

digital

# VAX11 780

## Dual RK07 Disk-Based VAX-11/780 System Configuration



Effective: January 1981

# Configuration Guidelines

This VAX-11/780 packaged system is configured with 512K bytes of ECC MOS memory, an RK711 UNIBUS controller with two top loading RK07 cartridge disk drives for a total of 56 megabytes of on-line storage, and an LA120 DECwriter III console terminal.

The CPU cabinet in this system houses a UNIBUS Mounting Frame which contains the RK711 controller, one DZ11-A asynchronous multiplexer for connection of eight EIA communication lines, and mounting space for UNIBUS options.

Please note that there may be no substitution made for the LA120 console terminal in this packaged system. Also note that it is not advisable to use a video terminal as the console device because there are cases where diagnostics and system software messages are longer than the number of lines available on the screen. In these cases, parts of the error messages would be lost as they scrolled off the top of the screen.

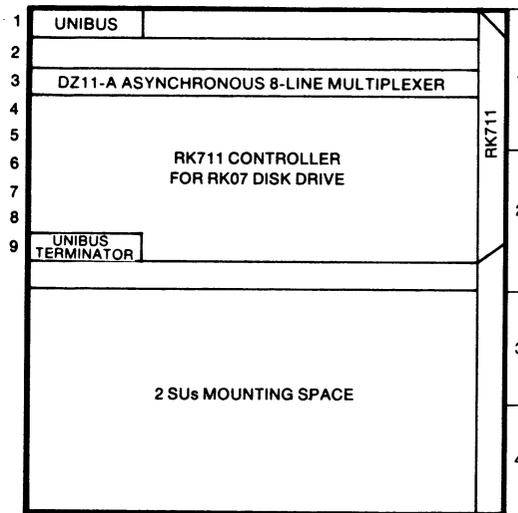
## Memory

The CPU cabinet in this system has predesignated space available for an additional 3,584K bytes of ECC MOS, 16K chip memory for a total of four megabytes in the basic CPU cabinet. Additional memory may be ordered in any of the combinations noted in the *VAX SYSTEMS AND OPTIONS SUMMARY*.

## UNIBUS Expansion

One DW780 UNIBUS Adapter (UBA) is mounted in predesignated CPU cabinet space. The system can run as many UNIBUS options (listed in the *VAX Systems & Options Summary*) from the UBA as will mount into the available backplane space in the UNIBUS Mounting Frame (see diagram and Table I), within the power and bus load limits of the UNIBUS.

To expand beyond the limits of the UNIBUS Mounting Frame, an UNIBUS Options Cabinet, H9602-DF(DH), can be ordered (see back cover). This cabinet, which includes an 861-C(B) power control, provides space for two additional BA11-K boxes and three more DZ11 distribution panels.



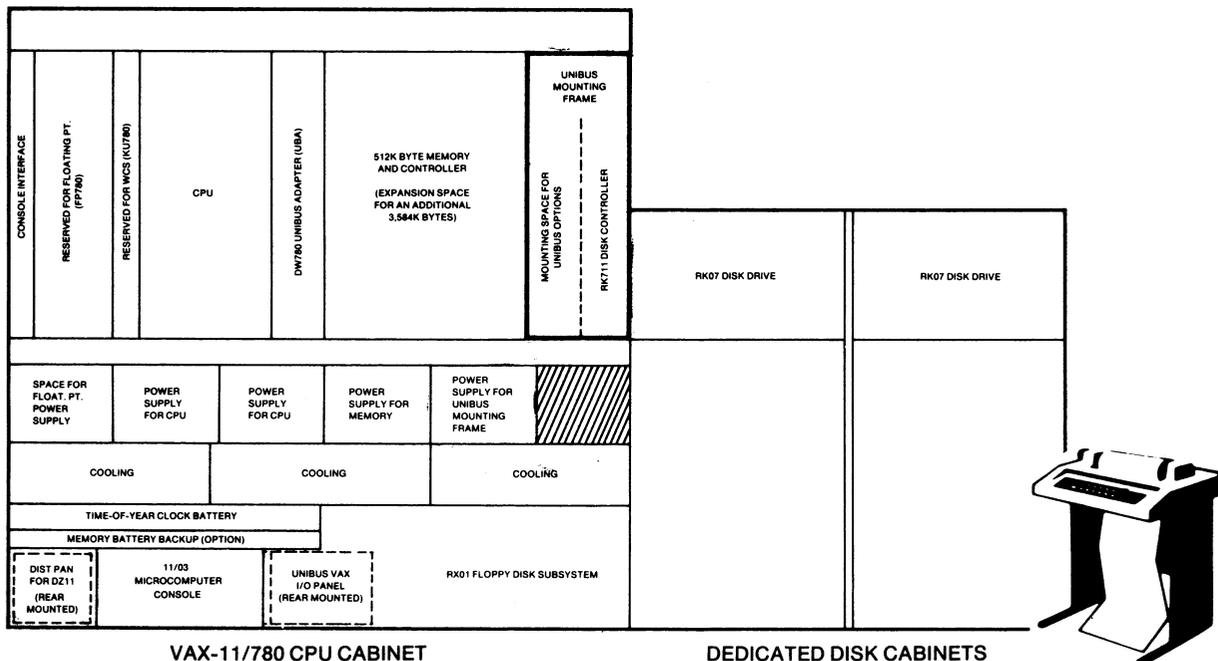
UNIBUS MOUNTING FRAME

UNIBUS expansion in this system is also governed by several other configuring considerations:

First, there is a system limit of one distribution panel. The DZ11-A which comes with this system includes a controller for eight asynchronous EIA lines and a 16-line distribution panel (to which one DZ11-B may be added for control of an additional eight EIA lines). Therefore, any additional distribution panels (e.g., for the DMR11, DZ11, CS11, LPA11-K and lab options, CS11) require the add-on UNIBUS Options Cabinet, H9602-DF(DH), for mounting.

Second, expansion is limited by space available in the UNIBUS I/O Panel (see diagram). This panel serves as the connection point between control modules mounted in the UNIBUS Mounting Frame and their associated external devices.

## Dual RK07 Disk-Based VAX-11/780 System Configuration



VAX-11/780 CPU CABINET

DEDICATED DISK CABINETS

The system's RK711 UNIBUS controller and the first RK07 disk drive, as well as the LA120 console terminal have been preconnected on this panel. In addition, there is reserved space for the remote diagnosis line, routing and strain relief for local DMC11 cables, and six Connector Spaces.

Options requiring Connector Spaces are listed below in Table X, along with the number of spaces each requires.

CONNECTOR SPACES	OPTION
1	Line Printers (LP11, LA11, LPR11)
1	Card Readers (CR11, CME11)
1	DMC11-DA,-FA Remote Lines (local DMC11s have dedicated space for cables - see diagram)
2	DR11-B Interface
1	DUP11 Interface

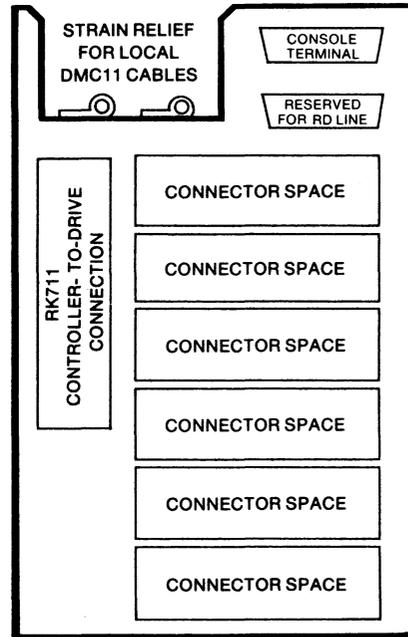
A BC06K-9F cable and an H7004-B filter is needed for each option which requires a Connector Space (CS). Cables and filters are provided as appropriate for options which are ordered at the same time as the packaged system. However, an additional cable and filter must be purchased for each Connector Space required by any field installed options.

### Power Supplies

This VAX-11/780 configuration includes four power supplies which provide power for the CPU, UNIBUS Adapter, optional WCS (KU780), the first four megabytes of ECC MOS memory, and options mounted in the UNIBUS Mounting Frame.

There are also two predesignated spaces for power supplies in the CPU cabinet: one for the power supply included with the Floating Point Accelerator option and a second for the H7112 memory battery backup option.

In this dual RK07 system configuration, there is adequate power available @ +5V in the UNIBUS Mounting Frame for mounting any UNIBUS options (as listed in the VAX Systems & Options Summary). There are 17 bus loads available for UNIBUS options expansion. (See Table I)



UNIBUS I/O PANEL

MODEL	MEMORY	MASS STORAGE	EXPANSION SPACE	POWER AVAILABLE Amps@ +5V	BUS LOADS AVAILABLE
SV-AXHHV-CA(CD)	512Kb ECC MOS	Dual RK07s	<p><b>CPU</b> Reserved space for: 3,584Kb memory FP780 KU780 H7112</p> <p><b>UNIBUS MOUNTING FRAME</b> SU 1-2: 1 Hex slot 1 Quad slot SU 3-4: 2 SUs</p>	N/A	17

Table I

Please note that the information below describes the configuration of the SV-AXHHV packaged system when it is upgraded with the VAX-11/780 System Upgrade Option, H9604-BA(BB).

### VAX-11/780 System Upgrade Option, H9604-BA(BB)

A field installed System Upgrade Option is available for this VAX-11/780 packaged system. It includes one H9602-DF(DH) UNIBUS Expansion Cabinet with power control, plus a BA11-KE(KF) expansion mounting box and one DD11-DK expansion backplane. The upgrade involves the transfer of all UNIBUS options in the CPU Cabinet's UNIBUS Mounting Frame to the UNIBUS Expansion Cabinet.

The space occupied by the UNIBUS Mounting Frame is converted to two Option Panel Spaces and the UNIBUS I/O Panel is eliminated. In addition, it becomes possible to order the CPU Expansion Cabinet, H9602-HA(HB), which provides four additional Option Panel Spaces.

Once the system has been upgraded, the Option Panel Spaces in the CPU Cabinet and the CPU Expansion Cabinet can be used to mount MASSBUS Adapters (MBA), additional UNIBUS Adapters (UBA), a second memory controller (CPU Expansion Cabinet only), Multiport Memory port interfaces, and/or the DR780 general purpose interface.

### Memory (Local and Shared)

For expansion beyond four megabytes to a maximum of eight megabytes of local memory, an H9602-HA(HB) CPU Expansion Cabinet can be ordered. An additional four megabytes of memory with control (one MS780-C plus combinations of MS780-D expansion memory) can be mounted in this cabinet. The MS780-C controller requires two Option Panel Spaces (OPS) in the CPU Expansion Cabinet.

Physical memory can also be expanded using the MA780 Multiport (shared) Memory Option. Two of these options can be added to a VAX-11/780 system. Each MA780 holds up to 2 megabytes of ECC MOS memory.

Maximum VAX-11/780 configurations will therefore support up to 12 megabytes of ECC MOS memory.

The MA780 Multiport Memory option is connected to a VAX-11/780 via port interfaces (MA780-C). One MA780-C can be mounted in the basic CPU cabinet. If two MA780 subsystems are to be connected, an Option Panel Space in the CPU cabinet or the CPU Expansion Cabinet is required. The MA780 cabinet is always positioned adjacent to either the CPU cabinet or the CPU Expansion Cabinet.

### I/O Adapters (UNIBUS and MASSBUS)

One DW780 UNIBUS Adapter (UBA) is mounted in predesignated CPU cabinet space. MASSBUS Adapters (MBA) and additional UNIBUS Adapters can be mounted in the Option Panel Spaces available in the CPU Cabinet and the CPU Expansion Cabinet, H9602-HA/HB. Each MBA and each additional UBA requires one Option Panel Space. VAX-11/780 systems can accommodate up to four UNIBUS Adapters AND four MASSBUS Adapters.

The system can run as many UNIBUS options (listed in the VAX Systems & Options Summary) from a UBA as will mount into the allowable backplanes (within the the power and bus load limits of the UNIBUS). One BA11-K expansion box must be ordered for each UBA which is added to a VAX-11/780 system, in order to mount options which are to be connected to additional UNIBUSes.

An MBA is needed when adding high-performance MASSBUS devices such as RM80, RM05, RM03, RP06, TE16, TU45, or TU77. These devices should be ordered as REM80, REM05, REM03, REP06, TEE16, TEU45, or TEU77 respectively, each of which includes the mass storage unit, its controller, a MASSBUS Adapter, and the power supply for that MBA.

Each MBA can run up to eight disk drives, OR eight TE16 or TU45 tape drives and seven disk drives OR four TU77 tape drives and seven disk drives on its MASSBUS.

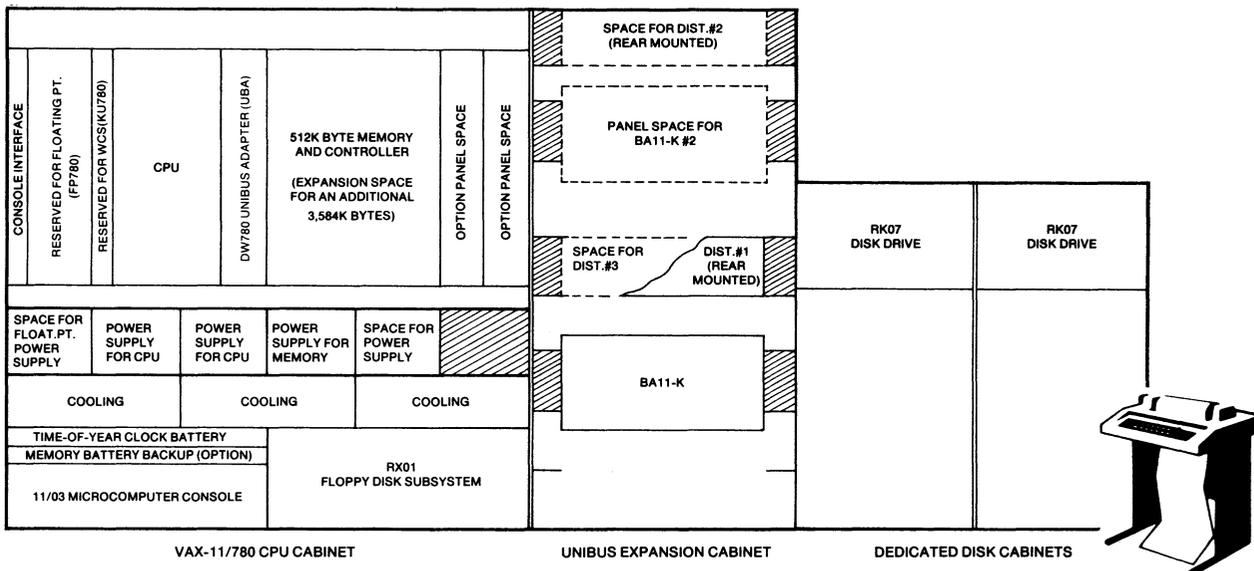
### DR780 High-Performance Channel Interface

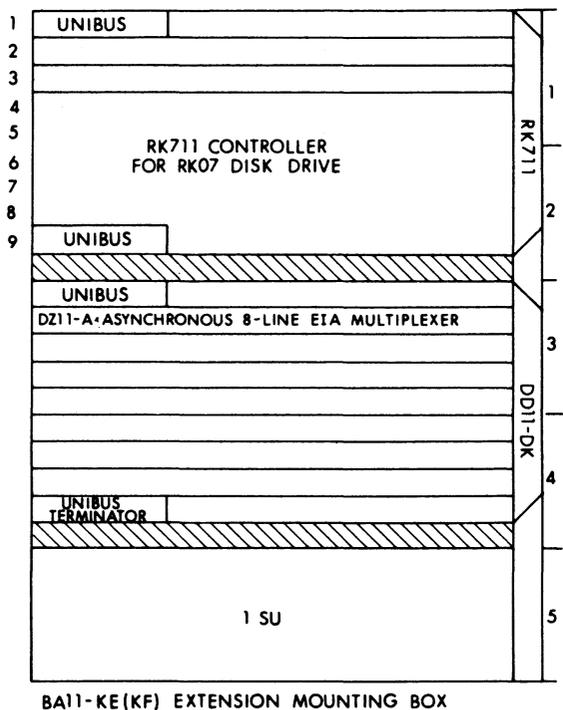
The DR780 is a general-purpose interface which can be used to connect customer-designed devices to a VAX-11/780. Also, two DR780s can be used to connect two VAX-11/780 systems.

The DR780 requires one Option Panel Space in a CPU Expansion Cabinet, H9602-HA(HB). It includes the interface logic, power supply, and 25 ft. of cable. There is a limit of one DR780 per VAX-11/780 system and the DR780 cannot be configured on systems which already include the MA780 Multiport Memory. The cable from the user device to the DR780 can be up to 80 ft. in length.

Table II lists necessary information on expansion space, plus available power and bus loads for configuring add-on equipment to this upgraded VAX-11/780 packaged system.

### Upgraded Dual RK07 Disk-Based VAX-11/780 Configuration





BA11-KE(KF) EXTENSION MOUNTING BOX

### UNIBUS Expansion Cabinet

The UNIBUS Expansion Cabinet which comes with the upgrade kit contains one BA11-K expansion mounting box, and one DD11-DK expansion backplane mounting unit. The UNIBUS Expansion Cabinet can house a maximum of two BA11-K expansion mounting boxes and provides space for up to three DZ11 distribution panels. Each distribution panel is capable of handling up to 16 lines for either EIA or 20mA terminals for a possible total of 48 asynchronous lines.

To expand beyond the limits of the UNIBUS Expansion Cabinet, an UNIBUS Options Cabinet, H9602-DF(DH), can be ordered (see back cover). This cabinet, which includes an 861-C(B) power control, provides space for two additional BA11-K boxes and three more DZ11 distribution panels.

The illustration above shows where the RK711 disk controller, the DD11-DK, and the DZ11-A mount in the BA11-K. Note that the RK711 and DD11-DK each occupy 2 SUs of space and provide a total of 8 Hex slots and 3 Quad slots of additional mounting space.

### Asynchronous Multiplexers (Programmed I/O)

There are two kinds of asynchronous multiplexers available on VAX-11/780 systems, one for 20mA current loop operation and one for EIA/CCITT. Each of these is available in 8- or 16-line units.

The table indicates the correct options to order based upon the number and type of terminals or lines to be used. Note that a DZ11-A, which includes a controller for eight EIA lines and a 16-line distribution panel, is standard with every packaged system.

Quantities of EIA lines and 20mA lines can be mixed, but only in groups of eight on different distribution panels. The first 8 lines of either option includes its own 16-line distribution panel which is prewired. So, for example, if 8 lines of EIA and 8 lines of 20mA are desired, two different distribution panels are required. To expand to more than 48 lines, an H9602-DF(DH) UNIBUS Options Cabinet can be added.

NUMBER LINES	EIA	20 milliamper loop
1-8	DZ11-A (incl.)	DZ11-C
9-16	DZ11-B	DZ11-F
17-24	DZ11-E	DZ11-F + DZ11-C
25-32	DZ11-E + DZ11-B	DZ11-F + DZ11-F
33-40	DZ11-E + DZ11-E	DZ11-F + DZ11-F + DZ11-C
41-48	DZ11-E + DZ11-E + DZ11-B	DZ11-F + DZ11-F + DZ11-F

The information in this table should only be used for an initial VAX-11/780 system.

### Power Supplies

The upgraded VAX-11/780 configuration includes three power supplies which provide power for the CPU, UNIBUS Adapter, optional WCS (KU780), the first four megabytes of ECC MOS memory.

There are also two predesignated spaces for power supplies in the CPU cabinet: one for the power supply included with the Floating Point Accelerator option and a second for the H7112 memory battery backup option.

The optional VAX-11/780 CPU Expansion Cabinet, H9602-HA(HB), also includes space for two power supplies to accommodate additional memory and I/O adapters plus space for the power supply included with the memory battery backup option.

In this upgraded dual RK07 system configuration, there is a total of 34.5 amps of power @ +5V and 17 bus loads available for UNIBUS expansion.

SYSTEM CODE	MEMORY	MASS STORAGE	EXPANSION SPACE	POWER AVAILABLE Amps @ +5V	BUS LOADS AVAILABLE
Upgraded SV-AXHHV	512KB ECC MOS	Dual RK07s	<b>BA11-K:</b> SU 1-2: 2 Hex slots 1 Quad slot  SU 3-5: 6 Hex slots 2 Quad slots 1 SU  <b>CPU:</b> FP780-AA(AB) KU780 3,584K bytes memory 2 OPS H7112-A(B)	13.0  21.5  N/A	17  N/A

Table II

# VAX11 780

## Environmental Considerations

VAX-11/780 systems, as well as other DIGITAL products, are designed to perform while exposed to a variety of environmental conditions. DIGITAL recommends the following environmental operating specifications for the computer facility for maximum reliability:

- Temperature: 18°C to 24°C (65°F to 75°F).
- Temperature rate of change: 2°C/hr.(3.6°F/hr.).
- Relative humidity: 40% to 60% (non-condensing).
- Humidity rate of change: 2%/hr.

All VAX-11/780 system environments should be fully evaluated by a Field Service representative to ensure proper performance.

## Add-On UNIBUS Options Cabinet H9602-DF(DH)

For UNIBUS expansion beyond the limits of the system's UNIBUS Expansion Cabinet, the UNIBUS Options Cabinet, H9602-DF(DH), may be ordered. This single-width, high-boy cabinet, which includes an 861-C(B) power control, can accept two additional expansion mounting boxes (shown in the diagram to the far right as BA11-K #3 & BA11-K #4), and three more distribution panels.

Please note that expansion backplane mounting units (DD11s), the BA11-Ks, and the distribution panels are not included and must be ordered separately for use in this add-on UNIBUS Options Cabinet.

## VAX-11/780 CPU Expansion Cabinet H9602-HA(HB)

A single-width, high-boy cabinet, referred to as the H9602-HA(HB) CPU Expansion Cabinet. This cabinet includes four Option Panel Spaces which may be used to mount additional memory, port interfaces for the Multiport Memory option, I/O adapters, and the DR780 interface option.

These subsystems can be configured as required up to the maximum number of each device supported by the VAX/VMS operating system and within the available mounting space in each system. Refer to the *VAX Systems and Options Summary* for more detailed information on the mounting requirements of the various subsystems.

The CPU Expansion Cabinet also includes space for the power supplies for these options and for one H7112-A(B) memory battery backup option.

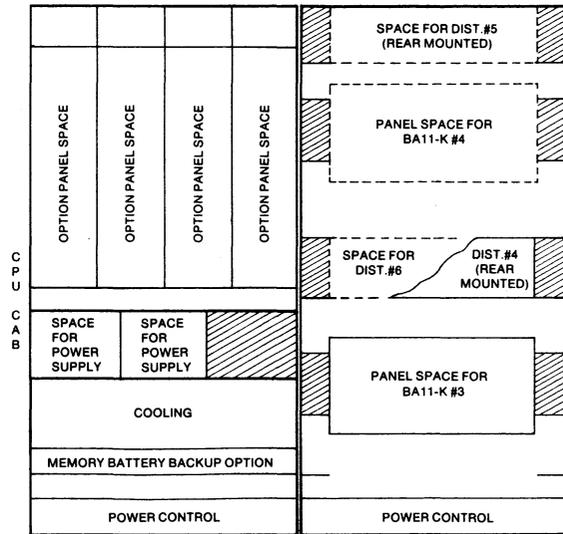
The H9602-HA(HB) is always positioned adjacent to the main CPU cabinet.

## Expansion Mounting Box Diagram BA11-KE(KF)

When an additional BA11-K is mounted in an UNIBUS cabinet, use the diagram to configure the option modules. For your reference, a DD11-DK has been included in this diagram.

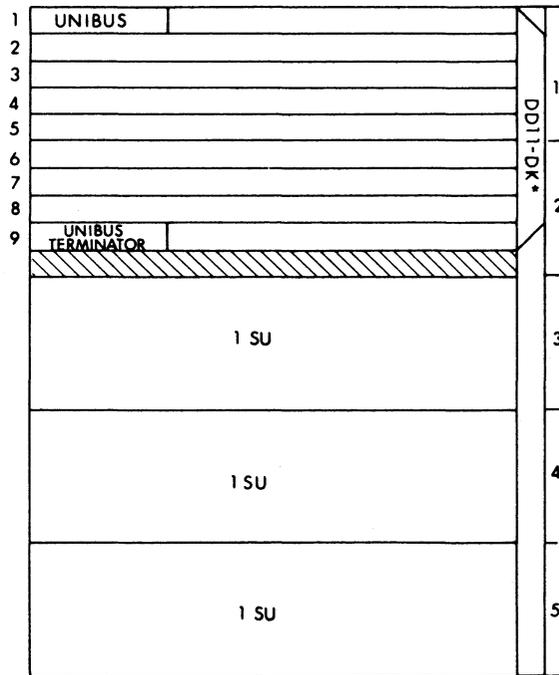
However, please note that the BA11-K does not include DD11-CK or DD11-DK expansion backplane mounting units. Therefore, DD11s must be added to your CONFIGURING WORKSHEET as separate line items to convert system unit space to module slots.

As shown, the BA11-K box provides mounting space for five system units. SUs 1-2 together, and SUs 3-5 together, each have 25.0 amps of power available @ +5V.



VAX-11/780 CPU EXPANSION  
CABINET H9602-HA(HB)

ADD-ON UNIBUS  
OPTIONS CABINET  
H9602-DF(DH)



BA11-KE(KF) EXTENSION MOUNTING BOX

\* For information only - not included in the BA11-KE(KF).