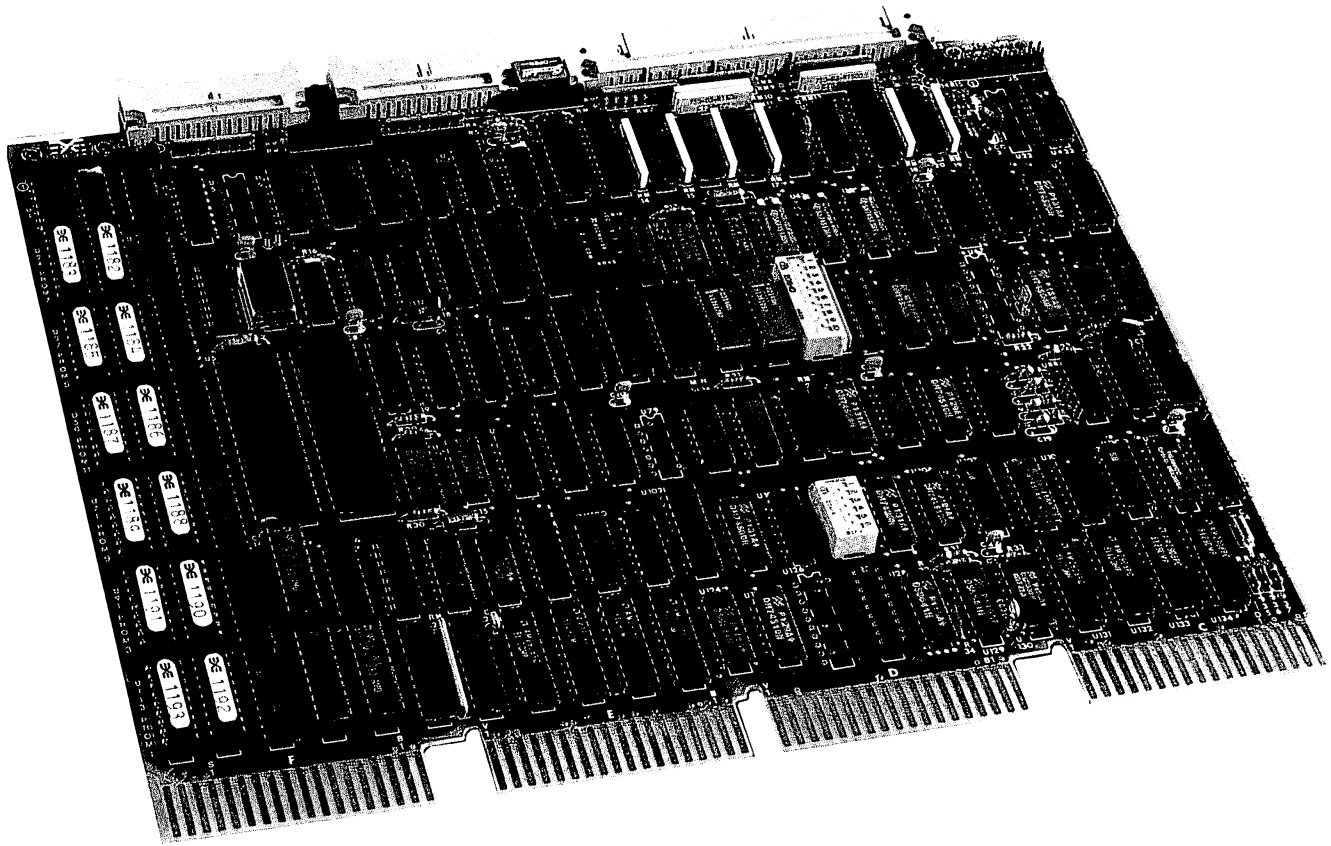




**THE GENUINE ALTERNATIVE
FOR VAX AND PDP-11*
DISK CONTROLLER TECHNOLOGY
EMULEX SC12 SERIES**



**NEED A SMALL/MEDIUM DISK CONTROLLER
WITH BIG DISK PERFORMANCE?**

Then your only choice is the new SC12. It's designed to match the packaging and economy of today's new breed of small and medium capacity 8" and 14" hard disk drives. It provides the high

performance and flexibility demanded for their effective application with VAX and PDP-11 computers. And it has the usual EMULEX quality and features the industry has learned to depend on.

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DESIGNED FOR HANDLING SMALL TO MEDIUM CAPACITY DISK DRIVES, THE SC12 GIVES YOU THE ADVANTAGES OF...

USING standard DEC operating systems and diagnostic software.

IMBEDDING the controller in any single quad slot of a standard VAX or PDP-11 backplane.

PERFORMING the full error detection/correction algorithms required for reliable application of modern, high-density disk drives.

EXECUTING a comprehensive set of self-test diagnostics as part of every startup operation.

INCORPORATING most currently available small to medium size 8" and 14" disk drives.

MIXING different types and capacities of drives on one controller for optimizing combinations of fixed (Winchester) and/or removable media drives.

YOU GET OPTIMUM COST/ PERFORMANCE IN THIS RANGE BECAUSE...

The SC12 was designed specifically and exclusively to integrate small-to-medium capacity moving head disk drives with the VAX or PDP-11. Incorporating a standard SMD interface, it is optimum for 14 inch drives up to 160 MBytes (including CMD type drives) and for all current 8" drives which offer an SMD interface option. The unit is an excellent complementary product to the EMULEX SC21 controller, designed for SMD class drives having capacities of 80 MByte and above.

The SC12, a Unibus companion for, and format compatible with the EMULEX SC02 controller, introduced previously for use with the LSI-11 Q-Bus.

UNIQUE, UNCOMPROMISING DESIGN GIVES YOU BIG SYSTEM CAPABILITY IN A SMALL, ECONOMICAL PACKAGE...

The SC12 design is based on EMULEX micro-processor technology, already proven in thousands of controller installations. The following combination of features makes it an unbeatable choice for effectively using today's 14" and small 8" disk drives in VAX and PDP-11 based systems.

MICROPROCESSOR ARCHITECTURE.

The same basic EMULEX bipolar microprocessor architecture which consistently sets the industry standards is used to give the SC12 broad flexibility and high performance.

COMPACT PACKAGING. Only one quad height pcb plugs into any standard Unibus slot to minimize mounting cost and complexity.

SOFTWARE TRANSPARENCY. Microcode versions provide software transparent emulation of DEC RP02/03 and RK06/07 subsystems, including execution of standard system level diagnostics, which permits use of standard operating system drivers.

ECC/CRC HARDWARE. The standard 32-bit ECC used for SMD-class disk error detection/correction (single 11-bit error burst), combined with a 32-bit header CRC, is provided to insure reliable operation with all types of high-density drives, particularly those with removable media.

MIXED DRIVE CAPACITY. Disk drives having different combinations of heads, surfaces, and densities can be handled by the controller; the drive type code can be read directly from the controller by DEC's software, or by custom software drivers.

LOW POWER. Only 5.7 amps is required from the CPU internal +5V power supply (no -15V power required) via standard backplane power pins.

INTERNAL SELF TEST. Extensive self-test routines, contained in microcode, automatically verify controller operation when power is applied.

DISK SECTOR BUFFER. A full 512 byte data buffer permits multiple sector reads with a 3-to-1 sector interlace format. Buffer operation eliminates possibility of "data late" conditions and permits controller to be operated at low bus priorities.

SMD INTERFACE. Any two industry compatible drives, each operating at serial data rates to 10 MHz, may be integrated.

AND YOU GET MORE THAN JUST A GREAT PRODUCT...

With the SC12 you get superb quality and excellent support. Production capability exists to meet the highest of volume requirements. All components are pre-aged for over 160 hours, and final product

assemblies are environmentally cycled for over 96 hours (while operating) to insure high reliability from the moment they are first installed. All products are backed by a full one year warranty and supported internationally by the EMULEX technical applications group.

GENERAL SPECIFICATIONS

The following specifications apply to all SC12 Series disk controllers.

Characteristic FUNCTIONAL

Characteristic	Specification
Design	High-speed bipolar micro-processor-based controller for integration of industry-standard SMD, fixed-head, and Winchester type mass storage devices to host VAX or PDP-11 computer; incorporates unique design to achieve high-speed operations with minimum hardware.
Computer Interface	Standard Unibus.
Disk Interface	Storage Module Drive (SMD) interface standard; serial data rate up to 10 MHz.
Bus Address Range	0-128K Words.
Bus Register	Four switch-selectable start locations.
Vector Address	Four switch-selectable vectors.
Priority Level	Level 5.
Error Control	On-board 32-bit data ECC and header CRC hardware for error detection/correction under microprogram control.
Status Display	Edge-mounted LED for activity/error/status display under microprogram control.
Option Switches	On-board slide switches for selection of program-controlled operating/configuration options.
Buffer Memory	1024 byte high-speed RAM buffer, accessible to the micro-program, for data buffering and internal storage operations. Typically 512 bytes used for data buffering.
Media Format	3 to 1 sector interlace.

Characteristic PHYSICAL

Characteristic	Specification
Packaging	One printed circuit board, Unibus 4-connector interface.
Mounting	Any quad slot in standard backplane or system unit.
Cable Connectors	One common 60-pin control (A) flat cable connector and two 26-pin radial data (B) flat cable connectors.
Physical Drives	1 or 2 per controller.
Logical Drives	1 to 8 per controller.

ELECTRICAL

Unibus Interface	Approved line drivers/receivers used exclusively; one unit load per bus signal line.
Disk Interface	Differential line drivers and receivers used on all signal lines. Daisy chain (A) and radial (B) cable lengths up to 100 and 50 feet, respectively.
Power	+5V \pm 5%, 5.7 amps max; standard backplane/system unit pins used.

ENVIRONMENTAL

Exceeds all environmental ranges and conditions specified for commercial VAX or PDP-11 computers and applicable disk drives.



STANDARD MODELS

The SC12 is available in three standard models which emulate standard DEC disk storage subsystems. All models execute applicable DEC diagnostics, operating systems, and applications software. The SC12 includes a configuration PROM which permits definition of up to 64 different switch selectable combinations of disk drive configurations on the two controller ports. This permits essentially unlimited selection of drive type/capacity combinations.

• Model SC12/A

Emulates the DEC RP11E controller with standard-sized RP02 (20.8 MByte), RP03 (41.6 MByte) or expanded capacity, logical units. Controller includes all RP11E functional features/capability plus extended features, such as automatic pack formatting and switch selection of transparent ECC with error reporting to system software. Supports essentially all standard SMD (removable media), Winchester (fixed media), and CMD (removable/fixed media) type drives of various capacities from 8-160 MBytes. A single microcode package with switch selection of desired configuration supports all drives applicable to this model.

4 of 64 Switch-Selectable Drive Configurations

CHARACTERISTIC	CONFIGURATION NUMBER			
	0	1	2	3
Drive Type— Capacity	SMD-80	SMD-80	MMD-12/24	CMD-32/64/96
Emulation	RP02	RP03	RP02	RP02
Mode	Standard	Expanded	Contracted/Std.	Contracted
Platters/Drive	3	3	2/4	2/4/6
MBytes/Logical Unit	20.8	62.4	10.4/20.8	13.4
Logical Units/Drive	3	1	2	2/4/6
MBytes/Drive	62.4	62.4	10.4/20.8	26.8/53.6/80.4
Drives/Controller, Max.	2	2	2	2/2/2
MBytes/Controller, Max.	124.8	124.8	20.8/41.6	53.6/107.2/160.8

• Model SC12/C

Emulates the DEC RK611 controller combined with multiple RK06 (13.9 MByte) or RK07 (27.5 MByte) logical units. Controller includes all RK611 capability plus the same extended features provided in the Model A series. Particularly well-suited for support of 32-96 MByte CMD-type drives having a removable and multiple fixed platters, with a logical RK06 mapped onto each data surface. Also supports other 8" and 14" drives by mapping 1 or more standard logical RK06/07 drives onto 1 or 2 physical drives. A single microcode package with switch selection of desired configuration supports all drives applicable to this model.

• Model SC12/V

Emulates DEC's RK711 controller combined with multiple RK07 drives on the VAX-11 Unibus. The SC12/V is important to VAX users who wish to adapt smaller capacity drives to the VAX Unibus since the RK06 (14 MByte) and RK07 (28 MByte) software can be used transparently with other disks. The CMD (fixed and removable media) with logical RK06's mapped on each surface is attractive in many cases because the back-up issue is solved with one device.

3 of 64 Switch-Selectable Drive Configurations for Models SC12/C and SC12/V

CHARACTERISTIC	CONFIGURATION NUMBER		
	0	1	2
Drive Type— Capacity	CDC 9730-80	Priam 3350	CDC-9448-96
Platters/Drive	5	3	6
MBytes/Logical Unit	27.4(2) 13.9(1)	27.4	13.9(2) 27.4(2)
Logical Units/Drive	5	1	6
MBytes/Drive	68.7	27.4	82.6
Drives/System, Max.	2	2	2
MBytes/System, Max.	137.4	54.8	165.2