

# PDP-10 instruction set – KA10

## Floating Point

UFA	130	$(AC) + (E) \rightarrow (AC+1)$ without normalization
DFN	131	$(AC,E) \rightarrow -(AC,E)$
FSC	132	$(AC) \times 2^E \rightarrow (AC)$

## Byte Manipulation

IBP	133	<i>If</i> $P - S > 0$ : $P - S \rightarrow P$ <i>If</i> $P - S < 0$ : $Y + 1 \rightarrow Y$ ; $36 - S \rightarrow P$	LDB	135	BYTE IN ((E)) $\rightarrow$ (AC)
ILDB	134	IBP, LDB	DPB	137	BYTE IN (AC) $\rightarrow$ BYTE IN ((E))
IDPB	136	IBP, DPB			

## Floating Point Arithmetic

FAD	140	$(AC) + (E) \rightarrow (AC)$	FADR	144	$(AC) + (E) \rightarrow (AC)$
FADL	141	$(AC) + (E) \rightarrow (AC,AC+1)$	FADRI	145	$(AC) + E,0 \rightarrow (AC)$
FADM	142	$(AC) + (E) \rightarrow (E)$	FADRM	146	$(AC) + (E) \rightarrow (E)$
FADB	143	$(AC) + (E) \rightarrow (AC)(E)$	FADRB	147	$(AC) + (E) \rightarrow (AC)(E)$
FSB	150	$(AC) - (E) \rightarrow (AC)$	FSBR	154	$(AC) - (E) \rightarrow (AC)$
FSBL	151	$(AC) - (E) \rightarrow (AC,AC+1)$	FSBRI	155	$(AC) - E,0 \rightarrow (AC)$
FSBM	152	$(AC) - (E) \rightarrow (E)$	FSBRM	156	$(AC) - (E) \rightarrow (E)$
FSBB	153	$(AC) - (E) \rightarrow (AC)(E)$	FSBRB	157	$(AC) - (E) \rightarrow (AC)(E)$
FMP	160	$(AC) \times (E) \rightarrow (AC)$	FMPR	164	$(AC) \times (E) \rightarrow (AC)$
FMPPL	161	$(AC) \times (E) \rightarrow (AC,AC+1)$	FMPRI	165	$(AC) \times E,0 \rightarrow (AC)$
FMPM	162	$(AC) \times (E) \rightarrow (E)$	FMPRM	166	$(AC) \times (E) \rightarrow (E)$
FMPB	163	$(AC) \times (E) \rightarrow (AC)(E)$	FMPRB	167	$(AC) \times (E) \rightarrow (AC)(E)$
FDV	170	$(AC) / (E) \rightarrow (AC)$	FDVR	174	$(AC) / (E) \rightarrow (AC)$
FDVL	171	$(AC) / (E) \rightarrow (AC)$ REMAINDER $\rightarrow$ (AC+1)	FDVRI	175	$(AC) / E,0 \rightarrow (AC)$
FDVM	172	$(AC) / (E) \rightarrow (E)$	FDVRM	176	$(AC) / (E) \rightarrow (E)$
FDVB	173	$(AC) / (E) \rightarrow (AC)(E)$	FDVRB	177	$(AC) / (E) \rightarrow (AC)(E)$

## Full Word Data Transmission

MOVE	200	$(E) \rightarrow (AC)$	MOVSI	205	$E,0 \rightarrow (AC)$
MOVEI	201	$0,E \rightarrow (AC)$	MOVSM	206	$(AC)_S \rightarrow (E)$
MOVEM	202	$(AC) \rightarrow (E)$	MOVSS	207	$(E)_S \rightarrow (E)$ <i>If</i> $AC \neq 0$ : $(E) \rightarrow (AC)$
MOVES	203	<i>If</i> $AC \neq 0$ : $(E) \rightarrow (AC)$			
MOVN	210	$-(E) \rightarrow (AC)$	MOVMI	215	$0,E \rightarrow (AC)$
MOVNI	211	$-[0,E] \rightarrow (AC)$	MOVMM	216	$ (AC)  \rightarrow (E)$
MOVNM	212	$-(AC) \rightarrow (E)$	MOVMS	217	$ (E)  \rightarrow (E)$ <i>If</i> $AC \neq 0$ : $(E) \rightarrow (AC)$
MOVNS	213	$-(E) \rightarrow (E)$ <i>If</i> $AC \neq 0$ : $(E) \rightarrow (AC)$			

### Fixed Point Multiply-Divide

IMUL	220	$(AC) \times (E) \rightarrow (AC)$	MUL	224	$(AC) \times (E) \rightarrow (AC, AC+1)$
IMULI	221	$(AC) \times 0, E \rightarrow (AC)$	MULI	225	$(AC) \times 0, E \rightarrow (AC, AC+1)$
IMULM	222	$(AC) \times (E) \rightarrow (E)$	MULM	226	$(AC) \times (E) \rightarrow (E)$
IMULB	223	$(AC) \times (E) \rightarrow (AC)(E)$	MULB	227	$(AC) \times (E) \rightarrow (AC, AC+1)(E)$
IDIV	230	$(AC) / (E) \rightarrow (AC)$ REMAINDER $\rightarrow (AC+1)$	DIV	234	$(AC, AC+1) / (E) \rightarrow (AC)$ REMAINDER $\rightarrow (AC+1)$
IDIVI	231	$(AC) / 0, E \rightarrow (AC)$ REMAINDER $\rightarrow (AC+1)$	DIVI	235	$(AC, AC+1) / 0, E \rightarrow (AC)$ REMAINDER $\rightarrow (AC+1)$
IDIVM	232	$(AC) / (E) \rightarrow (E)$	DIVM	236	$(AC, AC+1) / (E) \rightarrow (E)$
IDIVB	233	$(AC) / (E) \rightarrow (AC)(E)$ REMAINDER $\rightarrow (AC+1)$	DIVB	237	$(AC, AC+1) / (E) \rightarrow (AC)(E)$ REMAINDER $\rightarrow (AC+1)$

### Shift and Rotate

ASH	240	$(AC) \times 2^E \rightarrow (AC)$	ASHC	244	$(AC, AC+1) \times 2^E \rightarrow (AC, AC+1)$
ROT	241	Rotate $(AC)$ $E$ places	ROTC	245	Rotate $(AC, AC+1)$ $E$ places
LSH	242	Shift $(AC)$ $E$ places	LSHC	246	Shift $(AC, AC+1)$ $E$ places

### Miscellaneous

JFFO	243	<i>If</i> $(AC) = 0: 0 \rightarrow (AC+1)$ <i>If</i> $(AC) \neq 0: \text{NUMBER OF LEADING ZEROS IN } (AC) \rightarrow (AC+1); E \rightarrow (PC)$
EXCH	250	$(AC) \leftrightarrow (E)$
BLT	251	Move $E - (AC)_R + 1$ words starting with $((AC)_L) \rightarrow ((AC)_R)$
AOBJP	252	$(AC) + 1000001 \rightarrow (AC); \text{If } (AC) \geq 0: E \rightarrow (PC)$
AOBJN	253	$(AC) + 1000001 \rightarrow (AC); \text{If } (AC) < 0: E \rightarrow (PC)$
JRST	254	$E \rightarrow (PC)$ [ <i>If</i> $AC \neq 0$ , reset processor state according to $AC$ ]
JFCL	255	<i>If</i> $AC \wedge \text{FLAGS} \neq 0: E \rightarrow (PC); \sim AC \wedge \text{FLAGS} \rightarrow \text{FLAGS}$
XCT	256	Execute $(E)$

### Pushdown List and Jumps

PUSHJ	260	$(AC) + 1000001 \rightarrow (AC); \text{FLAGS}, (PC) \rightarrow ((AC)_R); E \rightarrow (PC)$
PUSH	261	$(AC) + 1000001 \rightarrow (AC); (E) \rightarrow ((AC)_R)$
POP	262	$((AC)_R) \rightarrow (E); (AC) - 1000001 \rightarrow (AC)$
POPJ	263	$((AC)_R)_R \rightarrow (PC); (AC) - 1000001 \rightarrow (AC)$
JSR	264	$\text{FLAGS}, (PC) \rightarrow (E); E + 1 \rightarrow (PC)$
JSP	265	$\text{FLAGS}, (PC) \rightarrow (AC); E \rightarrow (PC)$
JSA	266	$(AC) \rightarrow (E); E, (PC) \rightarrow (AC); E + 1 \rightarrow (PC)$
JRA	267	$E \rightarrow (PC); ((AC)_L) \rightarrow (AC)$

### Fixed Point Add-Subtract

ADD	270	$(AC) + (E) \rightarrow (AC)$	SUB	274	$(AC) - (E) \rightarrow (AC)$
ADDI	271	$(AC) + 0, E \rightarrow (AC)$	SUBI	275	$(AC) - 0, E \rightarrow (AC)$
ADDM	272	$(AC) + (E) \rightarrow (E)$	SUBM	276	$(AC) - (E) \rightarrow (E)$
ADDB	273	$(AC) + (E) \rightarrow (AC)(E)$	SUBB	277	$(AC) - (E) \rightarrow (AC)(E)$

## Arithmetic Testing

CAI	300	No-op	CAM	310	No-op
CAIL	301	If (AC) < E: skip	CAML	311	If (AC) < (E): skip
CAIE	302	If (AC) = E: skip	CAME	312	If (AC) = (E): skip
CAILE	303	If (AC) ≤ E: skip	CAMLE	313	If (AC) ≤ (E): skip
CAIA	304	skip	CAMA	314	skip
CAIGE	305	If (AC) ≥ E: skip	CAMGE	315	If (AC) ≥ (E): skip
CAIN	306	If (AC) ≠ E: skip	CAMN	316	If (AC) ≠ (E): skip
CAIG	307	If (AC) > E: skip	CAMG	317	If (AC) > (E): skip
JUMP	320	No-op	SKIP	330	If AC ≠ 0: (E) → (AC)
JUMPL	321	If (AC) < 0: E → (PC)	SKIPL	331	If AC ≠ 0: (E) → (AC) If (E) < 0: skip
JUMPE	322	If (AC) = 0: E → (PC)	SKIPE	332	If AC ≠ 0: (E) → (AC) If (E) = 0: skip
JUMPLE	323	If (AC) ≤ 0: E → (PC)	SKIPL	333	If AC ≠ 0: (E) → (AC) If (E) ≤ 0: skip
JUMPA	324	E → (PC)	SKIP	334	If AC ≠ 0: (E) → (AC) skip
JUMPGE	325	If (AC) ≥ 0: E → (PC)	SKIPGE	335	If AC ≠ 0: (E) → (AC) If (E) ≥ 0: skip
JUMPN	326	If (AC) ≠ 0: E → (PC)	SKIPN	336	If AC ≠ 0: (E) → (AC) If (E) ≠ 0: skip
JUMPG	327	If (AC) > 0: E → (PC)	SKIPG	337	If AC > 0: (E) → (AC) If (E) > 0: skip
AOJ	340	(AC) + 1 → (AC)	SOJ	360	(AC) - 1 → (AC)
AOJL	341	(AC) + 1 → (AC) If (AC) < 0: E → (PC)	SOJL	361	(AC) - 1 → (AC) If (AC) < 0: E → (PC)
AOJE	342	(AC) + 1 → (AC) If (AC) = 0: E → (PC)	SOJE	362	(AC) - 1 → (AC) If (AC) = 0: E → (PC)
AOJLE	343	(AC) + 1 → (AC) If (AC) ≤ 0: E → (PC)	SOJLE	363	(AC) - 1 → (AC) If (AC) ≤ 0: E → (PC)
AOJA	344	(AC) + 1 → (AC) E → (PC)	SOJA	364	(AC) - 1 → (AC) E → (PC)
AOJGE	345	(AC) + 1 → (AC) If (AC) ≥ 0: E → (PC)	SOJGE	365	(AC) - 1 → (AC) If (AC) ≥ 0: E → (PC)
AOJN	346	(AC) + 1 → (AC) If (AC) ≠ 0: E → (PC)	SOJN	366	(AC) - 1 → (AC) If (AC) ≠ 0: E → (PC)
AOJG	347	(AC) + 1 → (AC) If (AC) ≥ 0: E → (PC)	SOJG	367	(AC) - 1 → (AC) If (AC) ≥ 0: E → (PC)

AOS	350	$(E) + 1 \rightarrow (E)$ <i>If <math>AC \neq 0</math>: <math>(E) \rightarrow (AC)</math></i>	SOS	370	$(E) - 1 \rightarrow (E)$ <i>If <math>AC \neq 0</math>: <math>(E) \rightarrow (AC)</math></i>
AOSL	351	$(E) + 1 \rightarrow (E)$ <i>If <math>AC \neq 0</math>: <math>(E) \rightarrow (AC)</math></i> <i>If <math>(E) &lt; 0</math>: skip</i>	SOSL	371	$(E) - 1 \rightarrow (E)$ <i>If <math>AC \neq 0</math>: <math>(E) \rightarrow (AC)</math></i> <i>If <math>(E) &lt; 0</math>: skip</i>
AOSE	352	$(E) + 1 \rightarrow (E)$ <i>If <math>AC \neq 0</math>: <math>(E) \rightarrow (AC)</math></i> <i>If <math>(E) = 0</math>: skip</i>	SOSE	372	$(E) - 1 \rightarrow (E)$ <i>If <math>AC \neq 0</math>: <math>(E) \rightarrow (AC)</math></i> <i>If <math>(E) = 0</math>: skip</i>
AOSLE	353	$(E) + 1 \rightarrow (E)$ <i>If <math>AC \neq 0</math>: <math>(E) \rightarrow (AC)</math></i> <i>If <math>(E) \leq 0</math>: skip</i>	SOSLE	373	$(E) - 1 \rightarrow (E)$ <i>If <math>AC \neq 0</math>: <math>(E) \rightarrow (AC)</math></i> <i>If <math>(E) \leq 0</math>: skip</i>
AOSA	354	$(E) + 1 \rightarrow (E)$ <i>If <math>AC \neq 0</math>: <math>(E) \rightarrow (AC)</math></i> <i>skip</i>	SOSA	374	$(E) - 1 \rightarrow (E)$ <i>If <math>AC \neq 0</math>: <math>(E) \rightarrow (AC)</math></i> <i>skip</i>
AOSGE	355	$(E) + 1 \rightarrow (E)$ <i>If <math>AC \neq 0</math>: <math>(E) \rightarrow (AC)</math></i> <i>If <math>(E) \geq 0</math>: skip</i>	SOSGE	375	$(E) - 1 \rightarrow (E)$ <i>If <math>AC \neq 0</math>: <math>(E) \rightarrow (AC)</math></i> <i>If <math>(E) \geq 0</math>: skip</i>
AOSN	356	$(E) + 1 \rightarrow (E)$ <i>If <math>AC \neq 0</math>: <math>(E) \rightarrow (AC)</math></i> <i>If <math>(E) \neq 0</math>: skip</i>	SOSN	376	$(E) - 1 \rightarrow (E)$ <i>If <math>AC \neq 0</math>: <math>(E) \rightarrow (AC)</math></i> <i>If <math>(E) \neq 0</math>: skip</i>
AOSG	357	$(E) + 1 \rightarrow (E)$ <i>If <math>AC \neq 0</math>: <math>(E) \rightarrow (AC)</math></i> <i>If <math>(E) &gt; 0</math>: skip</i>	SOSG	377	$(E) - 1 \rightarrow (E)$ <i>If <math>AC \neq 0</math>: <math>(E) \rightarrow (AC)</math></i> <i>If <math>(E) &gt; 0</math>: skip</i>

Boolean

SETZ	400	$0 \rightarrow (AC)$	AND	404	$(AC) \wedge (E) \rightarrow (AC)$
SETZI	401	$0 \rightarrow (AC)$	ANDI	405	$(AC) \wedge 0, E \rightarrow (AC)$
SETZM	402	$0 \rightarrow (E)$	ANDM	406	$(AC) \wedge (E) \rightarrow (E)$
SETZB	403	$0 \rightarrow (AC)(E)$	ANDB	407	$(AC) \wedge (E) \rightarrow (AC)(E)$
ANDCA	410	$\sim(AC) \wedge (E) \rightarrow (AC)$	SETM	414	$(E) \rightarrow (AC)$
ANDCAI	411	$\sim(AC) \wedge 0, E \rightarrow (AC)$	SETMI	415	$0, E \rightarrow (AC)$
ANDCAM	412	$\sim(AC) \wedge (E) \rightarrow (E)$	SETMM	416	$(E) \rightarrow (E)$ [no-op]
ANDCAB	413	$\sim(AC) \wedge (E) \rightarrow (AC)(E)$	SETMB	417	$(E) \rightarrow (AC)(E)$
ANDCM	420	$(AC) \wedge \sim(E) \rightarrow (AC)$	SETA	424	$(AC) \rightarrow (AC)$ [no-op]
ANDCMI	421	$(AC) \wedge \sim[0, E] \rightarrow (AC)$	SETAI	425	$(AC) \rightarrow (AC)$ [no-op]
ANDCMM	422	$(AC) \wedge \sim(E) \rightarrow (E)$	SETAM	426	$(AC) \rightarrow (E)$
ANDCMB	423	$(AC) \wedge \sim(E) \rightarrow (AC)(E)$	SETAB	427	$(AC) \rightarrow (AC)(E)$
XOR	430	$(AC) \underline{\vee} (E) \rightarrow (AC)$	IOR	434	$(AC) \vee (E) \rightarrow (AC)$
XORI	431	$(AC) \underline{\vee} 0, E \rightarrow (AC)$	IORI	435	$(AC) \vee 0, E \rightarrow (AC)$
XORM	432	$(AC) \underline{\vee} (E) \rightarrow (E)$	IORM	436	$(AC) \vee (E) \rightarrow (E)$
XORB	433	$(AC) \underline{\vee} (E) \rightarrow (AC)(E)$	IORB	437	$(AC) \vee (E) \rightarrow (AC)(E)$
ANDCB	440	$\sim(AC) \wedge \sim(E) \rightarrow (AC)$	EQV	444	$\sim[(AC) \underline{\vee} (E)] \rightarrow (AC)$
ANDCBI	441	$\sim(AC) \wedge \sim[0, E] \rightarrow (AC)$	EQVI	445	$\sim[(AC) \underline{\vee} 0, E] \rightarrow (AC)$
ANDCBM	442	$\sim(AC) \wedge \sim(E) \rightarrow (E)$	EQVM	446	$\sim[(AC) \underline{\vee} (E)] \rightarrow (E)$
ANDCBB	443	$\sim(AC) \wedge \sim(E) \rightarrow (AC)(E)$	EQVB	447	$\sim[(AC) \underline{\vee} (E)] \rightarrow (AC)(E)$
SETCA	450	$\sim(AC) \rightarrow (AC)$	ORCA	454	$\sim(AC) \vee (E) \rightarrow (AC)$
SETCAI	451	$\sim(AC) \rightarrow (AC)$	ORCAI	455	$\sim(AC) \vee 0, E \rightarrow (AC)$
SETCAM	452	$\sim(AC) \rightarrow (E)$	ORCAM	456	$\sim(AC) \vee (E) \rightarrow (E)$
SETCAB	453	$\sim(AC) \rightarrow (AC)(E)$	ORCAB	457	$\sim(AC) \vee (E) \rightarrow (AC)(E)$
SETCM	460	$\sim(E) \rightarrow (AC)$	ORCM	464	$(AC) \vee \sim(E) \rightarrow (AC)$
SETCMI	461	$\sim[0, E] \rightarrow (AC)$	ORCMI	465	$(AC) \vee \sim[0, E] \rightarrow (AC)$
SETCMM	462	$\sim(E) \rightarrow (E)$	ORCMM	466	$(AC) \vee \sim(E) \rightarrow (E)$
SETCMB	463	$\sim(E) \rightarrow (AC)(E)$	ORCMB	467	$(AC) \vee \sim(E) \rightarrow (AC)(E)$
ORCB	470	$\sim(AC) \vee \sim(E) \rightarrow (AC)$	SETO	474	$77777777777777 \rightarrow (AC)$
ORCBI	471	$\sim(AC) \vee \sim[0, E] \rightarrow (AC)$	SETOI	475	$77777777777777 \rightarrow (AC)$
ORCBM	472	$\sim(AC) \vee \sim(E) \rightarrow (E)$	SETOM	476	$77777777777777 \rightarrow (E)$
ORCBB	473	$\sim(AC) \vee \sim(E) \rightarrow (AC)(E)$	SETOB	477	$77777777777777 \rightarrow (AC)(E)$

Half Word Data Transmission

HLL	500	$(E)_L \rightarrow (AC)_L$	HRL	504	$(E)_R \rightarrow (AC)_L$
HLLI	501	$0 \rightarrow (AC)_L$	HRLI	505	$E \rightarrow (AC)_L$
HLLM	502	$(AC)_L \rightarrow (E)_L$	HRLM	506	$(AC)_R \rightarrow (E)_L$
HLLS	503	If $AC \neq 0$ : $(E) \rightarrow (AC)$	HRLS	507	$(E)_R \rightarrow (E)_L$ If $AC \neq 0$ : $(E) \rightarrow (AC)$
HLLZ	510	$(E)_L, 0 \rightarrow (AC)$	HRLZ	514	$(E)_R, 0 \rightarrow (AC)$
HLLZI	511	$0 \rightarrow (AC)$	HRLZI	515	$E, 0 \rightarrow (AC)$
HLLZM	512	$(AC)_L, 0 \rightarrow (E)$	HRLZM	516	$(AC)_R, 0 \rightarrow (E)$
HLLZS	513	$0 \rightarrow (E)_R$ If $AC \neq 0$ : $(E) \rightarrow (AC)$	HRLZS	517	$(E)_R, 0 \rightarrow (E)$ If $AC \neq 0$ : $(E) \rightarrow (AC)$
HLLO	520	$(E)_L, 777777 \rightarrow (AC)$	HRLO	524	$(E)_R, 777777 \rightarrow (AC)$
HLLOI	521	$0, 777777 \rightarrow (AC)$	HRLOI	525	$E, 777777 \rightarrow (AC)$
HLLOM	522	$(AC)_L, 777777 \rightarrow (E)$	HRLOM	526	$(AC)_R, 777777 \rightarrow (E)$
HLLOS	523	$777777 \rightarrow (E)_R$ If $AC \neq 0$ : $(E) \rightarrow (AC)$	HRLOS	527	$(E)_R, 777777 \rightarrow (E)$ If $AC \neq 0$ : $(E) \rightarrow (AC)$
HLLE	530	$(E)_L, [(E)_0 \times 777777] \rightarrow (AC)$	HRLE	534	$(E)_R, [(E)_{18} \times 777777] \rightarrow (AC)$
HLLEI	531	$0 \rightarrow (AC)$	HRLEI	535	$E, [E_{18} \times 777777] \rightarrow (AC)$
HLLEM	532	$(AC)_L, [(AC)_0 \times 777777] \rightarrow (E)$	HRLEM	536	$(AC)_R, [(AC)_{18} \times 777777] \rightarrow (E)$
HLLES	533	$(E)_0 \times 777777 \rightarrow (E)_R$ If $AC \neq 0$ : $(E) \rightarrow (AC)$	HRLES	537	$(E)_R, [(E)_{18} \times 777777] \rightarrow (E)$ If $AC \neq 0$ : $(E) \rightarrow (AC)$
HRR	540	$(E)_R \rightarrow (AC)_R$	HLR	544	$(E)_L \rightarrow (AC)_R$
HRRI	541	$E \rightarrow (AC)_R$	HLRI	545	$0 \rightarrow (AC)_R$
HRRM	542	$(AC)_R \rightarrow (E)_R$	HLRM	546	$(AC)_L \rightarrow (E)_R$
HRRS	543	If $AC \neq 0$ : $(E) \rightarrow (AC)$	HLRS	547	$(E)_L \rightarrow (E)_R$ If $AC \neq 0$ : $(E) \rightarrow (AC)$
HRRZ	550	$0, (E)_R \rightarrow (AC)$	HLRZ	554	$0, (E)_L \rightarrow (AC)$
HRRZI	551	$0, E \rightarrow (AC)$	HLRZI	555	$0 \rightarrow (AC)$
HRRZM	552	$0, (AC)_R \rightarrow (E)$	HLRZM	556	$0, (AC)_L \rightarrow (E)$
HRRZS	553	$0 \rightarrow (E)_L$ If $AC \neq 0$ : $(E) \rightarrow (AC)$	HLRZS	557	$0, (E)_L \rightarrow (E)$ If $AC \neq 0$ : $(E) \rightarrow (AC)$
HRRO	560	$777777, (E)_R \rightarrow (AC)$	HLRO	564	$777777, (E)_L \rightarrow (AC)$
HRROI	561	$777777, E \rightarrow (AC)$	HLROI	565	$777777, 0 \rightarrow (AC)$
HRROM	562	$777777, (AC)_R \rightarrow (E)$	HLROM	566	$777777, (AC)_L \rightarrow (E)$
HRROS	563	$777777 \rightarrow (E)_L$ If $AC \neq 0$ : $(E) \rightarrow (AC)$	HLROS	567	$777777, (E)_L \rightarrow (E)$ If $AC \neq 0$ : $(E) \rightarrow (AC)$
HRRE	570	$[(E)_{18} \times 777777], (E)_R \rightarrow (AC)$	HLRE	574	$[(E)_0 \times 777777], (E)_L \rightarrow (AC)$
HRREI	571	$[E_{18} \times 777777], E \rightarrow (AC)$	HLREI	575	$0 \rightarrow (AC)$
HRREM	572	$[(AC)_{18} \times 777777], (AC)_R \rightarrow (E)$	HLREM	576	$[(AC)_0 \times 777777], (AC)_L \rightarrow (E)$
HRRES	573	$(E)_{18} \times 777777 \rightarrow (E)_L$ If $AC \neq 0$ : $(E) \rightarrow (AC)$	HLRES	577	$[(E)_0 \times 777777], (E)_L \rightarrow (E)$ If $AC \neq 0$ : $(E) \rightarrow (AC)$

Logical Testing and Manipulation

TRN	600	No-op	TLN	601	No-op
TRNE	602	If $(AC)_R \wedge E = 0$ : skip	TLNE	603	If $(AC)_L \wedge E = 0$ : skip
TRNA	604	skip	TLNA	605	skip
TRNN	606	If $(AC)_R \wedge E \neq 0$ : skip	TLNN	607	If $(AC)_L \wedge E \neq 0$ : skip
TDN	610	No-op	TSN	611	No-op
TDNE	612	If $(AC) \wedge (E) = 0$ : skip	TSNE	613	If $(AC) \wedge (E)_S = 0$ : skip
TDNA	614	skip	TSNA	615	skip
TDNN	616	If $(AC) \wedge (E) \neq 0$ : skip	TSNN	617	If $(AC) \wedge (E)_S \neq 0$ : skip
TRZ	620	$(AC)_R \wedge \sim E \rightarrow (AC)_R$	TLZ	621	$(AC)_L \wedge \sim E \rightarrow (AC)_L$
TRZE	622	If $(AC)_R \wedge E = 0$ : skip $(AC)_R \wedge \sim E \rightarrow (AC)_R$	TLZE	623	If $(AC)_L \wedge E = 0$ : skip $(AC)_L \wedge \sim E \rightarrow (AC)_L$
TRZA	624	$(AC)_R \wedge \sim E \rightarrow (AC)_R$ skip	TLZA	625	$(AC)_L \wedge \sim E \rightarrow (AC)_L$ skip
TRZN	626	If $(AC)_R \wedge E \neq 0$ : skip $(AC)_R \wedge \sim E \rightarrow (AC)_R$	TLZN	627	If $(AC)_L \wedge E \neq 0$ : skip $(AC)_L \wedge \sim E \rightarrow (AC)_L$
TDZ	630	$(AC) \wedge \sim(E) \rightarrow (AC)$	TSZ	631	$(AC) \wedge \sim(E)_S \rightarrow (AC)$
TDZE	632	If $(AC) \wedge (E) = 0$ : skip $(AC) \wedge \sim(E) \rightarrow (AC)$	TSZE	633	If $(AC) \wedge (E)_S = 0$ : skip $(AC) \wedge \sim(E)_S \rightarrow (AC)$
TDZA	634	$(AC) \wedge \sim(E) \rightarrow (AC)$ skip	TSZA	635	$(AC) \wedge \sim(E)_S \rightarrow (AC)$ skip
TDZN	636	If $(AC) \wedge (E) \neq 0$ : skip $(AC) \wedge \sim(E) \rightarrow (AC)$	TSZN	637	If $(AC) \wedge (E)_S \neq 0$ : skip $(AC) \wedge \sim(E)_S \rightarrow (AC)$
TRC	640	$(AC)_R \vee E \rightarrow (AC)_R$	TLC	641	$(AC)_L \vee E \rightarrow (AC)_L$
TRCE	642	If $(AC)_R \wedge E = 0$ : skip $(AC)_R \vee E \rightarrow (AC)_R$	TLCE	643	If $(AC)_L \wedge E = 0$ : skip $(AC)_L \vee E \rightarrow (AC)_L$
TRCA	644	$(AC)_R \vee E \rightarrow (AC)_R$ skip	TLCA	645	$(AC)_L \vee E \rightarrow (AC)_L$ skip
TRCN	646	If $(AC)_R \wedge E \neq 0$ : skip $(AC)_R \vee E \rightarrow (AC)_R$	TLCN	647	If $(AC)_L \wedge E \neq 0$ : skip $(AC)_L \vee E \rightarrow (AC)_L$
TDC	650	$(AC) \vee (E) \rightarrow (AC)$	TSC	651	$(AC) \vee (E)_S \rightarrow (AC)$
TDCE	652	If $(AC) \wedge (E) = 0$ : skip $(AC) \vee (E) \rightarrow (AC)$	TSCE	653	If $(AC) \wedge (E)_S = 0$ : skip $(AC) \vee (E)_S \rightarrow (AC)$
TDCA	654	$(AC) \vee (E) \rightarrow (AC)$ skip	TSCA	655	$(AC) \vee (E)_S \rightarrow (AC)$ skip
TDCN	656	If $(AC) \wedge (E) \neq 0$ : skip $(AC) \vee (E) \rightarrow (AC)$	TSCN	657	If $(AC) \wedge (E)_S \neq 0$ : skip $(AC) \vee (E)_S \rightarrow (AC)$
TRO	660	$(AC)_R \vee E \rightarrow (AC)_R$	TLO	661	$(AC)_L \vee E \rightarrow (AC)_R$
TROE	662	If $(AC)_R \wedge E = 0$ : skip $(AC)_R \vee E \rightarrow (AC)_R$	TLOE	663	If $(AC)_L \wedge E = 0$ : skip $(AC)_L \vee E \rightarrow (AC)_R$
TROA	664	$(AC)_R \vee E \rightarrow (AC)_R$ skip	TLOA	665	$(AC)_L \vee E \rightarrow (AC)_R$ skip
TRON	666	If $(AC)_R \wedge E \neq 0$ : skip $(AC)_R \vee E \rightarrow (AC)_R$	TLON	667	If $(AC)_L \wedge E \neq 0$ : skip $(AC)_L \vee E \rightarrow (AC)_R$
TDO	670	$(AC) \vee (E) \rightarrow (AC)$	TSO	671	$(AC) \vee (E)_S \rightarrow (AC)$
TDOE	672	If $(AC) \wedge (E) = 0$ : skip $(AC) \vee (E) \rightarrow (AC)$	TSOE	673	If $(AC) \wedge (E)_S = 0$ : skip $(AC) \vee (E)_S \rightarrow (AC)$
TDOA	674	$(AC) \vee (E) \rightarrow (AC)$ skip	TSOA	675	$(AC) \vee (E)_S \rightarrow (AC)$ skip
TDON	676	If $(AC) \wedge (E) \neq 0$ : skip $(AC) \vee (E) \rightarrow (AC)$	TSON	677	If $(AC) \wedge (E)_S \neq 0$ : skip $(AC) \vee (E)_S \rightarrow (AC)$

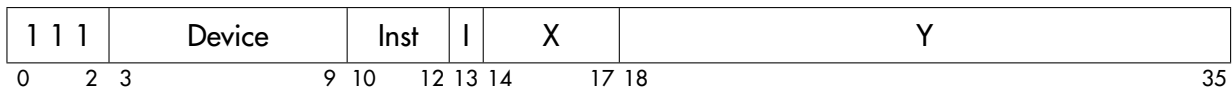
### IO Instructions

BLKI	7--00	(E) + 1000001 → (E); DATA → ((E) <sub>R</sub> ) If ((E) <sub>L</sub> ) = 0: Execute next instruction If ((E) <sub>L</sub> ) ≠ 0: skip /dismiss PI break
DATAI	7--04	DATA → (E)
BLKO	7--10	(E) + 1000001 → (E); ((E) <sub>R</sub> ) → DATA If ((E) <sub>L</sub> ) = 0: Execute next instruction If ((E) <sub>L</sub> ) ≠ 0: skip /dismiss PI break
DATAO	7--14	(E) → DATA
CONO	7--20	E → COMMAND
CONI	7--24	STATUS => (E)
CONSZ	7--30	If STATUS ∧ E = 0: skip
CONSO	7--34	If STATUS ∧ E ≠ 0: skip

### Basic Instruction



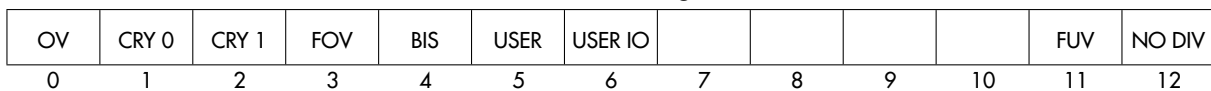
### IO Instruction



### Byte Pointer



### PC Word Flags



JFCL 0,		No-op
JFCL 1,	JFOV	Jump on Floating Overflow flag
JFCL 2,	JCRY1	Jump on Carry 1 flag
JFCL 4,	JCRY0	Jump on Carry 0 flag
JFCL 6,	JCRY	Jump on Carry 0 or 1 flag
JFCL 10,	JOV	Jump on Overflow flag

JRST 0,		Jump
JRST 1,		Jump and enter User mode
JRST 2,	JRSTF	Jump and restore flags
JRST 4,	HALT	Jump and halt
JRST 10,		Jump and reset priority interrupt channel
JRST 12,	JEN	Jump, restore flags and reset priority interrupt channel

Positive shift/rotate values move the values left, negative values move right. ASHC always moves the sign bit of the higher word into the sign bit of the lower word.