3490-E01 IBM Magnetic Tape Subsystem Model E01

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IBM U.S. Product Life Cycle Dates

Type Model	Announced	Available	Marketing Withdrawn	Service Discontinued	Replaced By
3490-E01	1994/02/01	1994/03/25	1997/05/09	-	3490-F01

Abstract

The IBM 3490 is a family of Magnetic Tape Subsystems designed to provide significant tape subsystem performance and cartridge capacity improvements.

Model Abstract 3490-E01

(For IBM US, No Longer Available as of May 9, 1997)

The Model E01 is a table-top version. See the Model E11 for the rack- mounted version. This Enhanced Capability model is a substantially lower priced 3490E tape sub system designed for the RS/6000* and AS/400*. The 3490E family of tapes are the fastest, most reliable tape systems available from IBM for AS/400 and for RS/6000. It includes a seven cartridge Cartridge Stack Loader, a 16-bit, fast-and-wide, SCSI-Differential Interface, a 3490E tape transport, and an integrated control unit. The maximum effective throughput is up to 6.5MB per second. The seven-cartridge Cartridge Stack Loader provides an automated, unattended backup capacity of up to 16.8 Gb with compressible data. Uncompressed, the capacity is up to 5.6 Gb. Compression is provided by the 3490E's IDRC data compression hardware.

Highlights

- Significant Tape Subsystem Performance Improvement
- Significant Cartridge Capacity Improvement

Model Highlights 3490-E01

- Substantially Lower Priced 3490E
- Integrated Fast And Wide SCSI-2 Differential Interface
- Seven-Cartridge Cartridge Stack Loader for up to 16.8 Gb
- Performance of Up To 6.5 MBytes Per Second

Description

NEW LEVEL OF PRICE/PERFORMANCE FOR FULL-FUNCTION 3490E

The 3490E Model E01 offers full function 3490E tape performance and compatibility at a substantially lower price than other 3490E tape subsystems.

This model is intended for RS/6000 and AS/400 systems where limited time for system backup or large amounts of data require high performance tape. The standard Cartridge Stack Loaders automatically load and unload cartridges as they are filled, improving efficiency by reducing the need for operator handling. The 3490E Model E01 may be used to create tapes for archive files, for backup and restore in the event of system or disk storage problems, for off-site data storage for disaster recovery, and for data interchange with other systems. Mainframe data interchange is particularly likely to use 36-track, 1/2 inch cartridge tape. In addition to reading and writing 36-track tape, the Model E01 can read the older 18-track 1/2 inch cartridge tape.

GROWTH ENABLEMENT - IMPROVED EFFICIENCY

The affordable price of these models of the 3490E can allow users to more readily cost justify a high performance tape system. The family of IBM 3490E tape subsystems offers a device data rate six times faster than the 7208 8MM tape drives. The 3490E Model E01 can be used to perform system backups more rapidly, reducing the time data files are not available to users. The fast data rate also reduces the time needed to restore files in the event of a system problem or a disk storage problem.

HIGH PERFORMANCE

The 3490E family of tape subsystems provide the fastest tape performance available from IBM for AS/400 and RS/6000. The fast-and-wide SCSI interface offered on the Model E01 can support a higher effective data rate than is possible with the attachment options for other 3490E tape subsystems on AS/400 and RS/6000. Using the 3490E's IDRC data compression, the 3490E Model E01 can provide an effective throughput as high as 6.5MB per second for compressible data. In comparison, the 3490E C models support an effective throughput of up to 3.5 MB/sec with SCSI and up to 3.8 MB/sec with parallel channel attachment using IDRC. The actual throughput is a function of the system processor, data block size, and the software application used.

The fast and wide (16-bit) SCSI-2 Differential interface supports peak data rates of up to 20MB per second. Both 8-bit and 16-bit transfer are supported. Using an interposer for 8-bit mode, peak data rates of up to 10MB per second can be supported.

The SCSI-2 adapter on the E01 provides a higher effective throughput than the SCSI-2 adapter available on the 3490E C models. This SCSI-2 attachment potentially offers AS/400 customers faster performance than the current parallel channel attachment can provide for 3490E tape subsystems.

SYSTEMS MANAGEMENT - IMPROVED SYSTEMS AVAILABILITY

Customers with limited time for systems backup or with large amounts of disk storage need high performance tape solutions to backup their systems within the time available.

Tape backups are normally done at night and on weekends to limit the impact to end users. Over time, the growth of disk storage may not allow system backups to be completed within the time available. The 3490E with its higher performance may reduce the time needed for backups, allowing them to be completed within the allotted time.

The speed and features of the 3490E tape subsystem allow rapid backup and the rapid restoration of stored files. Fast backup of the systems allows files to be put back online sooner for continued end-user productivity and overall system availability. In the event of loss or damage to files on disk storage, the performance of the 3490E tape subsystems speeds up system recovery.

SMALLER, MORE COMPACT SIZE

The 3490E Model E01 is 29% of the weight of a 3490E Model C11 and about 26% of the size.

GROWTH ENABLEMENT - REDUCED ENVIRONMENTAL REQUIREMENTS

The table-top E01 allows customers who don't use racks to avoid the expense of a rack when selecting a 3490E tape drive. With the Models E01 and E11 (rack-mounted), customers can select the option most appropriate to their environment.

RELIABILITY AND DATA INTEGRITY

IBM 3490E family of tape subsystems are designed for heavy utilization and data integrity. They are IBM's most reliable tape offerings for AS/400 and RS/6000.

Advanced electronic packaging contributes to the reliability of the 3490E by reducing the number of cards in both the drive and the integrated control unit. The reliability of the circuit technology and enhanced control unit error recovery procedures (ERP) contribute to increased reliability and availability -- hallmarks of the 3490E tape subsystems.

All 3490E drives incorporate a single pass read-after-write function in addition to extensive error correction functions.

SYSTEMS MANAGEMENT - IMPROVED SYSTEMS AVAILABILITY

Read-after-write checks the data as it is written. Many errors can be corrected by the integrated control unit as the tape is written. If a problem cannot be corrected as it occurs, the tape unit retries and attempts to write (or read) the data correctly. If the problem remains uncorrectable, the operator is notified. The drive does not continue if data cannot be accurately recorded.

Data integrity is important to all customers. The reliability of tape systems is of increased importance for customers who do unattended backup of their systems. The tape drive needs to reliably complete system backup without problems because no operators are present to deal with hardware problems or restart the backup process.

OPERATIONAL EFFICIENCY

The 3490E Tape Subsystems are an efficient solution for customers with growing storage requirements and shrinking windows for system backup. The design combines a reliable, fast 36-track tape drive with a seven- cartridge Cartridge Stack Loader. Together they can further reduce the total time required for backup.

The 36-track bidirectional recording format can reduce or eliminate rewind time. The bidirectional head writes 18 tracks from the load point to the end of the tape and then writes the other 18 tracks from the end of the tape back to the load point, eliminating the rewind time for full tapes. For customers with a limited time window for system backup, eliminating the tape rewind time between tapes speeds up tape operations. It allows the Cartridge Stack Loader to go directly to the next cartridge when a cartridge is filled, without delay. The Cartridge Stack Loader eliminates waiting for an operator to insert a tape. The bidirectional read/write head and the Cartridge Stack Loader allow better use of the tape subsystem's speed.

The 3490E tape subsystems support the Enhanced Capacity cartridges and 36-track recording to provide the highest data capacity per cartridge of the 3480/3490 tape format cartridges. Uncompacted, the capacity is 800MB/cartridge. Using the IDRC compaction capability, the capacity may be an average of 3 times higher or 2.4Gb per cartridge. The increased cartridge capacity reduces the investment needed in cartridges and saves on storage costs.

SYSTEMS MANAGEMENT - OPERATIONS PRODUCTIVITY

By using very reliable tape systems with an efficient Cartridge Stack Loader, backup can proceed without an operator present. Even when operators are present, the Cartridge Stack Loader and the reliability of the 3490E allow them to concentrate on more productive activities.

The long cartridge life of the Enhanced Capacity Cartridge System Tape and the high quality of the 3490E make them excellent choices to support critical data.

Model Description 3490-E01

A table-top 3490E tape subsystem that includes a seven cartridge Automatic Cartridge Stacker, an integrated 16-bit fast-and-wide SCSI-2 Differential adapter, an integrated control unit, and one 3490E 36-track 1/2-inch cartridge tape drive. It is supported on RS/6000 models that support either the SCSI-2 Differential High-Performance External I/O Controller feature #2420 or the SCSI-2 Differential Fast/Wide Adapter/A feature #2416 or Enhanced SCSI-2 Differential Fast/Wide Adapter/A #2412, and on AS/400 9404 and AS/400 9406 systems that support feature #6501. One cartridge magazine is shipped with each unit.

Model

Model Summary Matrix

Model	Control Units	Drives	Channels Available	Tracks	Data Rate MB/sec	Data Capacity /Enhanced Tape
E01 (Table)	1	1	-	36	3MB/6.5MB	5.6Gb/16.8Gb

Maximum

Not applicable.

Customer Setup (CSU)

None.

Devices Supported

Not available.

Model Conversions

None.

Technical Description

The Model E01 is intended for use on RS/6000 and AS/400 systems that require reliable, high performance tape support for backup restore, archive, and data interchange.

The 3490E Model E01 is a compact 36-track, 1/2-inch cartridge tape subsystem. It includes an integrated control unit, an integrated auto- ranging power supply, a SCSI-2 Differential 16-bit interface, a seven cartridge Cartridge Stack Loader, and a 3490E tape transport. The SCSI-2 Differential interface can support 16-bit and 8-bit transmission. An interposer is available to allow attachment to 8-bit SCSI-2 Differential I/O controllers on the RS/6000. Other interposers are used to optimize attachment to 16-bit interfaces. Other standard E01 features include a 2MB Dynamic Data Buffer, Improved Data Recording Capability (IDRC) compression, auto-blocking, extensive error correction code, and one-pass-read-after write.

The supported tape cartridges are:

- Enhanced Capacity Cartridge System Tape
- Cartridge System Tape

The Enhanced Capacity Cartridge System Tape is suggested because it offers the greatest capacity. Uncompacted the capacity is 0.8 Gb. By taking advantage of the IDRC compaction, the capacity may be as much as 2.4 Gb per cartridge with compressible data. Using Enhanced Capacity Cartridge System tape, the capacity of the Cartridge Stack Loader is 5.6 Gb uncompacted or up to 16.8 Gb compacted.

The tape drive offers a 3MB per second device data rate. With data compression, the effective data rate can be up to 6.5MB per second for 64K blocks. The SCSI-2 Differential interface supports peak data rates of up to 20MB per second. When attached to 8-bit interfaces, the peak data rate can be up to 10MB per second.

Other operating characteristics are:

- Tape speed: 2 meters or 79 inches per second
- Cartridge load time: 8 Seconds
- Rewind Times:
    - Full cartridge rewind time: 2 Seconds
    - Maximum rewind time per cartridge: 90 Seconds

Physical Specifications

Model E01 Tabletop:

- Width: 22.0cm (8.8 inches)
- Depth: 80.1cm (32 inches)
- Height: 26.8cm (10.8 inches)

- Weight: 25.9kg (57 lbs)

Operating Environment

- Temperature:
  - Powered on (no media in use) 10 to 40C (50 to 104F)
  - In Operation (media in use) 16 to 32C (60 to 90F)
- Relative Humidity: 8% to 80%
- Wet Bulb: 27C (80.6F)
- Calorific value: 525 BTU/hour
- Electrical power: 0.39 KVA
- Capacity of Exhaust: 43 Cubic meter/min
- Noise Level: Idle 53 DB, Operational 58 DB
- Leakage: 2.1 ma
- Starting Current: 90V/1.93 amps, 125V/1.21 amps, 254V/0.67 amps

Note: Noise levels are estimates.

The 3490E Model E01 is subject to Federal Communications Commissions rules. They will be verified to comply with the rules for Class A digital devices before final delivery to the buyer or centers of distribution.

Limitations

The SCSI interface supports a maximum 256KB block size. It does not support block sizes above 256KB which are used in some older tape formats in the seismology industry.

The SCSI-2 Differential interface is a fast and wide 2-byte SCSI-2 interface. When attaching to an 1 byte SCSI-2 interface, such as the RS/6000 SCSI-2 Differential High Performance Controller (#2420) a 1 byte to 2 byte interposer is employed. The 3490E must be located physically at one end of the bus when attached to a 1-Byte SCSI-2 interface. If multiple 3490E models are attached to a RS/6000 bus, only one of them must be at the end of the bus.

Although multiple RS/6000 systems may be linked to a 3490E E01 tape drive, the systems cannot use the drive simultaneously.

Only one AS/400 may be linked to a 3490E Model E01.

Hardware Requirements

RS/6000

The 3490E Model E01 is supported on all RS/6000 models that support either the RS/6000 SCSI-2 Differential High Performance Controller (#2420) or the SCSI-2 Differential Fast/Wide Adapter/A (#2416) or Enhanced SCSI-2 Differential Fast/Wide

Adapter/A #2412. The Model E01 is a table-top model that does not use a rack but does require a table or other support.

A SCSI cable and the correct interposer are required to connect the 3490E Model E01's SCSI-2 interface to either the RS/6000 system's SCSI-2 Differential High Performance I/O Controller (#2420) or SCSI-2 Differential Fast/Wide Adapter/A (#2416) or Enhanced SCSI-2 Differential Fast/Wide Adapter/A #2412. Multiple RS/6000's can be linked to each other by ordering RS/6000 system cables. Multiple 3490E Model E01 and E11 tape systems can be interconnected via their SCSI cables but the maximum total cable length allowed on a RS/6000 feature #2420 is 19 meters. The maximum total cable length allowed on a RS/6000 feature #2416 is 25 meters.

The interposer specify feature #9701 is required when 3490E Model E01 cables are connected to feature #2420 on RS/6000. The 3490E SCSI adapter is a 2 byte wide SCSI-2 Fast and Wide interface that requires a 1 byte to 2 byte interposer whenever its cables are attached to a Single byte SCSI-2 interface, such as feature #2040 on RS/6000. The interposer specify feature #9702 is required when 3490E Model E01 cables are connected to feature #2416 or #2412 on RS/6000. Although feature #2416 or #2412 is a Double byte SCSI-2 interface, an interposer is needed for proper cable connection. See the Introduction and Planning Guide (GA32-0297) for proper cabling.

- #5105: 0.5 meter SCSI cable
- #5128: 2.8 meter SCSI cable
- #5145: 4.5 meter SCSI cable
- #5112: 12.0 meter SCSI cable
- #5118: 18 meter SCSI cable
- #5125: 25.0 meter SCSI cable

AS/400:

The 3490E Model E01, table-top model, can be attached to AS/400 9404 Models DXX, EXX, and FXX using the 9404's Magnetic Media Subsystem Controller (#6501). One card slot is required on the 9404. Each feature #6501 has two ports. Each port can support one E01 or E11 for a total of two E01/E11 tape subsystems. Other tape drives or DASD are not supported on the same #6501 as an E01/E11. AS/400 systems cannot be interconnected using SCSI. As a result, a Model E01 can only be attached to one AS/400.

The Model E01 can also be attached to the AS/400 9406 Models DXX, EXX, and FXX using feature #6501. Each #6501 has two ports. Each port can support one E01 for a total of two E01 tape subsystems. No other tape drives or DASD may be attached to the same #6501 with 3490E Tape Subsystems. AS/400 systems cannot be interconnected using SCSI. As a result, a Model E01 can only be attached to one AS/400.

An interposer, feature code #9410 on the 3490E, is used to attach 3490E Model E01 SCSI cables to the feature #6501 on AS/400. Although, both the 3490E E01/E11 and

feature #6501 on the AS/400 are Fast and Wide SCSI interfaces, an interposer is needed to connect the cables correctly. The support cables for AS/400 are:

- #5128: 2.8 meter SCSI cable
- #5145: 4.5 meter SCSI cable
- #5112: 12.0 meter SCSI cable
- #5118: 18.0 meter SCSI cable
- #5125: 25.0 meter SCSI cable

See the Introduction and Planning Guide (GA32-0297) for cable planning information.

Software Requirements

AS/400:

The IBM 3490E Model E01 is supported by OS/400* Version 2 Release 3 and beyond. The following PTFs must be ordered for support on OS/400 V2R3:

- SF14821
- MF06504
- MF06505
- MF06506
- MF06507
- MF06508
- MF06509
- MF06510
- MF06511
- MF06512
- MF06513

BRMS/400 Version 2.3 also supports the IBM 3490E Model E01.

RS/6000:

The IBM 3490E Model E01 is supported by AIX/6000 3.2.0 and later releases. Specific device support for AIX/6000 is provided by specify feature #9603, the AIX Device Driver, which is ordered on the 3490E.

ADSTAR Distributed Storage Manager/6000 Version 1.2 (ADSM/6000), also supports the 3490E Model E01. ADSM/6000 offers highly automated, centrally scheduled, policy-managed backup and archive facilities to protect data in distributed enterprises using AIX/6000 systems as servers.

Publications

The following publications are shipped with the product. Additional copies will be available at general availability.

- SA37-0296, IBM 3490 Magnetic Tape Subsystem Enhanced Capability Models E01 and E11 Maintenance Information.
- GA32-0298, IBM 3490 Magnetic Tape Subsystem Enhanced Capability Models E01 and E11 User's Guide.

The following publication is shipped only for tape subsystems attached to RS/6000:

- GC35-0154, IBM Tape Drive and Library Device Drivers, Version 1 Release 1.0 Installation and User's Guide.

Features -- Specify/Special/Exchange

No Charge Specify Codes

The 3490-E01 may be ordered from the plant in one of two colors, raven black (#9068) or white. Raven black applies only to AS/400 systems. If no feature code is specified, the E01 will be white. The color cannot be changed in the field.

The following power cords are available to support the table-top model, Model E01. They are field or plant installable.

- #9080, Water Tight Plug, applies only to 9800 or 9832
- #9800, 9 Ft (2.7 Meter) 125V, 15A Power Cord
- #9832, 6 Ft (1.8 Meter) 125V, 15A Power Cord
- #9833, 9 FT (2.7M) 250V, 15A Power Cord
- #9830, 9 FT (2.7M) 250V, 10A and 16A Power Cord
- #9825, 9 FT (2.7M) 250V, 13A Power Cord
- #9820, 9 FT (2.7M) 250V, 16A (AC) Power Cord
- #9821, 9 FT (2.7M) 250V, 10A Power Cord
- #9827, 9 FT (2.7M) 250V, 6-16A Power Cord
- #9829, 9 FT (2.7M) 250V, 10A Power Cord
- #9839, 9 FT (2.7M) 250V, 16A Power Cord
- #9831, 9 FT (2.7M) 250V, 10A Power Cord
- #9834, 9 FT (2.7M) 250V, 10A Power Cord

Publication support is available in the following languages. These codes are orderable only at the time of manufacture.

- #2924, U.S. English
- #2928, French
- #2929, German

- #2930, Japanese
- #2987, Korean

The following specify codes indicate the attached system type. They are record purposes only specify codes and may be changed at any time.

- #9600, Attached to RS/6000
- #9400, Attached to AS/400

The following specify codes are plant or field installable.

- #9603, AIX device driver
- #9701, Interposer, single byte wide, for RS/6000
- #9702, Interposer, double byte wide, for RS/6000
- #9410, Interposer for AS/400

3490 ORDER ROUTING SPECIFY CODES

No order routing specify codes are used for the 3490 E01 table-top version of the 3490E. All 3490 Models E01 ship from San Jose.

Special Feature Codes -- Chargeable

(#5105) 0.5 Meter SCSI Cable

(For IBM US, No Longer Available as of June 28, 2002)

Supplies a 0.5 meter SCSI cable that is used to connect 3490E Models E01 when they are side by side and connected to the same SCSI I/O controller on a RS/6000. Maximum: One. Optional. Field or Plant installable.

(#5145) 4.5 Meter SCSI Cable

(For IBM US, No Longer Available as of June 28, 2002)

Supplies one 4.5 meter SCSI cable. This is the minimum length SCSI cable required to connect a 3490E Model E01 to a SCSI I/O controller on RS/6000 or to the Magnetic Media Subsystem Controller (#6501) on an AS/400. Maximum: One. Field or Plant Installable. If the SCSI feature #2420 on RS/6000 is used, or a second E01 is daisy chained to this one, you can only use the 0.5 (#5105) or another 4.5 meter cable (#5145) without exceeding the 18.0 Meter cable limitation of feature #2420.

(#5112) 12 Meter SCSI Cable

(For IBM US, No Longer Available as of June 28, 2002)

Supplies one 12 meter SCSI cable. Maximum: One. Field or plant installable. If the SCSI feature #2420 on RS/6000 is used, or a second E01 is daisy chained to this one, you can use a 0.5 meter cable (#5105), or a 4.5 meter cable (#5145) without exceeding the 18.0 Meter cable limitation of feature #2420.

(#5118) 18.0 Meter SCSI Cable

(For IBM US, No Longer Available as of June 28, 2002)

Supplies one 18.0 meter SCSI cable. This cable allows the tape drive to be located further away from the RS/6000 or AS/400 for greater flexibility. This is the maximum distance for SCSI feature #2420 on RS/6000. The maximum distance for other SCSI features and for AS/400 is 25 meters. Maximum: One. Field or Plant installable. If #2420 on RS/6000 is used, or a second E01 is daisy chained to this one, it can only be located next to the first one and connected with the 0.5 meter cable.

(#5125) 25.0 Meter SCSI cable

(For IBM US, No Longer Available as of June 28, 2002)

Ships one 25.0 meter SCSI cable. This is the maximum distance supported for SCSI attachment to AS/400 and the maximum distance supported on RS/6000 with SCSI feature code #2416 or #2412. Maximum: One. Field or Plant installable. Maximum: One. Not supported when the E01 is attached to feature #2420 on RS/6000.

Feature Exchanges

Not applicable.

Accessories

One cartridge magazine is shipped with each E01. A cartridge magazine must be in the E01 for the CSL to be operated. It is suggested that a spare magazine be ordered and kept on hand in case the original magazine is misplaced or accidentally damaged.

Customer Replacement Parts

None.

Machine Elements

Not applicable.

Supplies

Product Description	Part No.	UPC Code
3480 Cartridge Storage Tape, 200MB	4770150	0-87944-21119-8
Conductive Cleaning Cartridge	05H3917	0-87944-21181-5
3490E Cartridge Storage Tape, 800MB	09G4494	0-87944-21117-4

For additional media supplies refer to:

- http://www.storage.ibm.com/media

or contact the appropriate distributor for your location as given below:

To purchase IBM-branded media and media supplies, call 1-888-IBM- MEDIA in the U.S. and Canada, or go to:

- http://www.storage.ibm.com/media

Diskettes

3490E E01 models that include specify feature code #9603, AIX Device Driver, include a diskette. The diskette provides device support needed by RS/6000 systems with AIX/6000 for the 3490-E01. AIX/6000 3.2.0 or later is required.

Trademarks

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