (* LOOP OVER THE WORDS OF A LINE *) * M[DA] := R6; (* OF THE DEST BLOCK *) * DA := DA + 1; * R6 := BITPAT; * W := W - 1; * END;																						
6B8	14	7A	0C	60	FF	#REPLACE2	1	Q	-&	AQ	0	G	-	-	-	-	-	0	-	-	T & Q -> Q	G Q
6B9	6C	6C	CC	60	FF		1	B	OR	AQ	0	6	6	-	-	-	-	0	-	-	R6 OR Q -> R6	6 Q
6BA	6E	77	0C	60	FF		1	B	OR	ZA	0	H	10	-	-	-	-	0	-	-	H -> R10	8 H
6BB	6C	21	47	20	0F		0	#ENDWHL4	FZ												GOTO ENDWHL4 IF <=0	
6BC	2E	6C	0C	60	10	#WHILE4	1	-	OR	ZA	0	6	-	-	-	-	-	0	MD	ALU	R6 -> MD	6
6BD	2E	64	0C	60	D0		1	-	OR	ZA	0	2	-	-	-	-	-	0	BNK	ALU	R2 -> BNK	2
6BE	42	59	8C	60	30		1	B*	+	ZA	1	S	S	-	-	-	-	0	MAR	ALU	S -> MAR, S+1 -> S	S
6BF	6E	66	CC	60	FF		1	B	OR	ZA	0	3	6	-	-	-	-	0	-	-	R3 -> R6	3 6
6C0	66	71	0C	60	FF		1	B	-+	ZA	0	10	10	-	-	-	-	0	-	-	R10 - 1 -> R10	8
6C1	6B	C9	07	20	0F		0	#WHILE4	-Z												GOTO WHILE4 IF #0	
* Q := MASK3 AND R6; * R6 := M[DA] & NOT MASK3; * M[DA] := R6 OR Q /																						
6C2	10	FE	CC	60	FF	#ENDWHL4	1	Q	&	AB	0	T	6	-	-	-	-	0	-	-	T & R6 -> Q	6 T Q
6C3	2E	64	0C	60	D0		1	-	OR	ZA	0	2	-	-	-	-	-	0	BNK	ALU	R2 -> BNK	2
6C4	2E	78	0C	60	30		1	-	OR	ZA	0	S	-	-	-	-	-	0	MAR	ALU	S -> MAR	S

	4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED REGS	
6C5	7E	7E	CC	60	FF		1	B	-XR	ZA	0	T	6	-	-	-	-	0	-	-	T XOR T -> R6	6 T	
6C6	72	EC	CC	60	01		1	B	&	DA	0	6	6	-	-	-	-	0	ALU	MD	MD & R6 -> R6	6	
6C7	2C	6C	0C	60	10		1	-	OR	AQ	0	6	-	-	-	-	-	0	MD	ALU	R6 OR Q -> MD	6 Q	
6C8	6F	28	07	20	0F		0	#ENDCAS		T											- JMP	GOTO ENDCASE	
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4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED REGS	
FLOATING POINT ROUTINES (NW 5.11.80)																						
+-----+ I S I EXPO I MANTISSA I +-----+																						
0 1 - 8 9 - 31																						
SIGN: 0 = POSITIVE, 1 = NEGATIVE																						
EXPO: WEIGHT = 200B																						
MANT: LEADING ONE BIT IS OMITTED																						
6FB	6F	E0	44	71	01	FSUB	1 B	OR	DZ	0	-	2	R	1	-	-	-	1	1	1+1 -> R2	2	
6FC	6F	E8	07	20	0F		0 #A1		T											- JMP	GOTO A1	
6FD	72	64	4C	60	FF	FADD	1 B	&	ZA	0	2	2	-	-	-	-	0	-	-	0 -> R2	2	
6FE	6F	E0	2C	40	FF	#A1	1 B	OR	DZ	0	-	1	-	-	-	S	0	POP	-	STK -> R1 YH	1	
6FF	2C	FE	2C	60	FF		1 -	OR	AB	0	T	1	-	-	-	-	0	-	-	T OR R1	1 T	
700	74	21	07	20	0F		0 #Y0		Z											- JMP	IF =0 GOTO Y0	
701	78	E4	2C	60	FF		1 B	XOR	AB	0	2	1	-	-	-	-	0	-	-	R2 XOR R1 -> R1	1 2	
702	7B	E0	AC	40	FF		1 B	XOR	DZ	0	-	5	-	-	-	S	0	POP	-	STK -> R5 XL	5	
703	6F	E0	0C	40	FF		1 B	OR	DZ	0	-	0	-	-	-	S	0	POP	-	STK -> R0 XH	0	
704	2C	E0	AC	60	FF		1 -	OR	AB	0	0	5	-	-	-	-	0	-	-	R0 OR R5	0 5	
705	74	01	07	20	0F		0 #X0		Z											- JMP	IF =0 GOTO X0	
706	72	E0	44	79	FF		1 B	&	DA	0	0	2	R	11	-	-	-	1	377	(377+9)&R0 -> R2 XE	0 2	
707	72	E2	64	79	FF		1 B	&	DA	0	1	3	R	11	-	-	-	1	377	(377+9)&R1 -> R3 YE	1 3	
708	72	E0	8C	70	7F		1 B	&	DA	0	0	4	-	-	-	-	1	177	177&R0 -> R4 XH	0 4		
709	72	E2	CC	70	7F		1 B	&	DA	0	1	6	-	-	-	-	1	177	177&R1 -> R6 YH	1 6		
70A	6E	E8	84	79	01		1 B	OR	DA	0	4	4	R	11	-	-	-	1	1	(1+9) OR R4 -> R4	4	
70B	6E	EC	C4	79	01		1 B	OR	DA	0	6	6	R	11	-	-	-	1	1	(1+9) OR R6 -> R6	6	
XE,XH,XL IN R2,R4,R5																						
YE,YH,YL IN R3,R6,T																						
70C	64	C6	4C	60	FF		1 B	++	AB	1	3	2	-	-	-	-	0	-	-	R2-R3 -> R2 ZE	2 3	
70D	71	48	47	20	0F		0 #A3		-F											- JMP	IF <0 THEN (XE<YE)	
70E	0E	6A	0C	60	FF		1 Q	OR	ZA	0	5	-	-	-	-	-	0	-	-	R5 -> Q	5 Q	
70F	82	68	8C	60	FF	#A2	1 BQR	+	ZA	0	4	4	-	-	-	-	0	-	-	REP (R4,Q)/2 X	4 Q	
710	62	E4	44	79	01		1 B	+	DA	0	2	2	R	11	-	-	-	1	1	R2+(1+9) -> R2	2	
711	70	F9	07	20	0F		0 #A2		-Z											- JMP	UNTIL R2=0	
712	6D	60	AC	60	FF		1 B	OR	ZQ	0	-	5	-	-	-	-	0	-	-	Q -> R5	5 Q	
713	71	B8	07	20	0F		0 #A5		T											- JMP		
714	71	B1	07	20	0F	#A3	0 #A5		Z											- JMP	ELSIF >0 THEN (XE>XY)	
715	60	E4	6C	60	FF		1 B	+	AB	0	2	3	-	-	-	-	0	-	-	R3+R2 -> R3	2 3	
716	0E	7E	0C	60	FF		1 Q	OR	ZA	0	T	-	-	-	-	-	0	-	-	T -> Q	T Q	
717	82	6C	CC	60	FF	#A4	1 BQR	+	ZA	0	6	6	-	-	-	-	0	-	-	REP (R6,Q)/2 Y	6 Q	
718	66	C4	44	79	01		1 B	++	DA	1	2	2	R	11	-	-	-	1	1	R2-(1+9) -> R2	2	
719	71	79	07	20	0F		0 #A4		-Z											- JMP	UNTIL R2=0	
71A	6D	61	EC	60	FF		1 B	OR	ZQ	0	-	T	-	-	-	-	0	-	-	Q -> T	T Q	
END																						
71B	2E	60	0C	60	FF	#A5	1 -	OR	ZA	0	0	-	-	-	-	-	0	-	-	R0 SIGN(X)	0	
71C	71	F8	47	20	0F		0 #A6		-F											- JMP	IF <0 THEN	
71D	6A	4A	AC	60	FF		1 B	-	ZA	1	5	5	-	-	-	-	0	-	-	-R5 -> R5	5	
71E	6A	08	8C	60	FF		1 B	-	ZA	C	4	4	-	-	-	-	0	-	-	-R4 -> R4	4	
END																						
71F	2E	62	0C	60	FF	#A6	1 -	OR	ZA	0	1	-	-	-	-	-	0	-	-	R1 SIGN(Y)	1	
720	72	48	47	20	0F		0 #A7		-F											- JMP	IF <0 THEN	
721	08	CB	EC	60	FF		1 Q	-	AB	1	5	T	-	-	-	-	0	-	-	R5-T -> Q	5 T Q	
722	68	88	CC	60	FF		1 B	-	AB	C	4	6	-	-	-	-	0	-	-	R4-R6 -> R6	4 6	
723	72	68	07	20	0F		0 #A8		T											- JMP	ELSE	



	4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED	REGS		
746	6E	7E	EC	60	FF	FMUL	1	B	OR	ZA	0	T	7	-	-	-	-	0	-	-	T -> R7	YL	7	T	
747	6F	E0	CC	40	FF		1	B	OR	DZ	0	-	6	-	-	-	S	0	POP	-	STK -> R6	YH	6		
748	6F	E0	AC	40	FF		1	B	OR	DZ	0	-	5	-	-	-	S	0	POP	-	STK -> R5	XL	5		
749	6F	E0	8C	40	FF		1	B	OR	DZ	0	-	4	-	-	-	S	0	POP	-	STK -> R4	XH	4		
74A	2C	E8	AC	60	FF		1	-	OR	AB	0	4	5	-	-	-	-	0	-	-	R4 OR R5	X	4	5	
74B	74	41	07	20	0F		0	#ZERO	Z												IF X=0 GOTO ZERO				
74C	2C	EC	EC	60	FF		1	-	OR	AB	0	6	7	-	-	-	-	0	-	-	R6 OR R7	Y	6	7	
74D	74	41	07	20	0F		0	#ZERO	Z												IF Y=0 GOTO ZERO				
74E	38	E8	CC	40	0F		1	-	XOR	AB	0	4	6	-	-	-	S	0	PSH	-	R4 XOR R6 -> STK		4	6	
74F	72	E8	44	79	FF		1	B	&	DA	0	4	2	R	11	-	-	-	1	377	(377+9)&R4 -> R2	XE	2	4	
750	72	EC	64	79	FF		1	B	&	DA	0	6	3	R	11	-	-	-	1	377	(377+9)&R6 -> R3	YE	3	6	
751	72	E8	8C	70	7F		1	B	&	DA	0	4	4	-	-	-	-	1	177	177&R4 -> R4		4			
752	72	EC	CC	70	7F		1	B	&	DA	0	6	6	-	-	-	-	1	177	177&R6 -> R6		6			
753	6E	E8	84	79	01		1	B	OR	DA	0	4	4	R	11	-	-	-	1	1	(1+9) OR R4 -> R4		4		
754	6E	EC	C4	79	01		1	B	OR	DA	0	6	6	R	11	-	-	-	1	1	(1+9) OR R6 -> R6		6		
XE,XH,XL IN R2,R4,R5 YE,YH,YL IN R3,R6,R7      SIGN IN STK																									
755	60	E4	6C	60	FF		1	B	+	AB	0	2	3	-	-	-	-	0	-	-	R2+R3 -> R3	ZE	2	3	
756	0E	6A	0C	60	FF		1	Q	OR	ZA	0	5	-	-	-	-	-	0	-	-	R5 -> Q		5	Q	
757	3C	98	03	20	0F		0	#MUL16	T												XL*YL Q*T -> (R2,Q)				
758	6E	64	2C	60	FF		1	B	OR	ZA	0	2	1	-	-	-	-	0	-	-	R2 -> R1	ZL	1	2	
759	0E	6A	0C	60	FF		1	Q	OR	ZA	0	5	-	-	-	-	-	0	-	-	R5 -> Q		5	Q	
75A	6E	6D	EC	60	FF		1	B	OR	ZA	0	6	T	-	-	-	-	0	-	-	R6 -> T		6	T	
75B	3C	98	03	20	0F		0	#MUL16	T												XL*YH				
75C	60	62	2C	60	FF		1	B	+	AQ	0	1	1	-	-	-	-	0	-	-	R1+Q -> R1	ZL	1	Q	
75D	62	04	0C	60	FF		1	B	+	ZA	C	2	0	-	-	-	-	0	-	-	R2+C -> R0	ZH	0	2	
75E	0E	68	0C	60	FF		1	Q	OR	ZA	0	4	-	-	-	-	-	0	-	-	R4 -> Q		4	Q	
75F	6E	6F	EC	60	FF		1	B	OR	ZA	0	7	T	-	-	-	-	0	-	-	R7 -> T		7	T	
760	3C	98	03	20	0F		0	#MUL16	T												XH*YL				
761	60	62	2C	60	FF		1	B	+	AQ	0	1	1	-	-	-	-	0	-	-	R1+Q -> R1	ZL	1	Q	
762	60	84	0C	60	FF		1	B	+	AB	C	2	0	-	-	-	-	0	-	-	R2+R0 -> R0	ZH	0	2	
763	0E	68	0C	60	FF		1	Q	OR	ZA	0	4	-	-	-	-	-	0	-	-	R4 -> Q		4	Q	
764	6E	6D	EC	60	FF		1	B	OR	ZA	0	6	T	-	-	-	-	0	-	-	R6 -> T		6	T	
765	3C	98	03	20	0F		0	#MUL16	T												XH*YH				
766	60	60	0C	60	FF		1	B	+	AQ	0	0	0	-	-	-	-	0	-	-	R0+Q -> R0	ZH	0	Q	
767	76	B0	47	20	0F		0	#M1	F												IF -F THEN				
768	60	E2	2C	60	FF		1	B	+	AB	0	1	1	-	-	-	-	0	-	-	2*R1 -> R1	NORMALIZE	1		
769	60	80	0C	60	FF		1	B	+	AB	C	0	0	-	-	-	-	0	-	-	2*R0 -> R0		0		
76A	66	C6	64	79	01		1	B	--	DA	1	3	3	R	11	-	-	-	1	1	R3 - (1+9) -> R3		3		
END																									
76B	6F	E0	EC	40	FF	#M1	1	B	OR	DZ	0	-	7	-	-	-	S	0	POP	-	STK -> R7	SIGN	7		
76C	66	C6	64	72	01		1	B	--	DA	1	3	3	R	2	-	-	-	1	1	R3 - (200+9) -> R3		3		
76D	74	4A	07	20	0F		0	#ZERO	-C												IF <0 GOTO ZERO				
76E	3E	40	47	20	0F		0	TRAP(6)	F												IF >= 400 OVERFLOW				
76F	4F	E0	04	68	00		1	B*	OR	DZ	0	0	0	R	10	-	-	-	0	ALU	ALU	R0+8 -> R0		0	
770	4F	E2	24	68	00		1	B*	OR	DZ	0	1	1	R	10	-	-	-	0	ALU	ALU	R1+8 -> R1		1	
771	72	E0	44	78	FF		1	B	&	DA	0	0	2	R	10	-	-	-	1	377	(377+8)&R0 -> R2		0	2	
772	72	E0	0C	70	7F		1	B	&	DA	0	0	0	-	-	-	-	1	177	177&R0 -> R0		0			
773	72	E3	EC	70	FF		1	B	&	DA	0	1	T	-	-	-	-	1	377	377&R1 -> T		1	T		
774	6C	E5	EC	60	FF		1	B	OR	AB	0	2	T	-	-	-	-	0	-	-	R2 OR T -> T	ZL	2	T	
775	6C	E6	0C	60	FF		1	B	OR	AB	0	3	0	-	-	-	-	0	-	-	R3 OR R0 -> R0		0	3	
776	72	EE	E4	71	01		1	B	&	DA	0	7	7	R	1	-	-	-	1	1	(1+1)&R7 -> R7		7		
777	2C	EE	0C	40	0F		1	-	OR	AB	0	7	0	-	-	-	S	0	PSH	-	R7 OR R0 -> STK	ZH	0	7	

4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED REGS	
778	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU IR4	JMAP	Q
779	6F	E0	CC	40	FF	FDIV	1	B	OR	DZ	0	-	6	-	-	-	S	0	POP	-	STK -> R6 YH	6
77A	6F	E0	AC	40	FF		1	B	OR	DZ	0	-	5	-	-	-	S	0	POP	-	STK -> R5 XL	5
77B	6F	E0	8C	40	FF		1	B	OR	DZ	0	-	4	-	-	-	S	0	POP	-	STK -> R4 XH	4
77C	2C	ED	EC	60	FF		1	-	OR	AB	0	6	T	-	-	-	-	0	-	-	R6 OR T	6 T
77D	3E	41	07	20	0F		0	TRAP(6)	Z												IF Y=0 ZERO DIVIDE	
77E	2C	E8	AC	60	FF		1	-	OR	AB	0	4	5	-	-	-	-	0	-	-	R4 OR R5	4 5
77F	74	41	07	20	0F		0	#ZERO	Z												IF X=0 GOTO ZERO	
780	38	E8	CC	40	0F		1	-	XOR	AB	0	4	6	-	-	-	S	0	PSH	-	R4 XOR R6 -> STK	4 6
781	72	E8	44	79	FF		1	B	&	DA	0	4	2	R	11	-	-	-	1	377	(377+9)&R4 -> R2 XE	2 4
782	72	EC	64	79	FF		1	B	&	DA	0	6	3	R	11	-	-	-	1	377	(377+9)&R6 -> R3 YE	3 6
783	72	E8	8C	70	7F		1	B	&	DA	0	4	4	-	-	-	-	-	1	177	177&R4 -> R4	4
784	72	EC	CC	70	7F		1	B	&	DA	0	6	6	-	-	-	-	-	1	177	177&R6 -> R6	6
785	6E	E8	84	79	01		1	B	OR	DA	0	4	4	R	11	-	-	-	1	1	(1+9) OR R4 -> R4	4
786	6E	EC	C4	79	01		1	B	OR	DA	0	6	6	R	11	-	-	-	1	1	(1+9) OR R6 -> R6	6

XE,XH,XL IN R2,R4,R5  
YE,YH,YL IN R3,R6,T

787	68	C4	6C	60	FF		1	B	-	AB	1	2	3	-	-	-	-	0	-	-	R2-R3 -> R3 QE	2 3
788	64	DE	AC	60	FF		1	B	--	AB	1	T	5	-	-	-	-	0	-	-	R5-T -> R5 (R-Y -> R)	5 T
789	64	8C	8C	60	FF		1	B	--	AB	C	6	4	-	-	-	-	0	-	-	FIRST DIV STEP	4 6
78A	78	E0	27	20	0F		0	#D1	S												IF R >= Y THEN	
78B	6F	E0	2C	70	01		1	B	OR	DZ	0	-	1	-	-	-	-	1	1		1 -> R1 (1 -> Q)	1
78C	62	E6	64	79	01		1	B	+	DA	0	3	3	R	11	-	-	-	1	1	R3+(1+9) -> R3	3
78D	79	18	07	20	0F		0	#D2	T												ELSE	
78E	72	62	2C	60	FF	#D1	1	B	&	ZA	0	1	1	-	-	-	-	0	-	-	0 -> R1 (0 -> Q)	1
78F	60	FE	AC	60	FF		1	B	+	AB	0	T	5	-	-	-	-	0	-	-	R5+T -> R5 (R+Y -> R)	5 T
790	60	8C	8C	60	FF		1	B	+	AB	C	6	4	-	-	-	-	0	-	-	R4+R6 -> R4	4 6
791	6A	C2	4C	70	08	#D2	1	B	-	DA	1	1	2	-	-	-	-	1	10		END	
792	7A	08	03	20	0F		0	#XDIV	T												8-R1 -> R2 (8-Q -> N)	1 2
793	6E	62	0C	60	FF		1	B	OR	ZA	0	1	0	-	-	-	-	0	-	-	N DIV STEPS FOR QH	
794	72	62	2C	60	FF		1	B	&	ZA	0	1	1	-	-	-	-	0	-	-	R1 -> R0 SAVE QH	0 1
795	7A	08	03	20	0F		0	#XDIV	T												0 -> R1	1
796	6F	E0	4C	40	FF		1	B	OR	DZ	0	-	2	-	-	-	S	0	POP	-	16 DIV STEPS FOR QL	
797	76	E0	04	79	01		1	B	-&	DA	0	0	0	R	11	-	-	-	1	1	STK -> R2 SIGN	2
798	62	E6	64	72	01		1	B	+	DA	0	3	3	R	2	-	-	-	1	1	-(1+9)&R0 -> R0	0
799	74	40	27	20	0F		0	#ZERO	S												R3 + (200+9) -> R3 QE	3
79A	3E	40	47	20	0F		0	TRAP(6)	F												IF QE<0 GOTO ZERO	
79B	6C	E6	0C	60	FF		1	B	OR	AB	0	3	0	-	-	-	-	0	-	-	OVERFLOW	
79C	72	E4	44	71	01		1	B	&	DA	0	2	2	R	1	-	-	-	1	1	R3 OR R0 -> R0	0 3
79D	2C	E0	4C	40	0F		1	-	OR	AB	0	0	2	-	-	-	S	0	PSH	-	(1+1)&R2 -> R2	2
79E	6E	63	EC	60	FF		1	B	OR	ZA	0	1	T	-	-	-	-	0	-	-	R0 OR R2 -> STK QH	0 2
79F	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU IR4	JMAP	QL

R2 DIVISION STEPS

(R IN (R4,Q), Q IN R1, COUNT N IN R2)

REPEAT

7A0	60	EA	AC	60	FF	#XDIV	1	B	+	AB	0	5	5	-	-	-	-	0	-	-	2*R5 -> R5 (2*R -> R)	5
7A1	60	88	8C	60	FF		1	B	+	AB	C	4	4	-	-	-	-	0	-	-	2*R4 -> R4	4
7A2	60	E2	2C	60	FF		1	B	+	AB	0	1	1	-	-	-	-	0	-	-	2*R1 -> R1 (2*Q -> Q)	1
7A3	64	DE	AC	60	FF		1	B	--	AB	1	T	5	-	-	-	-	0	-	-	R5-T -> R5 (R-Y -> R)	5 T
7A4	64	8C	8C	60	FF		1	B	--	AB	C	6	4	-	-	-	-	0	-	-	R4-R6 -> R4	4 6
7A5	7A	08	27	20	0F		0	#XD1	S												IF R >= Y THEN	
7A6	62	42	2C	60	FF		1	B	+	ZA	1	1	1	-	-	-	-	0	-	-	R1+1 (Q+1 -> Q)	1
7A7	7A	A8	07	20	0F		0	#XD2	T												ELSE	
7A8	60	FE	AC	60	FF	#XD1	1	B	+	AB	0	T	5	-	-	-	-	0	-	-	R5+T -> (R+Y -> R)	5 T
7A9	60	8C	8C	60	FF		1	B	+	AB	C	6	4	-	-	-	-	0	-	-	R4+R6 -> R4	4 6
7AA	66	64	4C	60	FF	#XD2	1	B	--	ZA	0	2	2	-	-	-	-	0	-	-	END	
																					R2-1 -> R2	2

4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED	REGS	
7AB	7A	09	07	20	0F	0	#XDIV		-Z											- JMP	UNTIL R2=0		
7AC	6F	E0	49	70	10	1	B	OR	DZ	0	-	2	-	-	-	RTN	-	1	20	16 -> R2		2	
7AD	6E	7E	EC	60	FF	FCMP	1	B	OR	ZA	0	T	7	-	-	-	-	0	-	T -> R7	YL	7	T
7AE	6F	E0	CC	40	FF		1	B	OR	DZ	0	-	6	-	-	-	S	0	POP	STK -> R6	YH	6	
7AF	6F	E0	AC	40	FF		1	B	OR	DZ	0	-	5	-	-	-	S	0	POP	STK -> R5	XL	5	
7B0	6F	E0	8C	40	FF		1	B	OR	DZ	0	-	4	-	-	-	S	0	POP	STK -> R4	XH	4	
7B1	72	7F	EC	60	FF		1	B	&	ZA	0	T	T	-	-	-	-	0	-	0 -> T		T	
7B2	38	E8	CC	60	FF		1	-	XOR	AB	0	4	6	-	-	-	-	0	-	R4 XOR R6		4	6
7B3	7B	78	47	20	0F		0	#C1		-F										JUMP IF SIGNS EQUAL			
7B4	2E	68	0C	60	FF		1	-	OR	ZA	0	4	-	-	-	-	-	0	-	R4		4	
7B5	7C	10	47	20	0F		0	#LSS		F										- JMP			
7B6	7C	58	07	20	0F		0	#GTR		T										- JMP			
7B7	68	CA	EC	60	FF	#C1	1	B	-	AB	1	5	7	-	-	-	-	0	-	R5-R7 -> R7		5	7
7B8	68	88	CC	60	FF		1	B	-	AB	C	4	6	-	-	-	-	0	-	R4-R6 -> R6		4	6
7B9	7B	F0	47	20	0F		0	#C2		F										JUMP IF X < Y			
7BA	2C	EC	EC	60	FF		1	-	OR	AB	0	6	7	-	-	-	-	0	-	R6 OR R7		6	7
7BB	7C	31	07	20	0F		0	#EQL		Z										- JMP			
7BC	2E	68	0C	60	FF		1	-	OR	ZA	0	4	-	-	-	-	-	0	-	R4		4	
7BD	7C	10	47	20	0F		0	#LSS		F										- JMP			
7BE	7C	58	07	20	0F		0	#GTR		T										- JMP			
7BF	2E	68	0C	60	FF	#C2	1	-	OR	ZA	0	4	-	-	-	-	-	0	-	R4		4	
7C0	7C	50	47	20	0F		0	#GTR		F										- JMP			
7C1	2A	7E	0C	40	0F	#LSS	1	-	-	ZA	0	T	-	-	-	-	S	0	PSH	-1 -> STK		T	
7C2	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU IR4	JMAP		Q
7C3	32	7E	0C	40	0F	#EQL	1	-	&	ZA	0	T	-	-	-	-	S	0	PSH	0 -> STK		T	
7C4	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU IR4	JMAP		Q
7C5	22	5E	0C	40	0F	#GTR	1	-	+	ZA	1	T	-	-	-	-	S	0	PSH	1 -> STK		T	
7C6	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	S	JMP	-	0	ALU IR4	JMAP		Q

\$



4	3	2	1	0	LABEL	K	DST	FCT	RS	C	A	B	SHFT	SP	PC	S	E	BD	BS	COMMENT	USED	REGS	
					*																		
					*																		
					*																		
7DC	4F	FF	E4	59	98	FIX	1	B*	OR	DZ	0	T	T	R	11	-	-	S	1	230	T -> STK, 230+9 -> T	T	
7DD	0F	E0	0C	40	FF	FIX1	1	Q	OR	DZ	0	-	-	-	-	-	-	S	0	POP	-	STK -> Q XL	Q
7DE	6F	E0	4C	40	FF		1	B	OR	DZ	0	-	2	-	-	-	-	S	0	POP	-	STK -> R2 XH	2
7DF	2C	64	0C	60	FF		1	-	OR	AQ	0	2	-	-	-	-	-	-	0	-	-	R2 OR 0	2 Q
7E0	7E	A1	07	20	0F		0	#FX2		Z												IF #0 THEN	
7E1	72	E4	24	79	FF		1	B	&	DA	0	2	1	R	11	-	-	-	1	377	(377+9)&R2 -> R1	1 2	
7E2	72	E4	4C	70	7F		1	B	&	DA	0	2	2	-	-	-	-	-	1	177	177 & R2 ->R2	2	
7E3	6E	E4	44	79	01		1	B	OR	DA	0	2	2	R	11	-	-	-	1	1	(1+9) OR R2 -> R2	2	
7E4	64	C3	EC	60	FF		1	B	-+	AB	1	1	T	-	-	-	-	-	0	-	-	T - R1 -> T	1 T
7E5	3E	40	47	20	0F		0	TRAP(6)		F												OUT OF RANGE	
7E6	7E	A1	07	20	0F		0	#FX2		Z												IF #0 THEN (NORM)	
7E7	82	64	4C	60	FF	#FX1	1	BQR	+	ZA	0	2	2	-	-	-	-	-	0	-	-	REPEAT (R2,Q)/2	2 Q
7E8	66	DF	E4	79	01		1	B	-+	DA	1	T	T	R	11	-	-	-	1	1		T - (1+9) -> T	T
7E9	7E	79	07	20	0F		0	#FX1		-Z												UNTIL T=0	
						*																END	
						*																END	
7EA	6D	61	EC	60	FF	#FX2	1	B	OR	ZQ	0	-	T	-	-	-	-	-	0	-	-	Q -> T	T Q
7EB	2E	60	0C	60	FF		1	-	OR	ZA	0	0	-	-	-	-	-	-	0	-	-	R0	0
7EC	7E	F8	47	20	0F		0	#FX3		-F												- JMP	
7ED	2E	64	0C	40	0F		1	-	OR	ZA	0	2	-	-	-	-	-	S	0	PSH	-	R2 -> STK HI	2
7EE	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	-	-	S	JMP	-	0	ALU IR4 JMAP	Q
7EF	2E	64	0C	60	FF	#FX3	1	-	OR	ZA	0	2	-	-	-	-	-	-	0	-	-	R2	2
7F0	3E	49	07	20	0F		0	TRAP(6)		-Z												OVERFLOW	
7F1	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	-	-	S	JMP	-	0	ALU IR4 JMAP	Q
7F2	5C	A8	03	20	0F	#ENDREPL	0	EXITREPL		T												- JSR	
7F3	0F	E0	0F	E0	03		1	Q	OR	DZ	0	-	-	-	-	-	-	S	JMP	-	0	ALU IR4 JMAP	Q
						*																POP(S);	
						*																POP(P);	
						*																POP(H);	
						*																POP(G);	
						*																POP(L);	
						*																POP(M);	
						*																POP(T);	
						*																END REPL;	
						*																END DISPLAYHANDLER;	
						*																	
						*																	

.ORG 6000

.MAP 246 ESCAPE-INSTRUCTION: JUMP TO THE BEGINNING OF THE 4-TH K

Table of the MAP Entries

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		0	20	40	60	80	A0	C0	E0
		0	40	100	140	200	240	300	340
0	0	10	52	90	AC	BE	157	233	319
1	1	10	56	94	B0	C3	15C	24B	327
2	2	10	5C	9A	B0	CB	161	265	339
3	3	10	64	9A	B0	D1	16F	282	33A
4	4	10	6E	9A	B0	DB	17D	285	33B
5	5	10	6E	9A	B0	E0	183	28A	33C
6	6	10	6E	9A	B0	E9	C00	292	33D
7	7	10	6E	9A	B0	ED	18B	297	342
8	10	10	6E	9A	B0	F6	1A6	29A	34E
9	11	10	6E	9A	B0	FB	1B7	29E	356
A	12	10	6E	9A	B0	401	1BE	2A1	359
B	13	10	6E	9A	B0	405	1C2	2A5	360
C	14	10	6E	9A	B0	400	1C6	2A9	368
D	15	10	6E	9A	B0	400	1CA	2AD	375
E	16	10	6E	9A	B0	40C	1CE	2B1	38C
F	17	10	6E	9A	B0	410	1D3	2B3	38F
10	20	12	71	9D	B4	100	1DC	2B6	394
11	21	400	75	A1	B9	106	1E0	2B8	397
12	22	14	7B	A7	B9	110	1E7	2BA	397
13	23	17	83	A7	B9	118	1EC	2BC	397
14	24	1C	8D	A7	B9	124	1F5	2BE	397
15	25	1F	8D	A7	B9	12A	1FA	2C4	397
16	26	22	8D	A7	B9	138	1FC	2C6	397
17	27	25	8D	A7	B9	13E	1FE	2C9	397
18	30	2B	8D	A7	B9	149	20F	2CB	397
19	31	2E	8D	A7	B9	14A	212	2CE	397
1A	32	33	8D	A7	B9	14B	215	2D1	397
1B	33	36	8D	A7	B9	14C	21B	2E5	397
1C	34	3A	8D	A7	B9	14D	221	400	397
1D	35	3D	8D	A7	B9	14E	227	2F8	397
1E	36	44	8D	A7	B9	152	22A	2FA	397
1F	37	4D	8D	A7	B9	156	22F	2FB	397