

K SERIES MODULES

Another very important variety of "off-the-shelf" modules is the K series module. These are used in, but not limited to control applications. The number of applications using these modules runs into the hundreds. Representative applications include:

- Computer Based Data Acquisition
- Computer Based Control Systems
- Multiprocessor Systems
- Industrial Data Acquisition and Control
- Analog-to-Digital Conversion and Multiplexer Subsystems
- Digital Input and Output Subsystems
- Gas Chromatography Systems
- N/C Tape Preparation Systems

The combination of the M and K series modules using the "building block" approach with "off-the-shelf" modules is an ideal method of interfacing to the PDP-8/E processor for control applications. For more information and detailed examples, the reader should acquire a free copy of DEC's Control Handbook containing more than 200 pages of instructive material in the field of industrial control.

appendix

SPARE PARTS LIST

PDP8E CUSTOMER RECOMMENDED SPARES

Option SP8-EA Kit (First Level) (4K)

DEC PART NO.	DESCRIPTION
M8300	Major Register
M8310	Register Control
M8330	Timing Module
G104	Sense/Inhibit Module
G227	X/Y Driver Module
12-05941	Slide Switch
12-05375	Slide Switch, Momentary
12-5849-13	Handle, Terra Cotta
12-5849-12	Handle, Amber
12-9219	Indicator Bulb
70-06994	Key Switch Assy.
54-9264	Power Supply Module
54-9262	Power Supply Module

SP8-EA KIT

Option SP8-EC Kit (First Level) (8K)

DEC PART NO.	DESCRIPTION
M8300	Major Register
M8310	Register Control
M8330	Timing Module
G111	Sense/Inhibit Module
G233	X/Y Driver Module
12-05941	Slide Switch
12-05375	Slide Switch, Momentary
12-5849-13	Handle, Terra Cotta
12-5849-12	Handle, Amber
12-9219	Indicator Bulb
70-06994	Key Switch Assy.
54-9264	Power Supply Module
54-9262	Power Supply Module

SP8-EC KIT

Option SP8-EB (Second Level) (4K)

10-00004	Capacitor
10-00016	Capacitor
10-00024	Capacitor
10-00067	Capacitor
10-00076	Capacitor
10-01610	Capacitor
10-03053	Capacitor
10-05306	Capacitor
10-09678	Capacitor
11-00113	Diode D662
11-00114	Diode 1N644
11-05314	1N645
11-09977	1N749A
11-09979	1N1185A
11-10006	1N1201A
11-10181-0	Thyrector
11-10182-0	1N4721
11-10183-0	SCR (h724)
11-10625	Diode Light
12-05375	Switch Rocker
12-09403-01	Fan
12-10072	Terminal
12-10073	Connector Socket
12-10198-0	Relay KVP
12-10199-0	Thermal Relay
12-10626	Switch Slide
12-10627	Switch
13-00204	Resistor
13-00229	Resistor
13-00293	Resistor
13-00317	Resistor
13-00391	Resistor
13-00432	Resistor
13-00439	Resistor

Option SP8-ED (Second Level) (8K)

10-00004	Capacitor
10-00016	Capacitor
10-00024	Capacitor
10-00067	Capacitor
10-00076	Capacitor
10-01610	Capacitor
10-03053	Capacitor
10-05306	Capacitor
10-09678	Capacitor
11-00113	Diode D662
11-00114	Diode 1N644
11-05314	1N645
11-09977	1N749A
11-09979	1N1185A
11-10006	1N1201A
11-10181-0	Thyrector
11-10182-0	1N4721
11-10183-0	SCR (h724)
11-10625	Diode Light
12-05375	Switch Rocker
12-09403-01	Fan
12-10072	Terminal
12-10073	Connector Socket
12-10198-0	Relay KVP
12-10199-0	Thermal Relay
12-10626	Switch Slide
12-10627	Switch
13-00204	Resistor
13-00229	Resistor
13-00293	Resistor
13-00317	Resistor
13-00391	Resistor
13-00432	Resistor
13-00439	Resistor

PDP8-E OPTION SP8-EB, SP8-ED (SECOND LEVEL) CONT.

DEC PART NO.	DESCRIPTION	DEC PART NO.	DESCRIPTION
13-00481	Resistor	13-00481	Resistor
13-00496	Resistor	13-00496	Resistor
13-01420	Resistor	13-01420	Resistor
13-02871	Resistor	13-02871	Resistor
13-02941	Resistor	13-02941	Resistor
13-02955	Resistor	13-02955	Resistor
13-02956	Resistor	13-02956	Resistor
13-04833	Resistor	13-04833	Resistor
13-04855	Resistor	13-04855	Resistor
13-04868	Resistor	13-04868	Resistor
13-05128	Resistor	13-05128	Resistor
13-05252	Resistor	13-05252	Resistor
13-09143-6	Potentiometer	13-09143-6	Potentiometer
13-09143-8	Potentiometer	13-09143-8	Potentiometer
13-10032	Resistor	13-10032	Resistor
13-10071	Resistor	12-10071	Resistor
13-10170	Thermister	13-10170	Thermister
15-01742	Transistor	15-01742	Transistor
15-03100	Transistor	15-03100	Transistor
15-03409-01	MPS6534B	15-03409-01	MPS6534B
15-05321	2N4258	15-05321	2N4258
15-05819	2N3055 Case	15-05819	2N3055 Case
15-09338	2N1613	15-09338	2N1613
15-09632	DEC 2007	15-09632	DEC 2007
15-09649	2N3762	15-09649	2N3762
15-10015	DEC 4008	15-11102	DEC 4011
15-01051	2N3054	15-10151	2N3054
16-09478	Transformer	16-09478	Transformer
16-09651	Transformer	16-09651	Transformer
16-09996	Transformer	16-09996	Transformer
18-09880	Crystal	18-09880	Crystal
18-09880-01	Crystal	18-09880-01	Crystal
19-05521	DEC 1540	19-05521	DEC 1540
19-05547	DEC 7474	19-05547	DEC 7474
19-05575-00	DEC 7400	19-05575-00	DEC 7400
19-05579	DEC 7440	19-05579	DEC 7440
19-05586	DEC 74H40	19-05586	DEC 74H40
19-09004	DEC 7402	19-09004	DEC 7402
19-09055	DEC 7495	19-09055	DEC 7495
19-09056	DEC 74H00	19-09056	DEC 74H00
19-09057	DEC 74H10	19-09057	DEC 74H10
19-09267	DEC 74H11	19-09267	DEC 74H11
19-09373	DEC ML-9601	19-09373	DEC ML-9601
19-09594	DEC 82513-930	19-09594	DEC 82513-930
19-09667	DEC 74H74	19-09667	DEC 74H74
19-09686	DEC 7404	19-09686	DEC 7404
19-09854	DEC 8251-1	19-10046	DEC 7442-1
19-09867	DEC 4007	19-09867	DEC 4007
19-09927	DEC 74H87	19-09927	DEC 74H87
19-09928	DEC 7416	19-09928	DEC 7416
19-09929	DEC 7417	19-09929	DEC 7417
19-09930	DEC 7405	19-09930	DEC 7405
19-09931	DEC 74H04	19-09931	DEC 74H04
19-09932	DEC 7483	19-09932	DEC 7483
19-09934	DEC 8266	19-09934	DEC 8266
19-09935	DEC 8235	19-09935	DEC 8235
19-09936	DEC 74151	19-09936	DEC 74151
19-09937	DEC 74153	19-09937	DEC 74153
19-09955	DEC 7412	19-09955	DEC 7412

PDP8E CUSTOMER RECOMMENDED SPARES
OPTION SP8-EB, SP8-ED (SECOND LEVEL) CONT.

DEC PART NO.	DESCRIPTION	DEC PART NO.	DESCRIPTION
19-09971	DEC 6380A	19-09971	DEC 6380A
19-09972	DEC 6314	19-09972	DEC 6314
19-09973	DEC 97401	19-09973	DEC 97401
19-09981	UA723C Volt Reg	19-09981	UA723C Volt Reg.
19-10010	DEC FSA2501	19-10010	DEC FSA2501
19-10011	DEC 7486	19-10011	DEC 7486
19-10391	DEC 5314	19-10391	DEC 5314
19-10392	DEC 5380	19-01392	DEC 5380
19-10394	DEC 5384	19-01394	DEC 5384
19-10624	DEC 74L54	19-10624	DEC 74L54
90-07208	Fuse	19-10973	R-C Network
90-08366-0	Fuse	90-07208	Fuse
90-08387-0	Fuse	90-08386-0	Fuse
90-08388-0	Fuse	90-08387-0	Fuse
90-08389-0	Fuse	90-08388-0	Fuse
90-08390-0	Fuse	90-08389-0	Fuse
12-10089	Socket	90-08390-0	Fuse
12-10090	Housing	12-10089	Socket
		12-10090	Housing
	SP8-ED KIT		SP8-EB KIT

PDP8M CUSTOMER RECOMMENDED SPARES

OPTION SP8-MA KIT (FIRST LEVEL) (4K)		OPTION SP8-MC KIT (FIRST LEVEL) (8K)	
M8300	Major Registers Module	M8300	Major Registers Module
M8310	Registers Control Module	M8310	Registers Control Module
M8330	Timing Module	M8330	Timing Module
G104	Sense/Inhibit Module	G111	Sense/Inhibit Module
G227	X/Y Drive Module	G233	X/Y Drive Module
11-10625	Light Emitting Diode	11-10625	Light Emitting Diode
12-10626	Slide Switch	12-10626	Slide Switch
12-05375	Slide Switch, Momentary	12-05375	Slide Switch, Momentary
12-05849-06	Handle, Russett Orange	12-05849-06	Handle, Russett Orange
12-05849-13	Handle, Terra Cotta	12-05849-13	Handle, Terra Cotta
54-09728	Regulator Board Assy.	54-09728	Regulator Board Assy.
	SP8-MA KIT		SP8-MC KIT

PDP8F CUSTOMER RECOMMENDED SPARES

OPTION SP8-FA KIT (FIRST LEVEL) (4K)		OPTION SP8-FC KIT (FIRST LEVEL) (8K)	
M8300	Major Registers Module	M8300	Major Registers Module
M8310	Registers Control Module	M8310	Registers Control Module
M8330	Timing Module	M8330	Timing Module
G104	Sense/Inhibit Module	G111	Sense/Inhibit Module
G227	X/Y Drive Module	G233	X/Y Drive Module
11-10625	Light Emitting Diode	11-10625	Light Emitting Diode
12-10626	Slide Switch	12-10626	Slide Switch
12-05375	Slide Switch, Momentary	12-05375	Slide Switch, Momentary
12-5849-12	Handle, Amber	12-5849-12	Handle, Amber
12-5849-13	Handle, Terra Cotta	12-5849-13	Handle, Terra Cotta
54-09728	Regulator Board Assy.	54-09728	Regulator Board Assy.
	SP8-FA KIT		SP8-FC KIT

PDP8F—PDP8M CUSTOMER RECOMMENDED SPARES
OPTION SP8-MB, SP8-MD (SECOND LEVEL)
OPTION SP8-FB, SP8-FD (SECOND LEVEL)

DEC PART NO.	DESCRIPTION	DEC PART NO.	DESCRIPTION
10-00004	Capacitor	15-10196	2N5302
10-00016	Capacitor	15-10706	GPS—A55 or MPS—A55
10-03053	Capacitor	15-10765	TRIAC MAC 11-3
10-05306	Capacitor	15-11102	DEC 4011
10-09678	Capacitor	16-09478	Transformer
11-10324	Solid State Lamp	16-09651	Transformer
11-10714	12A Diode Bridge NSS3514	16-09996	Transformer
12-09355	Switch, Micro	18-09880	Crystal
12-05033	Fan Boxer	18-09880-01	Crystal
12-10043	Switch, Miniature Rotary	19-05521	DEC 1540
12-10073	Connector, 40 Terminal	19-05547	DEC 7474
12-10627	Rotary Switch	19-05586	DEC 74H40
12-10790	Switch, DPST N.O	19-09004	DEC 7402
12-10824	Thermostat	19-09055	DEC 7495
12-10830-5	Circuit breaker 5 AMP	19-09056	DEC 74H00
12-10830-7	Circuit Breaker, 7 AMP	19-09057	DEC 74H10
13-00229	Resistor	19-09267	DEC 74H11
13-00317	Resistor	19-09373	DEC ML-9601
13-00439	Resistor	19-09594	DEC 82513-930
13-01420	Resistor	19-09667	DEC 74H74
13-02871	Resistor	19-09686	DEC 7404
13-02941	Resistor	19-09705	DEC 8881
13-02955	Resistor	19-09867	DEC 4007
13-02956	Resistor	19-09927	DEC 74H87
13-03156	Resistor	19-09928	DEC 7416
13-04833	Resistor	19-09929	DEC 7417
13-04855	Resistor	19-09930	DEC 7405
13-04868	Resistor	19-09931	DEC 74H04
13-05128	Resistor	19-09932	DEC 7483
13-05252	Resistor	19-09934	DEC 8266
13-05872	Resistor	19-09935	DEC 8235
13-10032	Resistor	19-09936	DEC 74151
13-10071	Resistor	19-09937	DEC 74153
13-10709	Resistor	19-09955	DEC 7412
15-03409-01	MPS6534B or 2N3133	19-09971	DEC 6380A
15-05321	2N4258	19-09972	DEC 6314A
15-09338	MPS6531 or 2N1613	19-09973	DEC 97401
15-09632	DEC 2007	19-10010	DEC FSA2501
15-09649	2N3762	19-10011	DEC 7486
19-09594	DEC 8251	19-10046	DEC 7442-1
15-10015	DEC 4008	19-10973	R-C Network
15-10151	RCA 40372 (2N3054)	90-7221	Fuse
		90-07226	Fuse
		90-08389	Fuse

SP8-MB KIT, SP8-FB KIT

SP8-MD, SP8-FD KIT

CUSTOMER RECOMMENDED ASR-33 SPARES
OPTION LT33-B TELETYPE

DEC PART NO.	DESCRIPTION
29-11424	Circuit Board
29-11495	Tape Sprocket
29-11443	Lever Universal
29-11144	Fuse
29-11367	Brush (Distrib.)
29-11412	Drive Gear
29-11417	Driven Gear
29-11411	Belt
29-11376	Shaft
29-11375	Bearings
29-11374	Bearings
29-17473	Ribbon

LT33-B KIT

CR8-E/CM8-E RECOMMENDED SPARE PARTS
(FIRST LEVEL)

DEC PART NUMBER	DESCRIPTION
19-9971	IC DEC 6380
19-9705	IC DEC 8881
19-9704	IC DEC 314
19-9373	IC DEC 9601
19-9686	IC DEC 7404
19-9594	IC DEC 8251
19-9050	IC DEC 7475
19-9004	IC DEC 7402
19-5579	IC DEC 7450
19-5580	IC DEC 7440
19-5577	IC DEC 7420
19-5576	IC DEC 7410
19-5575	IC DEC 7400
19-5547	IC DEC 7474

SP8-CR KIT

CR8-E/CM8-E RECOMMENDED SPARE PARTS
(SECOND LEVEL)

DEC PART NO.	DESCRIPTION
16-5528	Delay line, 30 ns
10-0025	Capacitor, 560 pF, 100V, 5% DM
10-0016	Capacitor, 100 pF, 100V, 5% DM
10-0067	Capacitor, 6.8 μ F, 35V, 20% S.
	TANT.
10-1610	Capacitor, 0.01 μ F, 100V, 20% DISK
70-7252	Cable, Card Reader Interface

SP8-CS KIT

OPTION LT33-ST TOOL KIT

DEC PART NO.	DESCRIPTION
29-12521	8 oz. Scale
29-12522	32 oz. Scale
29-12602	64 oz. Scale
29-12520	Set of gauges
29-12523	Offset screwdriver
29-12524	Offset screwdriver
29-12525	8 Crochet hook
29-12526	12 Crochet hook
29-12527	Spring hook push
29-12528	Spring hook pull
29-12529	Screw holder
29-11418	Handwheel adap
29-12540	Handwheel
29-12553	Contact adjustment
29-12554	Gauge
29-12555	Gauge
29-12556	Bending tool
29-11498	Gauge
29-12558	Extractor
29-12559	Tweezer
29-12560	Tommy Wrench
29-12561	Tommy Wrench
29-12562	Key lever remover

LT33-ST KIT

DB8-E RECOMMENDED SPARE PARTS

DEC PART NO.	DESCRIPTION
19-05547	IC DEC 7474
19-05575	IC DEC 7400
19-05579	IC DEC 7440
19-09486	IC DEC 384
19-09594	IC DEC 8251
19-09686	IC DEC 7404
19-09973	IC DEC 97401
19-09971	IC DEC 6380
19-09972	IC DEC 6314

SP8-DB KIT

SPARE MODULES

Module Part No.	Used In Option Number	Description
A231	AD8-E	A/D Converter
A841	AD8-E	A/D Converter
A232	AM8-E	8-Channel Mux
M843	CR8-F (CM8-E)	Card Reader Optical Mark Card Reader
M8326	DB8-E	Interprocessor Buffer
M882	DK8-EA	Real-Time Clock (Line)
M883	DK8-EC	Real-Time Clock (Crystal)
M860	DK8-EP	Real-Time Clock (Programmable)
M518	DK8-EP	Real-Time Clock (Programmable)
M7104	RK8-E	DECpack Control
M7105	RK8-E	DECpack Control
M7106	RK8-E	DECpack Control
M839	DP8-E	Synchronous Modem
M866	DP8-E	Synchronous Modem
M863	DR8-E	12-Channel Buffered I/O
M8350	KA8-E	Positive I/O Bus
M8360	KD8-E	Data Break Interface
M884	KG8-E	Redundancy Check
M8340	KE8-E	Extended Arithmetic Element
M8341	KE8-E	Extended Arithmetic Element
M849	KK8-E	RFI Shield
M8300	KK8-E	Major Registers
M8310	KK8-E	Major Registers Control
M8320	KK8-E	Bus Loads
M8330	KK8-E	Timing Generator
M8335	VT8-E	DEC Display Control
M8336	VT8-E	DEC Display Control
M8337	VT8-E	DEC Display Control
M8342	LS8-E	Line Printer
M8650	KL8-E	Teletype Control
M8650 YA	KL8-EX	Asynchronous Interface (EIA Levels)
M8652 YC	KL8-F	Asynchronous Interface (Double Buffered)
M8653	KL8-M	Modem Control
M848	KP8-E	Power Fail & Auto Restart
M8329	LC8-E	DECwriter Control
M841	LE8-E	Line Printer Control
M847	MI8-E	Bootstrap Loader
G104	MM8-E	Sense Inhibit
G111	MM8-EJ	Sense Inhibit 8K
G227	MM8-E	X-Y Drivers 4K
G233	MM8-EJ	X-Y Drivers 8K
H220	MM8-E	Memory Stack (4K)
H212	MM8-EJ	Memory Stack (8K)
G105	MP8-E	Sense Inhibit
M880	MR8-EA	256 ROM
M840	PC8-E	Reader, Punch Control
M868	TD8-EH (TD8-EM)	OMNIBUS DECTape Control OMNIBUS DECTape Control
M8321	TM8-E	MAGtape Control
M8322	TM8-E	MAGtape Control
M8323	TM8-E	MAGtape Control
M8327	TM8-E	MAGtape Control
M869	VC8-E	Display Generator
M885	VC8-E	Display Generator
H724(a)	P.S.	Power Supply (PDP8E)
M935	OMNIBUS Connector	Connector Module
M842	XY8-E	XY Plotter Control

KG8-E RECOMMENDED SPARE PARTS

DEC PART NO.	DESCRIPTION
19-09704	IC DEC 314
19-09485	IC DEC 380
19-05575	IC DEC 7400
19-09004	IC DEC 7402
19-09686	IC DEC 7404
19-05576	IC DEC 7410
19-05580	IC DEC 7450
19-05547	IC DEC 7474
19-10011	IC DEC 7486
19-09594	IC DEC 8251
19-09615	IC DEC 8271
19-09705	IC DEC 8881
19-10035	IC DEC 74197
10-00016	Capacitor, 100 pF, 100V, 5%
10-01610	Capacitor, 0.01 μF, 100V, 20% DISC
10-00027	Capacitor, 820 pF, 100V, 5%
13-00293	Resistor, 330Ω, 1/4W, 10%
13-01401	Resistor, 750Ω, 1/4W, 5%
13-00271	Resistor, 220Ω, 1/4W, 5%

SP8-KG KIT

KM8-E RECOMMENDED SPARE PARTS

DEC PART NO.	DESCRIPTION
19-05575	IC DEC 7400
19-09705	IC DEC 8881
19-09615	IC DEC 8271
19-09935	IC DEC 8235
19-09934	IC DEC 8266
19-09594	IC DEC 8251
19-09667	IC DEC 7474
19-05547	IC DEC 7474
19-05577	IC DEC 7420
19-05576	IC DEC 7410
19-09686	IC DEC 7404
19-09056	IC DEC 74H00
19-09486	IC DEC 364A
19-09972	IC DEC 6314A
13-00365	Resistor 1K, 1/4W, 5%
10-01610	Capacitor 0.01 MF DISK, 20%
10-05306	Capacitor 6.8 μF, 35V, 10%

SP8-KM KIT

KP8-E RECOMMENDED SPARE PARTS

DEC PART NO.	DESCRIPTION
11-09991	Diode, AZ1-1/4M, 6.8V
11-00114	Diode, D664
11-05275	Diode, D672
15-03100	Transistor, 3009B
15-03409-01	Transistor, DEC 6534B
19-05547	IC DEC 7474
19-05575	IC DEC 7400
19-05576	IC DEC 7410
19-09004	IC DEC 7402
19-09050	IC DEC 7475
19-09373	IC DEC 9601
19-09486	IC DEC 384
19-09705	IC DEC 8881
19-09971	IC DEC 6380
19-09972	IC DEC 6314

SP8-KD KIT

LC8-E RECOMMENDED SPARE PARTS

DEC PART NO.	DESCRIPTION
19-10394	IC DEC 5384
19-10392	IC DEC 5380
19-10391	IC DEC 5314
19-10046	IC DEC 7442
19-9929	IC DEC 7417
19-9973	IC DEC 97401
19-9686	IC DEC 7404
19-9056	IC DEC 74H00
19-9004	IC DEC 7402
19-5580	IC DEC 7450
19-5579	IC DEC 7440
19-5575	IC DEC 7400
19-5547	IC DEC 7474
10-1610	Capacitor, 0.01 μF, 100V, 20% Disk
10-0067	Capacitor, 6.8 μF, 35V, 20% Tant
10-0024	Capacitor, 47 pF, 100V, 5%DM
70-8417	Signal Cable

SP8-LC KIT

M18-E (M847) RECOMMENDED SPARE PARTS

DEC PART NO.	DESCRIPTION
19-10436	IC DEC 74123
19-09004	IC DEC 7402
19-05547	IC DEC 7474
19-09935	IC DEC 8235
19-10041	IC DEC 74164
19-05575	IC DEC 7400
19-09705	IC DEC 8881
19-09686	IC DEC 7404
19-09485	IC DEC 380
19-09486	IC DEC 384
15-03100	Transistor DEC 3009B
11-00114	Diode D664
13-01423	Resistor 6.8K, 1/4W, 5%
10-00006	Cap, 0.01 μF, 100V, 20%

SP8-MI KIT

DK8-EA/DK8-EC-(M882/M883) RECOMMENDED SPARE PARTS (FIRST LEVEL)

DEC PART NO.	DESCRIPTION
19-9705	DEC 8881
19-9704	DEC 314
19-9485	DEC 380
19-9051	DEC 7490
19-9050	DEC 7475
19-9004	DEC 7402
19-5589	DEC 7470
19-5576	DEC 7410
19-5575	DEC 7400
19-5547	DEC 7474
19-9486	DEC 384
	SP8-DK KIT

DK8-EA/DK8-EC-(M882/M883) RECOMMENDED SPARE PARTS (SECOND LEVEL)

DEC PART NO.	DESCRIPTION
18-9880	Crystal (M883 only)
16-9651	Pulse Transformer (M883 only)
10-9678	Capacitor 0.047 μ F, 16-15 20%
10-1610	Capacitor 0.01 μ F, 100V, 20%
10-0016	Capacitor 100 pF, 100V, 5%
10-0014	Capacitor 68 pF, 100V, 5%
10-0011	Capacitor 47 pF, 100V, 5%
10-0006	Capacitor 10 pF, 100V, 5%
10-1765	Capacitor 0.005 μ F,
	SP8-DL KIT

KA8-E RECOMMENDED SPARE PARTS

DEC PART NO.	DESCRIPTION
15-03100	Transistor, DEC 3009B
19-09705	IC DEC 8881
19-10010	IC DEC 2501
19-09971	IC DEC 6380
19-09921	IC DEC 7417
19-09928	IC DEC 7416
19-09686	IC DEC 7404
19-09373	IC DEC 9601 (M835 only)
19-09486	IC DEC 384
19-09004	IC DEC 7402
19-05578	IC DEC 7430
19-05577	IC DEC 7420
10-05576	IC DEC 7410
19-05575	IC DEC 7400
19-05547	IC DEC 7474
11-00114	Diode D664
11-00113	Diode D662
BCO8J-10	Cable, 10 ft.
19-10436	IC DEC 74123 (M8350 only)
	SP8-KA KIT

KD8-E RECOMMENDED SPARE PARTS

DEC PART NO.	DESCRIPTION
10-01610	Capacitor 0.01 μ F, 100V, 20%
11-00113	Diode D662
19-05575	IC DEC 7400
19-05579	IC DEC 7440
19-09004	IC DEC 7402
19-09057	IC DEC 74H10
19-09267	IC DEC 74H11
19-09971	IC DEC 6380
19-09486	IC DEC 384
19-09615	IC DEC 8217
19-09667	IC DEC 74H74
19-09686	IC DEC 7404
19-09972	IC DEC 6314
19-09973	IC DEC 97401
19-09928	IC DEC 7416
19-09934	IC DEC 8266
19-09955	IC DEC 7412
19-10010	IC DEC 2501
	SP8-KD KIT

KE8-E RECOMMENDED SPARE PARTS

DEC PART NO.	DESCRIPTION
19-05585	IC DEC 7476
19-05576	IC DEC 7410
19-09955	IC DEC 7412
19-10018	IC DEC 74193
19-09934	IC DEC 8266
19-09267	IC DEC 74H11
19-05635	IC DEC 74H20
19-05586	IC DEC 74H40
19-09486	IC DEC 384
19-09004	IC DEC 7402
19-09667	IC DEC 74H74
19-09059	IC DEC 74H30
19-09973	IC DEC 97401
19-09485	IC DEC 380
23-001A1	IC Encoded ROM (Drives ROM 11-18)
23-002A1	IC Encoded ROM (Drives ROM 21-28)
19-09930	IC DEC 7405
19-09705	IC DEC 8881
19-05575	IC DEC 7400
19-09686	IC DEC 7404
19-09062	IC DEC 74H53
19-10011	IC DEC 7486
19-09935	IC DEC 8235
13-00295	Resistor 330 Ω /1/4W, 5%
13-00365	Resistor 1K, 1/4W, 5%
13-00317	Resistor 470 Ω , 1/4W, 10%
10-00067	Capacitor 6.8 μ F, 5V, 20%
	Solid Tantalum
	Capacitor 0.01 μ F, 100V, 20%
	Ceramic Disk
10-01610	
	SP8-KE KIT

RECOMMENDED MR8-E SPARE PARTS

DEC PART NO.	DESCRIPTION
15-05321	Transistor DEC 4258
15-03100	Transistor DEC 3009B
11-00114	Diode D664
19-10047	IC DEC 74145
19-10046	IC DEC 7442
19-09705	IC DEC 8881
19-09688	IC DEC 846
19-09667	IC DEC 74H74
19-09486	IC DEC 384
19-09971	IC DEC 6380
19-09267	IC DEC 74H11
19-09056	IC DEC 7402
19-05576	IC DEC 7410
19-05575	IC DEC 7400
	SP8-MR KIT

RECOMMENDED MP8-E SPARE PARTS

DEC PART NO.	DESCRIPTION
15-02155	Transistor DEC 1008
15-01881	Transistor DEC 2219
15-03100	Transistor DEC 3009B
15-10062	Transistor DEC 3734
15-09649	Transistor DEC 3762
15-10015	Transistor DEC 4008
15-0532	Transistor DEC 4258
15-03409-01	Transistor DEC 6534B
19-05575	IC DEC 7400
19-05590	IC DEC 7401
19-09004	IC DEC 7402
19-09686	IC DEC 7404
19-05580	IC DEC 7450
19-05547	IC DEC 7474
19-10724	IC DEC 74180
19-09056	IC DEC 74H00
19-09057	IC DEC 74H10
19-09267	IC DEC 74H11
19-05586	IC DEC 74H40
19-09967	IC DEC 74H74
19-09704	IC DEC 314
19-09485	IC DEC 380
19-09486	IC DEC 384
19-09594	IC DEC 8251
19-09705	IC DEC 8881
	SP8-MQ

TD8-E RECOMMENDED SPARE PARTS (SECOND LEVEL)

DEC PART NO.	DESCRIPTION
19-09004	IC DEC 7402
19-05590	IC DEC 7401
19-05578	IC DEC 7430
19-05576	IC DEC 7410
19-05575	IC DEC 7400
19-05547	IC DEC 7474
15-09338	Transistor DEC 6351
11-00114	Diode, D664
11-00113	Diode, D662
	SP8-TE KIT

RECOMMENDED MP8-E SPARE PARTS (SECOND LEVEL)

DEC PART NO.	DESCRIPTION
12-10043	Rotary Switch
16-09651	Transformer 8010
16-09996	Transformer 6501
16-09478	Transformer 1775
16-09559	Delay Line, 100ns
13-10032	Resistor, 16.9 ohm, 6W, 1%
13-02858	Resistor, 100 ohm, 1/8W, 1%
13-02956	Resistor, 196 ohm, 1/8W, 1%
13-05114	Resistor, 348 ohm, 1/8W, 1%
13-02955	Resistor, 750 ohm, 1/8W, 1%
13-03114	Resistor, 1K ohm, 1/8W, 1%
13-02871	Resistor, 1.21K ohm, 1/8W, 1%
13-04833	Resistor, 1.96K ohm, 1/8W, 1%
13-04856	Resistor, 4.64K ohm, 1/8W, 1%
13-04885	Resistor, 9.09K ohm, 1/8W, 1%
13-02941	Resistor, 14.7K ohm, 1/8W, 1%
13-03156	Resistor, 34.8K ohm, 1/8W, 1%
13-05128	Resistor, 56.2K ohm, 1/8W, 1%
13-05252	Resistor, 68.1K ohm, 1/8W, 1%
13-10071	Thermistor, 1K, 1%
11-05275	Diode D672
11-00114	Diode D664
11-09991	Zener Diode 1/4M6, 8A21
19-10010	Diode Pack DEC 2501
	SP8-MP KIT

TD8-E RECOMMENDED SPARE PARTS

DEC PART NO.	DESCRIPTION
19-10436	IC 74123
19-09935	IC 8235
19-09931	IC DEC 74H04
19-09929	IC DEC 7417
19-09712	IC DEC 8242
19-09705	IC DEC 8881
19-10391	IC DEC 5314
19-09686	IC DEC 7404
19-09615	IC DEC 8271
19-09594	IC DEC 8251
19-10394	IC DEC 5384
19-10392	IC DEC 5380
19-09054	IC DEC 7493
19-09050	IC DEC 7475
	SP8-TD KIT

XY8-E RECOMMENDED SPARE PARTS

DEC PART NO.	DESCRIPTION
15-03409-1	Transistor DEC 6534B
15-03100	Transistor DEC 3009B
19-09705	IC DEC 8881
19-09704	IC DEC 314
19-09686	IC DEC 7404
19-09594	IC DEC 8251
19-09373	IC DEC 9601
19-09485	IC DEC 380
19-05577	IC DEC 7420
19-05576	IC DEC 7410
19-05575	IC DEC 7400
19-05547	IC DEC 7474
13-000391	Resistor 1.5K, 1/4W, 5%
	SP8-XY KIT

LOGIC CIRCUITS

INTRODUCTION

The digital logic circuits in this chapter are used to interface I/O devices to the computer using Digital Equipment Corporation FLIP CHIP Modules. Logic handbooks published by DEC describe hundreds of FLIP CHIP Modules with their component circuits, associated accessories, hardware, power supplies, and mounting panels. The designer should study the logic handbooks carefully before beginning on interface design for a special I/O device.

The basic logic circuits used for interfacing to the computer are: AND, OR, NAND, NOR, Flip-Flop, Single-Shot, Schmitt Trigger, Inverter, Amplifier, and Bus Driver. A brief discussion of these circuits and their logic symbology follows.

The symbology employed with the PDP-8 family of computers and M-series modules is similar to MIL-STD-806B. This chapter describes DEC symbology with definitions of logic functions, graphic representations of the functions, and examples of their application. A Table of Combinations is also shown.

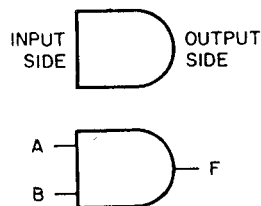
LOGIC SYMBOLS

The following description of logic symbols contains truth tables that show graph representations of the logic functions. In the truth tables, the letter H stands for HIGH (+ 3V), and the letter L stands for LOW (0V). Examples of DEC symbology are shown along with figures and truth tables.

State Indicator

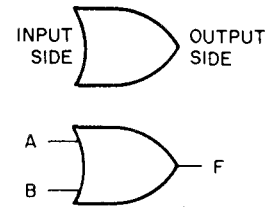
The presence of the small circular symbol at the input(s) of a function indicates that an L input signal activates the function. The absence of this small circle indicates that an H input signal activates the function. Similarly, a small circle at the output of a function indicates that the output terminal of the activated function is relatively low, and the absence of the circle indicates that the output is relatively high.

STATE INDICATOR ABSENT



INPUT		OUTPUT
A	B	F
L	L	L
L	H	L
H	L	L
H	H	H

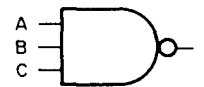
Symbol, AND Function



INPUT		OUTPUT
A	B	F
L	L	L
L	H	H
H	L	H
H	H	H

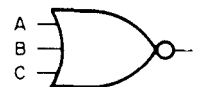
Symbol, OR Function

STATE INDICATOR PRESENT



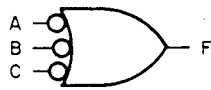
INPUT			OUTPUT
A	B	C	F
L	L	L	H
L	L	H	H
L	H	L	H
L	H	H	H
H	L	L	H
H	L	H	H
H	H	L	H
H	H	H	L

Symbol, NAND Function



INPUT			OUTPUT
A	B	C	F
L	L	L	H
L	L	H	L
L	H	L	L
L	H	H	L
H	L	L	L
H	L	H	L
H	H	L	L
H	H	H	L

Symbol, NOR Function

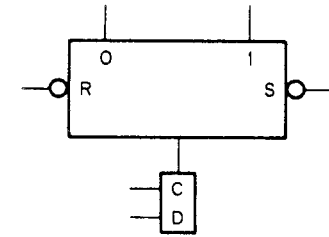


INPUT			OUTPUT
A	B	C	F
L	L	L	H
L	L	H	H
L	H	L	H
L	H	H	H
H	L	L	H
H	L	H	H
H	H	L	H
H	H	H	L

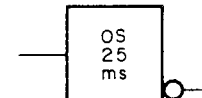
Symbol, NOR Function

Table of Combinations

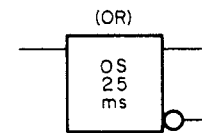
AND	OR	A	B	F
		H	H	H
		H	L	L
		L	H	L
		L	L	L
		H	H	L
		H	L	L
		L	H	L
		L	L	H
		H	H	H
		H	L	H
		L	H	H
		L	L	L



Symbol, Flip-Flop Function

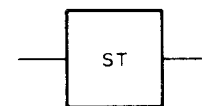


ONE OUTPUT



TWO OUTPUT

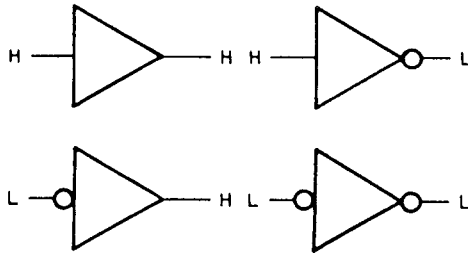
Symbol, One-Shot Function



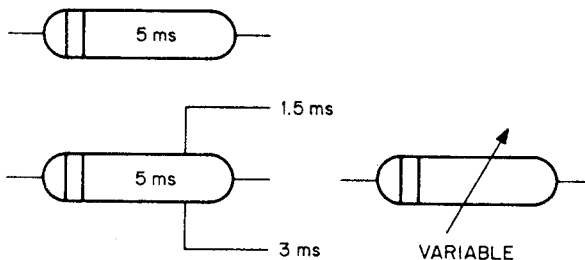
Symbol, Schmitt Trigger Function



Symbol, General Logic



Symbol, Amplifier



Symbol, Time Delay Function

Digital Equipment Corporation offers an extensive training program to every organization that purchases or presently owns a DEC computer. Our training objective is to familiarize the user with the hardware and software associated with his computer system. Professional full-time instructors regularly conduct classes at Digital's main training facility in Maynard, Massachusetts; Palo Alto, California; Reading, England; Paris, France; Munich, Germany; Scandinavia and Australia.

Early application for enrollment in the desired course is suggested, as class sizes are limited. DEC provides all training materials necessary for each class.

Software Courses — The software courses are familiarization courses, and as a general rule will give participants a working knowledge of the appropriate:

Machine Language Instruction Set	Assembler Programs
Programming Techniques	Editor Programs
Input/Output Programming	Debugging Routines

Hardware Courses — The hardware courses are familiarization courses, with the exception of Systems Maintenance Courses, and will give participants a working knowledge of the appropriate:

Machine Language Instruction Set	
Logic Symbolology	
Theory of Logic Operation of:	Memory Unit
	Central Processor Unit
	I/O Section

Systems Maintenance Courses — These courses are specially designed for the user who will maintain his own system or be involved with extensive interfacing, and who requires a good working knowledge of his system. The courses are patterned after those that DEC uses to train its own Field Service men, and will consist of lab time for on-the-job training.

The scheduled dates for DEC Training Courses at Maynard and Palo Alto will be listed in a separate document entitled "DIGITAL CUSTOMER TRAINING SCHEDULE" available from your local sales office, or the Training Departments.

To enroll in a scheduled course, use the enclosed registration form and mail it to the appropriate training facility, at Maynard, Massachusetts, or Palo Alto, California. A letter of confirmation will be sent to each registered student. In case of course cancellation, registered students will be notified during the week prior to the course's scheduled date. Digital Equipment Corporation, Training Department, 146 Main Street, Maynard, Massachusetts 01754. Telephone (617) 897-5111, Extension 2564, TWX 710-347-0212. Digital Equipment Corporation, Training Department, 560 San Antonio Road, Palo Alto, California 94306. Telephone (415) 326-5640, TWX 910-373-1266. Due to lack of adequate public transportation, a rental car is necessary when attending courses at either facility.

Digital can offer special training courses that will help solve the majority of your training problems. These courses can be tailored to your needs and your time schedule, and contain the information you desire your students to learn.

The cost to conduct a Special Course at your facility is the same as the on-site pricing for Standard Courses, plus any additional expenses necessary to prepare a course that we haven't taught before. If the course is conducted at one of our training facilities the cost is \$300 per student per week plus

Digital provides two types of training:

- Software Familiarization
- Hardware Familiarization

Both types of training assume that the individual has either a background in software or hardware fundamentals. For the individual desiring to get the utmost from his available training, or for the individual without the prerequisite background, the Introductory Programming Course will help provide the necessary foundation.

Introductory Programming Course – This course is designed to give the non-computer oriented person, or the individual with no machine language programming background, the fundamentals of computer arithmetic and machine language programming.

SOFTWARE COURSE DESCRIPTIONS

Introductory Programming Course

Course Length: one week

Course Cost: one training credit or \$300

Prerequisites: None

Description: The course gives non-computer oriented personnel the required programming background necessary to enter any of DEC's small computer software familiarization courses. The course consists of a description of: basic computer concepts, binary and octal numbering systems, computer arithmetic, problem solving, flow charting and programming techniques. Basic computer operation includes a description of a representative modified machine language instruction set, applicable programming techniques, use of computer operator console, and I/O programming fundamentals. Course consists of approximately 20% lab time.

PDP-8 Family Software Course (Paper Tape)

Course Length: one week

Course Cost: one training credit or \$300

Prerequisites: Introductory Programming Course or equivalent background

Description: Course covers general operation of the PDP-8 Family computers paper tape system software to include PAL III Assembler, Symbolic Tape Editor, On-line Debugging Technique (ODT), and Floating Point package.

PDP-8 Family Software Course (PS-8)

Course Length: one week

Course Cost: one training credit or \$300

Prerequisites: PDP-8 Family Software Course (Paper tape) or knowledge of the PDP-8 Family Paper Tape Software.

Description: This course covers the operation and familiarization of the 8K mass storage system including the operation of PS-8 editor, PAL 8 assembler, PS-8 Octal Debugging Technique (ODT), the SABR assembler, and user programming.

PDP-8 Family Software Course (4K Monitor)

Course Cost: one training credit or \$300

Prerequisites: PDP-8 Family Software Course (Paper Tape) or knowledge of the PDP-8 Family Paper Tape Software

Description: Course covers general operation of 4K mass storage software including monitor PAL-D assembler Disk/DECtape editor, Disk/DECtape On-line Debugging Program (DDT-D), and Peripheral Interchange Program (PIP). Students will develop programs in the following areas: Disk/DECtape, extended memory, and monitor input/output.

INDAC-8

Course Length: two weeks

Course Cost: two training credits or \$500

Prerequisites: Familiarity with FORTRAN, BASIC or similar procedural language helpful

Description: This course is designed to discuss:

- PDP-8 Family Computers – operation and programming to include the PDP-8 instruction set loader programs (RIM, BIN, HELP), assembler (PAL-3), and Symbolic Editor
- 4K Disk Monitor System – theory and operation to include the building of the monitor program.

PDP-8/I-8/L or 8/e Hardware Familiarization Courses

Course Length: one week

Course Cost: one training credit or \$300

Prerequisites: Background in basic electronics, computer technology, and machine language programming.

Description: The course covers the instruction set, central processor including instruction and data flow, memory operation, instruction logic, program interrupt, data break (one and three cycle), and I/O hardware.

PDP-8/I-8/L Systems Maintenance Course

Course Length: Three weeks

Course Cost: \$650 (training credits not applicable)

Prerequisites: Prior computer maintenance experience.

Description: The course covers systems description to include instruction set, logic operation of the central processor, power fail, extended memory, DF32-D, PC8/1 high speed reader/punch unit, and DMO1. Maintenance is covered from theory of operation to actual troubleshooting on equipment. The course will utilize lab time for hands-on experience.

LAB 8/e

Hardware Course

Course Length: two weeks

Course Cost: two training credits or \$500

Prerequisites: PDP-8/e hardware course or equivalent experience.

Description: This course is designed to train the PDP-8/e oriented person the theory and operation and maintenance of the following: extended memory (MM8/E), high speed reader/punch (PC8/E), A-D/D-A concepts and logic (AD8-EA), multiplexor and preamp (AM8-EA-EC), display control (UC8/E), Display (UR-14), digital I/O (DR8-EA), and clock (DK8-EP). The course will utilize lab time for hands-on experience.

PDP-8/e

Systems Maintenance Course

Course Length: three weeks

Course Cost: \$650. (training credits not applicable)

Prerequisites: Prior computer maintenance experience.

Description: This course covers systems description to include instruction set, logic operation of the central processor, power fail, extended memory, DF32-D, PC8-E high speed reader/punch unit, and M18-E bootstrap loader. Maintenance is covered from theory of operation to actual troubleshooting on equipment. The course will utilize lab time for hands-on experience.

TC08-TU56

Hardware Course

Course Length: one week

Course Cost: \$300. (training credits not applicable)

Prerequisites: PDP-8/1, 8/L, or 8/e Hardware course, Systems Maintenance Course or equivalent experience.

Description: The course covers systems description to include tape format and programming considerations, applicable IOT instructions, operation of the tape transport, logic operation of the control unit including read and write operations.

ASCII CHARACTER SETS

OCTAL

FIRST TWO DIGITS	LAST DIGIT							
	0	1	2	3	4	5	6	7
00	NULL	↑A	↑B	↑C	↑D	↑E	↑F	↑G
01	↑H	TAB	LINE FEED	VERT. TAB	FORM FEED	CAR. RET.	↑N	↑O
02	↑P	↑Q	↑R	↑S	↑T	↑U	↑V	↑W
03	↑X	↑Y	↑Z	ALT. MODE	CTRL. SHIFT L	CTRL. SHIFT M	CTRL. SHIFT N	CTRL. SHIFT O
04	SPACE	|	"	#	\$	%	&	'
05	[]	*	+	,	-	.	/
06	0	1	2	3	4	5	6	7
07	8	9	:	;	<	=	>	?
10	⊙	A	B	C	D	E	F	G
11	H	I	J	K	L	M	N	O
12	P	Q	R	S	T	U	V	W
13	X	Y	Z	[\]	↑	←
14	`	a	b	c	d	e	f	g
15	h	i	j	k	l	m	n	o
16	p	q	r	s	t	u	v	w
17	x	y	z	{	|	}	ESCAPE	DELETE

DECIMAL

FIRST TWO DIGITS	LAST DIGIT									
	0	1	2	3	4	5	6	7	8	9
00	NULL	↑A	↑B	↑C	↑D	↑E	↑F	↑G	↑H	TAB
01	LINE FEED	VERT. TAB	FORM FEED	CAR. RET.	↑N	↑O	↑P	↑Q	↑R	↑S
02	↑T	↑U	↑V	↑W	↑X	↑Y	↑Z	ALT. MODE	CTRL. SHIFT L	CTRL. SHIFT M
03	CTRL. SHIFT N	CTRL. SHIFT O	SPACE	|	"	#	\$	%	&	'
04	[	]	*	+	,	-	.	/	0	1
05	2	3	4	5	6	7	8	9	:	;
06	<	=	>	?	⊙	A	B	C	O	E
07	F	G	H	I	J	K	L	M	N	O
08	P	Q	R	S	T	U	V	W	X	Y
09	Z	[	\	\]	↑	←		o	b	c
10	d	e	f	g	h	i	j	k	l	m
11	n	o	p	q	r	s	t	u	v	w
12	x	y	z	{	|	}	ESCAPE	DELETE		

Model 33 ASR/KSR Teletype Code (ASCII) in Binary Form

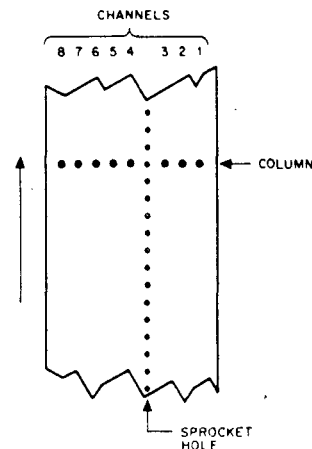
1 = HOLE PUNCHED = MARK
0 = NO HOLE PUNCHED = SPACE

				MOST SIGNIFICANT BIT LEAST SIGNIFICANT BIT								
				8	7	6	5	4	S	3	2	1
	@	SPACE	NULL/IDLE			0	0			0	0	0
	A	!	START OF MESSAGE			0	0			0	0	1
	B	"	END OF ADDRESS			0	0			0	1	0
	C	#	END OF MESSAGE			0	0			0	1	1
	D	\$	END OF TRANSMISSION			0	0			1	0	0
	E	%	WHO ARE YOU			0	0			1	0	1
	F	&	ARE YOU			0	0			1	1	0
	G	'	BELL			0	0			1	1	1
	H	(	FORMAT EFFECTOR			0	1			0	0	0
	I	)	HORIZONTAL TAB			0	1			0	0	1
	J	.	LINE FEED			0	1			0	1	0
	K	+	VERTICAL TAB			0	1			0	1	1
	L	,	FORM FEED			0	1			1	0	0
	M	-	CARRIAGE RETURN			0	1			1	0	1
	N	_	SHIFT OUT			0	1			1	1	0
	O	/	SHIFT IN			0	1			1	1	1
	P	0	DCO			1	0			0	0	0
	Q	1	READER ON			1	0			0	0	1
	R	2	TAPE (AUX ON)			1	0			0	1	0
	S	3	READER OFF			1	0			0	1	1
	T	4	(AUX OFF)			1	0			1	0	0
	U	5	ERROR			1	0			1	0	1
	V	6	SYNCHRONOUS IDLE			1	0			1	1	0
	W	7	LOGICAL END OF MEDIA			1	0			1	1	1
	X	8	S0			1	1			0	0	0
	Y	9	S1			1	1			0	0	1
	Z	:	S2			1	1			0	1	0
	[	;	S3			1	1			0	1	1
	<	<	S4			1	1			1	0	0
	=	=	S5			1	1			1	0	1
	>	>	S6			1	1			1	1	0
	?]	?]	S7			1	1			1	1	1
Alt-mode						1	0			0	0	
RUB OUT						1	0			1	0	
						1	1			0		
						1	1			1		

Paper Tape Formats

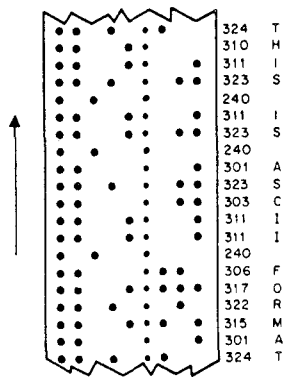
Manual use of the toggle switches on the operator console is a tedious and inefficient means of loading a program. This procedure is necessary in some instances, however, because the PDP-8/E computer must be programmed before any form of input to the memory unit is possible. For example, before any paper tape can be used to input information into the computer, the memory unit must have a stored program which will interpret the paper tape format for the computer. This loader program must be stored in memory with the console switches. A loader program consists of input instructions to accept information from the Teletype paper-tape reader and instructions to store the incoming data in the proper memory locations.

Before the loader program can be written to accept information, the format in which the data is represented on the paper tape must be established. There are three basic paper tape formats commonly used in conjunction with PDP-8/E computer. The following paragraphs describe and illustrate these formats.



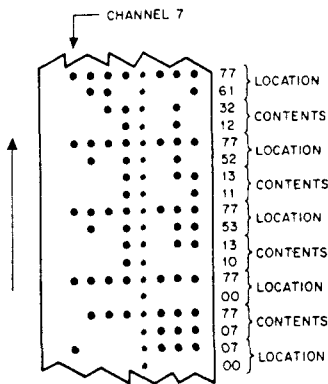
Data is recorded (punched) on paper tape by groups of holes arranged in a definite format along the length of the tape. The tape is divided into channels, which run the length of the tape, and into columns, which extend across the width of the tape, as shown in the adjacent diagram. The paper tape readers and punches used with PDP-8 family computers accept eight-channel paper tape.

* Channel 8 is normally designated for parity check. The Teletype units used with the PDP-8/E computer do not generate parity, and Channel 8 is always punched.



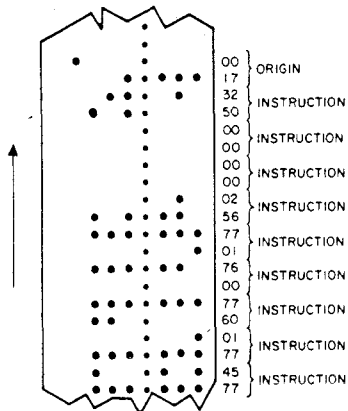
ASCII FORMAT

The USA Standard Code for Information Interchange (ASCII) format uses all eight channels* of the paper tape to represent a single character (letter, number, or symbol) as shown in the diagram at left. The complete code is given in Appendix C.



RIM (READ IN MODE) FORMAT

RIM format tape uses adjacent columns to represent 12-bit binary information directly. Channels 1 through 6 are used to represent either address or information to be stored. A channel 7 punch indicates that the adjacent column and the following column are to be interpreted as an address specifying the location in which the information of the following two columns is to be stored. The tape leader and trailer for RIM format tape must be punched in channel 8 only (octal 200).



BIN (BINARY FORMAT)

BIN format tape is similar to RIM format except that only the first address of consecutive locations is specified. An address is designated by a channel 7 punch and information following an address is stored in sequential locations after the designated address, until another location is specified as an origin. The tape leader/trailer for BIN format tape must be punched in channel 8 (octal 200) only.

PERFORATED-TAPE LOADER SEQUENCES

READIN MODE LOADER

The readin mode (RIM) loader is a minimum length, basic perforated-tape reader program for the ASR33, it is initially stored in memory by manual use of the operator console keys and switches. The loader is permanently stored in 18 locations of page 37.

A perforated tape to be read by the RIM loader must be in RIM format:

Tape Channel	Format
8 7 6 5 4 S 3 2 1	
1 0 0 0 0 . 0 0 0	Leader-trailer code
0 1 A 1 . A 2	Absolute address to
0 0 A 3 . A 4	contain next 4 digits
0 0 X 1 . X 2	Content of previous
0 0 X 3 . X 4	4-digit address
0 1 A 1 . A 2	Address
0 0 A 3 . A 4	Content
0 0 X 1 . X 2	(Etc.)
0 0 X 3 . X 4	(Etc.)
(Etc.)	(Etc.)
1 0 0 0 0 . 0 0 0	Leader-trailer code

The RIM loader can only be used in conjunction with the ASR33 reader (not the high-speed perforated-tape reader). Because a tape in RIM format is, in effect, twice as long as it need be, it is suggested that the RIM loader be used only to read the binary loader when using the ASR33. (Note that PDP-8 diagnostic program tapes are in RIM format.)

The complete PDP-8/I RIM loader (SA = 7756) is as follows:

Absolute Address	Octal Content	Tag	Instruction I Z	Comments
7756,	6032	BEG,	KCC	/CLEAR AC AND FLAG
7757,	6031		KSF	/SKIP IF FLAG = 1
7760,	5357		JMP .-1	/LOOKING FOR CHARACTER
7761,	6036		KRB	/READ BUFFER
7762,	7106		CLL RTL	
7763,	7006		RTL	/CHANNEL 8 IN ACO
7764,	7510		SPA	/CHECKING FOR LEADER
7765,	5357		JMP BEG+1	/FOUND LEADER
7766,	7006		RTL	/OK, CHANNEL 7 IN LINK
7767,	6031		KSF	
7770,	5367		JMP .-1	
7771,	6034		KRS	/READ, DO NOT CLEAR
7772,	7420		SNL	/CHECKING FOR ADDRESS
7773,	3776		DCA I TEMP	/STORE CONTENT
7774,	3376		DCA TEMP	/STORE ADDRESS

7775, 5356 JMP BEG /NEXT WORD
 7776, 0 TEMP, 0 /TEMP STORAGE

Placing the RIM loader in core memory by way of the operator console keys and switches is accomplished as follows:

1. Set the starting address 7756 in the switch register (SR).
2. Press LOAD ADDRESS key.
3. Set the first instruction (6032) in the SR.
4. Press the DEPOSIT key.
5. Set the next instruction (6031) in the SR.
6. Press DEPOSIT key.
7. Repeat steps 5 and 6 until all 16 instructions have been deposited.

To load a tape in RIM format, place the tape in the reader, set the SR to the starting address 7756 of the RIM loader (not of the program being read), press the LOAD ADDRESS key, press the START key, and start the Teletype reader.

Refer to Digital Program Library document DEC-08-LRAA-D for additional information on the Readin Mode Loader program.

BINARY LOADER

The binary loader (BIN) is used to read machine language tapes (in binary format) produced by the program assembly language (PAL). A tape in binary format is about one-half the length of the comparable RIM format tape. It can, therefore, be read about twice as fast as a RIM tape and is, for this reason, the more desirable format to use with the 10 cps ASR33 reader or the Type PR8/I High-Speed Perforated-Tape Reader.

The format of a binary tape is as follows:

LEADER: about 2 feet of leader-trailer codes.

BODY: characters representing the absolute, machine language program in easy-to-read binary (or octal) form. The section of tape may contain characters representing instructions (channel 8 and 7 not punched) or origin resettings (channel 8 not punched, channel 7 punched) and is concluded by 2 characters (channel 8 and 7 not punched) that represent a check sum for the entire section.

TRAILER: same as leader.

Operation of the BIN loader in no way depends upon or uses the RIM loader. To load a tape in BIN format place the tape in the reader, set the SR to 7777 (the starting address of the BIN loader), press the LOAD ADDRESS key, set SR switch 0 up for loading via the Teletype unit or down for loading via the high speed reader, then press the START key, and start the tape reader.

Refer to Digital Program Library document Digital-8-2-U [DEC-08-LBAA-D] for additional information on the Binary Loader program.

Example of the format of a binary tape:

Tape Channel 8 7 6 5 4 S 3 2 1	Memory Location	Content	Comments
1 0 0 0 0 . 0 0 0			leader-trailer code
0 1 0 0 0 . 0 1 0			
0 0 0 0 0 . 0 0 0		0200	
0 0 1 1 1 . 0 1 0			
0 0 0 0 0 . 0 0 0	0200	CLA	origin-setting
0 0 0 0 1 . 0 1 0			
0 0 1 1 1 . 1 1 1	0201	TAD 277	
0 0 0 1 1 . 0 1 0			
0 0 1 1 1 . 1 1 0	0202	DCA 276	
0 0 1 1 1 . 1 0 0			
0 0 0 0 0 . 0 1 0	0203	HLT	
0 1 0 0 0 . 0 1 0			
0 0 1 1 1 . 1 1 1		0277	origin-setting
0 0 0 0 0 . 0 0 0			
0 0 1 0 1 . 0 1 1	0277	0053	
0 0 0 0 1 . 0 0 0			
0 0 0 0 0 . 1 1 1		1007	sum check
1 0 0 0 0 . 0 0 0			leader-trailer code

After a BIN tape has been read in, one of the two following conditions exists:

- a. No checksum error: halt with AC = 0
- b. Checksum error: halt with AC = (completed checksum) — (tape checksum)

CHARACTER CODES

8-bit ASCII Code	6-bit Code	DEC 029 Card Code	DEC 026 Card Code	Character Representation	Remarks
240	40	.blank	blank		space (non-printing)
241	41	11-8-2	12-8-7	!	exclamation point
242	42	8-7	0-8-5	"	quotation marks
243	43	8-3	0-8-6	#	number sign ⁽¹⁰⁾
244	44	11-8-3	11-8-3	\$	dollar sign
245	45	0-8-4	0-8-7	%	percent
246	46	12	11-8-7	&	ampersand
247	47	8-5	3-6	'	apostrophe or acute accent
250	50	12-8-5	0-8-4	(	opening parenthesis
251	51	11-8-5	12-8-4 ⁽¹¹⁾)	closing parenthesis
252	52	11-8-4	11-8-4	*	asterisk
253	53	12-8-6	12	+	plus
254	54	0-8-3	0-8-3	,	comma
255	55	11	11	-	minus sign or hyphen
256	56	12-8-3	12-8-3	.	period or decimal point
257	57	0-1	0-1	/	slash
260	60	0	0	0	
261	61	1	1	1	
262	62	2	2	2	
263	63	3	3	3	
264	64	4	4	4	
265	65	5	5	5	
266	66	6	6	6	
267	67	7	7	7	
270	70	8	8	8	
271	71	9	9	9	
272	72	8-2	11-8-2	:	colon
273	73	11-8-6	0-8-2	;	semicolon
274	74	12-8-4	12-8-6	<	less than
275	75	8-6	8-3	=	equals
276	76	0-8-6	11-8-6	>	greater than
277	77	0-8-7	12-8-2	?	question mark
300	00	8-4	8-4	@	at sign
301	01	12-1	12-1	A	
302	02	12-2	12-2	B	
303	03	12-3	12-3	C	
304	04	12-4	12-4	D	
305	05	12-5	12-5	E	
306	06	12-6	12-6	F	
307	07	12-7	12-7	G	



8-bit ASCII Code	6-bit Code	DEC 029 Card Code	DEC 026 Card Code	Character Representation	Remarks
310	10	12-8	12-8	H	
311	11	12-9	12-9	I	
312	12	11-1	11-1	J	
313	13	11-2	11-2	K	
314	14	11-3	11-3	L	
315	15	11-4	11-4	M	
316	16	11-5	11-5	N	
317	17	11-6	11-6	O	
320	20	11-7	11-7	P	
321	21	11-8	11-8	Q	
322	22	11-9	11-9	R	
323	23	0-2	0-2	S	
324	24	0-3	0-3	T	
325	25	0-4	0-4	U	
326	26	0-5	0-5	V	
327	27	0-6	0-6	W	
330	30	0-7	0-7	X	
331	31	0-8	0-8	Y	
332	32	0-9	0-9	Z	
333	33	12-8-2 ⁽⁵⁾	11-8-5	[	opening bracket, SHIFT/K
334	34	11-8-7 ⁽⁶⁾	8-7	\	backslash, SHIFT/L ⁽⁸⁾
335	35	0-8-2	12-8-5	]	closing bracket, SHIFT/M
336	36	12-8-7 ⁽⁷⁾	8-5	^	circumflex ⁽²⁾
337	37	0-8-5 ⁽³⁾	8-2 ⁽³⁾	_	underline ^(4,9)

Footnotes:

- (1) On some DEC 026 Keyboards this character is graphically represented as □.
- (2) On most DEC Teletypes circumflex is replaced by up-arrow (↑).
- (3) A card containing this code in column 1 with all remaining columns blank is an end-of-file card.
- (4) On most DEC Teletypes underline is replaced by backarrow (←).
- (5) On some 029 keyboards this character is graphically represented as a cent sign (¢).
- (6) On some 029 keyboards this character is graphically represented as logical NOT (¬).
- (7) On some 029 keyboards this character is graphically represented as vertical bar (|).
- (8) On some LP8 line printers, the character diamond (◊) is printed instead of backslash.
- (9) On some LP8 line printers, the character heart (♡) is printed instead of underline.
- (10) The number sign on some terminals is replaced by pound sign (£).

LINE PRINTER CHARACTER CODES

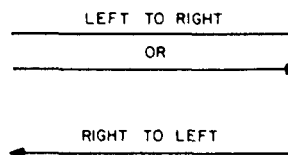
LE8-E LINE PRINTER CODE		Octal digit in AC 9-11							
Octal	Octal digit in AC 9-11								
digits in AC 5-8	0	1	2	3	4	5	6	7	
00									
01			LF		FF	CR			
02									
03									
04	SP	!	"	#	\$	%	&	'	
05	()	*	+	,	-	.	/	
06	0	1	2	3	4	5	6	7	
07	8	9	:	;	<	=	>	?	
10	@	A	B	C	D	E	F	G	
11	H	I	J	K	L	M	N	O	
12	P	Q	R	S	T	U	V	W	
13	X	Y	Z	[\]	^	_	
14	\	a	b	c	d	e	f	g	
15	h	i	j	k	l	m	n	o	
16	p	q	r	s	t	u	v	w	
17	x	y	z	{	|	}	~	DEL	

- Notes: 1. LF = Line Feed
 FF = Form Feed
 CR = Carriage Return
 SP = Space
2. Characters below the heavy line are available only on 96-character printers.
3. On some early models of the LE8-E Line Printer, the \ (Code 134) is replaced by a ; and the (Code 137) is replaced by a .

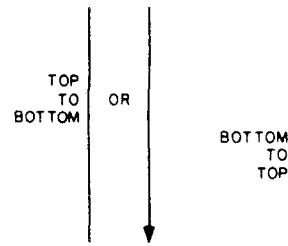
Flowchart guide

The following is a partial list of flowchart symbols which can be used to diagram the logical flow of a program. The symbols may be made sufficiently large to include the pertinent information.

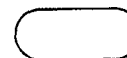
REPRESENTATION OF FLOW



The direction of flow in a program is represented by lines drawn between symbols. These lines indicate the order in which the operations are to be performed. Normal direction of flow is from left to right and top to bottom. When the flow direction is not from left to right or top to bottom, arrowheads are placed on the reverse direction flowlines. Arrowheads may also be used on normal flow lines for increased clarity.



TERMINAL



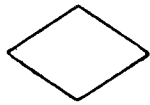
The oval symbol represents a terminal point in a program. It can be used to indicate a start, stop, or interrupt of program flow. The appropriate word is included within the symbol.

PROCESSING



The rectangular symbol represents a processing function. The process which the symbol is used to represent could be an instruction or a group of instructions to carry out a given task. A brief description of the task to be performed is included within the symbol.

DECISION



A diamond is used to indicate a point in a program where a choice must be made to determine the flow of the program from that point. A test condition is included within the symbol and the possible results of the test are used to label the respective flows from the symbol.

PREDEFINED PROCESS



This symbol is used to represent an operation or group of operations not detailed in the flowchart. It is usually detailed in another flowchart. A subroutine is often represented in this manner.

CONNECTOR



The circular symbol shown below represents an entry from or an exit to another part of the program flowchart. A number or a letter is enclosed to label the corresponding exits and entries. This symbol does not represent a program operation.

ANNOTATION



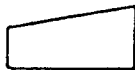
An addition of descriptive comments or explanatory notes for clarification is included within this symbol.

INPUT/OUTPUT



This symbol is used in a flowchart to represent the input or output of information. This symbol may be used for all input/output functions, or symbols for specific types of input or output (such as those which follow) may be used.

MANUAL INPUT



This symbol may be used to represent the manual input of information by means of on-line keyboards, switch settings, etc.

PUNCHED TAPE



The input or output of information in which the medium is punched tape may be represented by this symbol.

MAGNETIC TAPE



This symbol is used in a flowchart to represent magnetic tape input or output.

PAPER TAPE LOADERS

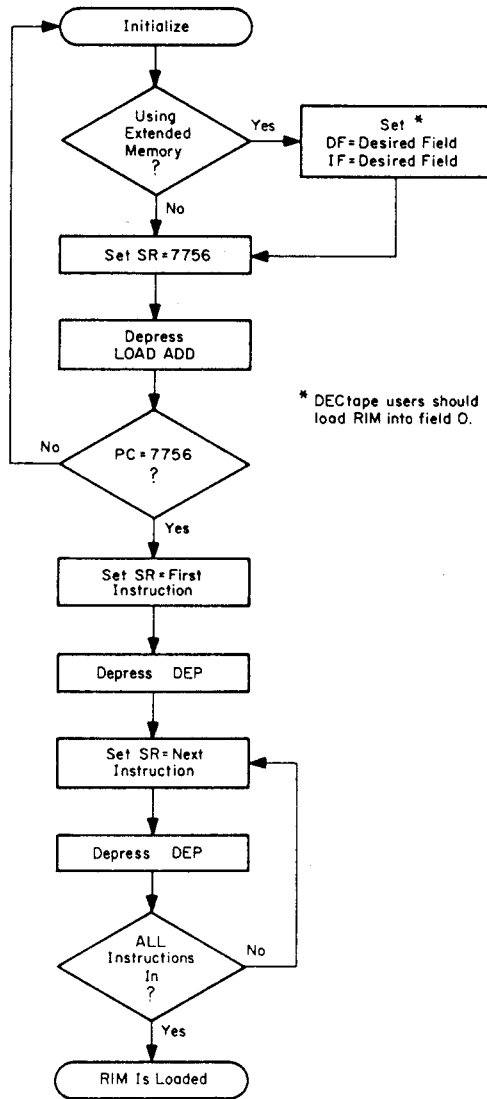
READ-IN MODE (RIM) LOADER

The RIM Loader is used to load programs punched on RIM format paper tape into core memory. It is stored in core memory locations 7756-7776 (21₈ locations), and started at location 7756. There are two versions of the RIM Loader, permitting either the high- or the low-speed reader to be used as an input device. The locations and corresponding instructions for both versions are listed below.

Table E1-1 RIM Loader Programs

Location	INSTRUCTION	
	Low-Speed Reader	High-Speed Reader
7756	6032	6014
7757	6031	6011
7760	5357	5357
7761	6036	6016
7762	7106	7106
7763	7006	7006
7764	7510	7510
7765	5357	5374
7766	7006	7006
7767	6031	6011
7770	5367	5367
7771	6034	6016
7772	7420	7420
7773	3776	3776
7774	3376	3376
7775	5356	5357

Note: Location 7776 is used for temporary storage.

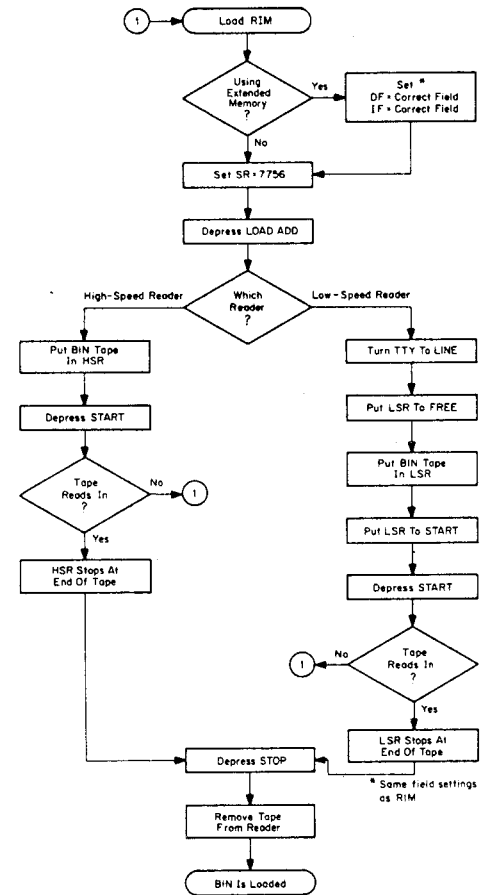


Loading the RIM Loader

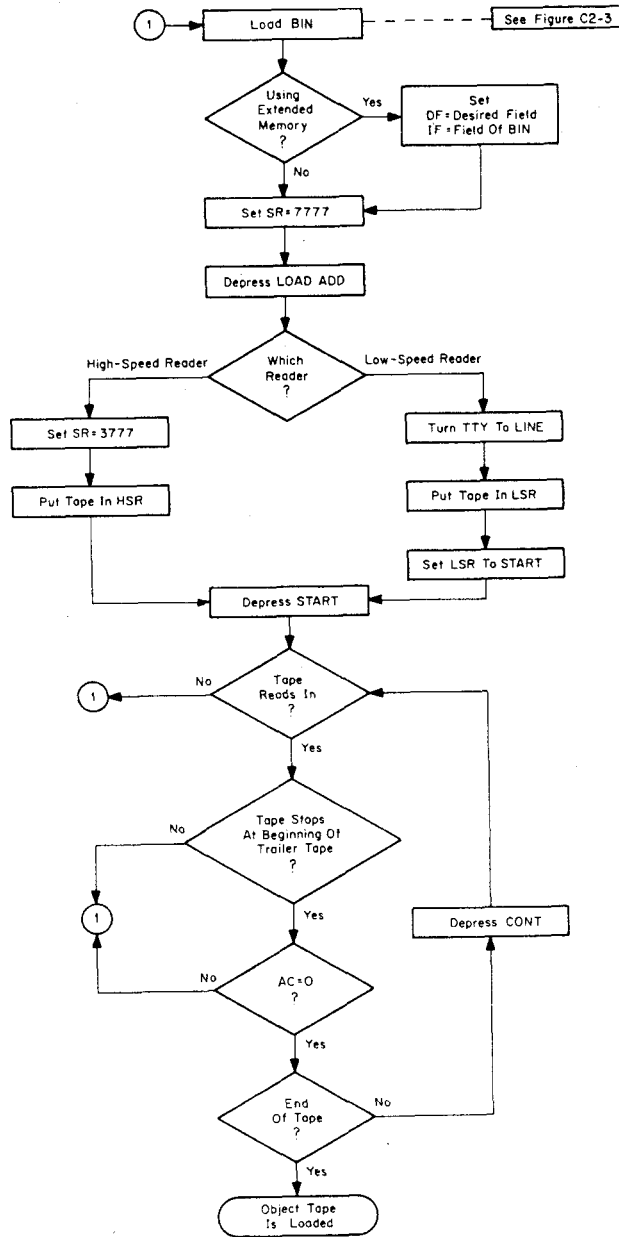
BINARY (BIN) LOADER

The BIN Loader is used to load programs punched on BIN format paper tape into core memory. It is stored in core memory locations 7625-7752 and 7777 (127₈ locations), and started at location 7777. The RIM Loader is usually used to load a RIM format tape of the BIN Loader.

When the BIN Loader is used to load a binary tape, caution must be exercised to ensure that the tape is started with binary leader code (code 200) under the read station. If the tape is started before this code, the contents of core memory may be lost.



Loading the BIN Loader



Loading A Binary Tape Using BIN

MATHEMATICAL TABLES

POWERS OF TWO

2^n	n	2^{-n}
1	0	1.0
2	1	0.5
4	2	0.25
8	3	0.125
16	4	0.062 5
32	5	0.031 25
64	6	0.015 625
128	7	0.007 812 5
256	8	0.003 906 25
512	9	0.001 953 125
1 024	10	0.000 976 562 5
2 048	11	0.000 488 281 25
4 096	12	0.000 244 140 625
8 192	13	0.000 122 070 312 5
16 384	14	0.000 061 035 156 25
32 768	15	0.000 030 517 578 125
65 536	16	0.000 015 258 789 062 5
131 072	17	0.000 007 629 394 531 25
262 144	18	0.000 003 814 697 265 625
524 288	19	0.000 001 907 348 632 812 5
1 048 576	20	0.000 000 953 674 316 406 25
2 097 152	21	0.000 000 476 837 158 203 125
4 194 304	22	0.000 000 238 418 579 101 562 5
8 388 608	23	0.000 000 119 209 289 550 781 25
16 777 216	24	0.000 000 059 604 644 775 390 625
33 554 432	25	0.000 000 029 802 322 387 695 312 5
67 108 864	26	0.000 000 014 901 161 193 847 656 25
134 217 728	27	0.000 000 007 450 580 596 923 808 125
268 435 456	28	0.000 000 003 725 290 298 461 974 062 5
536 870 912	29	0.000 000 001 862 645 149 230 957 031 25
1 073 741 824	30	0.000 000 000 931 322 574 615 478 515 625
2 147 483 648	31	0.000 000 000 465 661 287 307 739 257 812 5
4 294 967 296	32	0.000 000 000 232 830 643 653 869 628 906 25
8 589 934 592	33	0.000 000 000 116 415 321 826 934 814 453 125
17 179 869 184	34	0.000 000 000 058 207 660 913 467 407 226 562 5
34 359 738 368	35	0.000 000 000 029 103 830 456 733 703 613 061 25
68 719 476 736	36	0.000 000 000 014 551 915 228 366 851 806 640 625
137 438 953 472	37	0.000 000 000 007 275 957 614 183 425 903 320 312 5
274 877 906 944	38	0.000 000 000 003 637 978 807 091 712 951 660 156 25
549 755 813 888	39	0.000 000 000 001 818 989 403 545 856 475 630 078 125
1 099 511 627 776	40	0.000 000 000 000 909 494 701 727 928 237 915 039 062 5
2 199 023 255 552	41	0.000 000 000 000 454 747 350 886 464 118 957 519 531 25
4 398 046 511 104	42	0.000 000 000 000 227 373 675 443 232 059 478 759 765 625
8 796 093 022 208	43	0.000 000 000 000 113 686 837 721 616 029 739 379 882 812 5
17 592 186 044 416	44	0.000 000 000 000 056 843 418 860 808 014 869 689 941 406 25
35 184 372 088 832	45	0.000 000 000 000 028 421 709 430 404 007 434 844 970 703 125
70 368 744 177 664	46	0.000 000 000 000 014 210 854 715 202 003 717 422 485 351 562 5
140 737 488 355 328	47	0.000 000 000 000 007 105 427 357 601 001 858 711 242 675 781 25
281 474 976 710 656	48	0.000 000 000 000 003 527 133 678 800 500 929 355 621 337 896 625
562 949 953 421 312	49	0.000 000 000 000 001 776 356 839 400 250 464 677 810 668 945 312 5
1 125 899 906 842 624	50	0.000 000 000 000 000 889 178 419 700 125 232 308 905 334 472 656 25
2 251 799 813 985 248	51	0.000 000 000 000 000 444 089 209 850 62 616 169 452 667 236 328 125
4 503 599 627 970 496	52	0.000 000 000 000 000 222 044 604 925 031 308 084 726 333 668 164 062 5
9 007 199 254 740 992	53	0.000 000 000 000 000 111 022 302 462 515 654 042 363 166 834 582 031 25
18 014 398 509 481 984	54	0.000 000 000 000 000 055 511 151 231 257 827 021 171 513 417 041 015 625
36 028 797 018 963 968	55	0.000 000 000 000 000 027 755 575 615 628 913 510 590 791 708 520 507 812 5
72 057 594 037 927 936	56	0.000 000 000 000 000 013 877 787 807 814 456 755 215 395 854 260 253 906 25
144 115 188 075 855 872	57	0.000 000 000 000 000 006 938 893 903 907 228 377 647 697 927 120 126 953 125
288 230 376 151 711 744	58	0.000 000 000 000 000 003 469 446 951 953 614 188 823 848 963 565 063 476 562 5
576 460 752 303 423 488	59	0.000 000 000 000 000 001 734 723 475 976 807 094 411 924 481 782 531 738 281 25
1 152 921 504 606 846 976	60	0.000 000 000 000 000 000 867 361 737 988 403 547 205 962 240 891 265 869 140 625

SCALES OF NOTATION

2^x IN DECIMAL

x	2 ^x	x	2 ^x	x	2 ^x
0.001	1.00069 33874 62581	0.01	1.00695 55500 56719	0.1	1.07177 34625 36293
0.002	1.00138 72557 11335	0.02	1.01395 94797 90029	0.2	1.14869 83549 97035
0.003	1.00208 16050 79633	0.03	1.02101 21257 07193	0.3	1.23114 44133 44916
0.004	1.00277 64359 01078	0.04	1.02811 38266 56067	0.4	1.31950 79107 72894
0.005	1.00347 17485 09503	0.05	1.03526 49238 41377	0.5	1.41421 35623 73095
0.006	1.00416 78432 38973	0.06	1.04246 57608 41121	0.6	1.51571 65665 10398
0.007	1.00486 38204 23785	0.07	1.04971 66836 23067	0.7	1.62450 47927 12471
0.008	1.00556 05803 98468	0.08	1.05701 80405 61380	0.8	1.74110 11265 92248
0.009	1.00625 78234 97782	0.09	1.06437 01824 53360	0.9	1.86606 59830 73615

10ⁿ IN OCTAL

10 ⁿ	n	10 ⁿ	10 ⁿ	n	10 ⁿ
1	0	1.000 000 000 000 000 000 00	112 402 762 000 10	0.000 000 000 006 676 337 66	10
12	1	0.063 146 314 631 463 146 31	1 351 035 564 000 11	0.000 000 000 000 000 537 657 77	11
144	2	0.005 075 341 217 270 243 66	16 432 451 210 000 12	0.000 000 000 000 000 043 136 32	12
1 750	3	0.000 406 111 564 570 651 77	221 411 634 520 000 13	0.000 000 000 000 000 003 411 35	13
23 420	4	0.000 032 155 613 530 704 15	2 657 142 036 440 000 14	0.000 000 000 000 000 000 264 11	14
303 240	5	0.000 002 476 132 610 706 64	34 327 724 461 800 000 15	0.000 000 000 000 000 000 022 01	15
3 641 100	6	0.000 000 206 157 364 055 37	434 157 115 760 200 000 16	0.000 000 000 000 000 000 001 63	16
46 113 200	7	0.000 000 015 327 745 152 75	5 432 127 413 542 400 000 17	0.000 000 000 000 000 000 000 14	17
575 360 400	8	0.000 000 001 257 143 561 06	67 405 553 164 731 000 000 18	0.000 000 000 000 000 000 000 01	18
346 545 000	9	0.000 000 000 104 560 276 41			

n log₁₀ 2, n log₂ 10 IN DECIMAL

n	n log ₁₀ 2	n log ₂ 10	n	n log ₁₀ 2	n log ₂ 10
1	0.30102 99957	3.32192 80949	6	1.80617 99740	19.93156 85693
2	0.60205 99913	6.64385 61898	7	2.10720 99696	23.25349 66642
3	0.90308 99870	9.96578 42847	8	2.40823 99653	26.57542 47591
4	1.20411 99827	13.28771 23795	9	2.70926 99610	29.89735 28540
5	1.50514 99783	16.60964 04744	10	3.01029 99566	33.21928 09489

ADDITION AND MULTIPLICATION TABLES

Addition								Multiplication							
Binary Scale								Octal Scale							
$0 + 0 = 0$ $0 + 1 = 1$ $1 + 0 = 1$ $1 + 1 = 10$								$0 \times 0 = 0$ $0 \times 1 = 0$ $1 \times 0 = 0$ $1 \times 1 = 1$							
0	1	2	3	4	5	6	7	1	2	3	4	5	6	7	
1	02	03	04	05	06	07	10	2	04	06	10	12	14	16	
2	03	04	05	06	07	10	11	3	06	11	14	17	22	25	
3	04	05	06	07	10	11	12	4	10	14	20	24	30	34	
4	05	06	07	10	11	12	13	5	12	17	24	31	36	43	
5	06	07	10	11	12	13	14	6	14	22	30	36	44	52	
6	07	10	11	12	13	14	15	7	16	25	34	43	52	61	
7	10	11	12	13	14	15	16								

MATHEMATICAL CONSTANTS IN OCTAL SCALE

$\pi = 3.11037$	552421_8	$e = 2.55760$	521305_8	$\gamma = 0.44742$	147707_8
$\pi^{-1} = 0.24276$	301556_8	$e^{-1} = 0.27426$	530661_8	$\ln \gamma = -0.43127$	233602_8
$\sqrt{\pi} = 1.61337$	611067_8	$\sqrt{e} = 1.51411$	230704_8	$\log_2 \gamma = -0.62573$	030645_8
$\ln \pi = 1.11206$	404435_8	$\log_2 e = 0.33626$	754251_8	$\sqrt{2} = 1.32404$	746320_8
$\log_2 \pi = 1.51544$	163223_8	$\log_2 e = 1.34252$	166245_8	$\ln 2 = 0.54271$	027760_8
$\sqrt{10} = 3.12305$	407267_8	$\log_2 10 = 3.24464$	741136_8	$\ln 10 = 2.23273$	067355_8

Octal-Decimal Conversion

The following table gives the multiples of the powers of 8. To convert a number from octal to decimal using the table, add the decimal number opposite the digit value for each digit position. To convert 40277₈ to decimal, the following numbers are obtained from the table and added.

Position	Digit	Table entry
5	4	16384
4	0	0
3	2	128
2	7	56
1	7	7

$$16384 + 128 + 56 + 7 = 40277_{10}$$

This process is reversed to convert a number from decimal to octal. Subtract out the largest table entry which allows a positive remainder, then take the column number (position coefficient) of the table entry as the Nth digit of the result, where N is the row number (digit position) of the table entry. Continue this process, operating on the remainder from each step in the next step, until all digits of the result have been found. For example, to convert 23365₁₀ to an equivalent octal number:

$$\begin{array}{r}
 23365 \\
 -20480 = 5 \times 8^4 \\
 \hline
 2885 \\
 -2560 = 5 \times 8^3 \\
 \hline
 325 \\
 -320 = 5 \times 8^2 \\
 \hline
 5 \\
 -0 = 0 \times 8^1 \\
 \hline
 5 \\
 -5 = 5 \times 8^0 \\
 \hline
 0
 \end{array}$$

$55505_8 = 23365_{10}$

Octal Digit Position/ 8 ⁿ	Position Coefficients (Multipliers)							
	0	1	2	3	4	5	6	7
1st (8 ⁰)	0	1	2	3	4	5	6	7
2nd (8 ¹)	0	8	16	24	32	40	48	56
3rd (8 ²)	0	64	128	192	256	320	384	448
4th (8 ³)	0	512	1,024	1,536	2,048	2,560	3,072	3,584
5th (8 ⁴)	0	4,096	8,192	12,288	16,384	20,480	24,576	28,672
6th (8 ⁵)	0	32,768	65,536	98,304	131,072	163,840	196,608	229,376

Octal-Decimal Integer Conversion Table

		0	1	2	3	4	5	6	7			0	1	2	3	4	5	6	7
0000 to 0777 (Octal)	0000 to 0511 (Decimal)	0000	0000	0001	0002	0003	0004	0005	0006	0007	0400	0256	0257	0258	0259	0260	0261	0262	0263
		0010	0008	0009	0010	0011	0012	0013	0014	0015	0410	0264	0265	0266	0267	0268	0269	0270	0271
		0020	0016	0017	0018	0019	0020	0021	0022	0023	0420	0272	0273	0274	0275	0276	0277	0278	0279
		0030	0024	0025	0026	0027	0028	0029	0030	0031	0430	0280	0281	0282	0283	0284	0285	0286	0287
		0040	0032	0033	0034	0035	0036	0037	0038	0039	0440	0288	0289	0290	0291	0292	0293	0294	0295
		0050	0040	0041	0042	0043	0044	0045	0046	0047	0450	0296	0297	0298	0299	0300	0301	0302	0303
		0060	0048	0049	0050	0051	0052	0053	0054	0055	0460	0304	0305	0306	0307	0308	0309	0310	0311
		0070	0056	0057	0058	0059	0060	0061	0062	0063	0470	0312	0313	0314	0315	0316	0317	0318	0319
1000 to 4096 (Octal)	4096 to 7000 (Decimal)	0100	0064	0065	0066	0067	0068	0069	0070	0071	0500	0320	0321	0322	0323	0324	0325	0326	0327
		0110	0072	0073	0074	0075	0076	0077	0078	0079	0510	0328	0329	0330	0331	0332	0333	0334	0335
		0120	0080	0081	0082	0083	0084	0085	0086	0087	0520	0336	0337	0338	0339	0340	0341	0342	0343
		0130	0088	0089	0090	0091	0092	0093	0094	0095	0530	0344	0345	0346	0347	0348	0349	0350	0351
		0140	0096	0097	0098	0099	0100	0101	0102	0103	0540	0352	0353	0354	0355	0356	0357	0358	0359
		0150	0104	0105	0106	0107	0108	0109	0110	0111	0550	0360	0361	0362	0363	0364	0365	0366	0367
		0160	0112	0113	0114	0115	0116	0117	0118	0119	0560	0368	0369	0370	0371	0372	0373	0374	0375
		0170	0120	0121	0122	0123	0124	0125	0126	0127	0570	0376	0377	0378	0379	0380	0381	0382	0383
0200 to 0630 (Octal)	0630 to 1062 (Decimal)	0200	0128	0129	0130	0131	0132	0133	0134	0135	0600	0384	0385	0386	0387	0388	0389	0390	0391
		0210	0136	0137	0138	0139	0140	0141	0142	0143	0610	0392	0393	0394	0395	0396	0397	0398	0399
		0220	0144	0145	0146	0147	0148	0149	0150	0151	0620	0400	0401	0402	0403	0404	0405	0406	0407
		0230	0152	0153	0154	0155	0156	0157	0158	0159	0630	0408	0409	0410	0411	0412	0413	0414	0415
		0240	0160	0161	0162	0163	0164	0165	0166	0167	0640	0416	0417	0418	0419	0420	0421	0422	0423
		0250	0168	0169	0170	0171	0172	0173	0174	0175	0650	0424	0425	0426	0427	0428	0429	0430	0431
		0260	0176	0177	0178	0179	0180	0181	0182	0183	0660	0432	0433	0434	0435	0436	0437	0438	0439
		0270	0184	0185	0186	0187	0188	0189	0190	0191	0670	0440	0441	0442	0443	0444	0445	0446	0447
0300 to 0732 (Octal)	0732 to 1164 (Decimal)	0300	0192	0193	0194	0195	0196	0197	0198	0199	0700	0448	0449	0450	0451	0452	0453	0454	0455
		0310	0200	0201	0202	0203	0204	0205	0206	0207	0710	0456	0457	0458	0459	0460	0461	0462	0463
		0320	0208	0209	0210	0211	0212	0213	0214	0215	0720	0464	0465	0466	0467	0468	0469	0470	0471
		0330	0216	0217	0218	0219	0220	0221	0222	0223	0730	0472	0473	0474	0475	0476	0477	0478	0479
		0340	0224	0225	0226	0227	0228	0229	0230	0231	0740	0480	0481	0482	0483	0484	0485	0486	0487
		0350	0232	0233	0234	0235	0236	0237	0238	0239	0750	0488	0489	0490	0491	0492	0493	0494	0495
		0360	0240	0241	0242	0243	0244	0245	0246	0247	0760	0496	0497	0498	0499	0500	0501	0502	0503
		0370	0248	0249	0250	0251	0252	0253	0254	0255	0770	0504	0505	0506	0507	0508	0509	0510	0511
1000 to 1777 (Octal)	0512 to 1023 (Decimal)	1000	0512	0513	0514	0515	0516	0517	0518	0519	1400	0768	0769	0770	0771	0772	0773	0774	0775
		1010	0520	0521	0522	0523	0524	0525	0526	0527	1410	0776	0777	0778	0779	0780	0781	0782	0783
		1020	0528	0529	0530	0531	0532	0533	0534	0535	1420	0784	0785	0786	0787	0788	0789	0790	0791
		1030	0536	0537	0538	0539	0540	0541	0542	0543	1430	0792	0793	0794	0795	0796	0797	0798	0799
		1040	0544	0545	0546	0547	0548	0549	0550	0551	1440	0800	0801	0802	0803	0804	0805	0806	0807
		1050	0552	0553	0554	0555	0556	0557	0558	0559	1450	0808	0809	0810	0811	0812	0813	0814	0815
		1060	0560	0561	0562	0563	0564	0565	0566	0567	1460	0816	0817	0818	0819	0820	0821	0822	0823
		1070	0568	0569	0570	0571	0572	0573	0574	0575	1470	0824	0825	0826	0827	0828	0829	0830	0831
1100 to 2000 (Octal)	2000 to 2992 (Decimal)	1100	0576	0577	0578	0579	0580	0581	0582	0583	1500	0832	0833	0834	0835	0836	0837	0838	0839
		1110	0584	0585	0586	0587	0588	0589	0590	0591	1510	0840	0841	0842	0843	0844	0845	0846	0847
		1120	0592	0593	0594	0595	0596	0597	0598	0599	1520	0848	0849	0850	0851	0852	0853	0854	0855
		1130	0600	0601	0602	0603	0604	0605	0606	0607	1530	0856	0857	0858	0859	0860	0861	0862	0863
		1140	0608	0609	0610	0611	0612	0613	0614	0615	1540	0864	0865	0866	0867	0868	0869	0870	0871
		1150	0616	0617	0618	0619	0620	0621	0622	0623	1550	0872	0873	0874	0875	0876	0877	0878	0879
		1160	0624	0625	0626	0627	0628	0629	0630	0631	1560	0880	0881	0882	0883	0884	0885	0886	0887
		1170	0632	0633	0634	0635	0636	0637	0638	0639	1570	0888	0889	0890	0891	0892	0893	0894	0895
1200 to 2992 (Octal)	2992 to 3984 (Decimal)	1200	0640	0641	0642	0643	0644	0645	0646	0647	1600	0896	0897	0898	0899	0900	0901	0902	0903
		1210	0648	0649	0650	0651	0652	0653	0654	0655	1610	0904	0905	0906	0907	0908	0909	0910	0911
		1220	0656	0657	0658	0659	0660	0661	0662	0663	1620	0912	0913	0914	0915	0916	0917	0918	0919
		1230	0664	0665	0666	0667	0668	0669	0670	0671	1630	0920	0921	0922	0923	0924	0925	0926	0927
		1240	0672	0673	0674	0675	0676	0677	0678	0679	1640	0928	0929	0930	0931	0932	0933	0934	0935
		1250	0680	0681	0682	0683	0684	0685	0686	0687	1650	0936	0937	0938	0939	0940	0941	0942	0943
		1260	0688	0689	0690	0691	0692	0693	0694	0695	1660	0944	0945	0946	0947	0948	0949	0950	0951
		1270	0696	0697	0698	0699	0700	0701	0702	0703	1670	0952	0953	0954	0955	0956	0957	0958	0959
1300 to 3984 (Octal)	3984 to 4976 (Decimal)	1300	0704	0705	0706	0707	0708	0709	0710	0711	1700	0960	0961	0962	0963	0964	0965	0966	0967
		1310	0712	0713	0714	0715	0716	0717	0718	0719	1710	0968	0969	0970	0971	0972	0973	0974	0975
		1320	0720	0721	0722	0723	0724	0725	0726	0727	1720	0976	0977	0978	0979	0980	0981	0982	0983
		1330	0728	0729	0730	0731	0732	0733	0734	0735	1730	0984	0985	0986	0987	0988	0989	0990	0991
		1340	0736	0737	0738	0739	0740	0741	0742	0743	1740	0992	0993	0994	0995	0996	0997	0998	0999
		1350	0744	0745	0746	0747	0748	0749	0750	0751	1750	1000	1001	1002	1003	1004	1005	1006	1007
		1360	0752	0753	0754	0755	0756	0757	0758	0759	1760	1008	1009	1010	1011	1012	1013	1014	1015
		1370	0760	0761	0762	0763	0764	0765	0766	0767	1770	1016	1017	1018	1019	1020	1021	1022	1023

Octal-Decimal Integer Conversion Table (continued)

		0	1	2	3	4	5	6	7			0	1	2	3	4	5	6	7
2000 to 2777 (Octal)	1024 to 1535 (Decimal)	2000	1024	1025	1026	1027	1028	1029	1030	1031	2400	1280	1281	1282	1283	1284	1285	1286	1287
		2010	1032	1033	1034	1035	1036	1037	1038	1039	2410	1288	1289	1290	1291	1292	1293	1294	1295
		2020	1040	1041	1042	1043	1044	1045	1046	1047	2420	1296	1297	1298	1299	1300	1301		

Octal-Decimal Integer Conversion Table (continued)

4000 to 4777 (Octal) to 2048 to 2559 (Decimal)

0	1	2	3	4	5	6	7
4000	2048	2049	2050	2051	2052	2053	2054
4010	2056	2057	2058	2059	2060	2061	2062
4020	2064	2065	2066	2067	2068	2069	2070
4030	2072	2073	2074	2075	2076	2077	2078
4040	2080	2081	2082	2083	2084	2085	2086
4050	2088	2089	2090	2091	2092	2093	2094
4060	2096	2097	2098	2099	2100	2101	2102
4070	2104	2105	2106	2107	2108	2109	2110

0	1	2	3	4	5	6	7
4100	2112	2113	2114	2115	2116	2117	2118
4110	2120	2121	2122	2123	2124	2125	2126
4120	2128	2129	2130	2131	2132	2133	2134
4130	2136	2137	2138	2139	2140	2141	2142
4140	2144	2145	2146	2147	2148	2149	2150
4150	2152	2153	2154	2155	2156	2157	2158
4160	2160	2161	2162	2163	2164	2165	2166
4170	2168	2169	2170	2171	2172	2173	2174

0	1	2	3	4	5	6	7
4200	2176	2177	2178	2179	2180	2181	2182
4210	2184	2185	2186	2187	2188	2189	2190
4220	2192	2193	2194	2195	2196	2197	2198
4230	2200	2201	2202	2203	2204	2205	2206
4240	2208	2209	2210	2211	2212	2213	2214
4250	2216	2217	2218	2219	2220	2221	2222
4260	2224	2225	2226	2227	2228	2229	2230
4270	2232	2233	2234	2235	2236	2237	2238

0	1	2	3	4	5	6	7
4300	2240	2241	2242	2243	2244	2245	2246
4310	2248	2249	2250	2251	2252	2253	2254
4320	2256	2257	2258	2259	2260	2261	2262
4330	2264	2265	2266	2267	2268	2269	2270
4340	2272	2273	2274	2275	2276	2277	2278
4350	2280	2281	2282	2283	2284	2285	2286
4360	2288	2289	2290	2291	2292	2293	2294
4370	2296	2297	2298	2299	2300	2301	2302

5000 to 5777 (Octal) to 2560 to 3071 (Decimal)

0	1	2	3	4	5	6	7
5000	2560	2561	2562	2563	2564	2565	2566
5010	2568	2569	2570	2571	2572	2573	2574
5020	2576	2577	2578	2579	2580	2581	2582
5030	2584	2585	2586	2587	2588	2589	2590
5040	2592	2593	2594	2595	2596	2597	2598
5050	2600	2601	2602	2603	2604	2605	2606
5060	2608	2609	2610	2611	2612	2613	2614
5070	2616	2617	2618	2619	2620	2621	2622

0	1	2	3	4	5	6	7
5100	2624	2625	2626	2627	2628	2629	2630
5110	2632	2633	2634	2635	2636	2637	2638
5120	2640	2641	2642	2643	2644	2645	2646
5130	2648	2649	2650	2651	2652	2653	2654
5140	2656	2657	2658	2659	2660	2661	2662
5150	2664	2665	2666	2667	2668	2669	2670
5160	2672	2673	2674	2675	2676	2677	2678
5170	2680	2681	2682	2683	2684	2685	2686

0	1	2	3	4	5	6	7
5200	2688	2689	2690	2691	2692	2693	2694
5210	2696	2697	2698	2699	2700	2701	2702
5220	2704	2705	2706	2707	2708	2709	2710
5230	2712	2713	2714	2715	2716	2717	2718
5240	2720	2721	2722	2723	2724	2725	2726
5250	2728	2729	2730	2731	2732	2733	2734
5260	2736	2737	2738	2739	2740	2741	2742
5270	2744	2745	2746	2747	2748	2749	2750

0	1	2	3	4	5	6	7
5300	2752	2753	2754	2755	2756	2757	2758
5310	2760	2761	2762	2763	2764	2765	2766
5320	2768	2769	2770	2771	2772	2773	2774
5330	2776	2777	2778	2779	2780	2781	2782
5340	2784	2785	2786	2787	2788	2789	2790
5350	2792	2793	2794	2795	2796	2797	2798
5360	2800	2801	2802	2803	2804	2805	2806
5370	2808	2809	2810	2811	2812	2813	2814

4400 to 4777 (Octal) to 2304 to 2383 (Decimal)

0	1	2	3	4	5	6	7
4400	2304	2305	2306	2307	2308	2309	2310
4410	2312	2313	2314	2315	2316	2317	2318
4420	2320	2321	2322	2323	2324	2325	2326
4430	2328	2329	2330	2331	2332	2333	2334
4440	2336	2337	2338	2339	2340	2341	2342
4450	2344	2345	2346	2347	2348	2349	2350
4460	2352	2353	2354	2355	2356	2357	2358
4470	2360	2361	2362	2363	2364	2365	2366

0	1	2	3	4	5	6	7
4500	2368	2369	2370	2371	2372	2373	2374
4510	2376	2377	2378	2379	2380	2381	2382
4520	2384	2385	2386	2387	2388	2389	2390
4530	2392	2393	2394	2395	2396	2397	2398
4540	2400	2401	2402	2403	2404	2405	2406
4550	2408	2409	2410	2411	2412	2413	2414
4560	2416	2417	2418	2419	2420	2421	2422
4570	2424	2425	2426	2427	2428	2429	2430

0	1	2	3	4	5	6	7
4600	2432	2433	2434	2435	2436	2437	2438
4610	2440	2441	2442	2443	2444	2445	2446
4620	2448	2449	2450	2451	2452	2453	2454
4630	2456	2457	2458	2459	2460	2461	2462
4640	2464	2465	2466	2467	2468	2469	2470
4650	2472	2473	2474	2475	2476	2477	2478
4660	2480	2481	2482	2483	2484	2485	2486
4670	2488	2489	2490	2491	2492	2493	2494

0	1	2	3	4	5	6	7
4700	2496	2497	2498	2499	2500	2501	2502
4710	2504	2505	2506	2507	2508	2509	2510
4720	2512	2513	2514	2515	2516	2517	2518
4730	2520	2521	2522	2523	2524	2525	2526
4740	2528	2529	2530	2531	2532	2533	2534
4750	2536	2537	2538	2539	2540	2541	2542
4760	2544	2545	2546	2547	2548	2549	2550
4770	2552	2553	2554	2555	2556	2557	2558

5400 to 5777 (Octal) to 2816 to 3071 (Decimal)

0	1	2	3	4	5	6	7
5400	2816	2817	2818	2819	2820	2821	2822
5410	2824	2825	2826	2827	2828	2829	2830
5420	2832	2833	2834	2835	2836	2837	2838
5430	2840	2841	2842	2843	2844	2845	2846
5440	2848	2849	2850	2851	2852	2853	2854
5450	2856	2857	2858	2859	2860	2861	2862
5460	2864	2865	2866	2867	2868	2869	2870
5470	2872	2873	2874	2875	2876	2877	2878

0	1	2	3	4	5	6	7
5500	2880	2881	2882	2883	2884	2885	2886
5510	2888	2889	2890	2891	2892	2893	2894
5520	2896	2897	2898	2899	2900	2901	2902
5530	2904	2905	2906	2907	2908	2909	2910
5540	2912	2913	2914	2915	2916	2917	2918
5550	2920	2921	2922	2923	2924	2925	2926
5560	2928	2929	2930	2931	2932	2933	2934
5570	2936	2937	2938	2939	2940	2941	2942

0	1	2	3	4	5	6	7
5600	2944	2945	2946	2947	2948	2949	2950
5610	2952	2953	2954	2955	2956	2957	2958
5620	2960	2961	2962	2963	2964	2965	2966
5630	2968	2969	2970	2971	2972	2973	2974
5640	2976	2977	2978	2979	2980	2981	2982
5650	2984	2985	2986	2987	2988	2989	2990
5660	2992	2993	2994	2995	2996	2997	2998
5670	3000	3001	3002	3003	3004	3005	3006

5700 to 5777 (Octal) to 3008 to 3071 (Decimal)

0	1	2	3	4	5	6	7
5700	3008	3009	3010	3011	3012	3013	3014
5710	3016	3017	3018	3019	3020	3021	3022
5720	3024	3025	3026	3027	3028	3029	3030
5730	3032	3033	3034	3035	3036	3037	3038
5740	3040	3041	3042	3043	3044	3045	3046
5750	3048	3049	3050	3051	3052	3053	3054
5760	3056	3057	3058	3059	3060	3061	3062
5770	3064	3065	3066	3067	3068	3069	3070

Octal-Decimal Integer Conversion Table (continued)

6000 to 6777 (Octal) to 3072 to 3583 (Decimal)

0	1	2	3	4	5	6	7
6000	3072	3073	3074	3075	3076	3077	3078
6010	3080	3081	3082	3083	3084	3085	3086
6020	3						

Octal-Decimal Fraction Conversion Table

Octal	Decimal	Octal	Decimal	Octal	Decimal	Octal	Decimal
.000	.000000	.100	.125000	.200	.250000	.300	.375000
.001	.001953	.101	.126953	.201	.251953	.301	.376953
.002	.003906	.102	.128906	.202	.253906	.302	.378906
.003	.005859	.103	.130859	.203	.255859	.303	.380859
.004	.007812	.104	.132812	.204	.257812	.304	.382812
.005	.009765	.105	.134765	.205	.259765	.305	.384765
.006	.011718	.106	.136718	.206	.261718	.306	.386718
.007	.013671	.107	.138671	.207	.263671	.307	.388671
.010	.015625	.110	.140625	.210	.265625	.310	.390625
.011	.017578	.111	.142578	.211	.267578	.311	.392578
.012	.019531	.112	.144531	.212	.269531	.312	.394531
.013	.021484	.113	.146484	.213	.271484	.313	.396484
.014	.023437	.114	.148437	.214	.273437	.314	.398437
.015	.025390	.115	.150390	.215	.275390	.315	.400390
.016	.027343	.116	.152343	.216	.277343	.316	.402343
.017	.029296	.117	.154296	.217	.279296	.317	.404296
.020	.031250	.120	.156250	.220	.281250	.320	.406250
.021	.033203	.121	.158203	.221	.283203	.321	.408203
.022	.035156	.122	.160156	.222	.285156	.322	.410156
.023	.037109	.123	.162109	.223	.287109	.323	.412109
.024	.039062	.124	.164062	.224	.289062	.324	.414062
.025	.041015	.125	.166015	.225	.291015	.325	.416015
.026	.042968	.126	.167968	.226	.292968	.326	.417968
.027	.044921	.127	.169921	.227	.294921	.327	.419921
.030	.046875	.130	.171875	.230	.296875	.330	.421875
.031	.048828	.131	.173828	.231	.298828	.331	.423828
.032	.050781	.132	.175781	.232	.300781	.332	.425781
.033	.052734	.133	.177734	.233	.302734	.333	.427734
.034	.054687	.134	.179687	.234	.304687	.334	.429687
.035	.056640	.135	.181640	.235	.306640	.335	.431640
.036	.058593	.136	.183593	.236	.308593	.336	.433593
.037	.060546	.137	.185546	.237	.310546	.337	.435546
.040	.062500	.140	.187500	.240	.312500	.340	.437500
.041	.064453	.141	.189453	.241	.314453	.341	.439453
.042	.066406	.142	.191406	.242	.316406	.342	.441406
.043	.068359	.143	.193359	.243	.318359	.343	.443359
.044	.070312	.144	.195312	.244	.320312	.344	.445312
.045	.072265	.145	.197265	.245	.322265	.345	.447265
.046	.074218	.146	.199218	.246	.324218	.346	.449218
.047	.076171	.147	.201171	.247	.326171	.347	.451171
.050	.078125	.150	.203125	.250	.328125	.350	.453125
.051	.080078	.151	.205078	.251	.330078	.351	.455078
.052	.082031	.152	.207031	.252	.332031	.352	.457031
.053	.083984	.153	.208984	.253	.333984	.353	.458984
.054	.085937	.154	.210937	.254	.335937	.354	.460937
.055	.087890	.155	.212890	.255	.337890	.355	.462890
.056	.089843	.156	.214843	.256	.339843	.356	.464843
.057	.091796	.157	.216796	.257	.341796	.357	.466796
.060	.093750	.160	.218750	.260	.343750	.360	.468750
.061	.095703	.161	.220703	.261	.345703	.361	.470703
.062	.097656	.162	.222656	.262	.347656	.362	.472656
.063	.099609	.163	.224609	.263	.349609	.363	.474609
.064	.101562	.164	.226562	.264	.351562	.364	.476562
.065	.103515	.165	.228515	.265	.353515	.365	.478515
.066	.105468	.166	.230468	.266	.355468	.366	.480468
.067	.107421	.167	.232421	.267	.357421	.367	.482421
.070	.109375	.170	.234375	.270	.359375	.370	.484375
.071	.111328	.171	.236328	.271	.361328	.371	.486328
.072	.113281	.172	.238281	.272	.363281	.372	.488281
.073	.115234	.173	.240234	.273	.365234	.373	.490234
.074	.117187	.174	.242187	.274	.367187	.374	.492187
.075	.119140	.175	.244140	.275	.369140	.375	.494140
.076	.121093	.176	.246093	.276	.371093	.376	.496093
.077	.123046	.177	.248046	.277	.373046	.377	.498046

Octal-Decimal Fraction Conversion Table (continued)

Octal	Decimal	Octal	Decimal	Octal	Decimal	Octal	Decimal
.000000	.000000	.000100	.000244	.000200	.000488	.000300	.000732
.000001	.000003	.000101	.000247	.000201	.000492	.000301	.000736
.000002	.000007	.000102	.000251	.000202	.000495	.000302	.000740
.000003	.000011	.000103	.000255	.000203	.000499	.000303	.000744
.000004	.000015	.000104	.000259	.000204	.000503	.000304	.000747
.000005	.000019	.000105	.000263	.000205	.000507	.000305	.000751
.000006	.000022	.000106	.000267	.000206	.000511	.000306	.000755
.000007	.000026	.000107	.000270	.000207	.000514	.000307	.000759
.000010	.000030	.000110	.000274	.000210	.000518	.000310	.000762
.000011	.000034	.000111	.000278	.000211	.000522	.000311	.000766
.000012	.000038	.000112	.000282	.000212	.000526	.000312	.000770
.000013	.000041	.000113	.000286	.000213	.000530	.000313	.000774
.000014	.000045	.000114	.000289	.000214	.000534	.000314	.000778
.000015	.000049	.000115	.000293	.000215	.000537	.000315	.000782
.000016	.000053	.000116	.000297	.000216	.000541	.000316	.000785
.000017	.000057	.000117	.000301	.000217	.000545	.000317	.000789
.000020	.000061	.000120	.000305	.000220	.000549	.000320	.000793
.000021	.000064	.000121	.000308	.000221	.000553	.000321	.000797
.000022	.000068	.000122	.000312	.000222	.000557	.000322	.000801
.000023	.000072	.000123	.000316	.000223	.000560	.000323	.000805
.000024	.000076	.000124	.000320	.000224	.000564	.000324	.000809
.000025	.000080	.000125	.000324	.000225	.000568	.000325	.000812
.000026	.000083	.000126	.000328	.000226	.000572	.000326	.000816
.000027	.000087	.000127	.000331	.000227	.000576	.000327	.000820
.000030	.000091	.000130	.000335	.000230	.000579	.000330	.000823
.000031	.000095	.000131	.000339	.000231	.000583	.000331	.000827
.000032	.000099	.000132	.000343	.000232	.000587	.000332	.000831
.000033	.000102	.000133	.000347	.000233	.000591	.000333	.000835
.000034	.000106	.000134	.000350	.000234	.000595	.000334	.000839
.000035	.000110	.000135	.000354	.000235	.000599	.000335	.000843
.000036	.000114	.000136	.000358	.000236	.000603	.000336	.000846
.000037	.000118	.000137	.000362	.000237	.000606	.000337	.000850
.000040	.000122	.000140	.000366	.000240	.000610	.000340	.000854
.000041	.000125	.000141	.000370	.000241	.000614	.000341	.000858
.000042	.000129	.000142	.000373	.000242	.000617	.000342	.000862
.000043	.000133	.000143	.000377	.000243	.000621	.000343	.000865
.000044	.000137	.000144	.000381	.000244	.000625	.000344	.000869
.000045	.000141	.000145	.000385	.000245	.000629	.000345	.000873
.000046	.000144	.000146	.000389	.000246	.000633	.000346	.000877
.000047	.000148	.000147	.000392	.000247	.000637	.000347	.000881
.000050	.000152	.000150	.000396	.000250	.000640	.000350	.000885
.000051	.000156	.000151	.000400	.000251	.000644	.000351	.000888
.000052	.000160	.000152	.000404	.000252	.000648	.000352	.000892
.000053	.000164	.000153	.000408	.000253	.000652	.000353	.000896
.000054	.000167	.000154	.000411	.000254	.000656	.000354	.000900
.000055	.000171	.000155	.000415	.000255	.000659	.000355	.000904
.000056	.000175	.000156	.000419	.000256	.000663	.000356	.000907
.000057	.000179	.000157	.000423	.000257	.000667	.000357	.000911
.000060	.000183	.000160	.000427	.000260	.000671	.000360	.000915
.000061	.000186	.000161	.000431	.000261	.000675	.000361	.000919
.000062	.000190	.000162	.000434	.000262	.000679	.000362	.000923
.000063	.000194	.000163	.000438	.000263	.000682	.000363	.000926
.000064	.000198	.000164	.000442	.000264	.000686	.000364	.000930
.000065	.000202	.000165	.000446	.000265	.000690	.000365	.000934
.000066	.000205	.000166	.000450	.000266	.000694	.000366	.000938
.000067	.000209	.000167	.000453	.000267	.000698	.000367	.000942
.000070	.000213	.000170	.000457	.000270	.000701	.000370	.000946
.000071	.000217	.000171	.000461	.000271	.000705	.000371	.000949
.000072	.000221	.000172	.000465	.000272	.000709	.000372	.000953
.000073	.000225	.000173	.000469	.000273	.000713	.000373	.000957
.000074	.000228	.000174	.000473	.000274	.000717	.000374	.000961
.000075	.000232	.000175	.000477	.000275	.000720	.000375	.000965
.000076	.000236	.000176	.000480	.000276	.000724	.000376	.000968
.000077	.000240	.000177	.000484	.000277	.000728	.000377	.000972

Octal-Decimal Fraction Conversion Table (continued)

Octal	Decimal	Octal	Decimal	Octal	Decimal	Octal	Decimal
.000400	.000976	.000500	.001220	.000600	.001464	.000700	.001708
.000401	.000980	.000501	.001224	.000601	.001468	.000701	.001712
.000402	.000984	.000502	.001228	.000602	.001472	.000702	.001716
.000403	.000988	.000503	.001232	.000603	.001476	.000703	.001720
.000404	.000991	.000504	.001235	.000604	.001480	.000704	.001724
.000405	.000995	.000505	.001239	.000605	.001483	.000705	.001728
.000406	.000999	.000506	.001243	.000606	.001487	.000706	.001731
.000407	.001003	.000507	.001247	.000607	.001491	.000707	.001735
.000410	.001007	.000510	.001251	.000610	.001495	.000710	.001739
.000411	.001010	.000511	.001255	.000611	.001499	.000711	.001743
.000412	.001014	.000512	.001259	.000612	.001502	.000712	.001747
.000413	.001018	.000513	.001262	.000613	.001506	.000713	.001750
.000414	.001022	.000514	.001266	.000614	.001510	.000714	.001754
.000415	.001026	.000515	.001270	.000615	.001514	.000715	.001758
.000418	.001029	.000516	.001274	.000616	.001518	.000716	.001762
.000417	.001033	.000517	.001277	.000617	.001522	.000717	.001766
.000420	.001037	.000520	.001281	.000620	.001525	.000720	.001770
.000421	.001041	.000521	.001285	.000621	.001529	.000721	.001773
.000422	.001045	.000522	.001289	.000622	.001533	.000722	.001777
.000423	.001049	.000523	.001293	.000623	.001537	.000723	.001781
.000424	.001052	.000524	.001296	.000624	.001541	.000724	.001785
.000425	.001056	.000525	.001300	.000625	.001544	.000725	.001789
.000426	.001060	.000526	.001304	.000626	.001548	.000726	.001792
.000427	.001064	.000527	.001308	.000627	.001552	.000727	.001796
.000430	.001069	.000530	.001312	.000630	.001556	.000730	.001800
.000431	.001071	.000531	.001316	.000631	.001560	.000731	.001804
.000432	.001075	.000532	.001319	.000632	.001564	.000732	.001808
.000433	.001079	.000533	.001323	.000633	.001567	.000733	.001811
.000434	.001083	.000534	.001327	.000634	.001571	.000734	.001815
.000435	.001087	.000535	.001331	.000635	.001575	.000735	.001819
.000436	.001091	.000536	.001335	.000636	.001579	.000736	.001823
.000437	.001094	.000537	.001338	.000637	.001583	.000737	.001827
.000440	.001098	.000540	.001342	.000640	.001586	.000740	.001831
.000441	.001102	.000541	.001346	.000641	.001590	.000741	.001834
.000442	.001106	.000542	.001350	.000642	.001594	.000742	.001838
.000443	.001110	.000543	.001354	.000643	.001598	.000743	.001842
.000444	.001113	.000544	.001358	.000644	.001602	.000744	.001846
.000445	.001117	.000545	.001361	.000645	.001605	.000745	.001850
.000446	.001121	.000546	.001365	.000646	.001609	.000746	.001853
.000447	.001125	.000547	.001369	.000647	.001613	.000747	.001857
.000450	.001129	.000550	.001373	.000650	.001617	.000750	.001861
.000451	.001132	.000551	.001377	.000651	.001621	.000751	.001865
.000452	.001136	.000552	.001380	.000652	.001625	.000752	.001869
.000453	.001140	.000553	.001384	.000653	.001628	.000753	.001873
.000454	.001144	.000554	.001388	.000654	.001632	.000754	.001877
.000455	.001148	.000555	.001392	.000655	.001636	.000755	.001880
.000456	.001152	.000556	.001396	.000656	.001640	.000756	.001884
.000457	.001155	.000557	.001399	.000657	.001644	.000757	.001888
.000460	.001159	.000560	.001403	.000660	.001647	.000760	.001892
.000461	.001163	.000561	.001407	.000661	.001651	.000761	.001895
.000462	.001167	.000562	.001411	.000662	.001655	.000762	.001899
.000463	.001171	.000563	.001415	.000663	.001659	.000763	.001903
.000464	.001174	.000564	.001419	.000664	.001663	.000764	.001907
.000465	.001178	.000565	.001422	.000665	.001667	.000765	.001911
.000466	.001182	.000566	.001426	.000666	.001670	.000766	.001914
.000467	.001186	.000567	.001430	.000667	.001674	.000767	.001918
.000470	.001190	.000570	.001434	.000670	.001678	.000770	.001922
.000471	.001194	.000571	.001438	.000671	.001682	.000771	.001926
.000472	.001197	.000572	.001441	.000672	.001686	.000772	.001930
.000473	.001201	.000573	.001445	.000673	.001689	.000773	.001934
.000474	.001205	.000574	.001449	.000674	.001693	.000774	.001937
.000475	.001209	.000575	.001453	.000675	.001697	.000775	.001941
.000476	.001213	.000576	.001457	.000676	.001701	.000776	.001945
.000477	.001216	.000577	.001461	.000677	.001705	.000777	.001949

Table 1-1 PDP-8/E Memory Reference Instructions
(Refer to Chapter 3)

Mnemonic Symbol	Octal Code	Indicators	Execution Times			Operation
			Direct Address	Indirect Address	Auto-Indexed	
AND Y	0	IR = 0,F,E	2.6	3.8	4.0	Logical AND between Y and AC
TAD Y	1	IR = 1,F,E	2.6	3.8	4.0	Two's complement Add Y to AC
ISZ Y	2	IR = 2,F,E	2.6	3.8	4.0	Increment Y and skip if zero
DCA Y	3	IR = 3,F,E	2.6	3.8	4.0	Deposit at Y and clear AC
JMS Y	4	IR = 4,F,E	2.6	3.8	4.0	Jump to sub-routine at Y
JMP Y	5	IR = 5,F	1.2	2.4	2.6	Jump to Y

Table 1-2 Loading Constants Into The Accumulator

Mnemonic	Decimal Constant	Octal Code	Instructions Combined
NL0000 =	0	7300	CLA CLL
NL0001 =	1	7301	CLA CLL IAC
NL0002 =	2	7305	CLA CLL IAC RAL
		(or)	
NL0002 =	2	7326	CLA CLL CML RTL
NL0003 =	3	7325	CLA CLL CML IAC RAL
NL0004 =	4	7307	CLA CLL IAC RTL
NL0006 =	6	7327	CLA CLL CML IAC RTL
NL0100 =	64	7203	CLA IAC BSW
NL2000 =	1024	7332	CLA CLL CML RTR
NL3777 =	2047	7350	CLA CLL CMA RAR
NL4000 =	-0	7330	CLA CLL CML RAR
NL5777 =	-1025	7352	CLA CLL CMA RTR
NL6000 =	-1024	7333	CLA CLL CML IAC RTL
NL7775 =	-3	7346	CLA CLL CMA RTL
NL7776 =	-2	7344	CLA CLL CMA RAL
NL7777 =	-1	7340	CLA CLL CMA

Table 1-3 Group 1 Operate Microinstructions

Mnemonic Symbol	Octal Code	Sequence	Operation
NOP	7000	—	No operation. Causes a 1.2 μ s program delay.
IAC	7001	3	Increment AC. The content of the AC is incremented by one in two's complement arithmetic.
RAL	7004	4	Rotate AC and L left. The content of the AC and the L are rotated left one place.
RTL	7006	4	Rotate two places to the left. Equivalent to two successive RAL operations.
RAR	7010	4	Rotate AC and L right. The content of the AC and L are rotated right one place.
RTR	7012	4	Rotate two places to the right. Equivalent to two successive RAR operations.
BSW	7002	4	Byte swap.
CML	7020	2	Complement L.
CMA	7040	2	Complement AC. The content of the AC is set to the one's complement of its current content.
CIA	7041	2, 3	Complement and increment accumulator. Used to form two's complement.
CLL	7100	1	Clear L.
CLL RAL	7104	1, 4	Shift positive number one left.
CLL RTL	7106	1, 4	Clear link, rotate two left.
CLL RAR	7110	1, 4	Shift positive number one right.
CLL RTR	7112	1, 4	Clear link, rotate two right.
STL	7120	1, 2	Set link. The L is set to contain a binary 1.
CLA	7200	1	Clear AC. To be used alone or in OPR 1 combinations.
CLA IAC	7201	1, 3	Set AC = 1.
GLK	7204	1, 4	Get link. Transfer L into AC11.
CLA CLL	7300	1	Clear AC and L.
STA	7240	2	Set AC = 1. Each bit of the AC is set to contain a 1.

Table 1-4 Group 2 Operate Microinstructions

Mnemonic Symbol	Octal Code	Sequence	Operation
HLT	7402	3	Halt. Stops the program after completion of the cycle in process. If this instruction is combined with others in the OPR 2 group the other operations are completed before the end of the cycle.
OSR	7404	3	OR with switch register. The OR function is performed between the content of the SR and the content of the AC, with the result left in the AC.
SKP	7410	1	Skip, unconditional. The next instruction is skipped.
SNL	7420	1	Skip if L \neq 0.
SZL	7430	1	Skip if L = 0.
SZA	7440	1	Skip if AC = 0.
SNA	7450	1	Skip if AC \neq 0.
SZA SNL	7460	1	Skip if AC = 0, or L \neq 1, or both.
SNA SZL	7470	1	Skip if AC \neq 0 and L = 0.
SMA	7500	1	Skip on minus AC. If the content of the AC is a negative number, the next instruction is skipped.
SPA	7510	1	Skip on positive AC. If the content of the AC is a positive number, including zero, the next instruction is skipped.
SMA SNL	7520	1	Skip if AC < 0, or L = 1, or both.
SPA SZL	7530	1	Skip if AC \geq 0 and if L = 0.
SMA SZA	7540	1	Skip if AC \leq 0.
SPA SNA	7550	1	Skip if AC > 0.
CLA	7600	2	Clear AC. To be used alone or in OPR 2 combinations.
LAS	7604	1, 3	Load AC with SR.
SZA CLA	7640	1, 2	Skip if AC = 0, then clear AC.
SNA CLA	7650	1, 2	Skip if AC \neq 0, then clear AC.
SMA CLA	7700	1, 2	Skip if AC < 0, then clear AC.
SPA CLA	7710	1, 2	Skip if AC \geq 0, then clear AC.

Table 1-5 Group 3 Operate Microinstructions

Mnemonic Symbol	Octal Code	Operation
NOP	7401	No Operation
MQL	7421	Load Multiplier Quotient
MQA	7501	Multiplier Quotient OR into Accumulator
SWP	7521	Swap Accumulator and Multiplier Quotient
CLA	7601	Clear Accumulator
CAM	7621	Clear Accumulator and Multiplier Quotient (CLA MQL)
ACL	7701	Clear Accumulator, Load Multiplier Quotient into Accumulator (CLA MQA)
CLA SWP	7721	Load Multiplier Quotient into Accumulator, Clear Multiplier Quotient

Table 1-6 Programmed Data Transfer Instructions

Mnemonic Symbol	Octal Code	Operation
ION	6001	Interrupt Turn On
IOF	6002	Interrupt Turn Off
SKON	6000	Skip if Interrupt On, IOF
SRQ	6003	Skip if Interrupt Request
GTF	6004	Get Flags
RTF	6005	Restore Flag, ION
SGT	6006	Skip if "Greater Than" Flag is Set
CAF	6007	Clear All Flags

Table 1-7 KM8-E Memory Extension

Mnemonic Symbol	Octal Code	Operation
GTF	6004	Get Flags
RFT	6005	Restore Flags, ION
CDF	62N1	Change to Data Field N (N=0 to 7)
CIF	62N2	Change to Instruction Field N (N=0 to 7)
CDI	62N3	Change Data Field, Change Instruction Field (CDF CIF)
RDF	6214	Read Data Field
RIF	6224	Read Instruction Field
RIB	6234	Read Interrupt Buffer
RMF	6244	Restore Memory Field

Table 1-8 KE8-E Extended Arithmetic Element

Mnemonic Symbol	Octal Code	Operation
MODE CHANGING INSTRUCTIONS		
SWAB	7431	Switch from Mode A to B
SWBA	7447	Switch from Mode B to A
SKB	7471	Skip if Mode B
STANDARD INSTRUCTIONS		
CAM	7621	0→ AC, 0→ MQ
MQA	7501	MQ "OR"ed with AC→ AC
ACL	7701	MQ→ AC (MQA CLA)
MQL	7421	AC→ MQ, 0→ AC
SWP	7521	AC→ MQ, MQ→ AC
MODE A INSTRUCTIONS		
SCA	7441	Step Counter "OR" with AC
SCA CLA	7641	Step Counter to AC
SCL	7403	Step Counter Load from Memory
MUY	7405	Multiply
DVI	7407	Divide
NMI	7411	Normalize
SHL	7413	Shift Left
ASR	7415	Arithmetic Shift Right
LSR	7417	Logical Shift Right
MODE B INSTRUCTIONS		
ACS	7403	AC to Step Count
MUY	7405	Multiply
DVI	7407	Divide
NMI	7411	Normalize
SHL	7413	Shift Left
ASR	7415	Arithmetic Shift Right
LSR	7417	Logical Shift Right
DOUBLE PRECISION INSTRUCTIONS		
DAD	7443	Double Precision Add
DST	7445	Double Precision Store
DPIC	7573	Double Precision Increment
DCM	7575	Double Precision Complement
DPSZ	7451	Double Precision Skip if Zero

Table 1-9 Teletype Keyboard/Reader

Mnemonic Symbol	Octal Code	Operation
KCF	6030	Clear Keyboard Flag
KSF	6031	Skip on Keyboard Flag
KCC	6032	Clear Keyboard Flag, and AC, Advance Reader
KRS	6034	Read Keyboard Buffer Static
KIE	6035	Set/Clear Interrupt Enable
KRB	6036	Read Keyboard Buffer, Clear Flag

Table 1-10 Teletype Teleprinter/Punch

Mnemonic Symbol	Octal Code	Operation
TFL	6040	Set Teleprinter Flag
TSF	6041	Skip on Teleprinter Flag
TCF	6042	Clear Teleprinter Flag
TPC	6044	Load Teleprinter and Print
TSK	6045	Skip on Printer or Keyboard Flag
TLS	6046	Load Teleprinter Sequence

Table 1-11 PR8-E Paper Tape Readers

Mnemonic Symbol	Octal Code	Operation
RPE	6010	Set Reader/Punch Interrupt Enable
RSF	6011	Skip on Reader Flag
RRB	6012	Read Reader Buffer
RFC	6014	Reader Fetch Character
RCC	6016	Read Buffer and Fetch New Character (RRB, RFC)
PCE	6020	Clear Reader/Punch Interrupt Enable

Table 1-12 PP8-E Paper Tape Punch

Mnemonic Symbol	Octal Code	Operation
RPE	6010	Set Reader/Punch Interrupt Enable
PCE	6020	Clear Reader/Punch Interrupt Enable
PSF	6021	Skip on Punch Flag
RCF	6022	Clear Punch Flag
PPC	6024	Load Punch Buffer and Punch Character
PLS	6026	Load Punch Buffer Sequence

Table 1-13 PC8-E Reader/Punch

Mnemonic Symbol	Octal Code	Operation
RPE	6010	Set Reader/Punch Interrupt Enable
RSF	6011	Skip on Reader Flag
RRB	6012	Read Reader Buffer
RFC	6014	Reader Fetch Character
RFC, RRB	6016	Read Buffer and Fetch New Character
PCE	6020	Clear Reader/Punch Interrupt Enable
PSF	6021	Skip on Punch Flag
PCF	6022	Clear Punch Flag
PPC	6024	Load Punch Buffer and Punch Character
PLS	6026	Load Punch Buffer Sequence

Table 1-14 TC08-P DECtape Control

Mnemonic Symbol	Octal Code	Operation	Time (μ s)
DTRA	6761	Read Status Register A	2.6
DTCA	6762	Clear Status Register A	2.6
DTXA	6764	Load Status Register A	2.6
DTLA	6766	Clear and Load Status Register A	3.6
DTSF	6771	Skip on Flag	2.6
DTRB	6772	Read Status Register B	2.6
DTXB	6774	Load Status Register B	2.6

Address Locations: 7754 = Word Count
7755 = Current Address

Table 1-15 TC58 DECmagtape System

Mnemonic Symbol	Octal Code	Operation
MTSF	6701	Skip on Error Flag or Magnetic Tape Flag
MTCR	6711	Skip on Tape Control Ready
MTTR	6721	Skip on Tape Transport Ready
MTAF	6712	Clear Registers, Error Flag and Magnetic Tape Flag
MTRC	6724	Inclusive OR Contents of Command Register
MTCM	6714	Inclusive OR Contents of AC
MTLC	6716	Load Command Register
none	6704	Inclusive OR Contents of Status Register
MTRS	6706	Read Status Register
MTGO	6722	Mag Tape "GO"
none	6702	Clear AC

Table 1-16 RK08-P Control and RK01 Disk Drive and Control

Mnemonic Symbol	Octal Code	Operation	Time (μ s)
DLDA	6731	Load Disk Address (Maintenance Only)	2.6
DLDC	6732	Load Command Register	2.6
DLDR	6733	Load Disk Address and Read	2.6
DRDA	6734	Read Disk Address	2.6
DLDW	6735	Load Disk Address and Write	2.6
DRDC	6736	Read Disk Command Register	3.6
DCHP	6737	Load Disk Address and Check Parity	4.6
DRDS	6741	Read Disk Status Register	2.6
DCLS	6742	Clear Status Register	2.6
DMNT	6743	Load Maintenance Register	3.6
DSKD	6745	Skip on Disk Done	3.6
DSKE	6747	Skip on Disk Error	4.6
DCLA	6751	Clear All	2.6
DRWC	6752	Read Word Count Register	3.6
DLWC	6753	Load Word Count Register	3.6
DLCA	6755	Load Current Address Register	3.6
DRCA	6757	Read Current Address Register	4.6

Table 1-17 DF32-D Disk File and Control

Mnemonic Symbol	Octal Code	Operation	Time (μ s)
DCMA	6601	Clear Disk Address Register	2.6
DMAR	6603	Load Disk Address Register and Read	3.6
DMAW	6605	Load Disk Address Register and Write	3.6
DCEA	6611	Clear Disk Extended Address	2.6
DSAC	6612	Skip on Address Confirmed Flag	2.6
DEAL	6615	Load Disk Extended Address	3.6
DEAC	6616	Read Disk Extended Address	3.6
DFSE	6621	Skip on Zero Error Flag	2.6
DFSC	6622	Skip on Data Completion Flag	2.6
DMAC	6626	Read Disk Memory Address Register	3.6

Address Locations: 7750 = Word Count
7751 = Memory Address

Table 1-18 RF08 Disk File

Mnemonic Symbol	Octal Code	Operation
DCIM	6611	Clear Disk Interrupt Enable and Core Memory Address Extension Register
DIML	6615	Load Interrupt Enable and Memory Address Extension Register
DIMA	6616	Load Interrupt and Extended Memory Address
DFSE	6621	Skip on Disc Error
DISK	6623	Skip Error or Completion Flag
DCXA	6641	Clear High Order Address Register
DXAL	6643	Clear and Load High Order Address Register
DXAC	6645	Clear AC & Load DAR into AC
DMMT	6646	Initiate Maintenance Register

Table 1-19 TM8-E/F Control

Mnemonic Symbol	Octal Code	Operation
LWCR	6701	Load Word Count Register
CWCR	6702	Clear Word Count Register
LCAR	6703	Load Current Address Register
CCAR	6704	Clear Current Address Register
LCMR	6705	Load Command Register
LFGR	6706	Load Function Register
LDBR	6707	Load Data Buffer Register
RWCR	6711	Read Word Count Register
CLT	6712	Clear Transport
RCAR	6713	Read Current Address Register
RMSR	6714	Read Main Status Register
RCMR	6715	Read Command Register
RFSR	6716	Read Function Register & Status
RDBR	6717	Read Data Buffer
SKEF	6721	Skip if Error Flag
SKCB	6722	Skip if Not Busing
SKJD	6723	Skip if Job Done
SKTR	6724	Skip if Tape Ready
CLF	6725	Clear Controller and Master

Table 1-20 LE-8 Line Printer

Mnemonic Symbol	Octal Code	Operation
PSKF	6661	Skip on Character Flag
PCLF	6662	Clear the Character Flag
PSKE	6663	Skip on Error
PSTB	6664	Load Printer Buffer, Print on Full Buffer or Control Character
PSIE	6665	Set Program Interrupt Flag
PCLF, PSTB	6666	Clear Line Printer Flag, Load Character, and Print
PCIE	6667	Clear Program Interrupt Flag

Table 1-21 CR8-E Card Reader and Control or CM8-E Optical Mark Card Reader and Control

Mnemonic Symbol	Octal Code	Operation
RCSF	6631	Skip on Data Ready
RCRA	6632	Read Alphanumeric
RCRB	6634	Read Binary
RCNO	6635	Read Conditions Out to Card Reader
RCRC	6636	Read Compressed
RCNI	6637	Read Condition In From Card Reader
RCSD	6671	Skip on Card Done Flag
RCSE	6672	Select Card Reader and Skip if Ready
RCRD	6674	Clear Card Done Flag
RCSI	6675	Skip If Interrupt Being Generated
RCTF	6677	Clear Transition Flags

Table 1-22 XY8-E Incremental Plotter Control

Mnemonic Symbol	Octal Code	Operation
PLCE	6500	Clear Interrupt Enable
PLSF	6501	Skip on Plotter Flag
PLCF	6502	Clear Plotter Flag
PLPU	6503	Pen Up
PLLR	6504	Load Direction Register, Set Flag
PLPD	6505	Pen Down
PLCF, PLLR	6506	Clear Flag, Load Direction Register, Set Flag
PLSE	6507	Set Interrupt Enable

Table 1-23 VC8-E CRT Display Control

Mnemonic Symbol	Octal Code	Operation
DILC	6050	Clears Enables, Flags and Delays
DICD	6051	Clears Done Flag
DISD	6052	Skip on Done Flag
DILX	6053	Load X Register
DILY	6054	Load Y Register
DIXY	6055	Clear Done Flag; Intensify; Set Done Flag
DILE	6056	Transfers AC to Enable Register
DIRE	6057	Transfers Display Enable/Status Register to AC

Table 1-24 VW01 Writing Tablet

Mnemonic Symbol	Octal Code	Operation
WTSC	6054	Set Tablet Controls
WTRX	6052	Read X
WTRS	6072	Read Status
WTSE	6074	Select Tablet
WTMN	6064	Clear Set XY

Table 1-25 DC02-F 8-Channel Multiple Teletype Control

Mnemonic Symbol	Octal Code	Operation
MTPF	6113	Read Transmitter Flag
MINT	6115	Set Interrupt Flip-Flop
MTON	6117	Select Specified Station
MTKF	6123	Read Receiver Flag Status
MINS	6125	Skip on Interrupt Request
MTRS	6127	Read Station Status
MKSF	6111	Skip on Key Board Flag
MKCC	6112	Clear Receive Flag
MKRS	6114	Receive Operation
NONE	6116	Combined MKRS & MICCC
MTSF	6121	Skip on Transmitter Flag
MTCF	6122	Clear Transmitter Flag
MTPC	6124	Transmit Operation
NONE	6126	Combined MTCF & MTPC

Table 1-26 BB08-P General Purpose Interface Unit

Mnemonic Symbol	Octal Code	Operation	Time (μ s)
GTSF	6361	Skip on Transmit Flag	2.6
GCTF	6362	Clear Transmit Flag	2.6
	6564	(User-Assigned)	2.6
GRSF	6371	Skip on Receive Flag	2.6
GCRF	6372	Clear Receive Flag	2.6
GRDB	6374	Read Device Buffer	2.6

Table 1-27 Universal Digit Controller (UDC)

Mnemonic Symbol	Octal Code	Operation	Time (μ s)
UDSS	6351	Skip on Scan Not Busy	2.6
UDSC	6353	Start Interrupt Scan	3.6
UDRA	6356	Read Address and Generic Type	3.6
UDLS	6357	Load Previous Status	4.6
UDSF	6361	Skip on UDC Flag and Clear Flag	2.6
UDLA	6363	Load Address	3.6
UDEI	6364	Enable UDC Interrupt Flag	2.6
UDDI	6365	Disable UDC Interrupt Flag	3.6
UDRD	6366	Clear AC and Read Data	3.6
UDLD	6367	Load Data and Clear AC	4.6

Table 1-28 DR8-EA 12-Channel Buffered Digital I/O

Mnemonic Symbol	Octal Code	Operation
DBDI	65x0	Disable Interrupt
DBEI	65x1	Enable Interrupt
DBSK	65x2	Skip on Done Flag
DBCI	65x3	Clear Selective Input Register
DBRI	65x4	Transfer Input to AC
DBCO	65x5	Clear Selective Output Register
DBSO	65x6	Set Selective Output Register
DBRO	65x7	Transfer Output to AC

Table 1-29 MP8E-Memory Parity

Mnemonic Symbol	Octal Code	Operation
DPI	6100	Disable Memory Parity Error Interrupt
SMP	6101	Skip on No Memory Parity Error
EPI	6103	Enable Memory Parity Error Interrupt
CMP	6104	Clear Memory Parity Error Flag
SMP, CMP	6105	Skip on No Memory Parity Error, Clear Memory Parity Error Flag
CEP	6106	Check for Even Parity
SPO	6107	Skip on Memory Parity Option

Table 1-30 Synchronous Modem Interface

Mnemonic Symbol	Octal Code	Operation
SGTT	6405	Transmit Go
SGRR	6404	Receive Go
SSCD	6400	Skip if Character Detected
SCSD	6406	Clear Sync Detect
SSRO	6402	Skip if Receive Word Count Overflow
SCSI	6401	Clear Synchronous Interface
SRTA	6407	Read Transfer Address Register
SLCC	6412	Load Control
SSRG	6410	Skip if Ring Flag
SSCA	6411	Skip if Carrier/AGC Flag
SRS2	6414	Read Status 2
SRS1	6415	Read Status 1
SLFL	6413	Load Field
SSBE	6416	Skip on Bus Error
SRCD	6417	Read Character Detected (if AC0=0) Maintenance Instruction (if AC0=1)
SSTO	6403	Skip if Transmit Word Count Overflows

Break Address Locations:	For additional interfaces:
	Device Codes Break Locations
7720	
7721 Test Characters	42, 43 7700-7710
7722	44, 45 7660-7670
7723	46, 47 7640-7650
7724 Receive Word Count	
7725 Receive Current Address	
7726 Not Used	
7727 Transmit Word Count	
7730 Transmit Current Address	

Table 1-31 Multicycle Data Break Locations

Assigned Locations	Date Break Device	Channel
7640-7650	DP8-EA/EB	4
7660-7670	DP8-EA/EB	3
7700-7710	DP8-EA/EB	2
7720-7730	DP8-EA/EB	1
7750,7751	DF32-D	
7752,7753	(Reserved for Industry Standard Magnetic Tape)	
7754,7755	TC08-P	

Table 1-32 KM8-E Time-Share

Mnemonic Symbol	Octal Code	Operation
CINT	6204	Clear User Interrupt
SINT	6254	Skip on User Interrupt
CUF	6264	Clear User Flag
SUF	6274	Set User Flag

Table 1-33 DK8-EP Programmable Real Time Clock

Mnemonic Symbol	Octal Code	Operation
CLZE	6130	Clear Clock Enable Register per AC
CLSK	6131	Skip on Clock Interrupt
CLOE	6132	Set Clock Enable Register per AC
CLAB	6133	AC to Clock Buffer
CLEN	6134	Load Clock Enable Register
CLSA	6135	Clock Status to AC
CLBA	6136	Clock Buffer to AC
CLCA	6137	Clock Counter to AC

Table 1-34 DK8-EA Line Frequency Clock

Mnemonic Symbol	Octal Code	Operation
CLEI	6131	Enable Interrupt
CLDI	6132	Disable Interrupt
CLSK	6133	Skip on Clock Flag and Clear Flag

Table 1-35 DK8-EC Crystal Clock

Mnemonic Symbol	Octal Code	Operation
CLEI	6131	Enable Interrupt
CLDI	6132	Disable Interrupt
CLSK	6133	Skip on Clock Flag and Clear Flag

Table 1-36 KP8-E Power Fail Detect

Mnemonic Symbol	Octal Code	Operation
SPL	6102	Skip on Power Low

Table 1-37 DP8-EP Redundancy Check Option

Mnemonic Symbol	Octal Code	Operation
RCTV	6110	Test VRC and Skip
RCRL	6111	Read BCC Low
RCRH	6112	Read BCC High
RCCV	6113	Compute VRC
RCGB	6114	Generate BCC
RCLC	6115	Load Control
RCCB	6116	Clear BCC Accumulation

Table 1-38 DR8-E Interprocessor Buffer

Mnemonic Symbol	Octal Code	Operation
DBRF	65x1	Skip if the receive set to a 1
DBRD	65x2	Read incoming data into the AC, clear receive flag
DBTF	65x3	Skip if the transmit flag is set to a 1
DBTD	65x4	Load the AC into the transmit buffer, transmit and set the transmit flag
DBEI	65x5	Enable the Interrupt Request line
DBDI	65x6	Disable the Interrupt Request Line
DBCD	65x7	Clear done flag