7.2 Appendix: Microprogram Listing

The control store is composed of four 2764 PROMs. Only 12 of the 13 address bits are used. PROMs with only 12 address bits would have worked, but none were available for this project. Four PROMs provide a total of 32 data bits that can be used to control the CPU. Only 31 control bits are required by the P8.

Each control store address is 12 bits long. The eight most significant bits (A_{11} - A_4) are set by the instruction register IR), which contains the 8-bit opcode of the instruction being executed. The opcode of each instruction specifies a block of 16 addresses within the control store where the microwords for its execution are located.

The four least significant bits (A_3 - A_0) select the individual microwords required by the opcode in the instruction register. The microinstruction pointer (MIP) is a binary counter that drives address bits A_2, A_1, and A_0. This allows each instruction to have as many as eight microwords. Address bit A_3 is used only by the conditional jumps. The decision on whether to execute the conditional jump depends on the state of A_3.

See Figure 7.2.1 for a block diagram that shows how the control bits are addressed.

The microprogram contained in the control store is listed in this appendix. Each page shows an MP8 instruction, the addresses of its microwords, and the control bits that comprise the microinstructions. The addresses are divided into four fields:

OP: This is the 5-bit operation code that identifies each of the MP8 instruction types.

ADR: This is the 3-bit code that identifies the addressing mode and register used by each instruction. There are as many as five different codes for each instruction type identified by OP.

The OP and ADR fields are combined to form the 8-bit opcode unique to each instruction. See Appendix 7.1.

Z: This is A_3, which is used by conditional jump instructions to determine whether the jump should be executed. It is high during a conditional jump when the condition bit (Zero) is set. It is always low otherwise.

MIP: This is the 3-bit output of the MIP. It sequences through each micro-instruction until it is reset by the last one.

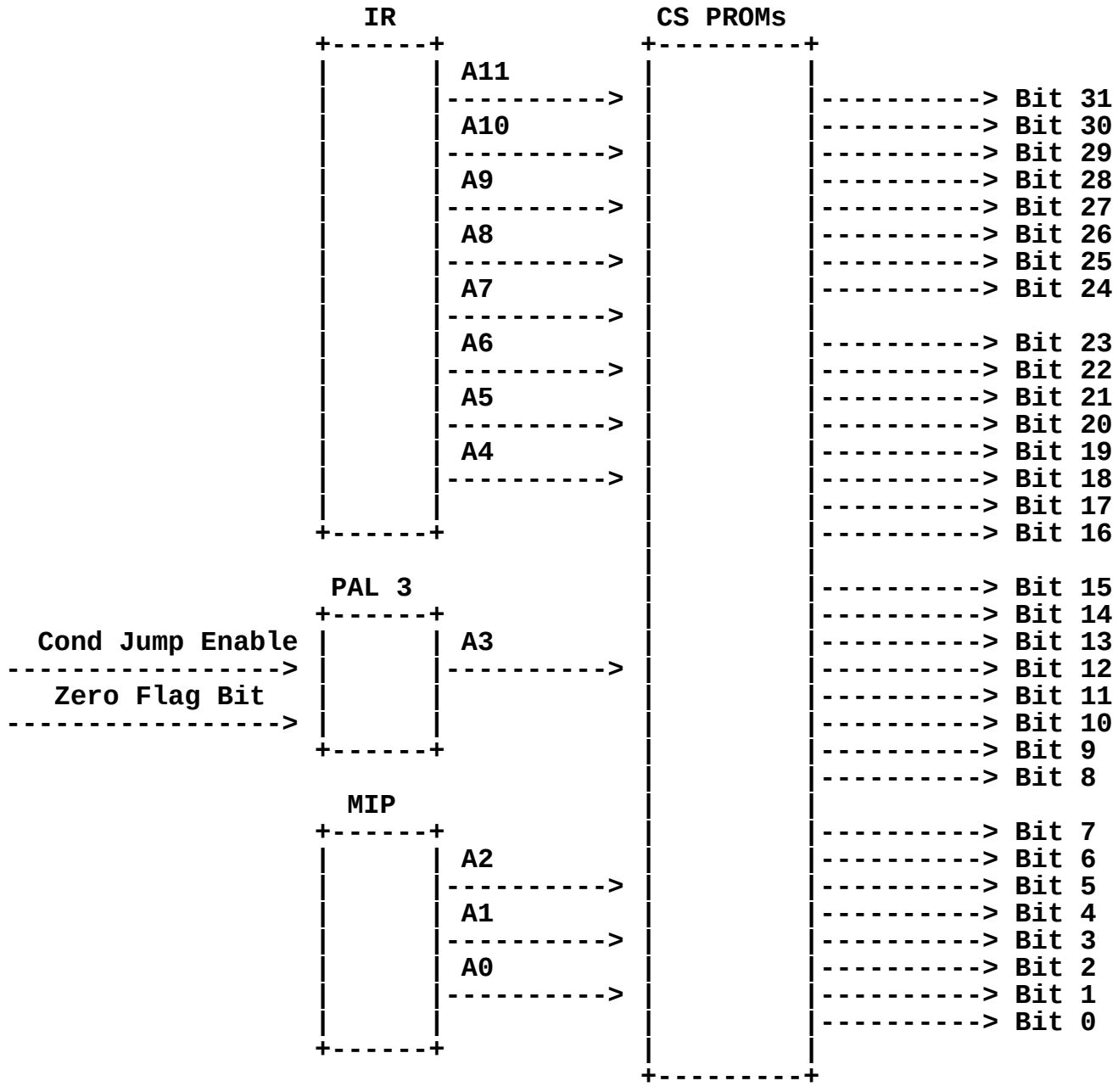

Figure 7.2.1: Block Diagram of Control Store Addressing

FETCH

Address				Data																															
				IOW	IOR	SPARE	COMPARE	COND JMP	ZLOAD	RLOAD	!ROUT	ALOAD	!AOUT	SHL	INV	OR	DEC	SUB	ADD	PASSTHRU	!IPOUT	!SYNC IPLOAD	IPCLKEN	ORLOAD	!OROUT	DROUTLOAD	!DROUT	DRINLOAD	!DRINOUT	ARLOAD	!AROUT	MEMW	MEMR	IRLOAD	IRRESET
OP	ADR	Z	MIP	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
00000	000	0	000	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	1	0	0	1	0	0
		0	001	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	1	0	1	0	1	1	1	0	0	0	1	0	0
		0	010	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	1	0	0	0	1	0	0	1	0
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IN Address

Address **Data**

OP	ADR	Z	MIP	IOW 31	IOR 30	SPARE 29	COMPARE 28	COND JMP EN 27	ZLOAD 26	RLOAD 25	!ROUT 24	ALOAD 23	!AOUT 22	SHL 21	INV 20	OR 19	DEC 18	SUB 17	ADD 16	PASTHRU 15	!IPOUT 14	!SYNC IPLOAD 13	IPCLKEN 12	ORLOAD 11	!OROUT 10	DROUTLOAD 09	!DROUT 08	DRINLOAD 07	!DRINOUT 06	ARLOAD 05	!AROUT 04	MEMW 03	MEMR 02	IRLOAD 01	IRRESET 00
00001	000	0	000	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	1	0	0	1	0	0
		0	001	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	1	0	1	0	1	1	1	0	0	0	1	0	0
		0	010	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	1	1	0	1	0	0	0	1	0	0	0	0
		0	011	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	1	1	0	0	0	0	0
		0	100	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	1	1	1	0	0	0	0	0	0
		0	101	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	1	1	1	0	0	1	0	1	0	0	0	1	0	0	0	1
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IN P

Address **Data**

OP	ADR	Z	MIP	IOW 31	IOR 30	SPARE 29	COMPARE 28	COND JMP EN 27	ZLOAD 26	RLOAD 25	!ROUT 24	ALOAD 23	!AOUT 22	SHL 21	INV 20	OR 19	DEC 18	SUB 17	ADD 16	PASSTHRU 15	!IPOUT 14	!SYNC IPLOAD 13	IPCLKEN 12	ORLOAD 11	!OROUT 10	DROUTLOAD 09	!DROUT 08	DRINLOAD 07	!DRINOUT 06	ARLOAD 05	!AROUT 04	MEMW 03	MEMR 02	IRLOAD 01	IRRESET 00
00001	100	0	000	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	1	1	0	1	0	1	0	1	0	0	0	0
		0	001	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	1	1	0	0	0	0	0
		0	010	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	1	1	1	0	0	0	0	0	0
		0	011	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	1	1	1	0	0	1	0	1	0	0	0	1	0	0	0	1
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OUT Address

Address **Data**

				IOW	IOR	SPARE	COMPARE	COND JMP	ZLOAD	RLOAD	!ROUT	ALOAD	!AOUT	SHL	INV	OR	DEC	SUB	ADD	PASSTHRU	!IPOUT	!SYNC IPLOAD	IPCLKEN	ORLOAD	!OROUT	DROUTLOAD	!DROUT	DRINLOAD	!DRINOUT	ARLOAD	!AROUT	MEMW	MEMR	IRLOAD	IRRESET
OP	ADR	Z	MIP	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
00010	000	0	000	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	1	0	0	1	0	0
		0	001	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	1	0	1	0	1	1	1	0	0	0	1	0	0
		0	010	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	1	1	0	1	0	0	0	1	0	0	0	0
		0	011	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	1	1	0	0	0	0	0
		0	100	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	1	0	0	0	0	0	0
		0	101	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	1	0	0	0	0	0	1
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OUT P

Address **Data**

OP	ADR	Z	MIP	31 IOW	30 IOR	29 SPARE	28 COMPARE	27 COND JMP EN	26 ZLOAD	25 RLOAD	24 !ROUT	23 ALOAD	22 !AOUT	21 SHL	20 INV	19 OR	18 DEC	17 SUB	16 ADD	15 PASS THRU	14 !IPOUT	13 !SYNC IPLOAD	12 IPCLK EN	11 ORLOAD	10 !OROUT	09 DROUT LOAD	08 !DROUT OUT	07 DRIN LOAD	06 !DRIN OUT	05 ARLOAD	04 !AROUT	03 MEMW	02 MEMR	01 IRLOAD	00 IR RESET
00010	100	0	000	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	1	1	0	1	0	1	0	1	0	0	0	0
		0	001	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	1	1	0	0	0	0	0
		0	010	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	1	0	0	0	0	0	0
		0	011	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	1	0	0	0	0	0	1
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JMP Address

Address **Data**

OP	ADR	Z	MIP	31 IOW	30 IOR	29 SPARE	28 COMPARE	27 COND JMP EN	26 ZLOAD	25 RLOAD	24 !ROUT	23 ALOAD	22 !AOUT	21 SHL	20 INV	19 OR	18 DEC	17 SUB	16 ADD	15 PASSTHRU	14 !IPOUT	13 !SYNC IPLOAD	12 IPCLKEN	11 ORLOAD	10 !OROUT	09 DROUTLOAD	08 !DROUTOUT	07 DRINLOAD	06 !DRINOUT	05 ARLOAD	04 !AROUT	03 MEMW	02 MEMR	01 IRLOAD	00 IRRESET
00100	000	0	000	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	1	0	0	1	0	0
		0	001	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	1	1	1	0	0	0	1	0	0
		0	010	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	0	1	0	1	0	1	0	0	0	1	0	0	0	1
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JMP R

Address **Data**

OP	ADR	Z	MIP	31 IOW	30 IOR	29 SPARE	28 COMPARE	27 COND JMP EN	26 ZLOAD	25 RLOAD	24 !ROUT	23 ALOAD	22 !AOUT	21 SHL	20 INV	19 OR	18 DEC	17 SUB	16 ADD	15 PASSTHRU	14 !IPOUT	13 !SYNC IPLOAD	12 IPCLKEN	11 ORLOAD	10 !OROUT	09 DROUTLOAD	08 !DROUTOUT	07 DRINLOAD	06 !DRINOUT	05 ARLOAD	04 !AROUT	03 MEMW	02 MEMR	01 IRLOAD	00 IRRESET
00100	011	0	000	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1	0	1	0	1	0	1	0	1	0	0	0	1
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JNZ Address

Address **Data**

OP	ADR	Z	MIP	31 IOW	30 IOR	29 SPARE	28 COMPARE	27 COND JMP EN	26 ZLOAD	25 RLOAD	24 !ROUT	23 ALOAD	22 !AOUT	21 SHL	20 INV	19 OR	18 DEC	17 SUB	16 ADD	15 PASSTHRU	14 !IPOUT	13 !SYNC IPLOAD	12 IPCLKEN	11 ORLOAD	10 !OROUT	09 DROUTLOAD	08 !DROUTOUT	07 DRINLOAD	06 !DRINOUT	05 ARLOAD	04 !AROUT	03 MEMW	02 MEMR	01 IRLOAD	00 IRRESET
00101	000	0	000	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	1	0	0	1	0	0
		0	001	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	1	1	1	0	0	0	1	0	0
		0	010	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	1	0	1	0	1	0	1	0	0	0	1	0	0	0	1
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		0	110																																
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JNZ R

Address **Data**

OP	ADR	Z	MIP	31 IOW	30 IOR	29 SPARE	28 COMPARE	27 COND JMP EN	26 ZLOAD	25 RLOAD	24 !ROUT	23 ALOAD	22 !AOUT	21 SHL	20 INV	19 OR	18 DEC	17 SUB	16 ADD	15 PASSTHRU	14 !IPOUT	13 !SYNC IPLOAD	12 IPCLKEN	11 ORLOAD	10 !OROUT	09 DROUTLOAD	08 !DROUTOUT	07 DRINLOAD	06 !DRINOUT	05 ARLOAD	04 !AROUT	03 MEMW	02 MEMR	01 IRLOAD	00 IRRESET
00101	011	0	000	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1	0	1	0	1	0	1	0	1	0	0	0	1
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JZ Address

Address				Data																																			
				IOW	IOR	SPARE	COMPARE	COND JMP	ZLOAD	RLOAD	!ROUT	ALOAD	!AOUT	SHL	INV	OR	DEC	SUB	ADD	PASSTHRU	!IPOUT	!SYNC IPLOAD	IPCLKEN	ORLOAD	!OROUT	DROUTLOAD	!DROUTOUT	DRINLOAD	!DRINOUT	ARLOAD	!AROUT	MEMW	MEMR	IRLOAD	IRRESET				
OP	ADR	Z	MIP	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00				
00110	000	0	000	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	1	1	1	0	1	0	1	0	1	0	1	0	0	0	1				
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		1	001	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	1	1	1	0	0	0	1	0	0				
		1	010	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	1	0	1	0	1	0	1	0	0	0	1	0	0	0	1				
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		1	111																																				

JZ R

Address **Data**

OP	ADR	Z	MIP	IOW 31	IOR 30	SPARE 29	COMPARE 28	COND JMP EN 27	ZLOAD 26	RLOAD 25	!ROUT 24	ALOAD 23	!AOUT 22	SHL 21	INV 20	OR 19	DEC 18	SUB 17	ADD 16	PASSTHRU 15	!IPOUT 14	!SYNC IPLOAD 13	IPCLKEN 12	ORLOAD 11	!OROUT 10	DROUTLOAD 09	!DROUT 08	DRINLOAD 07	!DRINOUT 06	ARLOAD 05	!AROUT 04	MEMW 03	MEMR 02	IRLOAD 01	IRRESET 00
00000	000	0	000	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	1	0	1	0	1	0	0	0	1
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CMP Address

Address **Data**

OP	ADR	Z	MIP	IOW 31	IOR 30	SPARE 29	COMPARE 28	CND JMP 27	ZLOAD 26	RLOAD 25	!ROUT 24	ALOAD 23	!AOUT 22	SHL 21	INV 20	OR 19	DEC 18	SUB 17	ADD 16	PASTHRU 15	!IPOUT 14	!SYNC IPLOAD 13	IPCLKEN 12	ORLOAD 11	!OROUT 10	DROUTLOAD 09	!DROUT 08	DRINLOAD 07	!DRINOUT 06	ARLOAD 05	!AROUT 04	MEMW 03	MEMR 02	IRLOAD 01	IRRESET 00
00111	000	0	000	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	1	0	0	1	0	0
		0	001	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	1	0	1	0	1	1	1	0	0	0	1	0	0
		0	010	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	1	1	0	1	0	0	0	1	0	0	0	0
		0	011	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	1	1	0	0	1	0	0
		0	100	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	1	1	1	0	0	0	1	0	0
		0	101	0	0	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	1	0	0	0	1	0	0	0	1
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CMP A

Address **Data**

OP	ADR	Z	MIP	31 IOW	30 IOR	29 SPARE	28 COMPARE	27 COND JMP EN	26 ZLOAD	25 RLOAD	24 !ROUT	23 ALOAD	22 !AOUT	21 SHL	20 INV	19 OR	18 DEC	17 SUB	16 ADD	15 PASSTHRU	14 !IPOUT	13 !SYNC IPLOAD	12 IPCLKEN	11 ORLOAD	10 !OROUT	09 DROUTLOAD	08 !DROUTOUT	07 DRINLOAD	06 !DRINOUT	05 ARLOAD	04 !AROUT	03 MEMW	02 MEMR	01 IRLOAD	00 IRRESET
00111	010	0	000	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	1	0	1	0	1	0	0	0	1
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CMP R

Address **Data**

OP	ADR	Z	MIP	31 IOW	30 IOR	29 SPARE	28 COMPARE	27 COND JMP EN	26 ZLOAD	25 RLOAD	24 !ROUT	23 ALOAD	22 !AOUT	21 SHL	20 INV	19 OR	18 DEC	17 SUB	16 ADD	15 PASSTHRU	14 !IPOUT	13 !SYNC IPLOAD	12 IPCLKEN	11 ORLOAD	10 !OROUT	09 DROUTLOAD	08 !DROUTOUT	07 DRINLOAD	06 !DRINOUT	05 ARLOAD	04 !AROUT	03 MEMW	02 MEMR	01 IRLOAD	00 IRRESET
00111	011	0	000	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	1	0	1	0	1	0	0	0	1
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OP	ADR	Z	MIP	IOW	IOR	SPARE	COMPARE	COND JMP	ZLOAD	RLOAD	!ROUT	ALOAD	!AOUT	SHL	INV	OR	DEC	SUB	ADD	PASSTHRU	!IPOUT	!SYNC IPLOAD	IPCLKEN	ORLOAD	!OROUT	DROUTLOAD	!DROUTOUT	DRINLOAD	!DRINOUT	ARLOAD	!AROUT	MEMW	MEMR	IRLOAD	IRRESET
				31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
00111	100	0	000	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	1	1	0	1	0	1	0	1	0	0	0	0
		0	001	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	1	1	0	0	1	0	0
		0	010	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	1	1	1	0	0	0	1	0	0
		0	011	0	0	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	1	0	0	0	1	0	0	0	1
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				IOW	IOR	SPARE	COMPARE	CONDJMP	ZLOAD	RLOAD	!ROUT	ALOAD	!AOUT	SHL	INV	OR	DEC	SUB	ADD	PASSTHRU	!IPOUT	!SYNCIPLOAD	IPCLKEN	ORLOAD	!OROUT	DROUTLOAD	!DROUTOUT	DRINLOAD	!DRINOUT	ARLOAD	!AROUT	MEMW	MEMR	IRLOAD	IRRESET
OP	ADR	Z	MIP	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
00111	110	0	000	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	1	0	0	1	0	0
		0	001	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	1	0	1	0	1	1	1	0	0	0	1	0	0
		0	010	0	0	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	1	0	0	0	1	0	0	0	1
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OP	ADR	Z	MIP	IOW 31	IOR 30	SPARE 29	COMPARE 28	COND JMP EN 27	ZLOAD 26	RLOAD 25	!ROUT 24	ALOAD 23	!AOUT 22	SHL 21	INV 20	OR 19	DEC 18	SUB 17	ADD 16	PASSTHRU 15	!IPOUT 14	!SYNC IPLOAD 13	IPCLKEN 12	ORLOAD 11	!OROUT 10	DROUTLOAD 09	!DROUT 08	DRINLOAD 07	!DRINOUT 06	ARLOAD 05	!AROUT 04	MEMW 03	MEMR 02	IRLOAD 01	IRRESET 00
01000	000	0	000	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	1	0	0	1	0	0
		0	001	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	1	0	1	0	1	1	1	0	0	0	1	0	0
		0	010	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	1	1	0	1	0	0	0	1	0	0	0	0
		0	011	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	1	1	0	0	1	0	0
		0	100	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	1	1	1	0	0	0	1	0	0
		0	101	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	1	1	1	0	0	1	0	1	0	0	0	1	0	0	0	1
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OP	ADR	Z	MIP	IOW 31	IOR 30	SPARE 29	COMPARE 28	COND JMP EN 27	ZLOAD 26	RLOAD 25	!ROUT 24	ALOAD 23	!AOUT 22	SHL 21	INV 20	OR 19	DEC 18	SUB 17	ADD 16	PASSTHRU 15	!IPOUT 14	!SYNC IPLOAD 13	IPCLKEN 12	OR LOAD 11	!OROUT 10	DROUT LOAD 09	!DROUT 08	DRIN LOAD 07	!DRINOUT 06	ARLOAD 05	!AROUT 04	MEMW 03	MEMR 02	IRLOAD 01	IRRESET 00
01000	010	0	000	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	1	0	1	0	1	0	0	0	1
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OP	ADR	Z	MIP	IOW 31	IOR 30	SPARE 29	COMPARE 28	COND JMP EN 27	ZLOAD 26	RLOAD 25	!ROUT 24	ALOAD 23	!AOUT 22	SHL 21	INV 20	OR 19	DEC 18	SUB 17	ADD 16	PASSTHRU 15	!IPOUT 14	!SYNC IPLOAD 13	IPCLKEN 12	ORLOAD 11	!OROUT 10	DROUTLOAD 09	!DROUT 08	DRINLOAD 07	!DRINOUT 06	ARLOAD 05	!AROUT 04	MEMW 03	MEMR 02	IRLOAD 01	IRRESET 00
01000	011	0	000	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1	1	0	0	1	0	1	0	1	0	1	0	0	0	1
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OP	ADR	Z	MIP	31 IOW	30 IOR	29 SPARE	28 COMPARE	27 COND JMP EN	26 ZLOAD	25 RLOAD	24 !ROUT	23 ALOAD	22 !AOUT	21 SHL	20 INV	19 OR	18 DEC	17 SUB	16 ADD	15 PASSTHRU	14 !IPOUT	13 !SYNC IPLOAD	12 IPCLKEN	11 ORLOAD	10 !OROUT	09 DROUTLOAD	08 !DROUTOUT	07 DRINLOAD	06 !DRINOUT	05 ARLOAD	04 !AROUT	03 MEMW	02 MEMR	01 IRLOAD	00 IRRESET
01000	100	0	000	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	1	1	0	1	0	1	0	1	0	0	0	0
		0	001	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	1	1	0	0	1	0	0
		0	010	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	1	1	1	0	0	0	1	0	0
		0	011	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	1	1	1	0	0	1	0	1	0	0	0	1	0	0	0	1
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OP	ADR	Z	MIP	31 IOW	30 IOR	29 SPARE	28 COMPARE	27 COND JMP EN	26 Z LOAD	25 R LOAD	24 !R OUT	23 A LOAD	22 !A OUT	21 SHL	20 INV	19 OR	18 DEC	17 SUB	16 ADD	15 PASS THRU	14 !IP OUT	13 !SYNC IP LOAD	12 IP CLK EN	11 OR LOAD	10 !OR OUT	09 DROUT LOAD	08 !DROUT OUT	07 DRIN LOAD	06 !DRIN OUT	05 AR LOAD	04 !AR OUT	03 MEMW	02 MEMR	01 IR LOAD	00 IR RESET
01000	110	0	000	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	1	0	0	1	0	0
		0	001	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	1	0	1	0	1	1	1	0	0	0	1	0	0
		0	010	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	1	1	1	0	0	1	0	1	0	0	0	1	0	0	0	1
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				IOW	IOR	SPARE	COMPARE	COND JMP EN	ZLOAD	RLOAD	!ROUT	ALOAD	!AOUT	SHL	INV	OR	DEC	SUB	ADD	PASSTHRU	!IPOUT	!SYNC IPLOAD	IPCLKEN	ORLOAD	!OROUT	DROUTLOAD	!DROUT	DRINLOAD	!DRINOUT	ARLOAD	!AROUT	MEMW	MEMR	IRLOAD	IRRESET
OP	ADR	Z	MIP	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
01001	000	0	000	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	1	0	0	1	0	0
		0	001	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	1	0	1	0	1	1	1	0	0	0	1	0	0
		0	010	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	1	1	0	1	0	0	0	1	0	0	0	0
		0	011	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	1	1	0	0	1	0	0
		0	100	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	1	1	1	0	0	0	1	0	0
		0	101	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	1	1	1	0	0	1	0	1	0	0	0	1	0	0	0	1
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				IOW	IOR	SPARE	COMPARE	COND JMP EN	ZLOAD	RLOAD	!ROUT	ALOAD	!AOUT	SHL	INV	OR	DEC	SUB	ADD	PASS THRU	!IP OUT	!SYNC IP LOAD	IP CLK EN	OR LOAD	!OR OUT	DROUT LOAD	!DROUT OUT	DRIN LOAD	!DRIN OUT	AR LOAD	!AR OUT	MEMW	MEMR	IR LOAD	IR RESET
OP	ADR	Z	MIP	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
01001	010	0	000	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	1	0	1	0	1	0	0	0	1
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Address **Data**

OP	ADR	Z	MIP	31 IOW	30 IOR	29 SPARE	28 COMPARE	27 COND JMP EN	26 ZLOAD	25 RLOAD	24 !ROUT	23 ALOAD	22 !AOUT	21 SHL	20 INV	19 OR	18 DEC	17 SUB	16 ADD	15 PASSTHRU	14 !IPOUT	13 !SYNC IPLOAD	12 IPCLKEN	11 ORLOAD	10 !OROUT	09 DROUTLOAD	08 !DROUTOUT	07 DRINLOAD	06 !DRINOUT	05 ARLOAD	04 !AROUT	03 MEMW	02 MEMR	01 IRLOAD	00 IR RESET
01001	011	0	000	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	1	0	1	0	1	0	0	0	1
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OP	ADR	Z	MIP	31 IOW	30 IOR	29 SPARE	28 COMPARE	27 COND JMP EN	26 ZLOAD	25 RLOAD	24 !ROUT	23 ALOAD	22 !AOUT	21 SHL	20 INV	19 OR	18 DEC	17 SUB	16 ADD	15 PASSTHRU	14 !IPOUT	13 !SYNC IPLOAD	12 IPCLKEN	11 ORLOAD	10 !OROUT	09 DROUTLOAD	08 !DROUTOUT	07 DRINLOAD	06 !DRINOUT	05 ARLOAD	04 !AROUT	03 MEMW	02 MEMR	01 IRLOAD	00 IR RESET
01001	100	0	000	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	1	1	0	1	0	1	0	1	0	0	0	0
		0	001	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	1	1	0	0	1	0	0
		0	010	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	1	1	1	0	0	0	1	0	0
		0	011	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	1	1	1	0	0	1	0	1	0	0	0	1	0	0	0	1
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				IOW	IOR	SPARE	COMPARE	COND JMP EN	Z LOAD	R LOAD	!R OUT	A LOAD	!A OUT	SHL	INV	OR	DEC	SUB	ADD	PASS THRU	!IP OUT	!SYNC IP LOAD	IP CLK EN	OR LOAD	!OR OUT	DROUT LOAD	!DROUT OUT	DRIN LOAD	!DRIN OUT	AR LOAD	!AR OUT	MEMW	MEMR	IR LOAD	IR RESET
OP	ADR	Z	MIP	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
01001	110	0	000	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	1	0	0	1	0	0
		0	001	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	1	0	1	0	1	1	1	0	0	0	1	0	0
		0	010	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	1	1	1	0	0	1	0	1	0	0	0	1	0	0	0	1
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				IOW	IOR	SPARE	COMPARE	COND JMP	ZLOAD	RLOAD	!ROUT	ALOAD	!AOUT	SHL	INV	OR	DEC	SUB	ADD	PASSTHRU	!IPOUT	!SYNC IPLOAD	IPCLKEN	ORLOAD	!OROUT	DROUTLOAD	!DROUTOUT	DRINLOAD	!DRINOUT	ARLOAD	!AROUT	MEMW	MEMR	IRLOAD	IRRESET
OP	ADR	Z	MIP	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
01010	000	0	000	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	1	0	0	1	0	0
		0	001	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	1	0	1	0	1	1	1	0	0	0	1	0	0
		0	010	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	1	1	0	1	0	0	0	1	0	0	0	0
		0	011	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	1	1	0	0	0	0	0
		0	100	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	1	0	0	1	0	0	0
		0	101	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	1	0	0	0	0	0	1
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OP	ADR	Z	MIP	IOW 31	IOR 30	SPARE 29	COMPARE 28	COND JMP 27	ZLOAD 26	RLOAD 25	!ROUT 24	ALOAD 23	!AOUT 22	SHL 21	INV 20	OR 19	DEC 18	SUB 17	ADD 16	PASSTHRU 15	!IPOUT 14	!SYNC IPLOAD 13	IPCLKEN 12	ORLOAD 11	!OROUT 10	DROUTLOAD 09	!DROUT 08	DRINLOAD 07	!DRINOUT 06	ARLOAD 05	!AROUT 04	MEMW 03	MEMR 02	IRLOAD 01	IRRESET 00
01010	100	0	000	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	1	1	0	1	0	1	0	1	0	0	0	0
		0	001	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	1	1	0	0	0	0	0
		0	010	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	1	0	0	1	0	0	0
		0	011	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	1	0	0	0	0	0	1
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				IOW	IOR	SPARE	COMPARE	COND JMP EN	ZLOAD	RLOAD	!ROUT	ALOAD	!AOUT	SHL	INV	OR	DEC	SUB	ADD	PASSTHRU	!IPOUT	!SYNC IPLOAD	IPCLKEN	ORLOAD	!OROUT	DROUTLOAD	!DROUT	DRINLOAD	!DRINOUT	ARLOAD	!AROUT			IRLOAD	IRRESET
OP	ADR	Z	MIP	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
01011	000	0	000	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	1	0	0	1	0	0
		0	001	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	1	0	1	0	1	1	1	0	0	0	1	0	0
		0	010	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	1	1	0	1	0	0	0	1	0	0	0	0
		0	011	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	1	1	0	0	0	0	0
		0	100	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	1	0	0	1	0	0	0
		0	101	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	1	0	0	0	0	0	1
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				IOW	IOR	SPARE	COMPARE	COND JMP EN	ZLOAD	RLOAD	!ROUT	ALOAD	!AOUT	SHL	INV	OR	DEC	SUB	ADD	PASSTHRU	!IPOUT	!SYNC IPLOAD	IPCLKEN	ORLOAD	!OROUT	DROUTLOAD	!DROUTOUT	DRINLOAD	!DRINOUT	ARLOAD	!AROUT	MEMW	MEMR	IRLOAD	IRRESET
OP	ADR	Z	MIP	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
01011	100	0	000	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	1	1	0	1	0	1	0	1	0	0	0	0
		0	001	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	1	1	0	0	0	0	0
		0	010	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	1	0	0	1	0	0	0
		0	011	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	1	0	0	0	0	0	1
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OP	ADR	Z	MIP	IOW 31	IOR 30	SPARE 29	COMPARE 28	COND JMP EN 27	ZLOAD 26	RLOAD 25	!ROUT 24	ALOAD 23	!AOUT 22	SHL 21	INV 20	OR 19	DEC 18	SUB 17	ADD 16	PASSTHRU 15	!IPOUT 14	!SYNC IPLOAD 13	IPCLKEN 12	ORLOAD 11	!OROUT 10	DROUTLOAD 09	!DROUT 08	DRINLOAD 07	!DRINOUT 06	ARLOAD 05	!AROUT 04	MEMW 03	MEMR 02	IRLOAD 01	IRRESET 00
01100	000	0	000	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	1	0	0	1	0	0
		0	001	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	1	0	1	0	1	1	1	0	0	0	1	0	0
		0	010	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	1	1	0	1	0	0	0	1	0	0	0	0
		0	011	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	1	1	0	0	1	0	0
		0	100	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	1	1	1	0	0	0	1	0	0
		0	101	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	0	1	1	0	0	1	0	1	0	0	0	1	0	0	0	1
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OP	ADR	Z	MIP	IOW 31	IOR 30	SPARE 29	COMPARE 28	COND JMP EN 27	ZLOAD 26	RLOAD 25	!ROUT 24	ALOAD 23	!AOUT 22	SHL 21	INV 20	OR 19	DEC 18	SUB 17	ADD 16	PASSTHRU 15	!IPOUT 14	!SYNC IPLOAD 13	IPCLKEN 12	ORLOAD 11	!OROUT 10	DROUTLOAD 09	!DROUT 08	DRINLOAD 07	!DRINOUT 06	ARLOAD 05	!AROUT 04	MEMW 03	MEMR 02	IRLOAD 01	IRRESET 00
01100	010	0	000	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	1	1	0	0	1	0	1	0	1	0	1	0	0	0	1
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OP	ADR	Z	MIP	31 IOW	30 IOR	29 SPARE	28 COMPARE	27 COND JMP EN	26 ZLOAD	25 RLOAD	24 !ROUT	23 ALOAD	22 !AOUT	21 SHL	20 INV	19 OR	18 DEC	17 SUB	16 ADD	15 PASS THRU	14 !IPOUT	13 !SYNC IPLOAD	12 IPCLK EN	11 OR LOAD	10 !OROUT	09 DROUTLOAD	08 !DROUT	07 DRIN LOAD	06 !DRIN OUT	05 ARLOAD	04 !AROUT	03 MEMW	02 MEMR	01 IRLOAD	00 IR RESET
01100	011	0	000	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	1	1	0	0	1	0	1	0	1	0	1	0	0	0	1
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OP	ADR	Z	MIP	31 IOW	30 IOR	29 SPARE	28 COMPARE	27 COND JMP EN	26 ZLOAD	25 RLOAD	24 !ROUT	23 ALOAD	22 !AOUT	21 SHL	20 INV	19 OR	18 DEC	17 SUB	16 ADD	15 PASSTHRU	14 !IPOUT	13 !SYNC IPLOAD	12 IPCLKEN	11 ORLOAD	10 !OROUT	09 DROUTLOAD	08 !DROUTOUT	07 DRINLOAD	06 !DRINOUT	05 ARLOAD	04 !AROUT	03 MEMW	02 MEMR	01 IRLOAD	00 IRRESET
01100	100	0	000	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	1	1	0	1	0	1	0	1	0	0	0	0
		0	001	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	1	1	0	0	1	0	0
		0	010	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	1	1	1	0	0	0	1	0	0
		0	011	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	0	1	1	0	0	1	0	1	0	0	0	1	0	0	0	1
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				IOW	IOR	SPARE	COMPARE	COND JMP EN	ZLOAD	RLOAD	!ROUT	ALOAD	!AOUT	SHL	INV	OR	DEC	SUB	ADD	PASST HRU	!IPOUT	!SYNC IPLOAD	IPCLK EN	ORLOAD	!OROUT	DROUTLOAD	!DROUT	DRINLOAD	!DRINOUT	ARLOAD	!AROUT	MEMW	MEMR	IRLOAD	IRRESET
OP	ADR	Z	MIP	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
01100	110	0	000	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	1	0	0	1	0	0
		0	001	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	1	0	1	0	1	1	1	0	0	0	1	0	0
		0	010	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	0	1	1	0	0	1	0	1	0	0	0	1	0	0	0	1
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				IOW	IOR	SPARE	COMPARE	COND JMP	ZLOAD	RLOAD	!ROUT	ALOAD	!AOUT	SHL	INV	OR	DEC	SUB	ADD	PASSTHRU	!IPOUT	!SYNC IPLOAD	IPCLKEN	ORLOAD	!OROUT	DROUTLOAD	!DROUT	DRINLOAD	!DRINOUT	ARLOAD	!AROUT	MEMW	MEMR	IRLOAD	IRRESET
OP	ADR	Z	MIP	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
01101	000	0	000	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	1	0	0	1	0	0
		0	001	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	1	0	1	0	1	1	1	0	0	0	1	0	0
		0	010	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	1	1	0	1	0	0	0	1	0	0	0	0
		0	011	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	1	1	0	0	1	0	0
		0	100	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	1	1	1	0	0	0	1	0	0
		0	101	0	0	0	0	0	0	0	1	1	1	0	0	0	0	1	0	0	1	1	0	0	1	0	1	0	0	0	1	0	0	0	1
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OP	ADR	Z	MIP	IOW 31	IOR 30	SPARE 29	COMPARE 28	COND JMP EN 27	ZLOAD 26	RLOAD 25	!ROUT 24	ALOAD 23	!AOUT 22	SHL 21	INV 20	OR 19	DEC 18	SUB 17	ADD 16	PASSTHRU 15	!IPOUT 14	!SYNC IPLOAD 13	IPCLKEN 12	ORLOAD 11	!OROUT 10	DROUTLOAD 09	!DROUT 08	DRINLOAD 07	!DRINOUT 06	ARLOAD 05	!AROUT 04	MEMW 03	MEMR 02	IRLOAD 01	IRRESET 00
01101	010	0	000	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	1	1	0	0	1	0	1	0	1	0	1	0	0	0	1
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OP	ADR	Z	MIP	IOW 31	IOR 30	SPARE 29	COMPARE 28	COND JMP EN 27	ZLOAD 26	RLOAD 25	!ROUT 24	ALOAD 23	!AOUT 22	SHL 21	INV 20	OR 19	DEC 18	SUB 17	ADD 16	PASSTHRU 15	!IPOUT 14	!SYNC IPLOAD 13	IPCLKEN 12	ORLOAD 11	!OROUT 10	DROUTLOAD 09	!DROUT 08	DRINLOAD 07	!DRINOUT 06	ARLOAD 05	!AROUT 04	MEMW 03	MEMR 02	IRLOAD 01	IRRESET 00
01101	011	0	000	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	1	1	0	0	1	0	1	0	1	0	1	0	0	0	1
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OP	ADR	Z	MIP	IOW	IOR	SPARE	COMPARE	COND JMP	ZLOAD	RLOAD	!ROUT	ALOAD	!AOUT	SHL	INV	OR	DEC	SUB	ADD	PASSTHRU	!IPOUT	!SYNC IPLOAD	IPCLKEN	ORLOAD	!OROUT	DROUTLOAD	!DROUT	DRINLOAD	!DRINOUT	ARLOAD	!AROUT	MEMW	MEMR	IRLOAD	IRRESET
				31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
01101	100	0	000	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	1	1	0	1	0	1	0	1	0	0	0	0
		0	001	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	1	1	0	0	1	0	0
		0	010	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	1	1	1	0	0	0	1	0	0
		0	011	0	0	0	0	0	0	0	1	1	1	0	0	0	0	1	0	0	1	1	0	0	1	0	1	0	0	0	1	0	0	0	1
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				IOW	IOR	SPARE	COMPARE	COND JMP EN	ZLOAD	RLOAD	!ROUT	ALOAD	!AOUT	SHL	INV	OR	DEC	SUB	ADD	PASSTHRU	!IPOUT	!SYNC IPLOAD	IPCLKEN	ORLOAD	!OROUT	DROUTLOAD	!DROUT	DRINLOAD	!DRINOUT	ARLOAD	!AROUT	MEMW	MEMR	IRLOAD	IRRESET
OP	ADR	Z	MIP	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
01101	110	0	000	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	1	0	0	1	0	0
		0	001	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	1	0	1	0	1	1	1	0	0	0	1	0	0
		0	010	0	0	0	0	0	0	0	1	1	1	0	0	0	0	1	0	0	1	1	0	0	1	0	1	0	0	0	1	0	0	0	1
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				IOW	IOR	SPARE	COMPARE	COND JMP	ZLOAD	RLOAD	!ROUT	ALOAD	!AOUT	SHL	INV	OR	DEC	SUB	ADD	PASSTHRU	!IPOUT	!SYNC IPLOAD	IPCLKEN	ORLOAD	!OROUT	DROUTLOAD	!DROUTOUT	DRINLOAD	!DRINOUT	ARLOAD	!AROUT	MEMW	MEMR	IRLOAD	IRRESET
OP	ADR	Z	MIP	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
01110	000	0	000	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	1	0	0	1	0	0
		0	001	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	1	0	1	0	1	1	1	0	0	0	1	0	0
		0	010	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	1	1	0	1	0	0	0	1	0	0	0	0
		0	011	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	1	1	0	0	1	0	0
		0	100	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	1	1	1	0	0	0	1	0	0
		0	101	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	1	1	1	0	0	1	0	1	0	0	0	1	0	0	0
		0	110	0	0	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	1	1	0	0	1	0	1	0	1	0	1	0	0	0	0
		0	111	0	0	0	0	0	0	0	1	1	1	0	0	0	1	0	0	0	1	1	0	0	1	0	1	0	1	0	1	0	0	0	1
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Address **Data**

OP	ADR	Z	MIP	IOW 31	IOR 30	SPARE 29	COMPARE 28	COND JMP EN 27	ZLOAD 26	RLOAD 25	!ROUT 24	ALOAD 23	!AOUT 22	SHL 21	INV 20	OR 19	DEC 18	SUB 18	ADD 16	PASSTHRU 15	!IPOUT 14	!SYNC IPLOAD 13	IPCLKEN 12	ORLOAD 11	!OROUT 10	DROUTLOAD 09	!DROUT 08	DRINLOAD 07	!DRINOUT 06	ARLOAD 05	!AROUT 04	MEMW 03	MEMR 02	IRLOAD 01	IRRESET 00
01110	010	0	000	0	0	0	0	0	0	0	1	1	1	0	0	0	1	0	0	0	1	1	0	0	1	0	1	0	1	0	1	0	0	0	1
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Address **Data**

OP	ADR	Z	MIP	IOW 31	IOR 30	SPARE 29	COMPARE 28	COND JMP 27	ZLOAD 26	RLOAD 25	!ROUT 24	ALOAD 23	!AOUT 22	SHL 21	INV 20	OR 19	DEC 18	SUB 18	ADD 16	PASSTHRU 15	!IPOUT 14	!SYNC IPLOAD 13	IPCLKEN 12	ORLOAD 11	!OROUT 10	DROUTLOAD 09	!DROUT 08	DRINLOAD 07	!DRINOUT 06	ARLOAD 05	!AROUT 04	MEMW 03	MEMR 02	IRLOAD 01	IRRESET 00
01110	011	0	000	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1	1	0	0	1	0	1	0	1	0	1	0	0	0	0
		0	001	0	0	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	1	1	0	0	1	0	1	0	1	0	1	0	0	0	0
		0	010	0	0	0	0	0	0	0	1	1	1	0	0	0	1	0	0	0	1	1	0	0	1	0	1	0	1	0	1	0	0	0	0
		0	011	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	1	0	1	0	1	0	0	0	1
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Address **Data**

OP	ADR	Z	MIP	31 IOW	30 IOR	29 SPARE	28 COMPARE	27 COND JMP EN	26 ZLOAD	25 RLOAD	24 !ROUT	23 ALOAD	22 !AOUT	21 SHL	20 INV	19 OR	18 DEC	17 SUB	16 ADD	15 PASS THRU	14 !IPOUT	13 !SYNC IPLOAD	12 IPCLK EN	11 ORLOAD	10 !OROUT	09 DROUT LOAD	08 !DROUT OUT	07 DRIN LOAD	06 !DRIN OUT	05 ARLOAD	04 !AROUT	03 MEMW	02 MEMR	01 IRLOAD	00 IR RESET
01110	100	0	000	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	1	1	0	1	0	1	0	1	0	0	0	0
		0	001	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	1	1	0	0	1	0	0
		0	010	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	1	1	1	0	0	0	1	0	0
		0	011	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	1	1	1	0	0	1	0	1	0	0	0	1	0	0	0
		0	100	0	0	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	1	1	0	0	1	0	1	0	1	0	1	0	0	0	0
		0	101	0	0	0	0	0	0	0	1	1	1	0	0	0	1	0	0	0	1	1	0	0	1	0	1	0	1	0	1	0	0	0	1
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OP	ADR	Z	MIP	31 IOW	30 IOR	29 SPARE	28 COMPARE	27 COND JMP EN	26 ZLOAD	25 RLOAD	24 !ROUT	23 ALOAD	22 !AOUT	21 SHL	20 INV	19 OR	18 DEC	17 SUB	16 ADD	15 PASS THRU	14 !IPOUT	13 !SYNC IPLOAD	12 IPCLK EN	11 ORLOAD	10 !OROUT	09 DROUTLOAD	08 !DROUTOUT	07 DRINLOAD	06 !DRINOUT	05 ARLOAD	04 !AROUT	03 MEMW	02 MEMR	01 IRLOAD	00 IR RESET
01110	110	0	000	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	1	0	0	1	0	0
		0	001	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	1	0	1	0	1	1	1	0	0	0	1	0	0
		0	010	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	1	1	1	0	0	1	0	1	0	0	0	1	0	0	0	0
		0	011	0	0	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	1	1	0	0	1	0	1	0	1	0	1	0	0	0	0
		0	100	0	0	0	0	0	0	0	1	1	1	0	0	0	1	0	0	0	1	1	0	0	1	0	1	0	1	0	1	0	0	0	1
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				IOW	IOR	SPARE	COMPARE	COND JMP	ZLOAD	RLOAD	!ROUT	ALOAD	!AOUT	SHL	INV	OR	DEC	SUB	ADD	PASSTHRU	!IPOUT	!SYNC IPLOAD	IPCLKEN	ORLOAD	!OROUT	DROUTLOAD	!DROUT	DRINLOAD	!DRINOUT	ARLOAD	!AROUT	MEMW	MEMR	IRLOAD	IRRESET
OP	ADR	Z	MIP	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
10000	000	0	000	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	1	0	0	1	0	0
		0	001	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	1	0	1	0	1	1	1	0	0	0	1	0	0
		0	010	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	1	1	0	1	0	0	0	1	0	0	0	0
		0	011	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	1	1	0	0	1	0	0
		0	100	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	1	1	1	0	0	0	1	0	0
		0	101	0	0	0	0	0	0	0	1	1	1	0	0	1	0	0	0	0	1	1	0	0	1	0	1	0	0	0	1	0	0	0	1
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Address **Data**

OP	ADR	Z	MIP	IOW 31	IOR 30	SPARE 29	COMPARE 28	COND JMP EN 27	ZLOAD 26	RLOAD 25	!ROUT 24	ALOAD 23	!AOUT 22	SHL 21	INV 20	OR 19	DEC 18	SUB 17	ADD 16	PASSTHRU 15	!IPOUT 14	!SYNC IPLOAD 13	IPCLKEN 12	ORLOAD 11	!OROUT 10	DROUTLOAD 09	!DROUT 08	DRINLOAD 07	!DRINOUT 06	ARLOAD 05	!AROUT 04	MEMW 03	MEMR 02	IRLOAD 01	IRRESET 00
10000	010	0	000	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	1	1	0	0	1	0	1	0	1	0	1	0	0	0	1
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Address **Data**

OP	ADR	Z	MIP	IOW 31	IOR 30	SPARE 29	COMPARE 28	COND JMP EN 27	ZLOAD 26	RLOAD 25	!ROUT 24	ALOAD 23	!AOUT 22	SHL 21	INV 20	OR 19	DEC 18	SUB 17	ADD 16	PASSTHRU 15	!IPOUT 14	!SYNC IPLOAD 13	IPCLKEN 12	ORLOAD 11	!OROUT 10	DROUTLOAD 09	!DROUT 08	DRINLOAD 07	!DRINOUT 06	ARLOAD 05	!AROUT 04	MEMW 03	MEMR 02	IRLOAD 01	IRRESET 00
10000	011	0	000	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	1	1	0	0	1	0	1	0	1	0	1	0	0	0	1
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Address **Data**

OP	ADR	Z	MIP	31 IOW	30 IOR	29 SPARE	28 COMPARE	27 COND JMP EN	26 ZLOAD	25 RLOAD	24 !ROUT	23 ALOAD	22 !AOUT	21 SHL	20 INV	19 OR	18 DEC	17 SUB	16 ADD	15 PASSTHRU	14 !IPOUT	13 !SYNC IPLOAD	12 IPCLKEN	11 ORLOAD	10 !OROUT	09 DROUTLOAD	08 !DROUTOUT	07 DRINLOAD	06 !DRINOUT	05 ARLOAD	04 !AROUT	03 MEMW	02 MEMR	01 IRLOAD	00 IRRESET
10000	100	0	000	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	1	1	0	1	0	1	0	1	0	0	0	0
		0	001	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	1	1	0	0	1	0	0
		0	010	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	1	1	1	0	0	0	1	0	0
		0	011	0	0	0	0	0	0	0	1	1	1	0	0	1	0	0	0	0	1	1	0	0	1	0	1	0	0	0	1	0	0	0	1
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				IOW	IOR	SPARE	COMPARE	COND JMP EN	ZLOAD	RLOAD	!ROUT	ALOAD	!AOUT	SHL	INV	OR	DEC	SUB	ADD	PASST HRU	!IPOUT	!SYNC IPLOAD	IPCLK EN	ORLOAD	!OROUT	DROUTLOAD	!DROUT	DRINLOAD	!DRINOUT	ARLOAD	!AROUT	MEMW	MEMR	IRLOAD	IRRESET
OP	ADR	Z	MIP	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
10000	110	0	000	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	1	0	0	1	0	0
		0	001	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	1	0	1	0	1	1	1	0	0	0	1	0	0
		0	010	0	0	0	0	0	0	0	1	1	1	0	0	1	0	0	0	0	1	1	0	0	1	0	1	0	0	0	1	0	0	0	1
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INV Address

Address **Data**

OP	ADR	Z	MIP	31 IOW	30 IOR	29 SPARE	28 COMPARE	27 COND JMP EN	26 ZLOAD	25 RLOAD	24 !ROUT	23 ALOAD	22 !AOUT	21 SHL	20 INV	19 OR	18 DEC	17 SUB	16 ADD	15 PASSTHRU	14 !IPOUT	13 !SYNC IPLOAD	12 IPCLKEN	11 ORLOAD	10 !OROUT	09 DROUTLOAD	08 !DROUTOUT	07 DRINLOAD	06 !DRINOUT	05 ARLOAD	04 !AROUT	03 MEMW	02 MEMR	01 IRLOAD	00 IRRESET
10001	000	0	000	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	1	0	0	1	0	0
		0	001	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	1	0	1	0	1	1	1	0	0	0	1	0	0
		0	010	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	1	1	0	1	0	0	0	1	0	0	0	0
		0	011	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	1	1	0	0	1	0	0
		0	100	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	1	1	1	0	0	0	1	0	0
		0	101	0	0	0	0	0	0	0	1	1	1	0	1	0	0	0	0	0	1	1	0	0	1	0	1	0	0	0	1	0	0	0	1
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INV A

Address **Data**

OP	ADR	Z	MIP	31 IOW	30 IOR	29 SPARE	28 COMPARE	27 COND JMP EN	26 ZLOAD	25 RLOAD	24 !ROUT	23 ALOAD	22 !AOUT	21 SHL	20 INV	19 OR	18 DEC	17 SUB	16 ADD	15 PASSTHRU	14 !IPOUT	13 !SYNC IPLOAD	12 IPCLKEN	11 ORLOAD	10 !OROUT	09 DROUTLOAD	08 !DROUTOUT	07 DRINLOAD	06 !DRINOUT	05 ARLOAD	04 !AROUT	03 MEMW	02 MEMR	01 IRLOAD	00 IRRESET
10001	010	0	000	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	1	1	0	0	1	0	1	0	1	0	1	0	0	0	1
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INV R

Address **Data**

OP	ADR	Z	MIP	31 IOW	30 IOR	29 SPARE	28 COMPARE	27 COND JMP EN	26 ZLOAD	25 RLOAD	24 !ROUT	23 ALOAD	22 !AOUT	21 SHL	20 INV	19 OR	18 DEC	17 SUB	16 ADD	15 PASSTHRU	14 !IPOUT	13 !SYNC IPLOAD	12 IPCLKEN	11 ORLOAD	10 !OROUT	09 DROUTLOAD	08 !DROUTOUT	07 DRINLOAD	06 !DRINOUT	05 ARLOAD	04 !AROUT	03 MEMW	02 MEMR	01 IRLOAD	00 IRRESET
10001	011	0	000	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	1	1	0	0	1	0	1	0	1	0	1	0	0	0	0
		0	001	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	1	0	1	0	1	0	0	0	1
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Address **Data**

OP	ADR	Z	MIP	31 IOW	30 IOR	29 SPARE	28 COMPARE	27 COND JMP EN	26 ZLOAD	25 RLOAD	24 !ROUT	23 ALOAD	22 !AOUT	21 SHL	20 INV	19 OR	18 DEC	17 SUB	16 ADD	15 PASS THRU	14 !IPOUT	13 !SYNC IPLOAD	12 IPCLK EN	11 ORLOAD	10 !OROUT	09 DROUTLOAD	08 !DROUTOUT	07 DRINLOAD	06 !DRINOUT	05 ARLOAD	04 !AROUT	03 MEMW	02 MEMR	01 IRLOAD	00 IRRESET
10001	100	0	000	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	1	1	0	1	0	1	0	1	0	0	0	0
		0	001	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	1	1	0	0	1	0	0
		0	010	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	1	1	1	0	0	0	1	0	0
		0	011	0	0	0	0	0	0	0	1	1	1	0	1	0	0	0	0	0	1	1	0	0	1	0	1	0	0	0	1	0	0	0	1
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INV I Data

Address **Data**

OP	ADR	Z	MIP	31 IOW	30 IOR	29 SPARE	28 COMPARE	27 COND JMP EN	26 ZLOAD	25 RLOAD	24 !ROUT	23 ALOAD	22 !AOUT	21 SHL	20 INV	19 OR	18 DEC	17 SUB	16 ADD	15 PASSTHRU	14 !IPOUT	13 !SYNC IPLOAD	12 IPCLKEN	11 ORLOAD	10 !OROUT	09 DROUTLOAD	08 !DROUTOUT	07 DRINLOAD	06 !DRINOUT	05 ARLOAD	04 !AROUT	03 MEMW	02 MEMR	01 IRLOAD	00 IRRESET
10001	110	0	000	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	1	0	0	1	0	0
		0	001	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	1	0	1	0	1	1	1	0	0	0	1	0	0
		0	010	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	1	0	0	0	1	0	0	0	1
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				IOW	IOR	SPARE	COMPARE	COND JMP	ZLOAD	RLOAD	!ROUT	ALOAD	!AOUT	SHL	INV	OR	DEC	SUB	ADD	PASSTHRU	!IPOUT	!SYNC IPLOAD	IPCLKEN	ORLOAD	!OROUT	DROUTLOAD	!DROUTOUT	DRINLOAD	!DRINOUT	ARLOAD	!AROUT	MEMW	MEMR	IRLOAD	IRRESET
OP	ADR	Z	MIP	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
10010	000	0	000	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	1	0	0	1	0	0
		0	001	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	1	0	1	0	1	1	1	0	0	0	1	0	0
		0	010	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	1	1	0	1	0	0	0	1	0	0	0	0
		0	011	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	1	1	0	0	1	0	0
		0	100	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	1	1	1	0	0	0	1	0	0
		0	101	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	1	1	1	0	0	1	0	1	0	0	0	1	0	0	0
		0	110	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	1	1	0	0	1	0	1	0	1	0	1	0	0	0	0
		0	111	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	1	1	0	0	1	0	1	0	1	0	1	0	0	0	1
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				IOW	IOR	SPARE	COMPARE	COND JMP EN	ZLOAD	RLOAD	!ROUT	ALOAD	!AOUT	SHL	INV	OR	DEC	SUB	ADD	PASST HRU	!IPOUT	!SYNC IPLOAD	IPCLK EN	ORLOAD	!OROUT	DROUTLOAD	!DROUT	DRINLOAD	!DRINOUT	ARLOAD	!AROUT	MEMW	MEMR	IRLOAD	IRRESET
OP	ADR	Z	MIP	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
10010	010	0	000	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	1	1	0	0	1	0	1	0	1	0	1	0	0	0	1
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OP	ADR	Z	MIP	31 IOW	30 IOR	29 SPARE	28 COMPARE	27 COND JMP EN	26 ZLOAD	25 RLOAD	24 !ROUT	23 ALOAD	22 !AOUT	21 SHL	20 INV	19 OR	18 DEC	17 SUB	16 ADD	15 PASSTHRU	14 !IPOUT	13 !SYNC IPLOAD	12 IPCLKEN	11 ORLOAD	10 !OROUT	09 DROUTLOAD	08 !DROUTOUT	07 DRINLOAD	06 !DRINOUT	05 ARLOAD	04 !AROUT	03 MEMW	02 MEMR	01 IRLOAD	00 IRRESET
10010	011	0	000	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1	1	0	0	1	0	1	0	1	0	1	0	0	0	0
		0	001	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	1	1	0	0	1	0	1	0	1	0	1	0	0	0	0
		0	010	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	1	1	0	0	1	0	1	0	1	0	1	0	0	0	0
		0	011	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	1	0	1	0	1	0	0	0	1
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OP	ADR	Z	MIP	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
10010	100	0	000	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	1	1	0	1	0	1	0	1	0	0	0	0
		0	001	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	1	1	0	0	1	0	0
		0	010	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	1	1	1	0	0	0	1	0	0
		0	011	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	1	1	1	0	0	1	0	1	0	0	0	1	0	0	0
		0	100	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	1	1	0	0	1	0	1	0	1	0	1	0	0	0	0
		0	101	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	1	1	0	0	1	0	1	0	1	0	1	0	0	0	1
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OP	ADR	Z	MIP	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
10010	110	0	000	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	1	0	0	1	0	0
		0	001	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	1	0	1	0	1	1	1	0	0	0	1	0	0
		0	010	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	1	1	1	0	0	1	0	1	0	0	0	1	0	0	0	0
		0	011	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	1	1	0	0	1	0	1	0	1	0	1	0	0	0	0
		0	100	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	1	1	0	0	1	0	1	0	1	0	1	0	0	0	1
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