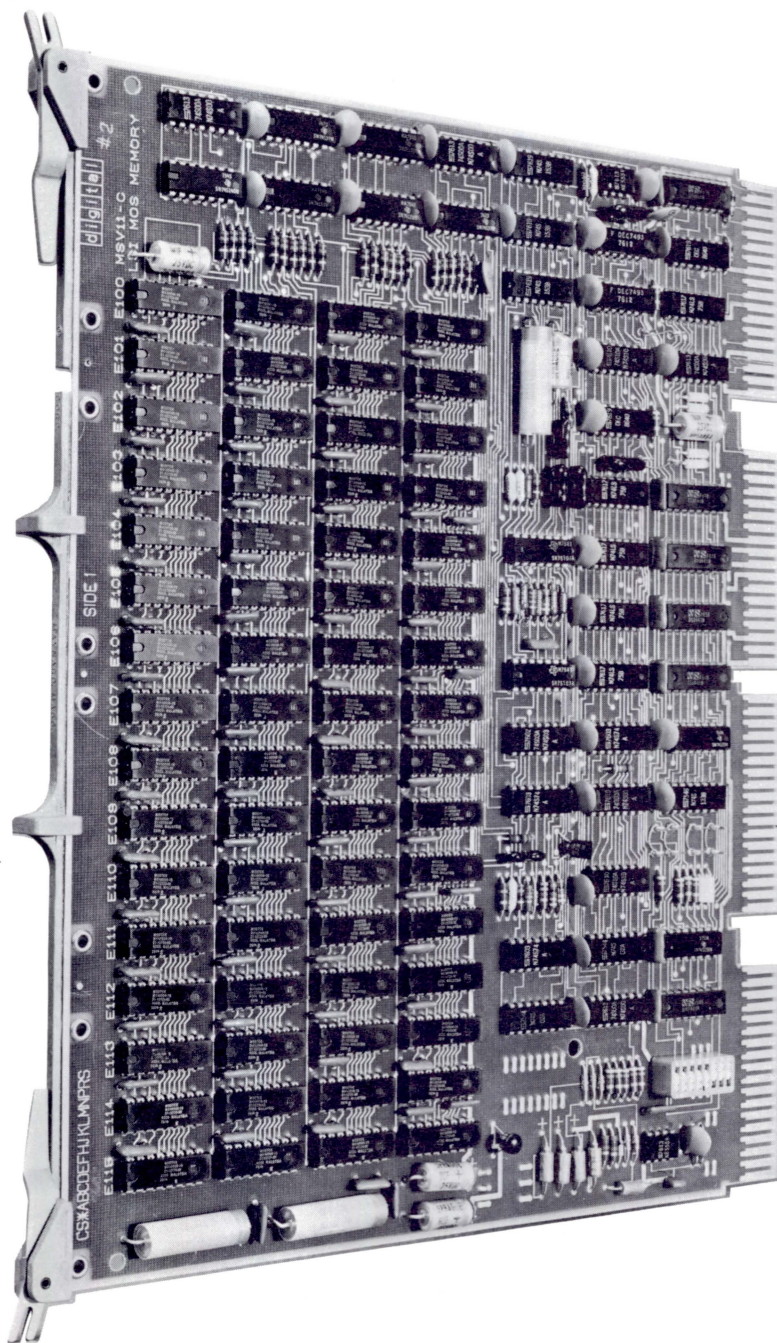


COMPONENTS GROUP

OCTOBER 1976

MSV11-C 16K MOS Memory Module



Introduction

The MSV11-C is a 16K x 16 bit MOS memory module for the LSI-11 and PDP-11/03 microcomputers. The memory features 4K dynamic MOS technology, internal refresh, 4k bank memory addresses, and 750 nanosecond cycle time with 390 nanosecond access time. The entire memory system fits on a single, 8.5 inch by 10 inch (Quad size) printed circuit module. The MSV11-C is offered as a separate memory board option or with the LSI-11 processor as a KD11-R or PDP-11/03 KA.

Features

- **Self-contained Refresh**
An on-board memory refresh circuit automatically refreshes memory circuits in a manner entirely transparent to the LSI-11 system. A single refresh cycle is executed (within the module circuits) approximately once every 25 microseconds. If the memory is accessed during this time by the LSI-11 microcomputer or a DMA device, the refresh cycle continues, and a maximum delay of 750 nanoseconds may be encountered before the memory completes the I/O transaction. Otherwise, the refresh does not affect other system components in any way.
- **No Special Power Requirements**
Only the normal +5V and +12V power available on the LSI-11 backplane is required. The required negative voltage for circuit operation is produced by an on-board charge pump circuit. Power sequencing is not required.
- **Provisions for Battery Backup**
Memory contents can be protected in the event of power loss by a user implemented battery backup power source. Module pins allow for separate +5B and +12B battery voltages to be applied for this purpose.
- **LSI-11 Bus Compatibility**
The options can be installed in any LSI-11, PDP-11/03 or PDP-11V03 system. It appears to the system as a single unit load. It normally requires two option locations in a system backplane unit as described in the Microcomputer Handbook.
- **Proven Technology**
Memory integrated circuits are the same type as those used in LSI-11 systems for over a year.
- **No Adjustments**
Simply selecting the memory's starting address by switches is all that is required during installation. There are no maintenance or timing adjustments.

Specifications

Power: +5V \pm 5% 1.1A typical (2.0A maximum)
+12V \pm 5%
Standby 0.16 typical (0.2 maximum)
Operating 0.54 typical (0.56 maximum)

Operating Speed:

The following speeds are valid if the bus is not attempting a memory cycle during a refresh and an arbitration was not necessary.

TAccess:	DATI, DATIO	TYP 300 nsec	MAX 350 nsec
	DATO (B)	TYP 400 nsec	MAX 450 nsec
TCycle:	DATI	TYP 650 nsec	MAX 750 nsec
	DATO (B)	TYP 750 nsec	MAX 850 nsec

If a bus cycle is being done as a result of winning the synchronization arbitration the bus cycle will be delayed or increased between 0 and 80 nanoseconds. If a refresh is in progress when a cycle is requested by the bus, a delay of between 0 and 750 nanoseconds will occur before the bus cycle starts.

Size: 26.6 cm (10.5 in.) high
22.8 cm (8.9 in.) long (approximate, including metal handles)
1.27 cm (0.5 in.) wide

Environmental:

Temperature: 5°C-50°C (41°F-122°F)

Humidity: 10% to 95% (no condensation)

Adequate air flow must maintain the inlet to outlet air temperature rise across the module to 7°C (12.5°F) maximum.

Ordering Information

For further information on DIGITAL component products, contact:

Digital Equipment Corporation, Components Group,
One Iron Way, Marlborough, Massachusetts 01752. Call
800-225-9480 toll-free from 8:30 AM to 5:30 PM our
time*.

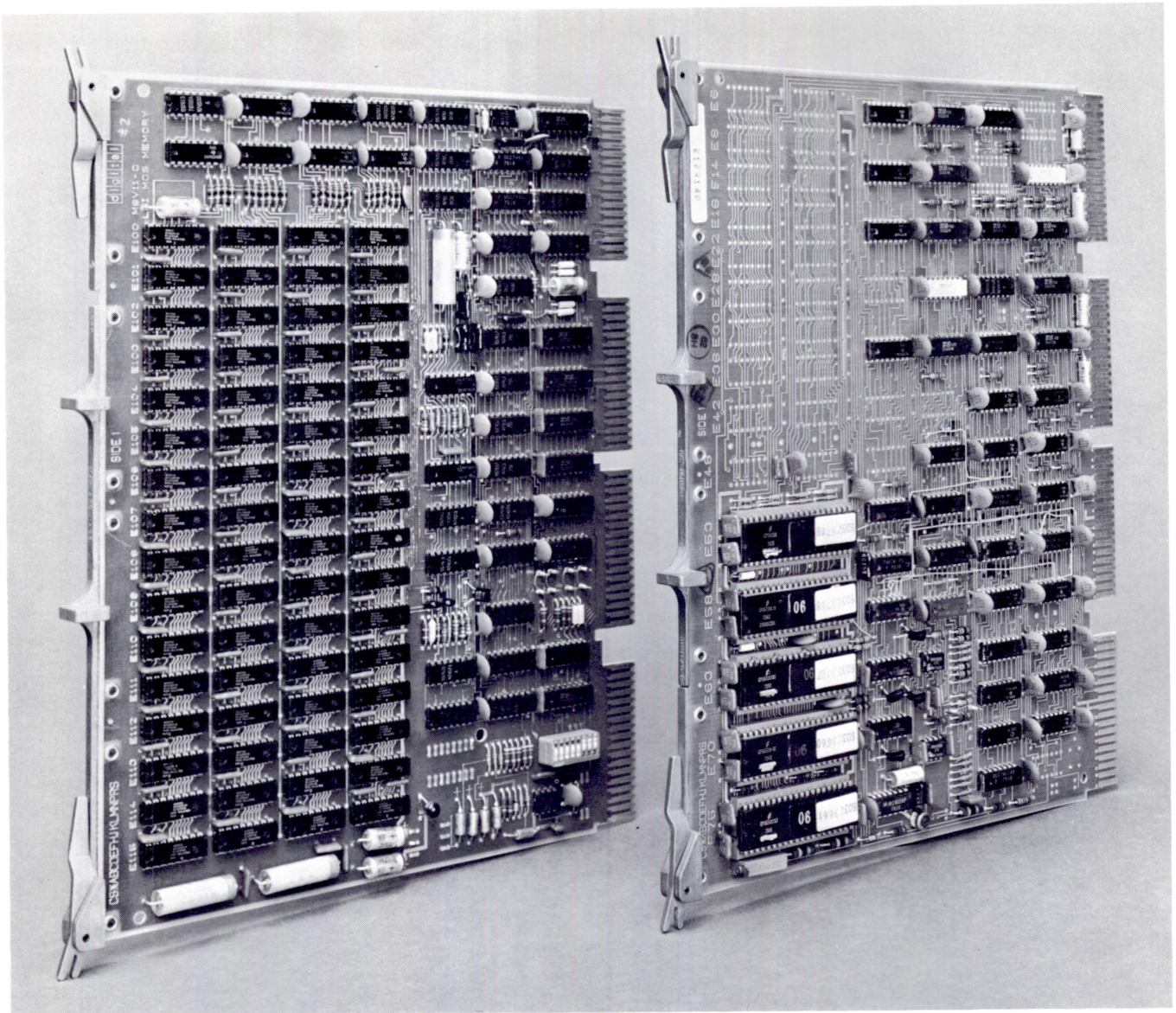
In Canada:

Digital Equipment of Canada Limited, P.O. Box 11500,
Ottawa, Ontario, K2H 8K8. Call (613) 592-5111, ext. 154.

In Europe:

Digital Equipment Corporation International (Europe),
81, route de l'Aire, C.P. 340, CH-1211 GENEVE 26.
Call (022)42 79 50.

*U.S. only. Massachusetts residents please dial (617) 481-7400.



KD11-R

The KD11-R combines the MSV11-C 16K MOS memory and the LSI-11 processor in a cost-effective package.

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DIGITAL EQUIPMENT CORPORATION

OPTION BULLETIN

COMPONENTS GROUP

OCTOBER 1976

LSI-11 Component Set CSV11



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Introduction

The LSI-11 component set provides a quick easy way for you to build your own microcomputer system. Each CSV11 set contains most of the components that you'll need to configure your system, and saves you the inconvenience of purchasing each LSI-11 accessory individually.

CSV11 Components

- 4K LSI-11 Central Processor
- 4K Expansion Memory Module
- Parallel and Serial Interface Modules
- Backplane/Card Guide Assembly
- I/O Interface Cables
- Paper Tape Software and Diagnostics

LSI-11 Microcomputer Module KD11-F

This 16-bit central processing unit includes 4K random access memory (RAM), power fail/auto restart, 16-bit parallel I/O bus port (DMS line operation), a real-time clock input, signal and vector interrupt handling. Board size: 21.6 x 25.4cm (8.5" x 10"). Power requirements: +5V \pm 5%/(1.8A (typ), 2.4A (max)). +12V +3%/0.8A (typ), 1.1A (max).

Expansion Memory Module MSV11-B

This is a 4K x 16 read/write random access memory (RAM) module utilizing dynamic semi-conductor memory devices. Dynamic refresh is performed automatically every 1.67 milliseconds. Board size: 21.6 x 12.7 (8.5" x 5")

Interface Modules DRV11 and DLV11

The DRV11 parallel line interface unit has 16 diode-clamped input lines, 16 latched output lines, and protocol and control signals. It requires a cable. Board size: 21.6 x 12.7cm (8.5" x 5").

The DLV11 serial line interface unit has either optically-isolated 20mA current loop or EIA interface levels. It includes jumper-selectable stop bits and data bits. Baud rates range from 50 to 9600. It requires a cable. Board size 21.6 x 12.7cm (8.5" x 5").

Backplane/Card Guide Assembly H9270

This backplane is based on a standard DIGITAL four-by-four slot configuration and prewired for the LSI-11 bus to accept one microcomputer and up to six I/O and/or memory modules. Backplane size: cm (11.15" x 2.8" x 11").

Interface Cables BC05M-2C, BC04Z-10, BC08R-01

The BC05M-2C connects the DLV11 interface module to a serial ASC11 console terminal. Cable length: 2cm (2.25').

The BC04Z-10 is a 40-conductor flat ribbon cable with Berg connector at one end and open at the other for use with DRV11 interface module. Cable length: 3.05m, (10'). Two of these are included in the CSV11 set.

The BC08R-01 is a DRV11 maintenance cable which connects input and output bus ports for use with diagnostic software.

LSI-11 Software ZJV01-RB and QJV10-CB

The ZJV01-RB paper tape diagnostics test the processor, exercise memory, isolate problem modules and exercise I/O devices.

The QJV10-CB is a collection of stand alone programs including ED11 Editor, which allows the user to create and modify ASCII source files to be used as input to other system programs; PALS-11S Assembler which allows the user to translate assembly language programs into executable machine-coded programs; LINK-11S Absolute Loader which allows the user to input programs and data from various media into the machine; ODT-11X an On-line Debugging tool which allows the user to debug assembled and linked programs; and IOX Dump-AB Input/Output Executive which allows the user to control the flow of data to and from devices under program control.

User Responsibilities

In addition to the components provided, you will need both a power supply and a serial terminal such as the ASR-33. A modified ASR-33, model LT33-DC is available from DIGITAL as separate option. DIGITAL can also supply a modification kit for the ASR-33 option model LT33-MB.

The user must provide the power supply and the BHALT and BDCOK control signals. DC power requirements are as follows:

- +5 VDC $\pm 3\%$ over 0-18A (typical) load, static and dynamic, ripple of less than 100 mV p-p.
- +12 VDC $\pm 3\%$ over 0-2.5A (typical) load, static and dynamic; ripple of less than 200 mV p-p.

Service and Warranty

LSI-11 microcomputers are warranted for 90 days. Return any defective unit during this period and it will be repaired or replaced without charge.

Post-warranty service can be provided in a variety of ways, including complete repair through a local DIGITAL depot, a contract with DIGITAL's Field Service Group, or the purchaser's own service organization, with or without training at DIGITAL.

Ordering Information

For further information on DIGITAL component products, contact:

Digital Equipment Corporation, Components Group, One Iron Way, Marlborough, Massachusetts 01752. Call 800-225-9480 toll-free from 8:30 AM to 5:30 PM our time.*

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In Europe:

Digital Equipment Corporation International (Europe), 81, route de l'Aire, C.P. 340, CH-1211 GENEVE 26. Call (022)42 79 50.

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