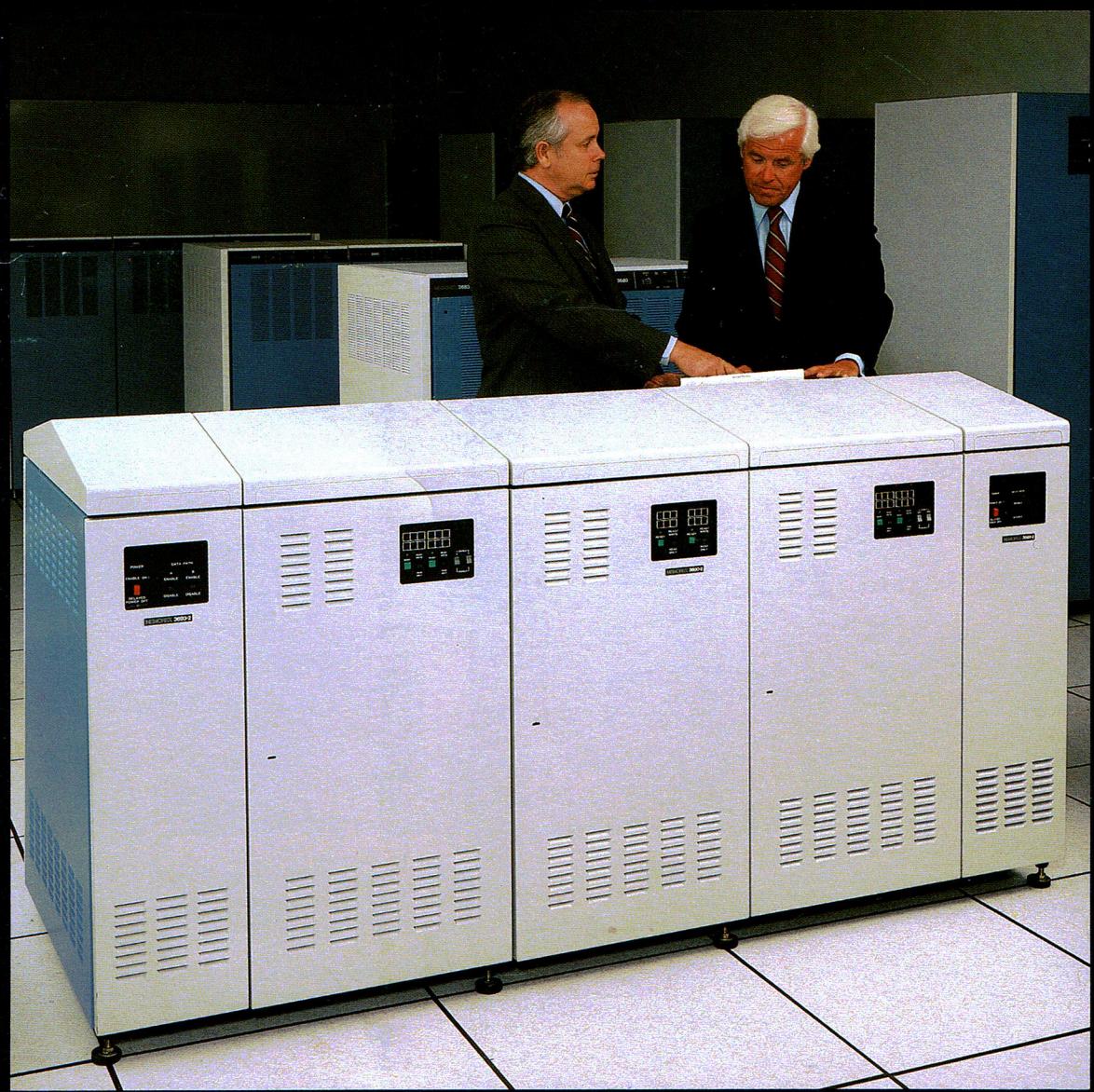


3690-2

Now with dual path

MEMOREX

3690-2 dual path
disc subsystem

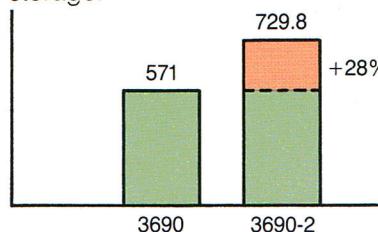


Memorex 3690-2 disc storage subsystem

The Memorex 3690-2 disc subsystem has been designed for the user who wants to retain the advantages of using fixed block architecture and needs extra capacity without degradation in performance.

Greater capacity

The Memorex 3690-2 offers 729.8 megabytes of data per module – 28% more than the Memorex 3690 or IBM 3370 Model 1. This gives the 4300 user a lower cost per megabyte and a smaller floorspace requirement to meet the need for more on-line storage.



Higher performance

With larger amounts of data on-line, accessibility of the data and performance of the disc subsystem become more critical. Memorex is the market leader in disc performance. Our products provide you with improved response times and better throughput than competitive systems. The optional Memorex dual path feature on the 3690-2 allows simultaneous access to any two drives within the string, a facility offered by Memorex on all its large disc drives. Typically, dual pathed strings can improve I/O performance by up to 30%. This will give better service to your users, and improved CPU utilisation.

Reliability

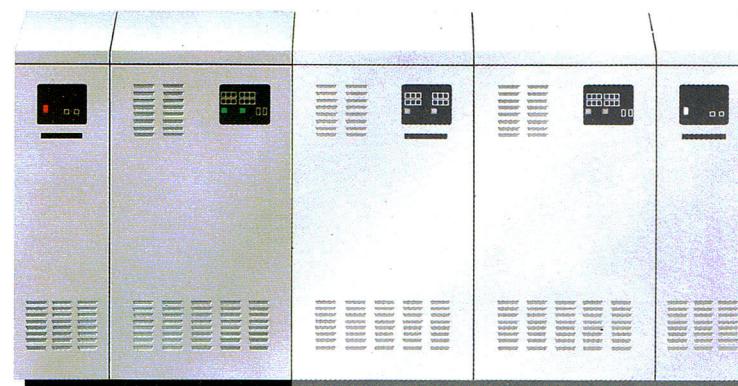
The 3690-2 disc subsystem is based on the design and experience of the Memorex 3690 (3370 equivalent). Reliability is assured through the use of the latest manufacturing techniques and by the incorporation of LSI (large scale integration) circuitry in the drive and controller electronics.

Dual path offers the added advantages of back up. If a storage director or channel path fails, the entire string can be accessed by the second path.

3690-2 subsystem components

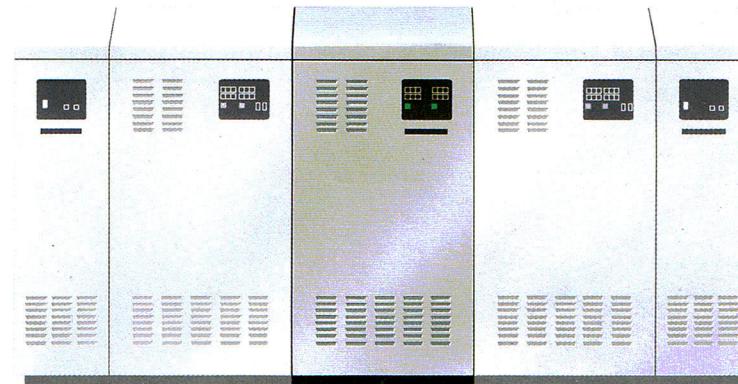
3693-2

The 3693-2 contains the primary string controller and one disc drive and is a functional replacement for the IBM 3370-A2.



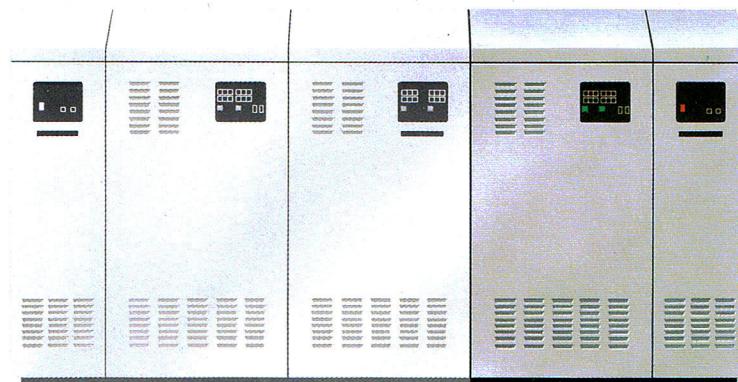
3690-2

The 3690-2 contains one disc drive and is a functional replacement for the IBM 3370-B2.



3699-2

The 3699-2 contains the alternate string controller and one disc drive. This provides a second path to the string as an alternative to the 3693-2.



Each disc drive within the subsystem contains a single spindle with a vertically mounted head disc assembly (HDA) providing 729.8 Mb of data storage space accessed by two independently addressable actuators.

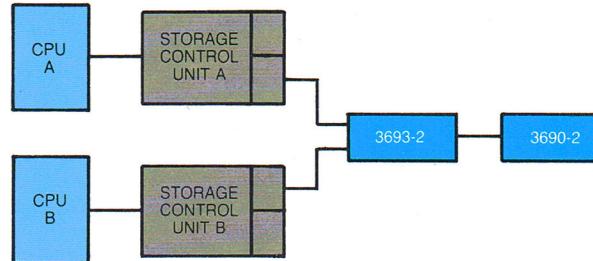
Each actuator accesses 364.9 Mb of data in fixed block architecture (FBA) format. This permits a seek operation to overlap a concurrent read/write operation within a drive.

Standard features

- Error detection and correction circuitry detects and corrects all data errors up to 9 bits in length, and detects and reports errors up to 16 bits in length.
- Automatic position sensing allows channel disconnect during periods of rotational delay, providing greater channel and control unit availability.
- The read only switch prevents writing on the selected actuator when set to 'read only'. If the switch is changed during an operation, the status of the unit remains unchanged until the completion of the current operation.

Optional feature

String switch



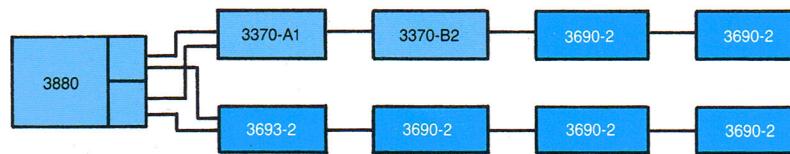
The string switch feature can be added to the 3693-2 to allow the string to be accessed through a second storage director on the same system, or on separate processors as shown.

With two channel switch and string switch, the user can dynamically share disc spindles between CPUs and provide back-up against individual channel or storage director failures.

Configuration flexibility

The Memorex 3690-2 disc subsystem can be configured to meet your individual requirements.

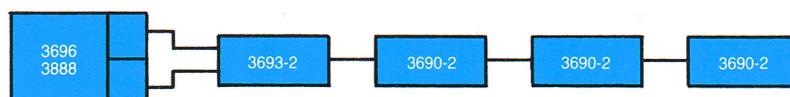
Add 3690-2 units to complement an existing string of IBM 3370 or 3370-2.



The 3690-2 can be added to an existing string of 3370/3370-2 attaching to the A1, B1, A2 and B2 units.

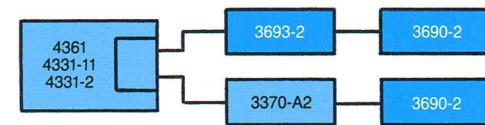
The 3690-2 subsystem can also run alongside an existing 3370/3370-2 string attaching to the same storage control unit.

Replace IBM 3880 and 3370-2



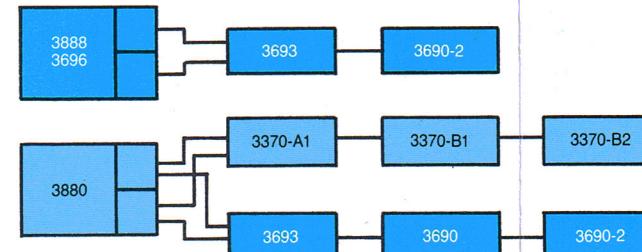
Memorex can replace both the IBM 3880 storage control unit and the 3370/3370-2 drives with the Memorex 3888 or 3696 storage control unit and the 3690-2 subsystem.

Attach to DASD adapter



The 3690-2 subsystem can be attached to the integrated DASD adapter on the 4361 and 4331 models 2 and 11.

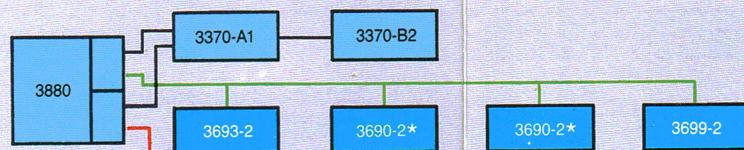
Add to an existing 3690 string



The 3690-2 can be attached to an existing Memorex 3693 or 3690 drive, with the string being attached to an existing Memorex 3696, a Memorex 3888, or to an IBM 3880 storage control unit.

Dual path configurations

Add 3690-2 dual path string to run alongside a string of IBM 3370 or 3370-2.

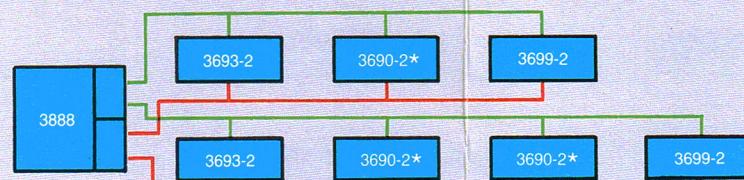


*optional

The Memorex 3693-2 dual path string can be added to run alongside an existing string of 3370-1 and/or 3370-2 drives attached to the IBM 3880 storage control unit.

The dual path string can be configured as a full string or short string.

Replace IBM 3880 and 3370 with dual path strings.



*optional

Memorex can replace both the IBM 3880 storage control unit and 3370 with the 3888 storage control unit and 3690-2 dual path disc subsystem to provide both increased capacity and performance.

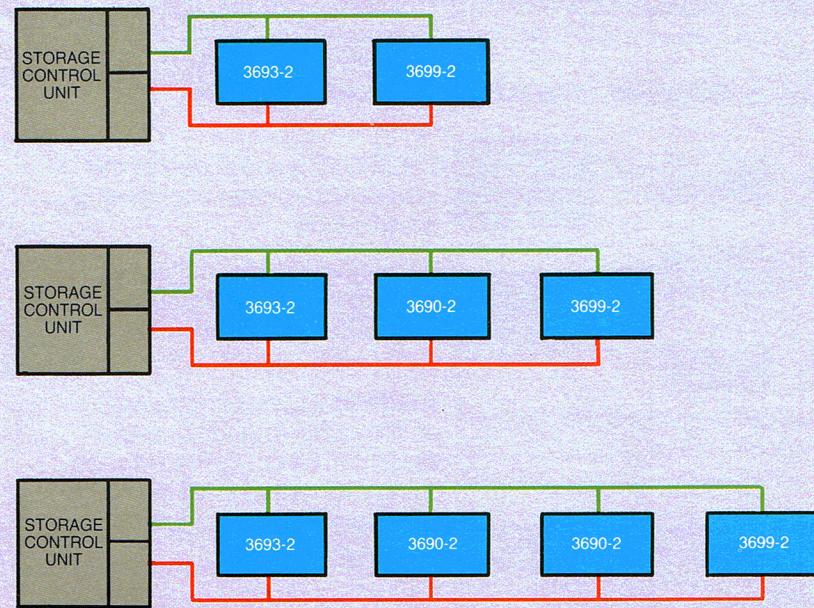
Benefits

- The 3690-2 can be installed to replace or complement 3370/3370-2 with no impact on operational procedures.
- The 3690-2 disc subsystem provides exceptionally high reliability and requires no scheduled preventive maintenance.
- The 3690-2 is supported by the Memorex customer engineering organisation.
- Memorex protects your current investment in 3690 disc drives. The 3690-2 can be added to your current 3690 drives.
- The 3690-2 brings improved performance through dual path which can be configured in short strings, as well as in full strings, to meet your exact requirement.
- The 3690-2 is competitively priced. It will offer cost savings and provide outstanding reliability and performance.

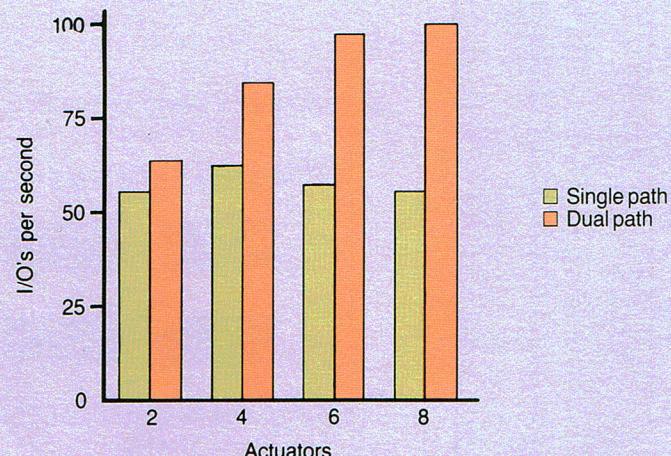
Dual path means capacity and performance

The dual path feature is an option which provides a second path to each drive within the string. The controllers within the 3693-2 and 3699-2 provide the two paths within the string and permit simultaneous read/write operations on two different drives within the string.

Configurations



Performance



This chart shows the results taken from a series of benchmark tests using 8K blocks of data. This shows quite clearly the improved performance achieved by dual path strings, particularly with three and four drives in the string.

Benefits

The benefits of dual path on the Memorex subsystem are:-

- the unit of contention is reduced, giving improved performance over single path strings.
- the I/O response times and channel utilisation are improved, giving higher data availability to the user.
- the ability to configure short strings enables you to obtain the resultant benefits of increased performance on the length of string which matches your exact requirements.

3690-2 dual path disc storage subsystem specifications

Capacity:

Capacity per spindle	729.8 Mb
Actuators per spindle	2
Capacity per actuator	364.9 Mb
Cylinders per actuator	958
Tracks per cylinder	12
Blocks per track	62
Capacity per block	512 bytes
Bit density (BPI)	12,128
Track density (TPI)	810

Data transfer rate:

1.859 Mb/sec	±3%
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Average rotational delay:

Average latency	10.1 msec
Rotational speed	2965 rpm nominal

Actuator positioning time:

Seek time minimum	5 msec
Seek time average	19 msec
Seek time maximum	40 msec

Physical dimensions:

3693-2/99-2	(WxDxH)	30.5x32x43 in
		77.5x81.3x109.3 cm
3690-2		20.5x32x43 in
		52.5x81.3x109.3 cm

Service clearances:

3693-2/90-2/99-2	Front	76.2 cm (30 ins)
	Rear	76.2 cm (30 ins)
Sides 3693-2	Right	61 cm (24 ins) – if end of string
	Left	76.2 cm (30 ins)
3690-2	Right	61 cm (24 ins) – if end of string
	Left	0
3699-2	Right	61 cm (24 ins)
	Left	0

Weight:

3693-2/99-2	660 lbs/300 kg
3690-2	463 lbs/210 kg

Altitude:

Operational
Mean sea level up to 6000 feet above
sea level.

Power requirement:

200, 208, 230 v, 60 hz, 3 phase	
200, 220, 235, 380 v, 50 hz, 3 phase	

Power consumption:

3693-2/99-2	1.2 kva (@ 220 v)
3690-2	0.8 kva (@ 220 v)

Average heat dissipation:

3693-2/99-2	3100 btu/hr
3690-2	1750 btu/hr

Software support:

The 3690-2 subsystem is supported by:

- SSX/VSE 1.3.1
- VSE SIPO/E 1.4.1*
- VSE SIPO/E 1.4.2
- VSE/AF 1.3.5*
- VM/SP 1.3

*plus EREP 3.1 and ICKDSF 1.7

With appropriate device support levels. See your Memorex systems engineer for details.

Air flow

3693-2/99-2	190 cu ft/min
3690-2	130

Feature:

String switch	
3693-2	Optional

Dual path

3693-2/90-2	Optional
3699-2	Standard
Dual path strings attach to the CPUs which support the Memorex 3888 or IBM 3880 storage control units.	

CPU attachment:

The 3693-2 attaches via the Memorex 3888 or 3696, or IBM 3880 storage control units to:

- 4331-2
- 4341
- 4361
- 4381

and via the DASD adapter to:

- 4331-11
- 4331-2
- 4361

When it matters, make it Memorex
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 A Burroughs Company