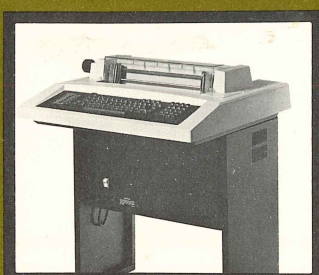
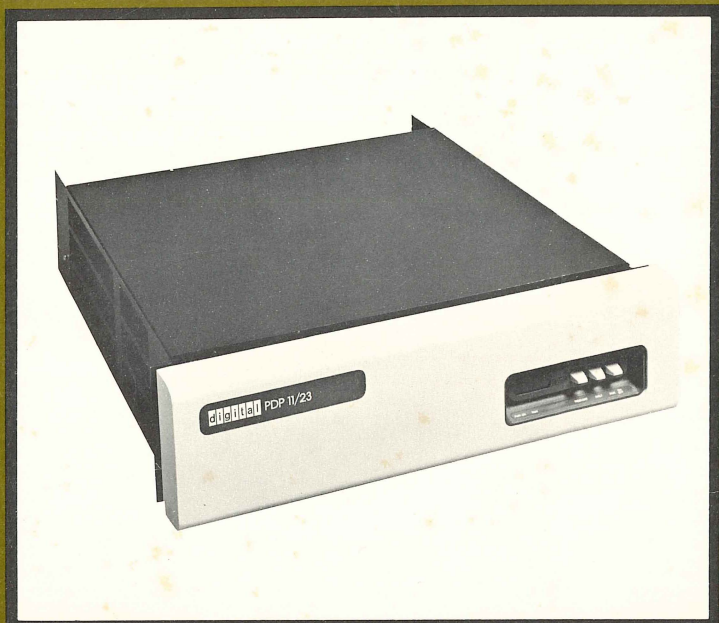


PDP-11/03, 23

SERIES



# Configuring Guide

digital



# PDP-11/03, 23

## Configuring Guide

This document includes an overview of the PDP-11/03, and 11/23 Microcomputers, peripheral and interfacing options, and configuring instructions. It is intended for use by Digital's Technical OEM field personnel, customers, and system analysts.

For further information, consult:

Technical OEM Product Summary,  
October Edition, EE18186 04/79

PDP-11/03 Packaged System Brochure, EJ17961-04

PDP-11/03 World's Most Complete  
Microcomputer Family, EAP1194-19

PDP-11/23 The Microcomputer That Has It All, EJP3175-04

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		VT

Information in this publication is based on specifications believed correct at the time of publication. The right is reserved to make changes in specifications and models as design improvements are introduced.

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# PDP-11/03

## PRODUCT DESCRIPTION

The PDP-11/03 features:

- Over 400 instructions
- Single and double operand instructions
- 16-bit word or 8-bit byte operation
- Direct addressing of 64Kb
- Modular component design for easy configuring and upgrading of systems
- Stack processing for easy handling of structured data, subroutines, and interrupts
- Direct Memory Addressing (DMA)
- Eight internal general purpose registers
- Vectored interrupt handling
- Power fail and automatic restart
- Line frequency clock (50 or 60 Hz)
- Operator's front panel
- ODT console emulator for easy program debugging
- 8Kb, 32Kb or 64Kb MOS memory, or 8Kb Core memory included in basic unit
- Optional Extended Instruction Set (EIS)/Floating Point Instruction Set (FIS) chip
- Optional add-on Core, MOS, PROM, UV-EPROM-memories
- Optional serial, parallel, A/D, D/A, IEEE 488 bus interfaces
- Optional mass storage, printer, terminal, clock, multifunction module

## PDP-11/03 SPECIFICATIONS

- Word Length: 16 bits (two 8-bit bytes)
- Memory access time: MOS-210 ns (typ) MSV11-D  
Core-425 ns (typ) MMV11-A
- DMA Rate: 1 MB/second (burst mode)
- Sub-UNIBUS Rate: 1.6 MB/second
- Addressing Space: 64Kb total (memory and peripherals)  
56Kb (memory only)
- Power Supply Specifications:

		Maximum Output	Recommended Load (90% max)
BA11-M Small Box	+5V	18.0A	16.0A
	+12V	3.5A	3.2A
BA11-N Large Box	+5V	22.0A	20.0A
	+12V	11.0A	10.0A

## ABBREVIATIONS USED

Q	Quad-size module, 26.6 cm (10.5 in.) × 21.59 cm (8.5 in.)
DH	Double-height module, 13.34 cm (5.25 in.) × 21.59 cm (8.5 in.)
PAN	48.3 cm (19 in.) rack-mountable unit
TT	Table-top mounting
FS	Free-standing floor unit

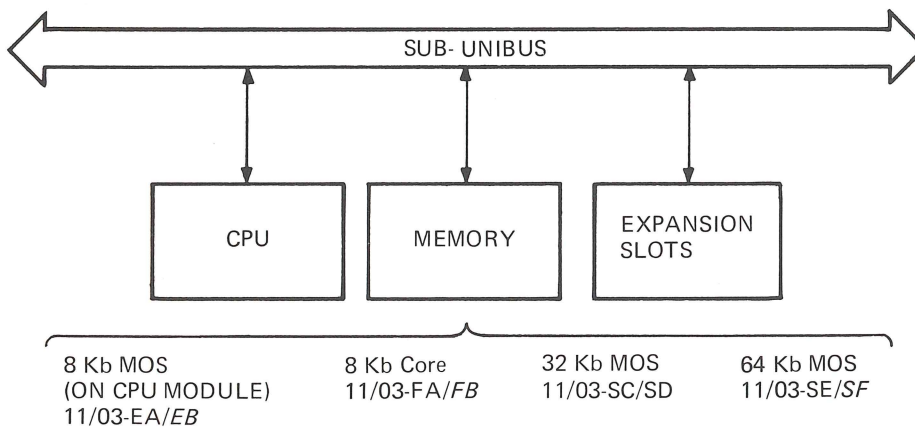


### BA11-M SMALL BOX PDP-11/03

#### Description

The BA11-M Small Box PDP-11/03 is a member of DIGITAL's PDP-11 family and provides the OEM with extensive system-building capabilities and efficient, real-time handling of communications or process control applications. The PDP-11/03 has a maximum address capacity of 64Kb. Of this 64Kb, only 56Kb is available for memory.

LSI technology enables the packaging of a 16-bit CPU, 8Kb of MOS memory and the LSI-11 bus interface on a single quad-sized module. This, coupled with a power supply, cooling fans, backplane and sheet metal chassis, forms a PDP-11/03. The KEV11, EIS/FIS chip, is standard on PDP-11/03 systems with 32Kb or 64Kb.



PDP-11/03 BLOCK DIAGRAM



## BA11-M SMALL BOX PDP-11/03 MODELS

Model	Memory Included	Slots Available	Amps Available		Bus Loads Available	
			+5V	+12V	AC	DC
11/03-EA 11/03-EB	8Kb (MOS)	3 Q or 6 DH	14.2	2.4	17.6	19
11/03-FA 11/03-FB	8Kb (CORE)	2 Q or 4 DH	7.2	1.8	15.7	18
11/03-SC 11/03-SD	32Kb (MOS)	3 Q or 6 DH	13.3	2.6	16.3	18
11/03SE 11/03-SF	64Kb (MOS)	3 Q or 6 DH	13.3	2.6	16.3	18

## BA11-M SMALL BOX PDP-11/03 SPECIFICATIONS

### ELECTRICAL

Input Voltage: 100–127V 60 ± 1 Hz or 50 ± 1 Hz  
200–254V 50 ± 1 Hz or 60 ± 1 Hz

Input Power: 400 W maximum (fully loaded)

Output Voltage:

	Maximum Output	Recommended Load (90% max)
+5V	18.0A	16.0A
+12V	3.5A	3.2A

Output Power: 120W maximum

### MECHANICAL

Size: 8.9 cm (3.5 in.) H × 48.3 cm (19 in.) W × 34.3 cm (13.5 in.) D (without mounting brackets)

Weight: 18.1 Kg (40 lbs.)

Cooling: Two self-contained fans provide 200 LFPM air flow

### ENVIRONMENTAL

Operating Temperature: 10°C–40°C (50°F–104°F)

Operating Humidity: 10%–90% with maximum wet bulb 28°C (82°F) and minimum dew point 2°C (36°F)

## BA11-M SMALL BOX PDP-11/03 PROCESSOR OPTIONS

Option Number	Description	Prerequisite	Mounting Code
KEV11	Extended Instruction Set (EIS)/Floating Instruction Set (FIS) Chip	11/03 11/03L	CPU Module

## BA11-M CONFIGURATION NOTES

1. The BA11-M is a box containing a  $4 \times 4$  backplane (H9270) with the H780 power supply set.
2. The LSI-11 bus signals are present on slots A and B in the BA11-M box as well as on slots C and D.
3. The H9270 backplane uses 5.1 ac bus loads.
4. Although the BA11-M backplane is position-independent, the interrupt priority structure is etched into the backplane. Therefore, I/O options should be positioned in the backplane according to speed.
5. The BA11-M can hold four quad modules or eight double-height modules or any combination of the two.
6. Both Core and MOS memory is supported in the BA11-M box. This is the only box capable of supporting core memory.
7. The MMV11-A (8Kb Core) consists of two quad modules. In a single box system, however, one quad slot can be saved by mounting the MMV11-A in the last slot. Note that the MMV11-A will overhang the backplane but it will physically fit in the box.
8. There are three versions of the LSI-11 processor used in the BA11-M small box PDP-11/03.
  - KD11-F is the original LSI-11 processor and has 8Kb MOS on the processor module (Quad).
  - KD11-H is the KD11-F without the memory (Quad).
  - KD11-HA is the LSI-11/2 processor (Double-Height).

## SINGLE-BACKPLANE CONFIGURATION RULES

1. The LSI-11 bus can support up to 20 ac loads, i.e., the processor has on-board termination for one end of the bus. After 20 ac loads, the other end of the bus must be terminated with 120 ohms.
2. The terminated bus can support up to 35 ac loads.
3. The bus can support up to 20 dc loads.
4. The recommended current drawn from the power supply should be no greater than 90% of the maximum rated output of the supply.

## MULTIPLE-BACKPLANE CONFIGURATION RULES

1. No more than three backplanes can be connected together.
2. Each backplane can have no more than 20 ac loads.
3. The total number of dc loads cannot be more than 20.
4. It is desirable to load boxes equally, or with the highest ac load options in the first and second boxes.
5. Both ends of the termination line must be terminated with 120 ohms; i.e., the first backplane must have an impedance of 120 ohms, and the last backplane must have a termination of 120 ohms.
6. It is recommended that the BCV1B cable (connecting the PDP-11/03 system with expansion box 1) be 183 cm (6 ft.) in length for ease of installation. This cable must be at least 61 cm (2 ft.). The BCV1B cable uses 0.29A @ +5 V.
7. It is recommended that the BCV1A cable (connecting expansion box 1 to expansion box 2) be 305 cm (10 ft.) in length for ease of installation. This cable must be at least 122 cm (4 ft.) longer or shorter than the BCV1B cable.

8. The combined length of both cables in a three-backplane system cannot exceed 488 cm (16 ft.).
9. The recommended current drawn from each power supply should be no greater than 90% of the maximum rated output of the supply.

**BA11-M SMALL BOX PDP-11/03 BACKPLANES**

11/03-EA, EB

H9270 MODULE PLACEMENT

ROW 1	KD11-F LSI-11 CPU + 8 Kb MOS			
ROW 2				
ROW 3				
ROW 4				
	SLOT A	SLOT B	SLOT C	SLOT D

H9270 POWER CONSUMPTION/LOADS

ROW POSITION	SIZE	OPTION		AMPS		BUS LOADS	
		TYPE	NO.	+5V	+12V	AC	DC
1	Q	KD11-F	M7264	1.8	0.8	2.4	1
2							
3							
4							
H9270				-	-	5.1	-
TOTAL AMPS/LOADS				1.8	0.8	7.5	1
AVAILABLE AMPS/LOADS				16.0	3.2	20	20
REMAINING AMPS/LOADS				14.2	2.4	12.5	19

11/03-SE, SF

H9270 MODULE PLACEMENT

ROW 1	KD11-HA LSI-11/2 CPU (EIS/FIS)		MSV11-DD 64 Kb MOS	
ROW 2				
ROW 3				
ROW 4				
	SLOT A	SLOT B	SLOT C	SLOT D

H9270 POWER CONSUMPTION/LOADS

ROW POSITION	SIZE	OPTION		AMPS		BUS LOADS	
		TYPE	NO.	+5V	+12V	AC	DC
1	DH	KD11-HA	M7270	1.0	0.22	1.7	1
	DH	MSV11-DD	M8044	1.7	0.37	2	1
2							
3							
4							
H9270				-	-	5.1	-
TOTAL AMPS/LOADS				2.7	0.59	8.8	2
AVAILABLE AMPS/LOADS				16.0	3.2	20	20
REMAINING AMPS/LOADS				13.3	2.6	11.2	18

11/03-SC, SD

H9270 MODULE PLACEMENT

ROW 1	KD11-HA LSI-11/2 CPU (EIS/FIS)		MSV11-DC 32 Kb MOS	
ROW 2				
ROW 3				
ROW 4				
	SLOT A	SLOT B	SLOT C	SLOT D

H9270 POWER CONSUMPTION/LOADS

ROW POSITION	SIZE	OPTION		AMPS		BUS LOADS	
		TYPE	NO.	+5V	+12V	AC	DC
1	DH	KD11-HA	M7270	1.0	0.22	1.7	1
	DH	MSV11-DC	M8044	1.7	0.34	2	1
2							
3							
4							
H9270				-	-	5.1	-
TOTAL AMPS/LOADS				2.7	0.56	8.8	2
AVAILABLE AMPS/LOADS				16.0	3.2	20	20
REMAINING AMPS/LOADS				13.3	2.6	11.2	18

11/03-FA, FB

H9270 MODULE PLACEMENT

ROW 1	KD11-H LSI-11 CPU			
ROW 2				
ROW 3				
ROW 4	MMV11-A 8Kb CORE			
	SLOT A	SLOT B	SLOT C	SLOT D

NOTE 1

H9270 POWER CONSUMPTION/LOADS

ROW POSITION	SIZE	OPTION		AMPS		BUS LOADS	
		TYPE	NO.	+5V	+12V	AC	DC
1	Q	KD11-H	M7264	1.8	0.8	2.4	1
2							
3							
4	Q	MMV11-A	G6531 H223	7.0	0.6	1.9	1
H9270				-	-	5.1	-
TOTAL AMPS/LOADS				8.8	1.4	9.4	2
AVAILABLE AMPS/LOADS				16.0	3.2	20	20
REMAINING AMPS/LOADS				7.2	1.8	10.6	18

NOTE 1

NOTE 1  
The MMV11-A (8Kb Core) consists of two quad modules. In a single box system, however, one quad slot can be saved by mounting the MMV11-A in the last slot. Note that the MMV11-A will overhang the backplane but it will physically fit in the box.

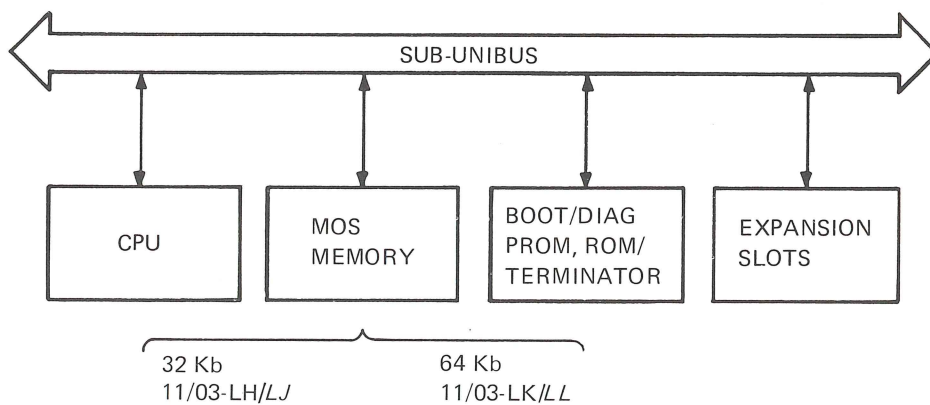


## BA11-N LARGE BOX PDP-11/03L

### Description

The BA11-N Large Box PDP-11/03L is a member of DIGITAL's PDP-11 family and offers the OEM additional mounting space and increased base-unit functionality. The PDP-11/03L has a maximum address capacity of 64Kb. Of this 64Kb, only 56Kb is available for memory. The PDP-11/03L is housed in the BA11-N box which has a universal power supply.

The BDV11-AA, bootstrap loader/diagnostic/PROM, ROM/terminator module, gives the OEM improved system capabilities and allows for fast hardware and software debugging. The KEV11,EIS/FIS chip, is standard on all Large Box PDP-1103L systems.



PDP-11/03L BLOCK DIAGRAM

## BA11-N LARGE BOX PDP-11/03L MODELS

Model 115V 230V	Memory Included	Slots Available	Amps Available		Bus Loads Available	
			+5V	+12V	AC	DC
11/03-LH 11/03-LJ	32Kb (MOS)	6 Q or DH	16.0	9.4	26.7	17
11/03-LK 11/03-LL	64Kb (MOS)	6 Q or DH	16.0	9.4	26.7	17

## BA11-N LARGE BOX PDP-11/03L SPECIFICATIONS

### ELECTRICAL

Input Voltage: 100–127V 47–63 Hz Switch  
200–254V Selectable

Input Power: 650 W

Input Current: 5.5A @ 115V  
2.7A @ 230V

Output Voltage:

	Maximum Output	Recommended Load (90% max)
+5V	22.0A	20.0A
+12V	11.0A	10.0A

Output Power: 240W

### MECHANICAL

Size: 13.2 cm (5.19 in.) H × 48.3 cm (19 in.) W × 57.8 cm (22.75 in.) D

Weight: 20 Kg (44 lbs)

Cooling: Two self-contained fans provide 160 LFPM air flow

### ENVIRONMENTAL

Operating  
Temperature: 5°C–50°C (41°F–122°F)

Operating  
Humidity: 10%–95% with maximum wet bulb 32°C (90°F) and minimum  
dew point 2°C (36°F)

## BA11-N LARGE BOX PDP-11/03L PROCESSOR OPTIONS

Option Number	Description	Prerequisite	Mounting Code
KEV11	Extended Instruction Set (EIS)/Floating Instruction Set (FIS) Chip	11/03 11/03L	CPU Module

## BA11-N CONFIGURATION NOTES

1. The BA11-N is a box containing a nine-slot backplane (H9273) with the H786 power supply.
2. The LSI-11 bus signals are present only on slots A and B in the BA11-N box. Slots C and D do not have the LSI-11 bus signals. Slots C and D allow the OEM the ability to install custom interfaces.
3. The H9273 backplane uses 2.6 ac bus loads.
4. Although the BA11-N backplane is position-independent, the interrupt priority structure is etched into the backplane. Therefore, I/O options should be positioned in the backplane according to speed.
5. The BA11-N can hold nine quad or nine double-height modules.
6. Only MOS memory is supported in the BA11-N.
7. All BA11-N Large Box PDP-11/03Ls have, as their processor, the KD11-HA which is the LSI-11/2 (double-height).

## SINGLE-BACKPLANE CONFIGURATION RULES

1. The LSI-11 bus can support up to 20 ac loads, i.e., the processor has on-board termination for one end of the bus. After 20 ac loads, the other end of the bus must be terminated with 120 ohms.
2. The terminated bus can support up to 35 ac loads.
3. The bus can support up to 20 dc loads.
4. The recommended current drawn from the power supply should be no greater than 90% of the maximum rated output of the supply.

## MULTIPLE-BACKPLANE CONFIGURATION RULES

1. No more than three backplanes can be connected together.
2. Each backplane can have no more than 20 ac loads.
3. The total number of dc loads cannot be more than 20.
4. It is desirable to load boxes equally, or with the highest ac load options in the first and second boxes.
5. Both ends of the termination line must be terminated with 120 ohms; i.e., the first backplane must have an impedance of 120 ohms, and the last backplane must have a termination of 120 ohms.
6. It is recommended that the BCV1B cable (connecting the PDP-11/03 system with expansion box 1) be 183 cm (6 ft.) in length for easy installation. This cable must be at least 61 cm (2 ft.). The BCV1B cable uses 0.29A @ +5V.
7. It is recommended that the BCV1A cable (connecting expansion box 1 to expansion box 2) be 305 cm (10 ft.) in length for easy installation. This cable must be at least 122 cm (4 ft.) longer or shorter than the BCV1B cable.
8. The combined length of both cables in a three-backplane system cannot exceed 488 cm (16 ft.).
9. The recommended current drawn from each power supply should be no greater than 90% of the maximum rated output of the supply.

BA11-N LARGE BOX PDP-11/03L BACKPLANES

11/03-LH, LJ

H9273 MODULE PLACEMENT

ROW 1	KD11-HA + LSI-11/2 CPU (EIS/FIS)			
ROW 2	MSV11-DC 32 Kb MOS			
ROW 3				
ROW 4				
ROW 5				
ROW 6				
ROW 7				
ROW 8				
ROW 9	BDV11-AA BOOT/DIAGNOSTIC/TERM			
	SLOT A	SLOT B	SLOT C	SLOT D

11/03-LK, LL

H9273 MODULE PLACEMENT

1	KD11-HA + LSI-11/2 CPU (EIS/FIS)			
2	MSV11-DD 64 Kb MOS			
3				
4				
5				
6				
7				
8				
9	BDV11-AA BOOT/DIAGNOSTIC/TERM			
	SLOT A	SLOT B	SLOT C	SLOT D

H9273 POWER CONSUMPTION/LOADS

ROW POSITION	SIZE	OPTION		AMPS		BUS LOADS	
		TYPE	NO.	+5V	+12V	AC	DC
1	DH	KD11-HA	M7270	1.0	0.22	1.7	1
2	DH	MSV11-DC	M8044	1.7	0.34	2	1
3							
4							
5							
6							
7							
8							
9	Q	BDV11-AA	M8012	1.3	0.05	2	1
H9273				-	-	2.6	-
TOTAL AMPS/LOADS				4.0	0.61	8.3	3
AVAILABLE AMPS/LOADS				20.0	10.0	35	20
REMAINING AMPS/LOADS				16.0	9.4	26.7	17

H9273 POWER CONSUMPTION/LOADS

ROW POSITION	SIZE	OPTION		AMPS		BUS LOADS	
		TYPE	NO.	+5V	+12V	AC	DC
1	DH	KD11-HA	M7270	1.0	0.22	1.7	1
2	DH	MSV11-DD	M8044	1.7	0.37	2	1
3							
4							
5							
6							
7							
8							
9	Q	BDV11-AA	M8012	1.3	0.05	2	1
H9273				-	-	2.6	-
TOTAL AMPS/LOADS				4.0	0.64	8.3	3
AVAILABLE AMPS/LOADS				20.0	10.0	35	20
REMAINING AMPS/LOADS				16.0	9.4	26.7	17





# PDP-11/23

## PRODUCT DESCRIPTION

The PDP-11/23 is similar to the PDP-11/03 but has the following additional features:

- Direct addressing of 256Kb via standard memory management
- Program execution 2.5 times faster than the PDP-11/03
- Optional floating point microcode with 46 instructions (software-compatible with FP11-A, -E, -C)
- Standard Extended Instruction Set (EIS)

## PDP-11/23 SYSTEM DIFFERENCES

A number of minor differences exist between the LSI-11/23 (KDF11-AA) processor and the LSI-11 (KD11-F) or LSI-11/2 (KD11-HA) processor. The following is a list of system differences:

- LSI-11/23 has no boot loader in microcode.
- Console ODT functions are different in the LSI-11/23.
- LSI-11/23 does not perform memory refresh.
- The EVENT line is on level 6 in LSI-11/23; LSI-11 and LSI-11/2 have it on level 4.

For more specific details on system differences, see the *Microcomputer Processor Handbook, 1979*.

## PDP-11/23 SPECIFICATIONS

- Word Length: 16 bits (two 8-bit bytes)
- Memory access time: MOS 210 ns (typ) MSV11-D
- DMA Rate: 1 Mb/second (burst mode)
- Sub-UNIBUS Rate: 1.6 Mb/second
- Addressing Space: 256Kb total (memory and peripherals)  
248Kb (memory only)
- Power Supply Specifications:

		Maximum Output	Recommended Load (90% max)
BA11-N Large Box	+5V	22.0A	20.0A
	+12V	11.0A	10.0A

## ABBREVIATIONS USED

Q	Quad-size module 26.6 cm (10.5 in.) × 21.59 cm (8.5 in.)
DH	Double-height module, 13.34 cm (5.25 in.) × 21.59 cm (8.5 in.)
PAN	48.3 cm (19 in.) rack-mountable unit
TT	Table-top mounting
FS	Free-standing floor unit

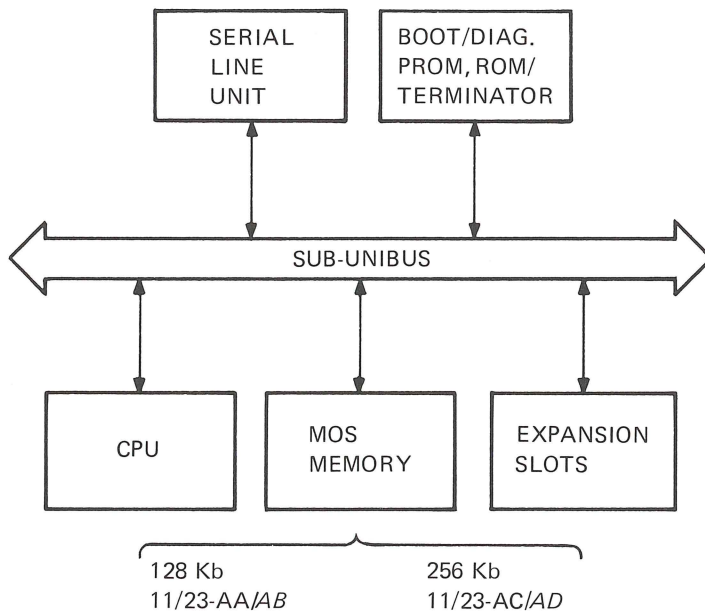


**PDP-11/23**

**Description**

The PDP-11/23 brings the full PDP-11/34 functionality to a microcomputer that communicates along the LSI-11 bus. The PDP-11/23 has a maximum address capacity of 256Kb. Of this 256Kb, only 248Kb is available for memory. The PDP-11/23 contains memory management as a standard feature and offers floating point (in microcode) as an option. The Extended Instruction Set (EIS) is also standard on the PDP-11/23. Program execution with this new microcomputer is 2.5 times faster than with the PDP-11/03.

The BDV11-AA, bootstrap loader/diagnostic/PROM,ROM/terminator module, gives the OEM improved system capabilities and allows fast hardware and software debugging. The DLV11-J, four-channel asynchronous SLU, provides OEMs four independent asynchronous lines for interfacing peripheral equipment to the LSI-11 bus. The PDP-11/23 is housed in the BA11-N large box which has a universal power supply. With the introduction of the PDP-11/23, it is now possible to run DIGITAL's popular RSX-11M operating system on an LSI-11 system.



**PDP-11/23 BLOCK DIAGRAM**

## PDP-11/23 MODELS

Model 115V 230V	Memory Included	Slots Available	Amps Available		Bus Loads Available	
			+5V	+12V	AC	DC
11/23-AA 11/23-AB	128 Kb	4 Q or DH	12.3	8.8	23.4	15
11/23-AC 11/23-AD	256 Kb	2 Q or DH	8.9	8.0	19.4	13

## PDP-11/23 SPECIFICATIONS

### ELECTRICAL

Input Voltage: 100–127V 47–63 Hz Switch  
200–254V Selectable

Input Power: 650 W

Input Current: 5.5A @ 115V  
2.7A @ 230V

Output Voltage:

	Maximum Output	Recommended Load (90% max)
+5V	22.0A	20.0A
+12V	11.0A	10.0A

Output Power: 240W

### MECHANICAL

Size: 13.2 cm (5.19 in.) H × 48.3 cm (19 in.) W × 57.8 cm  
(22.75 in.) D

Weight: 20 Kg (44 lbs)

Cooling: Two self-contained fans provide 160 LFPM air flow

### ENVIRONMENTAL

Operating  
Temperature: 5°C–50°C (41°F–122°F)

Operating  
Humidity: 10%–95% with maximum wet bulb 32°C (90°F) and  
minimum dew point 2°C (36°F)

## PDP-11/23 PROCESSOR OPTIONS

Option Number	Description	Prerequisite	Mounting Code
KEF11-AA	Floating Point Microcode Chip (46 instructions)	11/23	CPU Module

## BA11-N CONFIGURATION NOTES

1. The BA11-N is a box containing a nine-slot backplane (H9273) with the H786 power supply.
2. The LSI-11 bus signals are present only on slots A and B in the BA11-N box. Slots C and D do not have the LSI-11 bus signals. Slots C and D allow the OEM the ability to install custom interfaces.
3. The H9273 backplane uses 2.6 ac bus loads.
4. Although the BA11-N backplane is position-independent, the interrupt priority structure is etched into the backplane. Therefore, I/O options should be positioned in the backplane according to speed.
5. The BA11-N can hold nine quad or nine double-height modules.
6. Only MOS memory is supported in the BA11-N.
7. All PDP-11/23s have, as their processor, the KDF11-AA which is the LSI-11/23 (double-height).

## SINGLE-BACKPLANE CONFIGURATION RULES

1. The LSI-11 bus can support up to 20 ac loads, i.e., the processor has on-board termination for one end of the bus. After 20 ac loads, the other end of the bus must be terminated with 120 ohms.
2. The terminated bus can support up to 35 ac loads.
3. The bus can support up to 20 dc loads.
4. The recommended current drawn from the power supply should be no greater than 90% of the maximum rated output of the supply.

## MULTIPLE-BACKPLANE CONFIGURATION RULES

1. No more than three backplanes can be connected together.
2. Each backplane can have no more than 20 ac loads.
3. The total number of dc loads cannot be more than 20.
4. It is desirable to load boxes equally, or with the highest ac load options in the first and second boxes.
5. Both ends of the termination line must be terminated with 120 ohms; i.e., the first backplane must have an impedance of 120 ohms, and the last backplane must have a termination of 120 ohms.
6. It is recommended that the BCV1B cable (connecting the PDP-11/23 system with expansion box 1) be 183 cm (6 ft.) in length for easy installation. This cable must be at least 61 cm (2 ft.). The BCV1B cable uses 0.29A @ +5V.
7. It is recommended that the BCV1A cable (connecting expansion box 1 to expansion box 2) be 305 cm (10 ft.) in length for easy installation. This cable must be at least 122 cm (4 ft.) longer or shorter than the BCV1B cable.
8. The combined length of both cables in a three-backplane system cannot exceed 488 cm (16 ft.).
9. The recommended current drawn from each power supply should be no greater than 90% of the maximum rated output of the supply.

PDP-11/23 BACKPLANES

11/23-AA, AB

H9273 MODULE PLACEMENT

ROW 1	KDF11-AA LSI-11/23 CPU			
ROW 2	MSV11-DD	64 Kb MOS		
ROW 3	MSV11-DD	64 Kb MOS		
ROW 4	DLV11-J	SLU		
ROW 5				
ROW 6				
ROW 7				
ROW 8				
ROW 9	BDV11-AA	BOOT/DIAGNOSTIC/TERM		
	SLOT A	SLOT B	SLOT C	SLOT D

11/23-AC, AD

H9273 MODULE PLACEMENT

ROW 1	KDF11-AA LSI-11/23 CPU			
ROW 2	MSV11-DD	64 Kb MOS		
ROW 3	MSV11-DD	64 Kb MOS		
ROW 4	MSV11-DD	64 Kb MOS		
ROW 5	MSV11-DD	64 Kb MOS		
ROW 6	DLV11-J	SLU		
ROW 7				
ROW 8				
ROW 9	BDV11-AA	BOOT/DIAGNOSTIC/TERM		
	SLOT A	SLOT B	SLOT C	SLOT D

H9273 POWER CONSUMPTION/LOADS

ROW POSITION	SIZE	OPTION		AMPS		BUS LOADS	
		TYPE	NO.	+5 V	+12 V	AC	DC
1	DH	KDF11-AA	M8186	2.0	0.20	2	1
2	DH	MSV11-DD	M8044	1.7	0.37	2	1
3	DH	MSV11-DD	M8044	1.7	0.37	2	1
4	DH	DLV11-J	M8043	1.0	0.25	1	1
5							
6							
7							
8							
9	Q	BDV11-AA	M8012	1.3	0.05	2	1
		H9273		-	-	2.6	-
		TOTAL AMPS/LOADS		7.7	1.24	11.6	5
		AVAILABLE AMPS/LOADS		20.0	10.0	35	20
		REMAINING AMPS/LOADS		12.3	8.8	23.4	15

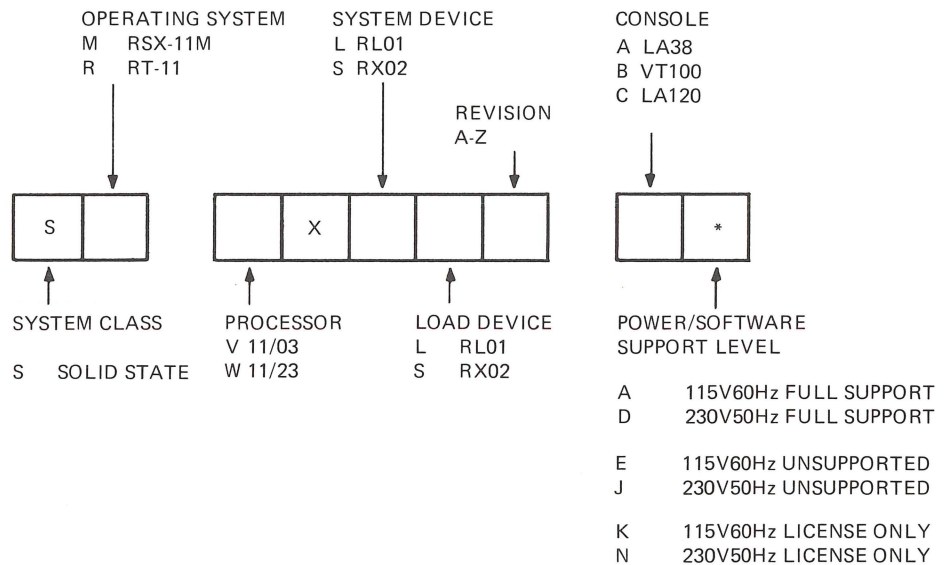
H9273 POWER CONSUMPTION/LOADS

ROW POSITION	SIZE	OPTION		AMPS		BUS LOADS	
		TYPE	NO.	+5 V	+12 V	AC	DC
1	DH	KD11F-AA	M8186	2.0	0.20	2	1
2	DH	MSV11-DD	M8044	1.7	0.37	2	1
3	DH	MSV11-DD	M8044	1.7	0.37	2	1
4	DH	MSV11-DD	M8044	1.7	0.37	2	1
5	DH	MSV11-DD	M8044	1.7	0.37	2	1
6	DH	DLV11-J	M8043	1.0	0.25	1	1
7							
8							
9	Q	BDV11-AA	M8012	1.3	0.05	2	1
		H9273		-	-	2.6	-
		TOTAL AMPS/LOADS		11.1	1.98	15.6	7
		AVAILABLE AMPS/LOADS		20.0	10.0	35	20
		REMAINING AMPS/LOADS		8.9	8.0	19.4	13



## Packaged Systems

### PDP-11/03, 11/23 PACKAGED SYSTEM MODEL NOMENCLATURE



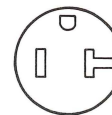
Packaged Systems are often referred to as 11V03 (11V23) and 11T03 (11T23) systems.

**11V03/11V23** This is an internal designation that applies to a floppy disk-based packaged system. It is not an ordering designation. The only ordering designation is the 2-5-2 designation (e.g., SR-VXSSB-BA).

**11T03/11T23** This is an internal designation that applies to a hard disk-based packaged system. It is not an ordering designation. The only ordering designation is the 2-5-2 designation (e.g., SR-VXSSB-BA).



20 amp PLUG  
(NEMA #5-20P)



20 amp OUTLET  
(NEMA #5-20R)

**NOTE**

All 11/23 packaged systems will be shipped with a 20 amp plug (NEMA #5-20P) which requires a 20 amp outlet (NEMA #5-20R). 20 amp outlets are standard in many recently built commercial buildings, however, modifications may have to be made to older buildings to accommodate 20 amp plugs. Older buildings are generally equipped with 15 amp outlets. 11/03 packaged systems will continue to be shipped with the standard 15 amp plug (NEMA #5-15P).

## PDP-11/03L PACKAGED SYSTEMS

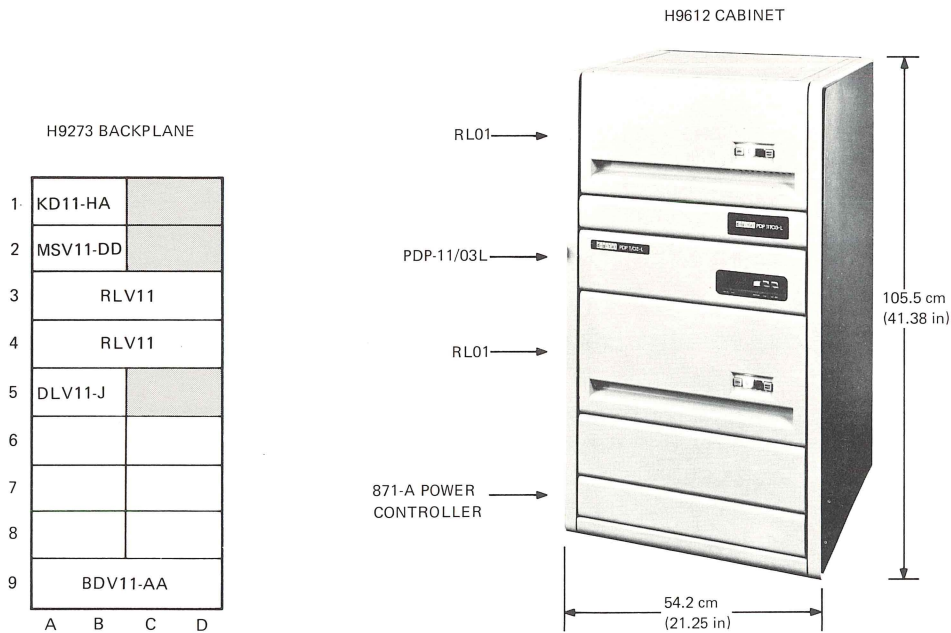
There are three versions of PDP-11/03L Packaged Systems offered.

- RT-11 Hard Disk-Based (Dual RL01)
- RT-11 32 Kb Floppy Disk-Based (Dual RX02)
- RT-11 64Kb Floppy Disk-Based (Dual RX02)

All PDP-11/03L Packaged Systems are made up of the following components:

- PDP-11/03-L
  - KD11-HA LSI-11/2 CPU
  - MSV11-DC 32Kb MOS  
(or MSV11-DD) (or 64Kb MOS)
  - BDV11-AA Boot/Diagnostic/PROM, ROM/Terminator
  - BA11-N Nine-slot box
- RXV21-BA Floppy Disk Subsystem or RLV11-AK Hard Disk Subsystem with RL01-AK Add-on Disk Drive
- DLV11-F or DLV11-J Asynchronous SLU
- Terminal
- Cabinet
- Software

## RT-11 DUAL RL01 HARD DISK-BASED



Model	Terminal	Slots Available	Amps Available		Bus Loads Available	
			+5V	+12V	AC	DC
SR-VXLLB-A*	LA38	3 Q or DH	9.5	8.1	22.5	15
B*	VT100					
C*	LA120					

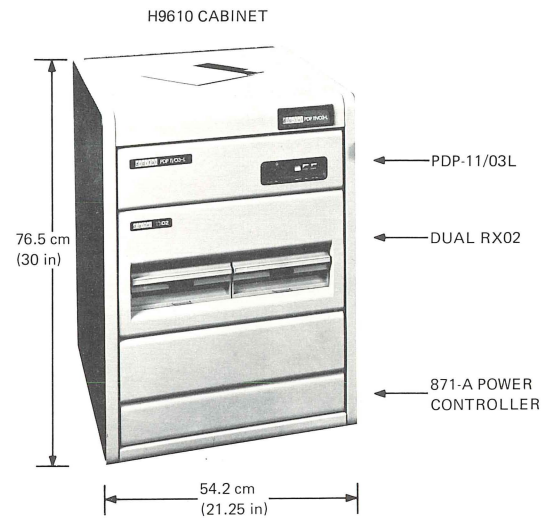
\*Power/Software Support Level (refer to Packaged System Model Nomenclature on Page 17.)



### RT-11 32Kb DUAL RX02 FLOPPY DISK-BASED

H9273 BACKPLANE

1	KD11-HA		
2	MSV11-DC		
3	RXV21		
4	DLV11-F		
5			
6			
7			
8			
9	BDV11-AA		
	A	B	C D

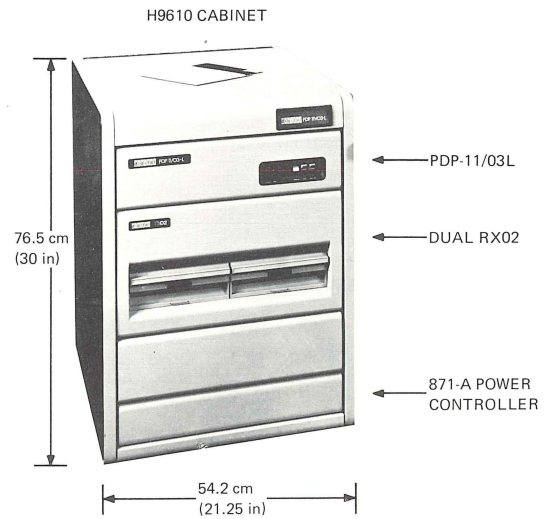


Model	Terminal	Slots Available	Amps Available		Bus Loads Available	
			+5V	+12V	AC	DC
SR-VXSSA-A	LA38	4 Q or DH	13.2	9.2	22.7	15
B*	VT100					
C*	LA120					

### RT-11 64Kb DUAL RX02 FLOPPY DISK-BASED

H9273 BACKPLANE

1	KD11-HA		
2	MSV11-DD		
3	RXV21		
4	DLV11-J		
5			
6			
7			
8			
9	BDV11-AA		
	A	B	C D



Model	Terminal	Slots Available	Amps Available		Bus Loads Available	
			+5V	+12V	AC	DC
SR-VXSSB-A*	LA38	4 Q or DH	13.2	9.1	23.9	15
B*	VT100					
C*	LA120					

\*Power/Software Support Level (refer to Packaged System Model Nomenclature on Page 17.)

## PDP-11/23 PACKAGED SYSTEMS

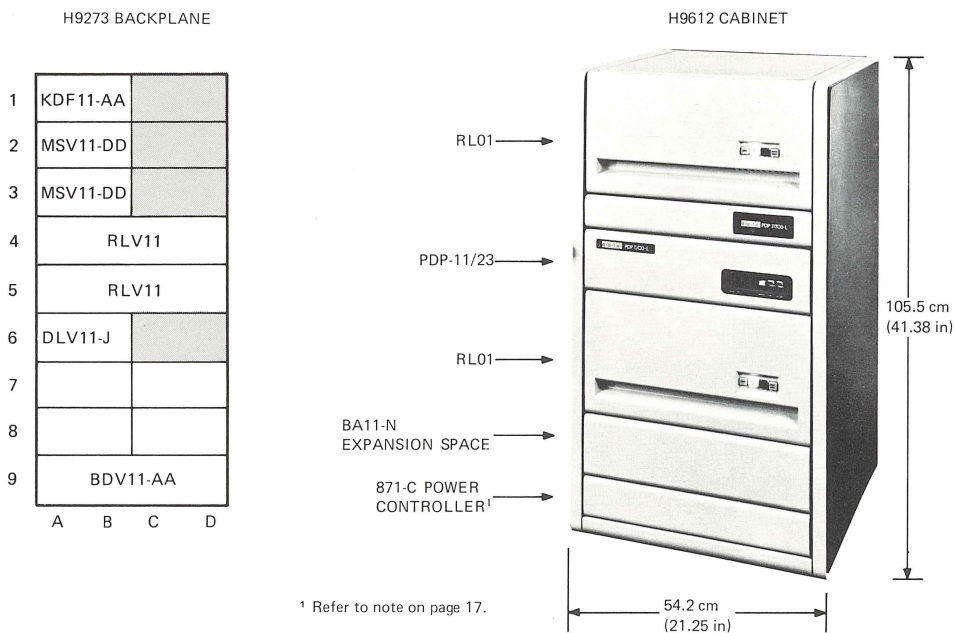
There are three versions of PDP-11/23 Packaged Systems offered.

- RSX-11M Hard Disk-Based (Dual RL01)
- RT-11 Floppy Disk-Based (Dual RX02)
- RT-11 Hard Disk-Based (Dual RL01)

All PDP-11/23 Packaged Systems are made up of the following components:

- PDP-11/23 – AA, AB
  - KDF11-AA LSI-11/23 CPU
  - MSV11-DD 64Kb MOS
  - MSV11-DD 64Kb MOS
  - DLV11-J 4-channel asynchronous SLU
  - BDV11-AA Boot/Diagnostic/PROM, ROM/Terminator
  - BA11-N Nine-slot box
- RXV21-BA Floppy Disk Subsystem or RLV11-AK Hard Disk Subsystem with RL01-AK Add-on Disk Drive
- Terminal
- Cabinet
- Software

## RSX-11M DUAL RL01 HARD DISK-BASED



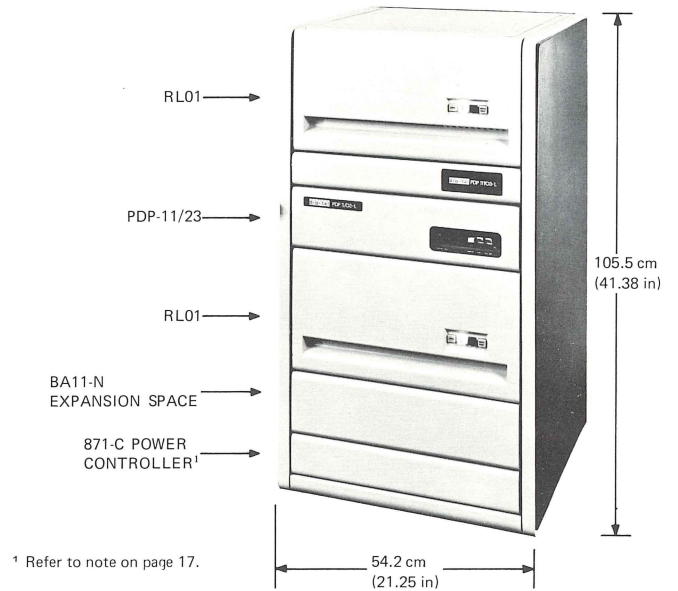
Model	Terminal	Slots Available	Amps Available		Bus Loads Available	
			+5V	+12V	AC	DC
SM-WXLLA-A*	LA38	2 Q or DH	6.8	7.8	20.2	14
B*	VT100					
C*	LA120					

\*Power/Software Support Level (refer to Packaged System Model Nomenclature on Page 17.)

### RT-11 DUAL RL01 HARD DISK-BASED H9612 CABINET

H9273 BACKPLANE

1	KDF11-AA			
2	MSV11-DD			
3	MSV11-DD			
4	RLV11			
5	RLV11			
6	DLV11-J			
7				
8				
9	BDV11-AA			
	A	B	C	D

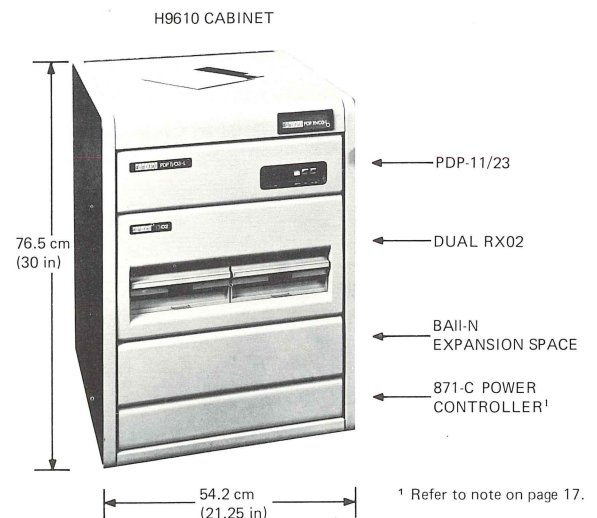


Model	Terminal	Slots Available	Amps Available		Bus Loads Available	
			+5V	+12V	AC	DC
SR-WXLLA-A*	LA38	2 Q or DH	6.8	7.8	20.2	14
B*	VT100					
C*	LA120					

### RT-11 DUAL RX02 FLOPPY DISK-BASED

H9273 BACK PLANE

1	KDF11-A			
2	MSV11-DD			
3	MSV11-DD			
4	RXV21			
5	DLV11-J			
6				
7				
8				
9	BDV11-AA			
	A	B	C	D



Model	Terminal	Slots Available	Amps Available		Bus Loads Available	
			+5V	+12V	AC	DC
SR-WXSSA-A*	LA38	3 Q or DH	10.5	8.8	21.6	14
B*	VT100					
C*	LA120					

\*Power/Software Support Level (refer to Packaged System Model Nomenclature on Page 17.)

### LSI-11 MEMORY OPTIONS

Option Number	Description	Prerequisite	Mounting Code	Amps		Bus Loads	
				+5 V	+12 V	AC	DC
MMV11-A	8 Kb Core	11/03	2 Q	7.0	0.6	1.9	1
MRV11-AA	8 Kb PROM/ROM	11/03, L	DH	2.8	N/A	1.8	1
MRV11-AC	Chip for use on MRV11-AA	MRV11-AA	MRV11-AA Module	N/A	N/A	N/A	N/A
MRV11-BA	8 Kb EPROM	11/03, L 11/23	DH	0.62	0.5	2.8	1
MRV11-BC	Chip for use on MRV11-BA	MRV11-BA	MRV11-BA Module	N/A	N/A	N/A	N/A
MRV11-C	64 Kb PROM/ROM/EPROM	11/03, L 11/23	DH	0.8 <sup>1</sup>	N/A	2	1
MSV11-B	8 Kb MOS	11/03, L	DH	0.6	0.54	1.9	1
MSV11-DB	16 Kb MOS	11/03, L 11/23	DH	1.7	0.37	2	1
MSV11-DC	32 Kb MOS	11/03, L 11/23	DH	1.7	0.34	2	1
MSV11-DD	64 Kb MOS	11/03, L 11/23	DH	1.7	0.37	2	1

### LSI-11 BOOT/DIAGNOSTIC/TERMINATOR OPTIONS

Option Number	Description	Prerequisite	Mounting Code	Amps		Bus Loads	
				+5 V	+12 V	AC	DC
BDV11-AA	Bootstrap loader (RL01, RX01/RX02, RK05), diagnostics, PROM/ROM, terminator	11/03, L 11/23	Q	1.3	0.05	2	1
REV11-A <sup>2</sup>	Bootstrap loader (RX01, RI05, paper tape), diagnostics, terminator, MOS memory refresh	11/03, L	DH	1.64	N/A	2.2	1
REV11-C <sup>2</sup>	Same as REV11-A but no termination	11/03, L	DH	1.0	N/A	2.2	1

### LSI-11 CLOCK OPTIONS

Option Number	Description	Prerequisite	Mounting Code	Amps		Bus Loads	
				+5 V	+12 V	AC	DC
KWV11-A	Programmable real-time clock	11/03, L 11/23	Q	1.75	0.01	3.4	1

#### Notes:

- 1 Plus current required for the ROM chips
- 2 If the REV11 is chosen for its MOS memory refresh capability, the following order designations should be followed.
  - REV11-C should be ordered if there are other DMA devices in the system. The REV11-C must be mounted ahead of the other DMA devices (note no termination provided).
  - REV11-A should be ordered if no DMA devices are in the system.
 REV11 and BDV11-AA cannot reside in the same system.

## LSI-11 COMMUNICATION OPTIONS

Option Number	Description	Prerequisite	Mounting Code	Amps		Bus Loads		
				+5 V	+12 V	AC	DC	
<b>Four-Channel Asynchronous SLU</b>								
DLV11-J	EIA RS232-C, RS423, RS422, no modem control, no cables	11/03, L 11/23 <sup>1</sup>	DH	1.0	0.25	1	1	
DLV11-KA	EIA to 20 mA converter, 3 ft. cable (BC21A-0)	DLV11-J	DLV11-J Module	N/A	0.23	N/A	N/A	
<b>Single-Line Asynchronous SLU</b>								
DLV11-E	EIA RS232-C, modem control, no cables	11/03, L 11/23	DH	1.0	0.18	1.6	1	
DLV11-EB	EIA RS232-C, modem control, BC01V-25	11/03, L 11/23	DH	1.0	0.18	1.6	1	
DLV11-FA	20 mA, no modem control, BC05M-04	11/03, L 11/23	DH	1.0	0.18	2.2	1	
DLV11-FB	EIA RS232-C, no modem control, BC03L-05	11/03, L 11/23	DH	1.0	0.18	2.2	1	
<b>Single-Line Synchronous SLU</b>								
DUV11-DA	EIA RS232-C, modem control, BC05C-25	11/03, L 11/23	Q	0.86	0.32	1	1	
<b>Four-Line Asynchronous Multiplexer</b>								
DZV11-B	EIA RS232-C, modem control, BC11U-25	11/03, L 11/23	Q	1.15	0.40	4.1	1	

Note:

1 If used on 11/23, M8043 must be CS Rev E or higher.

## LSI MULTIFUNCTION MODULE

Option Number	Description	Prerequisite	Mounting Code	Amps		Bus Loads	
				+5 V	+12 V	AC	DC
MXV11-AA	8 Kb RAM, two EIA RS232-C or RS423 SLUs, 60 Hz crystal clock, and sockets for either PROM memory or system bootstrap	11/03, L 11/23	DH	1.25	0.1	2	2
MXV11-AC	Same as MXV11-AA except 32 Kb RAM <sup>2</sup>	11/03, L 11/23	DH	1.25	0.1	2	2
MXV11-A2	Bootstrap PROMs for use with MXV11-AA, -AC. Boots TU58, RX01/RX02, RL01, RK05	MXV11-AA or MXV11-AC	Module	N/A	N/A	N/A	N/A

Note:

1 Maximum of two per system due to starting address limitation (memory start address must be below 64 Kb).

### LSI-11 PARALLEL INTERFACES

Option Number	Description	Prerequisite	Mounting Code	Amps		Bus Loads	
				+5 V	+12 V	AC	DC
DRV11	General-purpose, program interrupt, no cables	11/03, L 11/23	DH	0.9	N/A	1.4	1
DRV11-B	General-purpose, DMA, no cables	11/03, L 11/23	Q	1.9	N/A	3.3	1
DRV11-J	General-purpose, program interrupt, four 16-bit ports (3 ports word-oriented and 1 port bit-oriented), no cables.	11/03, L 11/23	DH	1.6	N/A	2	1

### LSI-11 REAL-TIME I/O OPTIONS

Option Number	Description	Prerequisite	Mounting Code	Amps		Bus Loads	
				+5 V	+12 V	AC	DC
AAV11-A	D/A Converter	11/03, L 11/23	Q	1.5	0.4	1.9	1
ADV11-A	A/D Converter	11/03, L 11/23	Q	2.0	0.45	3.3	1
IBV11-A	IEEE interface, BN11A-04	11/03, L 11/23	DH	0.8	N/A	1.8	1

### LSI-11 EXPANSION HARDWARE

Option Number	Description	Prerequisite	Mounting Code	Amps		Bus Loads	
				+5 V	+12 V	AC	DC
BA11-ME <i>MF</i>	8.9 cm (3.5 in.) small expansion box; includes power supply and backplane; does NOT include expansion cables.	11/03	PAN	16.0 (Recommended max)	3.2	5.1	N/A
BA11-NE <i>NF</i>	13.2 cm (5.19 in.) large expansion box; includes power supply and backplane; does NOT include expansion cables.	11/03, L 11/23	PAN	20.0 (Recommended max)	10.0	2.6	N/A
BCV1A-10	305 cm (10 ft) expansion cable assembly; connects expansion box 1 to expansion box 2.	BA11-ME BA11-NE	2 DH (one in each expansion box)	N/A	N/A	N/A	N/A
BCV1B-06	183 cm (6 ft) expansion cable assembly; connects PDP-11/03 or 11/23 system box to expansion box 1.	11/03, L 11/23	2 DH (one in system box and one in expansion box 1)	0.29	N/A	N/A	N/A

**CABINETS**

Option Number	Description	Prerequisite	Mounting Code	Amps		Bus Loads	
				+5 V	+12 V	AC	DC
H9610-AA AB	76.5 cm (30 in.) H; 54.2 cm (21.25 in.) W; 76.5 cm (30 in.) D (exterior dimensions); solid top; includes 871-A/B power controller.	N/A	FS	N/A	N/A	N/A	N/A
H9612-AA AB	105.5 cm (41.38 in.) H; 54.2 cm (21.25 in.) W; 76.5 cm (30 in.) D (exterior dimensions); open top; includes 871-A/B power controller.	N/A	FS	N/A	N/A	N/A	N/A
H9613-AA AB	Same as H9612 but has solid top.	N/A	FS	N/A	N/A	N/A	N/A

**LSI-11 DISK SUBSYSTEMS**

Option Number	Description	Prerequisite	Mounting Code	Amps		Bus Loads	
				+5 V	+12 V	AC	DC
RKV11-AA	2.5 Mb RK05J Disk Cartridge Drive and interface	11/03, L	DH PAN	1.8	N/A	1.9	1
RLV11-AK	5.0 Mb RL01 Disk Cartridge Drive and interface	11/03L 11/23	2 Q PAN	5.5	1.0	3.2	1
RLV21-AK	10.4 Mb RL02 Disk Cartridge Drive and interface	11/03L 11/23	2 Q PAN	5.5	1.0	3.2	1
RXV21-BA	1 Mb RX02 Floppy Disk Drive and interface	11/03, L 11/23	DH PAN	1.8	N/A	1.8	1

**LSI-11 ADD-ON DISK DRIVES**

Option Number	Description	Prerequisite	Mounting Code	Amps		Bus Loads	
				+5 V	+12 V	AC	DC
RK05-JJ	2.5 Mb Disk Cartridge Drive	RKV11-AA	PAN	N/A	N/A	N/A	N/A
RL01-AK	5.0 Mb Disk Cartridge Drive	RLV11-AK	PAN	N/A	N/A	N/A	N/A
RL02-AK	10.4 Mb Disk Cartridge Drive	RLV21-AK	PAN	N/A	N/A	N/A	N/A

**CARTRIDGE DISK ACCESSORIES**

Option Number	Description	Prerequisite	Mounting Code	Amps		Bus Loads	
				+5 V	+12 V	AC	DC
RK05K-11	2.5 Mb Disk Cartridge	RK05	N/A	N/A	N/A	N/A	N/A
RL01K-DC	5.0 Mb Disk Cartridge	RL01	N/A	N/A	N/A	N/A	N/A
RL02K-DC	10.4 Mb Disk Cartridge	RL02	N/A	N/A	N/A	N/A	N/A
RX01K-10	1 Mb Floppy Diskette (10 per pack)	RX01/RX02	N/A	N/A	N/A	N/A	N/A

**HARDCOPY TERMINALS**

Option Number	Description	Prerequisite	Mounting Code	Amps		Bus Loads	
				+5 V	+12 V	AC	DC
LA34-DA	EIA DECwriter IV Teleprinter, 300 Baud, Roll Platen, UPS	SLU	TT	N/A	N/A	N/A	N/A
LA36-CE <i>CJ</i>	20 mA DECwriter II Terminal, 300 Baud, Tractor-feed, 120/60 or 240/50	SLU	FS	N/A	N/A	N/A	N/A
LA36-HE <i>HJ</i>	EIA DECwriter II Terminal, 300 Baud, Tractor-feed, 120/60 or 240/50	SLU	FS	N/A	N/A	N/A	N/A
LA38-GA	EIA DECwriter IV Terminal, 300 Baud, Tractor-feed, UPS	SLU	TT	N/A	N/A	N/A	N/A
LA38-HA	LA38-GA with stand	SLU	FS	N/A	N/A	N/A	N/A
LA120-DA	EIA DECwriter III Terminal, 1200 Baud, Tractor-feed, UPS	SLU	FS	N/A	N/A	N/A	N/A
LA12X-AL	20 mA option for LA120-DA	LA120-DA	N/A	N/A	N/A	N/A	N/A
LAX34-CL	20 mA option for LA38-GA, HA or LA34-DA	LA38-GA LA38-HA LA34-DA	N/A	N/A	N/A	N/A	N/A

**VIDEO TERMINALS**

Option Number	Description	Prerequisite	Mounting Code	Amps		Bus Loads	
				+5 V	+12 V	AC	DC
VT100-AA AB	EIA video terminal, 19.2K Baud	SLU	TT	N/A	N/A	N/A	N/A
VT1XX-AA	20 mA option for VT100	VT100-AA AB	N/A	N/A	N/A	N/A	N/A
VT1XX-AB	Advanced video option for VT100	VT100-AA AB	N/A	N/A	N/A	N/A	N/A

**LINE PRINTERS**

Option Number	Description	Prerequisite	Mounting Code	Amps		Bus Loads	
				+5 V	+12 V	AC	DC
LPV11-PA <i>PD</i>	180-cps printer and interface	11/03, L 11/23	DH FS	0.8	N/A	1.4	1
LPV11-VA <i>VD</i>	300-lpm, 64-character line printer and interface	11/03, L 11/23	DH FS	0.8	N/A	1.4	1
LPV11-WA <i>WD</i>	230-lpm, 96-character line printer and interface	11/03, L 11/23	DH FS	0.8	N/A	1.4	1



## OPTIONS/MODULES

Option Number	Module Number	Mounting Code	Amps		Bus Loads	
			+5 V	+12 V	AC	DC
AAV11-A	A6001	Q	1.5	0.4	1.9	1
ADV11-A	A012	Q	2.0	0.45	3.3	1
BDV11-AA	M8012	Q	1.3	0.05	2.0	1
DLV11-E	M8017	DH	1.0	0.18	1.6	1
DLV11-EB	M8017	DH	1.0	0.18 <sup>1</sup>	1.6	1
DLV11-FA	M8028	DH	1.0	0.18	2.2	1
DLV11-FB	M8028	DH	1.0	0.18	2.2	1
DLV11-J	M8043	DH	1.0	0.25	1.0	1
DRV11	M7941	DH	0.9	N/A	1.4	1
DRV11-B	M7950	Q	1.9	N/A	3.3	1
DUV11-DA	M7951	Q	0.86	0.32	1.0	1
DZV11-B	M7957	Q	1.15	0.40	4.1	1
IBV11-A	M7954	DH	0.8	N/A	1.8	1
KD11-F	M7264	Q	1.8	0.8	2.4	1
KD11-HA	M7270	DH	1.0	0.22	1.7	1
KDF11-AA	M8186	DH	2.0	0.20	2.0	1
KWV11-A	M7952	Q	1.75	0.01	3.4	1
LAV11	M7949	DH	0.8	N/A	1.8	1
LPV11	M8027	DH	0.8	N/A	1.4	1
MMV11-A	G653/H223	2 Q	7.0	0.6	1.9	1
MRV11-AA	M7942	DH	2.8	N/A	1.8	1
MRV11-BA	M8021	DH	0.62	0.5	2.8	1
MRV11-C	M8048	DH	0.8 <sup>1</sup>	N/A	2.0	1
MSV11-B	M7944	DH	0.6	0.54	1.9	1
MSV11-DB	M8044-BA	DH	1.7	0.37	2.0	1
MSV11-DC	M8044-CA	DH	1.7	0.34	2.0	1
MSV11-DD	M8044-DA	DH	1.7	0.37	2.0	1
MXV11-AA	M8047-AA	DH	1.25	0.1	2.0	2
MXV11-AC	M8047-BA	DH	1.25	0.1	2.0	2
REV11-A	M9400-YA	DH	1.64	N/A	2.2	1
REV11-C	M9400-YC	DH	1.0	N/A	2.2	1
RKV11-DA	M7269	DH	1.8	N/A	1.9	1
RLV11	M8013/M8014	2 Q	5.5	1.0	3.2	1
RXV11	M7946	DH	1.5	N/A	1.8	1
RXV21	M8029	DH	1.8	N/A	1.8	1

Note:

1 Plus current required for the ROM chips

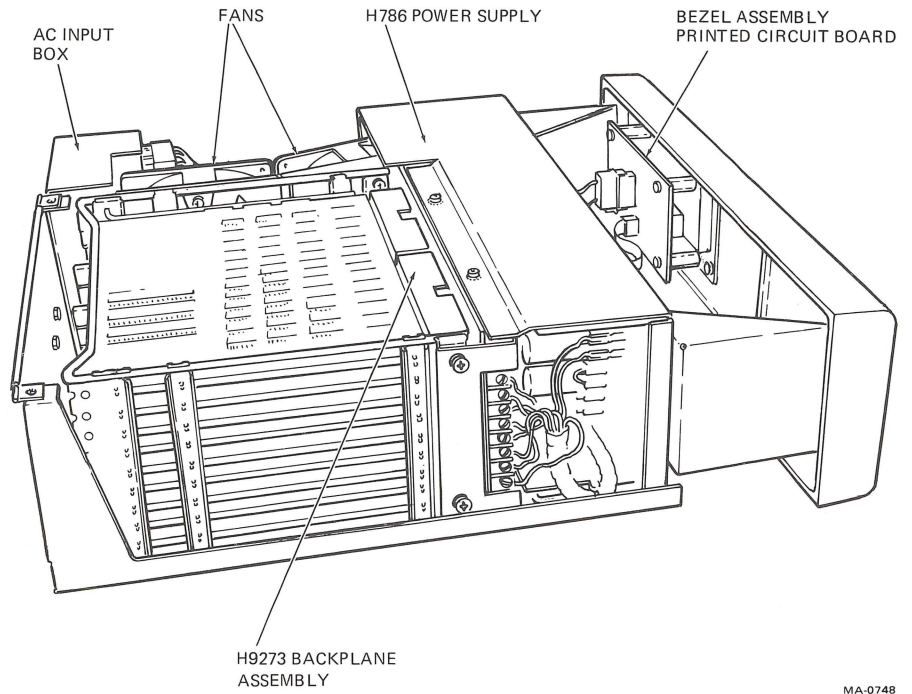
## COMMUNICATION CABLES

Cable Number	Connectors
BC01V	Berg (Female) to EIA (Male), 15-Conductor
BC03M	EIA (Female) to EIA (Female), Null Modem, 25-Conductor
BC05C	Berg (Female) to EIA (Male), 25-Conductor
BC05D	EIA (Male) to EIA (Female), 25-conductor
BC05F	20 mA (Male) to 20 mA (Male)
BC05M	Berg (Female) to 20 mA (Female)
BC20M	2 × 5 Amp (Female) to 2 × 5 Amp (Female)
BC20N	2 × 5 Amp (Female) to EIA (Female), Null Modem
BC21B	2 × 5 Amp (Female) to EIA (Male)
BC22A	EIA (Female) to EIA (Female) - Null Modem, 6-Conductor
BC22B	EIA (Male) to EIA (Female), 14-Conductor
BC11U	Berg (Female) to Four (4) EIA (Female)

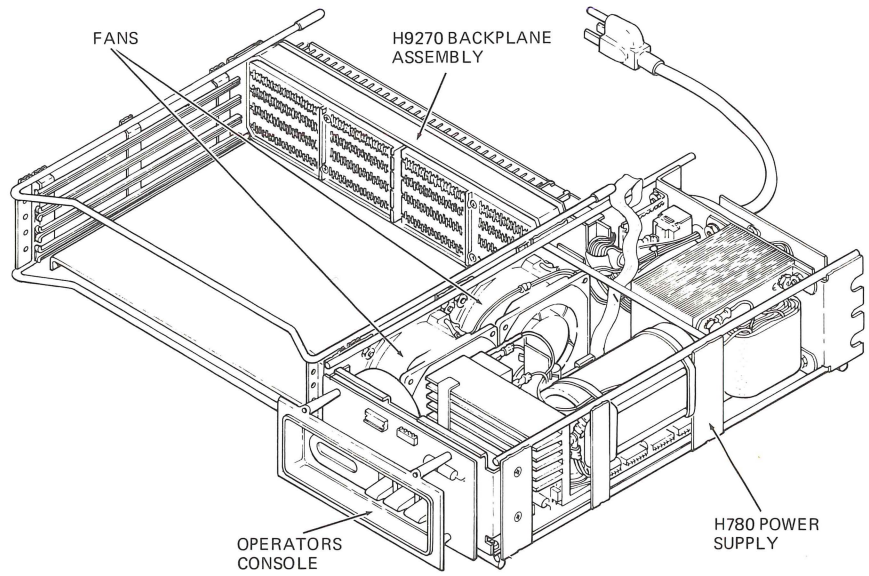
### Notes:

- 1 The BC22B cable can replace the BC05D when used with the LA120 and VT100. However, because the BC22B is a 14-conductor cable and the BC05D is a 25-conductor cable, they may not be interchangeable in other applications.
- 2 Due to the signals present at the EIA connector, the LA34/LA38 will function correctly only with the BC22A/BC22B series.

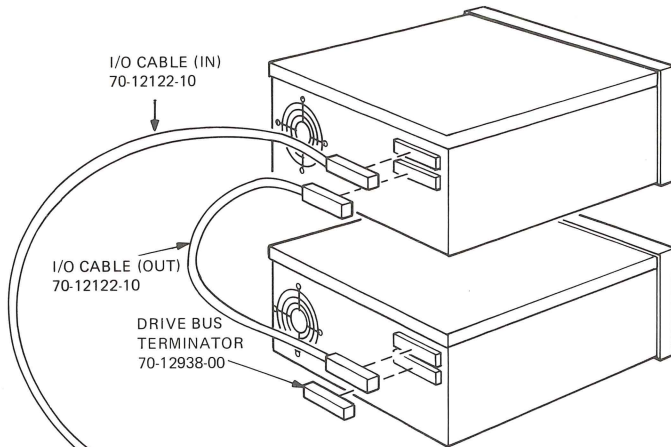
### BA11-N LARGE BOX



### BA11-M SMALL BOX

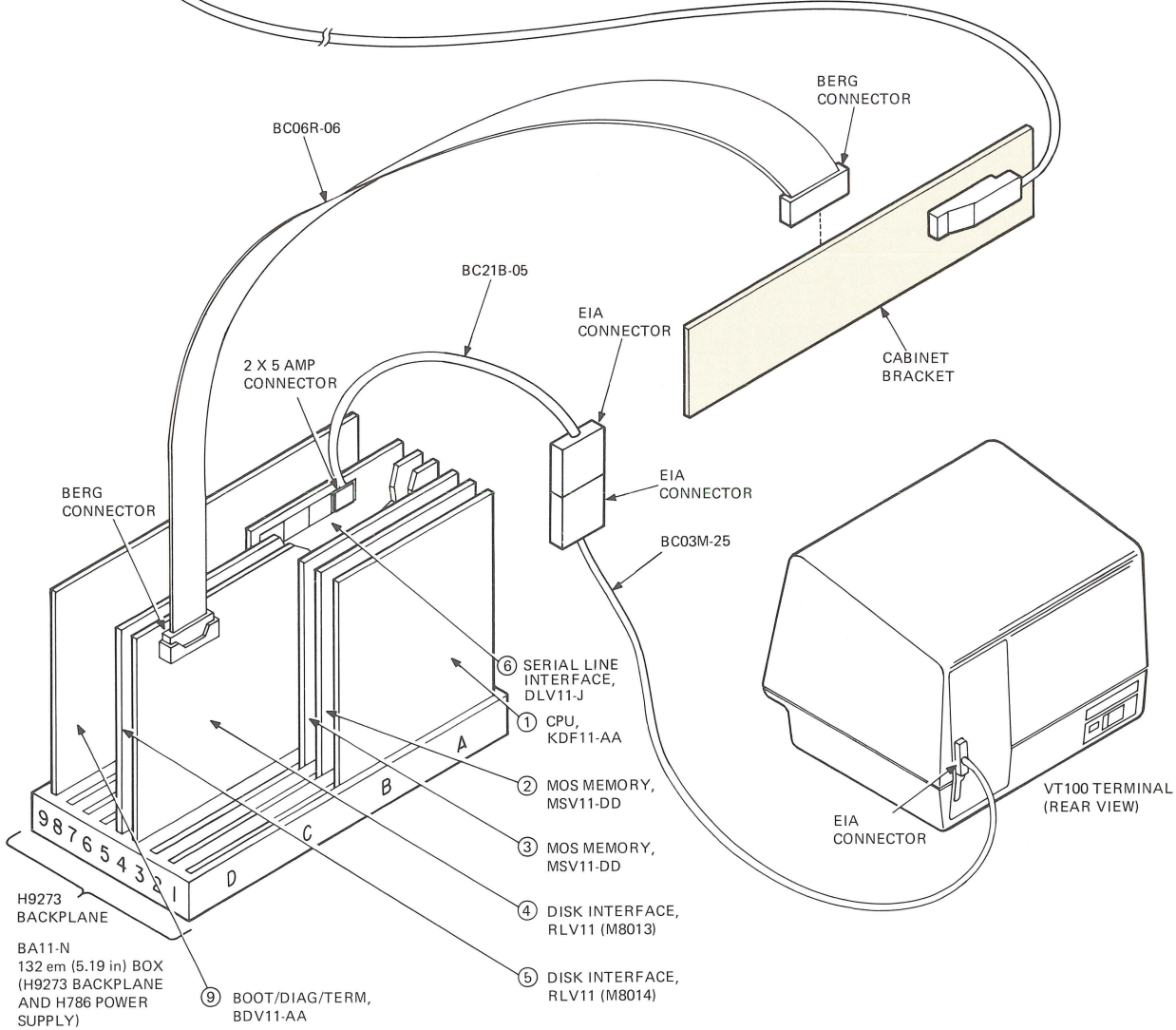
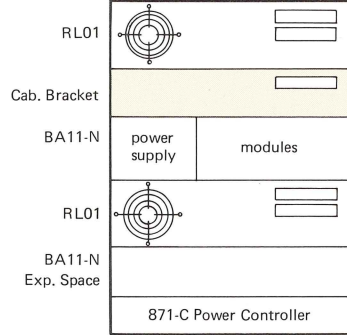


RL01 DISK DRIVE #1 (REAR VIEW)



RL01 DISK DRIVE #2 (REAR VIEW)

H9612 CAB (Rear View)



CONFIGURATION EXAMPLE OF PDP-11/23, DUAL RL01 PACKAGED SYSTEM

## **PDP-11/03, 11/23 SOFTWARE OPTIONS**

### **RT-11**

**(Supported on PDP-11/03 and PDP-11/23)**

RT-11 is a small, single-user disk-based operating system designed for interactive program development and on-line applications processing. RT-11 supports both single job and foreground/background modes of processing. A special feature of the foreground/background mode allows the user to access memory above 56Kb up to a maximum of 256Kb on the PDP-11/23. In addition to a variety of system and program development utilities, RT-11 includes the MACRO-11 assembly language processor, and offers optional support of a number of high-level language processors, including FORTRAN IV, BASIC-11, MU BASIC-11, and APL-11.

### **RSX-11M OPERATING SYSTEM**

**(Supported on PDP-11/23)**

RSX-11M is a highly responsive, event driven, multiprogramming operating system designed for real-time process control, communications, and information management systems. The functionality, and thus the size of the executive software, may be tailored to the application's needs; from a small, dedicated laboratory controller to a large, complex multi-user data acquisition, control, and retrieval system.

RSX-11M is an extremely flexible operating system. It imposes no requirements for division of memory into partitions when memory management hardware is present. The system dynamically schedules the execution of program units (tasks) according to a set of application defined priorities using all available memory. The association of specific tasks with predefined memory partitions is possible for optional use in highly time-critical applications.

A round-robin scheduler can be selectively used for multi-user program development and real-time operations. The checkpointing feature ensures the effective use of main memory.

Tasks can be written in MACRO-11, FORTRAN IV, FORTRAN-IV-PLUS, PDP-11 COBOL, BASIC-11, BASIC-PLUS-2, RPG II or CORAL-66. A comprehensive library of multi-language interfaces to executive functions is provided, giving the high-level language and assembly language programmer easy access to powerful system functions.

The RSX-11M file system provides automatic space allocation and file structures for all block-structured devices. In addition to the sequential, random, and relative (RMS-11) file organizations, the multikey indexed sequential file organization and access method (ISAM) is available via the RMS-11K software package.

### **RSX-11S OPERATING SYSTEM**

**(Supported on PDP-11/03 and PDP-11/23)**

RSTS/E is a resource-sharing, timesharing operating system. It allows multiple users to interact with the system and its data structures, and dynamically allocates processor execution. It is a subset of the RSX-11M disk-based operating system and is fully compatible with it. The I/O driver interface is identical so that any device driver written for one system executes on the other. Any application program that executes under RSX-11S will execute under RSX-11M without change following a relink of the object program.

As a memory based system, RSX-11S provides a run time environment for execution of tasks on a memory based processor. RSX-11S supports all of the peripheral devices that are supported under RSX-11M including such hardware as floating point

processors, parity memory, and memory management. The software components contained in the RSX-11S distribution kit include the Monitor Console Routine (RSX-11M Subset), On-line Task Loader, System Image Preservation Program, and File Control Services (FCS) for record devices (directory support, however, is not included). Transportability of tasks between the RSX-11M host and the RSX-11S target is provided via the File Exchange Utility (FLX) on the host system and the On-Line Task Loader (OTL) on the target system.

## **RSTS/E OPERATING SYSTEM**

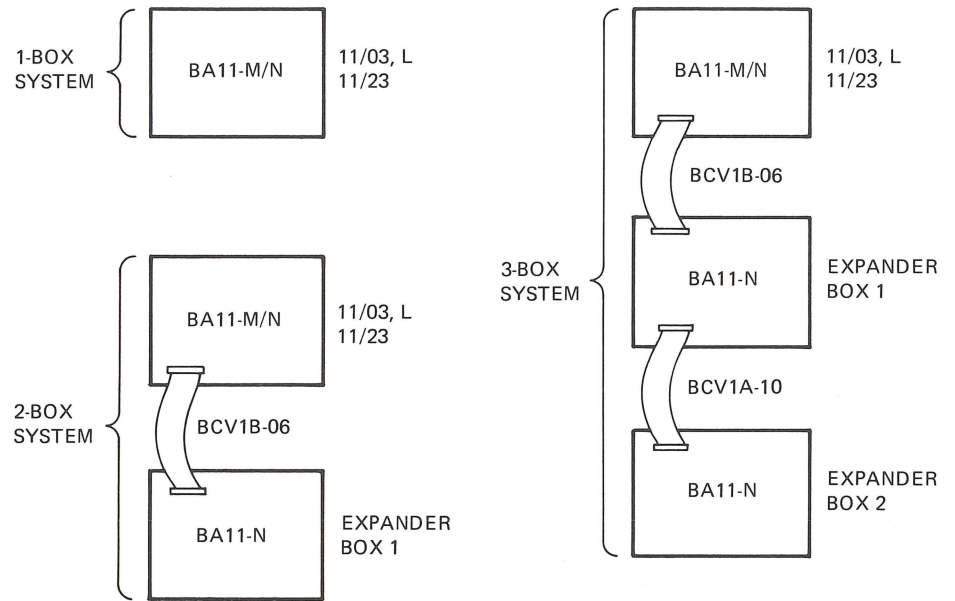
**(Supported on PDP-11/23)**

RSTS/E is a resource-sharing timesharing operating system. It allows multiple users to interact with the system and its data structures, and dynamically allocates processor time, file space, and peripherals on a best fit, best throughput basis. RSTS/E supports line printer spooling and execution of a maximum of light batch streams. It has a powerful and flexible file system, and provides efficient and controlled resource sharing.

Other features include: dynamic scheduling algorithm; commercial extensions; support of software options such as APL-11, SORT-11, PDP-11 COBOL, FORTRAN IV, RMS-11K, DATATRIEVE, PDP-11 COBOL, BASIC-PLUS-2, and RPG II.

BASIC-PLUS and MACRO-11 are standard on all RSTS/E systems.

BA11-M SMALL BOX/BA11-N LARGE BOX  
SINGLE BOX & MULTIPLE BOX INTERCONNECTION



It is recommended that the BCV1B cable (connecting the PDP-11/03 or 11/23 system with expansion box 1) be 183 cm (6 ft.) in length for easy installation. This cable must be at least 61 cm (2 ft.) long. The BCV1B cable uses 0.29A @ +5V. The BCV1B cable is made up of the following components:

- (1) M9400-YE
- (1) M9401
- (2) BC05L-6

It is recommended that the BCV1A cable (connecting expansion box 1 to expansion box 2) be 305 cm (10 ft.) in length for easy installation. This cable must be at least 122 cm (4 ft.) longer or shorter than the BCV1B cable. The BCV1A cable is made up of the following components:

- (1) M9400-YD
- (1) M9401
- (2) BC05L-10

## BA11-M SMALL BOX WORKSHEET

H9270 POWER CONSUMPTION/LOADS

ROW POSITION	SIZE	OPTION		AMPS		BUS LOADS	
		TYPE	NO.	+5 V	+12 V	AC	DC
1							
2							
3							
4							
H9270				—	—	5.1	—
TOTAL AMPS/LOADS							
AVAILABLE AMPS/LOADS				16.0	3.2	20*	20
REMAINING AMPS/LOADS							

## BA11-N LARGE BOX WORKSHEET

H9273 POWER CONSUMPTION/LOADS

ROW POSITION	SIZE	OPTION		AMPS		BUS LOADS	
		TYPE	NO.	+5 V	+12 V	AC	DC
1							
2							
3							
4							
5							
6							
7							
8							
9							
H9273				—	—	2.6	—
TOTAL AMPS/LOADS							
AVAILABLE AMPS/LOADS				20.0	10.0	20*	20
REMAINING AMPS/LOADS							

\* If the BA11 box is terminated, the number of AC bus loads available is increased to 35.



### PDP-11/03, 03L, 23 COMPARISON SHEET

Feature	11/03	11/03L	11/23
Addressing Space	64 Kb	64 Kb	256 Kb
Instructions	>400	>400	>400
General Purpose Registers	8	8	8
Floating Point	FIS Chip (4 instructions)	FIS Chip (4 instructions)	Microcode Chip (full floating point instruction set – 46 instructions)
EIS (fixed point arithmetic extended instruction set)	Optional	Standard	Standard
Speed	Speed is program dependent. The 11/23 is generally 2.5 times faster than the 11/03, 03L.		
Memory	MOS, Core	MOS	MOS
Cache	N/A	N/A	N/A
Powerfail/Restart	Standard	Standard	Standard
Line Time Clock	Standard	Standard	Standard
MOS Battery Backup	N/A	N/A	N/A
Memory Management	N/A	N/A	Standard
Operating Modes	N/A	N/A	2 (Kernel, User)
Word Length (bits)	16	16	16
Address Length (bits)	16	16	18
Parity Checking	N/A	N/A	N/A
Disks	RX02	RX02 RL01	RX02 RL01
Consoles	Operators	Operators	Operators
Operating System	RT-11	RT-11	RT-11
Software	RSX-11S	RSX-11S	RSX-11S RSX-11M RSTS/E





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