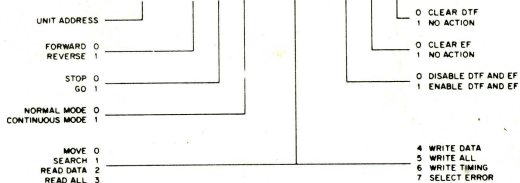
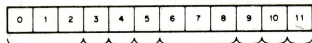


digital

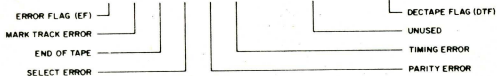
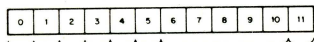
PDP-9

INSTRUCTION LIST

STATUS REGISTER A



STATUS REGISTER B



DECTape Status Registers

MODEL 33, 35 ASR/KSR TELETYPE CODE (ASCII)
IN OCTAL FORM

Character	8-Bit Code (in Octal)	Character	8-Bit Code (in Octal)
A	301	!	241
B	302	;"	242
C	303	#	243
D	304	\$	244
E	305	%	245
F	306	&	246
G	307	'	247
H	310	(250
I	311)	251
J	312	*	252
K	313	+,-	253
L	314	,	254
M	315	.	255
N	316	:	256
O	317	;	257
P	320	<	272
Q	321	=	273
R	322	>	274
S	323	?	275
T	324	@	276
U	325	A	277
V	326	B	300
W	327	C	333
X	330	D	334
Y	331	E	335
Z	332	F	336
0	260	G	337
1	261	Leader/Trailer	200*
2	262	Line-Feed	212*
3	263	Carriage-Return	215*
4	264	Space	240
5	265	Tab-out	377*
6	266	Blank	000*
7	267	ALT Mode	375
8	270	*Ignored by the	
9	271	operating system	

MEMORY REFERENCE INSTRUCTIONS*

Mnemonic	Code	Operation	Cycles
CAL	00	Call subroutine	2
DAC	04	Deposit AC	2
JMS	10	Jump to subroutine	2
DZM	14	Deposit zero in memory	2
LAC	20	Load AC	2
XOR	24	Exclusive OR	2
ADD	30	Add, 1's complement	2
TAD	34	Add, 2's complement	2
XCT	40	Execute	1+
ISZ	44	Increment and skip if zero	2
AND	50	AND	2
SAD	54	Skip if AC different from memory	2
JMP	60	Unconditional jump	1

*Add 1 cycle for indirect addressing or auto indexing

OPERATE INSTRUCTIONS*

Mnemonic	Code	Operation	Event Time
OPR or NOP	740000	Basic operate command	—
CMA	740001	Complement AC	3
CML	740002	Complement L	3
OAS	740004	OR AC switches to AC	3
RAL	740010	Rotate AC and L one left	3
RAR	740020	Rotate AC and L one right	2
HLT or XX	740040	Halt	—
SMA	740100	Skip if AC < 0	1
SZA	740200	Skip if AC = 0	1
SNL or SML	740400	Skip if L ≠ 0	1
SKP	741000	Skip	1
SPA	741100	Skip if AC ≥ 0	1
SNA	741200	Skip if AC ≠ 0	1
SZL or SPL	741400	Skip if L = 0	1
RTL	742010	Rotate AC and L two left	2,3
RTR	742020	Rotate AC and L two right	2,3
CLL	744000	Clear L	2
STL or CCL	744002	Set L	2,3
RCL	744010	Clear L, rotate AC and L one left	2,3
RCR	744020	Clear L, rotate AC and L one right	2,3
CLA	750000	Clear AC	2
CLC	750001	Clear and complement AC	2,3
LAS or LAT	750004	Load AC from switches	2,3
GLK	750010	L → AC17	2,3
LAW	76XXXX	Load AC with 760000 + XXXX	—

* Operation time is one cycle

EAE INSTRUCTIONS

Mnemonic	Code	Operation	Cycles
EAE	640000	Basic EAE command	2
LRS	640500	Long right shift	4-19
LRSS	660500	Long right shift, signed	4-19
LLS	640600	Long left shift	4-19
LLSS	660600	Long left shift, signed	4-19
ALS	640700	Accumulator left shift	4-19
ALSS	660700	Accumulator left shift, signed	4-19
NORM	640444	Normalize, unsigned	4-19
NORMS	660444	Normalize, signed	4-19
MUL	653122	Multiply, unsigned	5-13
MULS	657122	Multiply, signed	5-13
DIV	640323	Divide, unsigned	5-13
DIVS	644323	Divide, signed	5-13
IDIV	653323	Integer divide, unsigned	5-13
IDIVS	657323	Integer divide, signed	5-13
FRDIV	650323	Fraction divide, unsigned	5-13
FRDIVS	654323	Fraction divide, signed	5-13
LACQ	641002	Load AC with MQ	2
LACS	641001	Load AC with SC	2
CLO	650000	Clear MQ	2
ABS	644000	Load AC with IAC1	2
GSM	664000	Get sign and magnitude	2
OSC	640001	OR SC to AC	2
OMQ	640002	OR MQ to AC	2
CMQ	640004	Complement MQ	2
LMQ	652000	Load MQ	2

*INPUT/OUTPUT TRANSFER INSTRUCTIONS

Mnemonic	Code	Operation	Cycles
IOT	700000	Basic I/O command	4
IORS	700314	Read flags	4
CAF	703302	Clear flags	4

PROGRAM INTERRUPT

IOF	700002	Turn interrupt off	4
ION	700042	Turn interrupt on	4

TYPE KF09A AUTOMATIC PRIORITY INTERRUPT

DBK	703304	Debreak	4
DBR	703344	Debreak and restore	4
SPI	705501	Skip on priorities inactive	4
ISA	705504	Initiate selected activity	4

TYPE KG09A MEMORY EXTENSION CONTROL

SEM	707701	Skip if in extend mode	4
EEM	707702	Enter extend mode	4
LEM	707704	Leave extend mode	4

CONSOLE TELETYPE KEYBOARD

KSF	700301	Skip on keyboard flag	4
KRB	700312	Read keyboard to AC10-17	4

INPUT/OUTPUT TRANSFER INSTRUCTIONS (cont.)

Mnemonic	Code	Operation	Cycles
CONSOLE TELETYPE TELEPRINTER			
TSF	700401	Skip on teleprinter flag	4
TCF	700402	Clear teleprinter flag	4
TLS	700406	load teleprinter buffer and print	4
PAPER TAPE READER			
RSF	700101	Skip on reader flag	4
RCF	700102	OR reader buffer to AC	4
RSA	700104	Select alphanumeric mode	4
RRB	700112	Read reader buffer	4
RSB	700144	Select binary mode	4
PAPER TAPE PUNCH			
PSF	700201	Skip on punch flag	4
PCF	700202	Clear punch flag	4
PSA	700204	Punch, alphanumeric	4
PSB	700244	Punch, binary	4
REAL TIME CLOCK			
CLSF	700001	Skip on clock flag	4
CLOF	700004	Disable clock	4
CLON	700044	Enable clock	4

TYPE KP09A, POWER FAILURE DETECTION

PFSF	703201	Skip on power-low flag	
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TYPE KX09A MEMORY PROTECTION

MPSK	701701	Skip on memory protection violation	
MPCV	701702	Clear memory protection flag	
MPLD	701704	Load boundary register	
MPSNE	701741	Skip on non-existent memory violation	
MPEU	701742	Enter user mode	
MPCNE	701744	Clear non-existent memory flag	

TYPE 34H OSCILLOSCOPE DISPLAY

DXC	700502	Clear X	4
DXL	700506	Load X from AC8-17	4
DXS	700546	Load X and display	4
DYC	700602	Clear Y	4
DYL	700606	Load Y from AC8-17	4
DYS	700646	Load Y and display	4
DLB	700704	Load brightness register from AC16-17	4

TYPE TC02 DECTAPE CONTROL

DTCA	707541	Clear status register A	4
DTXA	707544	XOR to status register A	4
DTLA	707545	Load status register A	4
DTRA	707552	Read status register A	4
DTEF	707561	Skip on error flag	4
DTRB	707572	Read status register B	4
DTDF	707601	Skip on DECTape flag	4