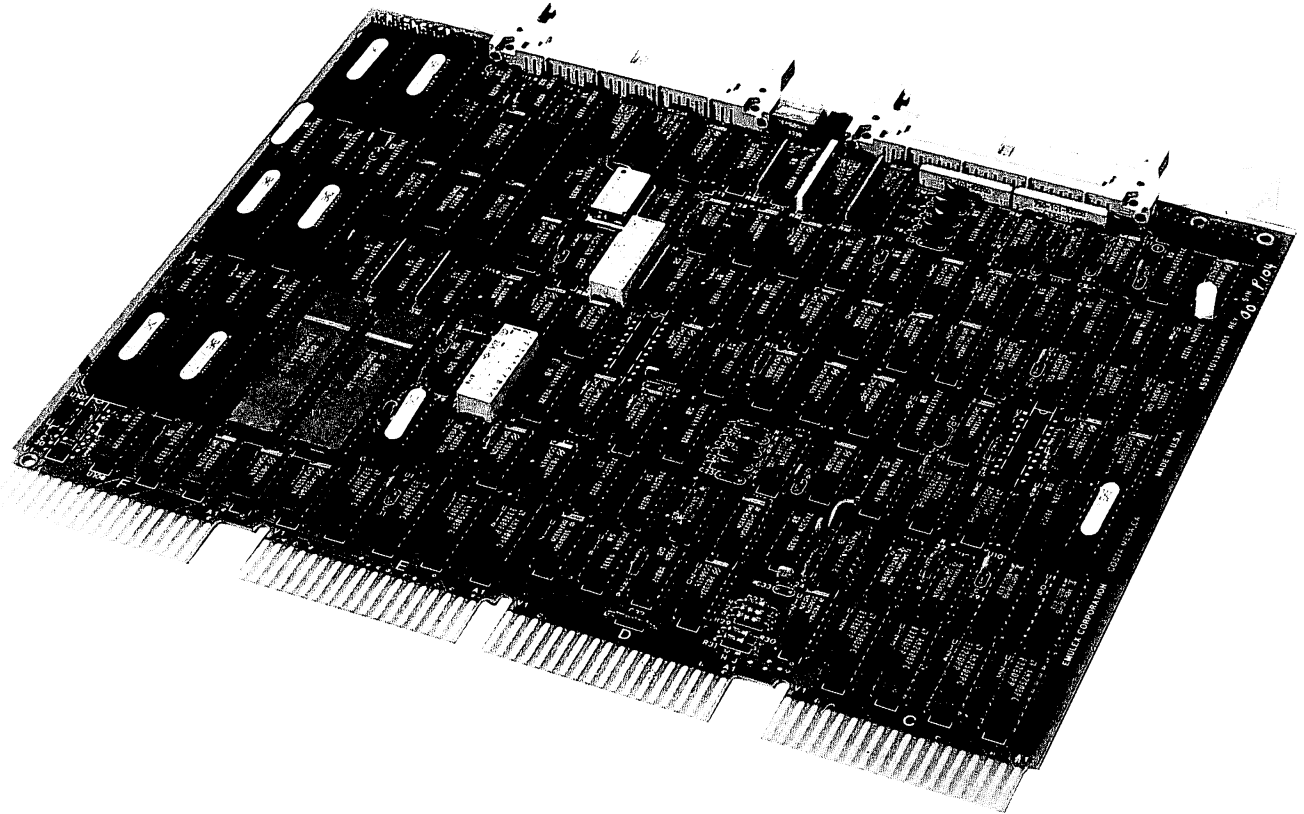




**THE GENUINE ALTERNATIVE  
FOR VAX\*/PDP-11 TAPE CONTROLLERS**

**EMULEX TC13 SERIES  
TS11 COMPATIBLE**



## **NOW YOU CAN GET EVEN MORE EFFICIENT USE OF THOSE HIGH-PERFORMANCE STREAMING TAPE TRANSPORTS!**

The new EMULEX TC13 handles every kind of industry-standard half-inch tape transport — conventional start/stop, streaming, and the new generation of GCR units. A 3.5 KByte buffer and handling of tape data rates up to 800 KB characters per second provide efficient use of high-performance streaming tape transports. All this, along with DEC TS11 diagnostic/software transparency and standard operating system support across the PDP-11 and VAX-11\* CPU lines. Compactly packaged on a single quad height board with low power consumption and super high reliability. Backed up with worldwide support and the EMULEX brand of quality.

\*DEC, PDP, VAX, VMS, and Unibus are trademarks of Digital Equipment Corporation.



## **THE INDUSTRY'S LATEST TS11 COMPATIBLE TAPE COUPLER SERIES...**

... provides software compatibility with DEC's newest half-inch magnetic tape system. And at the same time, opens a whole new range of new applications and product configurations from which to choose. With this exceptional new product, you get the advantages of:

**INCORPORATING** essentially all industry compatible, half-inch formatted tape drives — including conventional NRZI/PE start/stop; 1600/3200 bpi start/stop/streaming; and the new breed of low-cost GCR (6250 bpi) start/stop/streaming transports.

**EXECUTING** standard diagnostics and system software under all major DEC operating systems — including RT11, RSX11M, RSX11M PLUS, RSTS-E and VMS — supported across the PDP/VAX-11 line.

**BACKING UP** fixed media (Winchester) disk drives with EMULEX-supported software for streaming type tape transports.

**EMBEDDING** the controller in any quad slot of a standard Unibus backplane or system unit.

## **LIKE ALL EMULEX CONTROLLERS...**

... the TC13 for PDP/VAX-11's incorporate the same modern bipolar microprocessor technology first introduced by EMULEX, then perfected and proven in the many thousands of units already shipped. Use of this technology results in a product line with full flexibility, optimum packaging, outstanding reliability, extra features, and high performance.

## **COMPARE THIS COMBINATION OF KEY FEATURES AGAINST THOSE OF ANY OTHER PRODUCT...**

... and we think you will agree that the TC13 is the best choice for meeting all your PDP/VAX-11 tape subsystem requirements.

### **COMPACT PACKAGING.**

Each unit is contained on only one stand-alone quad height pc board which plugs into any standard Unibus SPC quad slot.

### **TRANSPARENT SOFTWARE OPERATION.**

The coupler, combined with one to four standard formatted tape drives, emulates all functions of the DEC TS11 subsystem, including execution of standard diagnostic programs.

### **INTERNAL SELF-TEST.**

The coupler automatically performs extensive diagnostic tests during power-up and flags detected errors with a fault LED indicator.

### **FLEXIBLE TRANSPORT INTERFACE.**

The coupler handles all industry standard ("Pertec interface") drives incorporating embedded or integral formatters. Up to four similar type transports (i. e. start/stop, streamer) may be daisy-chained on a single coupler.

### **LARGE DATA BUFFER.**

The TC13 contains a 3.5 KByte buffer which provides efficient use of the streaming tape operation.

### **HIGH PERFORMANCE.**

Each coupler is designed to handle tape data rates to 800 KB characters per second. This permits operation with high-performance transports, up to 6250 bpi @ 125 ips.

**EXTRA TAPE SELECTION FLEXIBILITY.** The DEC TS11 operates at 1600 bpi/45 ips only. The TC13 permits operation at any density and tape speed. Density selection is made at the tape drive.

### **STANDARD CPU BUS INTERFACE.**

The coupler interfaces to any standard quad bus slot and presents only one unit load on all lines. Full 16-bit word NPR data transfers are made, and the controller checks for bus parity errors if a parity controller is installed in the system. The TC13 interfaces via SPC connection on the Unibus C-F connectors.

**FLEXIBLE FORMATTING.** Data may be packed in either DEC or IBM 9-channel format. Tape drives may be daisy-chained together. User may edit previously recorded records.

### **COUPLER/TRANSPORT DATA INTEGRITY.**

Data parity is generated and checked on all transfers between the coupler and the tape transport with errors reported by status bits.

## FOR STREAMING BACKUP OF WINCHESTER DISKS...

... you're supported across the entire PDP-11 and VAX-11 series of CPU's. On the PDP-11 series, a stand-alone disk/tape backup program — written and supported by EMULEX — is provided. This package provides physical media backup for all EMULEX and DEC hard disk subsystems (except RK05) using the standard file structure of RSX11M, RSX11M-PLUS, RSTS-E and RT11.

On the VAX-11 series under VMS, the standard on-line backup utility (BACKUP) can be used with the TC13 to support tape backup operations for applicable EMULEX and DEC hard disk subsystems.

## THE SAME QUALITY AND RELIABILITY...

... proven in all EMULEX products is built into the TC13. Assembly starts with exclusive use of pretested, preaged parts per MIL STD 833. All assembled units are next thoroughly tested at the component, assembly, and subsystem level. This is followed by dynamic environmental burn-in for 96 hours over a cyclic temperature range of 0–55°C. Units passing environmental tests are then subjected to a one hundred percent QC certification test at the subsystem level. These demanding procedures yield negligible infant mortality rates on production units. Calculated MTBF's of the TC13 exceed 60,000 hours; and complete actual failure data is maintained by EMULEX to insure that actual MTBF experience conforms to predicted results.

## AND FINALLY, YOU GET SUPPORT...

... from the EMULEX customer service organization and from an application staff devoted solely to customer backup. All EMULEX-supplied software is written and maintained in-house by the EMULEX engineering group, including a 90-day full-support warranty plus renewable update service, so you're never left holding the bag by unsupported packages. Direct field installation is available from EMULEX, and the products are maintained nationwide by Control Data and other qualified service organizations.

## PRODUCT SPECIFICATIONS MODEL TC13

Characteristic	Specification	Characteristic	Specification
<b>FUNCTIONAL</b>			
Design	High-speed 8-bit bipolar micro-processor-based tape coupler for formatted tape transports.	Max Tape Data Rate	800 KB characters/second.
CPU's	PDP-11/04 thru 11/70, VAX-11/730, 11/750, and 11/780.	Standard Emulation	DEC TS11 Tape Subsystem.
Computer Interface	Standard Unibus via SPC interface on coupler board (C-F connectors).	Bus Address Range	0–256 KBytes.
Tape Speeds	12.5 to 125 ips.	Standard Register Base Address	Variable.
Data Buffer	3.5 KBytes.	Standard Interrupt Vector	Variable.
Tape Densities (Forward and Reverse)	800, 1600, 3200, 6250 bpi.	Interrupt Level	5
		Tape Transports: Start-Stop	All 9-track, 800/1600 bpi industry-standard formatted tape drives.

## PRODUCT SPECIFICATIONS MODEL TC13 (CONTINUED)

Characteristic	Specification
Tape Transports: Streamer	Cipher-F880 and F880 II Microstreamer CDC-92181 Streaming Tape Kennedy-6809 Data Streamer Percoc-F1000 Streaming Tape.
Number of Transports	Daisy-Chain, 1-4 drives.
Coupler/Tape Bus Parity	Parity generated and checked on all byte transfers between coupler and tape transport, with errors flagged as status bits.
Self-Test	Coupler automatically executes extensive power-up self-test.
Fault/Activity Display	LED indicates detected board fault and coupler read/write activity.
Option/ Configuration Switches	Three on-board slide switch modules for Base Address, Interrupt Vector, and microcode option selection.
Adaptive Streaming	Microprocessor will detect sequences of operations that can support effective streaming and will automatically switch between streaming and start/ stop modes.
<b>PHYSICAL</b>	
Packaging	Quad-size four layer board.
Cabling	Two 50-conductor flat cables to first tape transport.
Adapters	Daisy-chain cable adapters available for most industry standard tape drives.
<b>ELECTRICAL</b>	
Computer Interface	Standard Unibus using DEC approved drivers and receivers; one unit load per bus line.

Characteristic	Specification
Transport Interface	25 ma drivers used on all output lines. Max 25 feet cumulative daisy-chain cable length.
Power	+5V $\pm$ 5%, 5.2 amps.

### ENVIRONMENTAL

Exceeds all environmental  
ranges and conditions spec-  
ified for commercial PDP-11,  
VAX-11 computers and  
applicable tape drives.

### SOFTWARE

PDP-11 Diagnostics	TS11 Controller Logic Test — ZTSIBO TS11 Data Reliability Test — ZTSHCO
VAX-11 Diagnostics	TS11 Subsystem Repair — EVMAD TS11 Data Reliability — EVMAA
Operating Systems	All applicable to TS11 tape system on PDP-11 and VAX-11; includes RT11, RSX11M, RSX11M-PLUS, RSTS-E, and VMS.
Streaming Backup PDP-11	EMULEX supplied physical media backup stand-alone package supports all EMULEX and DEC hard disk subsystems (except RK05) with standard file structures of RT11, RSX11M, RSX11M-PLUS, RSTS-E, and VMS.
VAX-11	Standard on-line backup utility (BACKUP) can be used for physical backup.



huis ter heideweg 28, postbus 2  
 3700 AA zeist, tel 03404-21344