

IBM 3490-C11 Magnetic Tape Subsystem

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IBM U.S. Product Life Cycle Dates

Type Model	Announced	Available	Marketing Withdrawn	Service Discontinued	Replaced By
3490-C11	1992/02/18	1992/04/17	1998/09/25	-	3490-F1A

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-C11

(For IBM US, No Longer Available as of September 25, 1998)

The 3490-C11 is a 36-track, 1 Control Unit, 1-drive, Autoloader, tape subsystem. The Model C11 is a low-cost, rack-mountable member of the IBM 3490 Magnetic Tape Subsystem Enhanced Capability family, providing significant performance and cartridge capacity improvements for midrange systems. The 3490E Model C11 is fully compatible with existing 3490E models, using both the Cartridge System Tape and the longer 3490E Enhanced Capacity Cartridge System Tape, and are read-compatible with earlier cartridge formats for ease of migration. The Enhanced Capability format (36-track bi-directional recording), together with standard Improved Data Recording Capability (IDRC) and the higher capacity tape, dramatically increase overall cartridge capacity. This increased capacity and standard Automatic Cartridge Loader (ACL) on the C11 model combine to address the data capacity requirement for unattended backup on mid-range systems. Utilization of ES Connection (ESCON*) Channels provides new possibilities in performance, connectivity, and remote tape operations. This model is supported on AS/400*, RS/6000*, and ES/9000* systems.

Highlights

- Significant Tape Subsystem Performance Improvement

- Significant Cartridge Capacity Improvement
-

Description

Business Solutions

The 3490 Magnetic Tape Subsystem family offers solutions to business requirements in the areas of adaptability, maintenance, reliability, and availability, usability, and exploitation. All 3490 Magnetic Tape Subsystems can attach to multiple processors and are supported by MVS, VM, VSE, AIX/370, TPF, OS/400*, and AIX*.

The IBM 3490 family's innovative packaging provides environmental characteristics that are far superior to those of previous tape technologies.

Model Description 3490-C11

Systems Management and Systems Handling

The 3490E Model C11 offers equivalent function and capacity to the 3490E D4X models at a significantly lower price for mid-range systems. This model is rack-mountable in a standard 9309 rack, 5040 Bus Extension Unit, or 5042 System Unit Expansion. It occupies 14 EIA units (24.5 inches), offering significant floorspace savings over previous 3490 models. All models may be factory installed or field merged if sufficient space is available in an existing rack, otherwise an additional rack is required. Model C11 is a Control Unit with one tape drive and Automatic Cartridge Loaders.

The model C11 may be factory installed in an on-order 7202 RISC System/6000 Expansion Rack or field installed in an existing 7202 rack of a RS/6000.

Tape Subsystems Improvements

This model has a 36 track bi-directional (18 tracks at a time) read/write head providing equivalent cartridge capacity to the 3490E D41/D42. Utilizing the recently announced Enhanced Capacity Cartridge System Tape cartridge capacity is increased to 800Mb. By using the standard IDRC, and assuming a three times compaction ratio, the single cartridge capacity can be 2.4Gb. When combined with the Automatic Cartridge Loader on model C11, the total unattended capacity can be up to 14.4Gb. These improvements result in greater tape throughput and improved operator productivity by (1) reducing total tape mounts, (2) reducing the number of cartridges required, and (3) reducing cartridge rewind time in most cases and virtually eliminating rewind time for full cartridges.

The 3490E Model C11 writes only the 36 track format introduced with the 3490E family; however, to satisfy the interchange requirement, it reads 3480/3490 format, with or without IDRC.

Reliability and Availability

Advanced Electronic Packaging contributes to improved reliability and availability. The number of electronic cards in both the Control Unit and Drive Unit have been reduced, when compared to the 3490E D41/D42. Higher reliability of circuit technology and microcode input disk unit, and enhanced Control Unit Error Recovery Procedures (ERP) all contribute to increased reliability and availability.

Utilization and Performance

Utilization of ESCON Channels provide new possibilities in floorspace planning, configurability, and connectivity. The 3490E Model C11 fully participates in ESCON I/O architecture at distances up to 23KM (14.3 miles).

Improvement in subsystem performance is provided through the available Performance Enhancement Feature #5045 together with ESCON channels. The result is improved control unit data rate (up to 9 Mb/sec), reducing the backup and batch window time constraints, and time required for tape processing.

Up to two channel adapters may be installed to satisfy the requirement for sharing between two processors. Parallel, ESCON, or SCSI-2 channels may be attached in any combination.

The 3490E C11 tape drive is the highest performance tape offering from IBM for RS/6000. With the SCSI-2 Differential Adapter installed it offers up to a 3 Mb/sec transfer rate.

Business Solutions

The 3490E C11 model is a very cost-effective tape solution for the save/restore requirement on mid-range systems. The very high cartridge data capacity significantly reduces both the number of cartridges required and the number of mounts required during any tape operation such as save/restore. Operator productivity is increased and the number of cartridges required for the tape library is reduced, resulting in continuing significant cost savings.

The higher reliability and availability for these models provide additional savings in the form of less down time for maintenance and increased system availability for user applications.

ESCON architecture enables users to better plan remote disaster recovery sites with the ability to connect up to 23 kilometers from the central facility. This allows users to utilize less expensive floor space and potentially eliminates the need to expand facilities to accommodate growth.

Investment Protection

Past investments in the IBM 9309 Rack Enclosure can be further exploited to house the IBM 3490E Model C11. In the past, the option for a mid-range customer wishing to take advantage of Cartridge System Tape technology was to attach a 3490 Model D3X or D4X stand-alone unit. Now the IBM 3490E Models Cxx series can be integrated into the existing rack enclosure (excluding the 9370 System Rack) without floorspace. The IBM 3490E C11 may use the same cartridge system tape first introduced with the IBM 3480, protecting years of investment in media.

Growth Enablement

Mixing of Parallel Adapters and ESCON Adapters is allowed. Both adapter types can be field and/or factory installed. The Performance Enhancement Feature, in conjunction with ESCON channels, supports channel data rates up to 9Mb/sec. (Two tape drives each with their own ACL.)

Parallel, ESCON, and SCSI adapters can be intermixed in any combination up to two.

The SCSI adapters can support a peak data rate of 3.0 Mb/sec.

User Productivity

Direct Access Storage Device (DASD) to tape backup time is significantly reduced over available 10.5-inch reel tape devices, resulting in more online time for users.

The 3490E Model C11 is IBM's highest performance tape offering on RS/6000 systems. It may significantly reduce backup times.

Model

Model Summary Matrix

Model	Control Units	Drives	Channels Available	Tracks	Data Rate Mb/sec	Data Capacity /Enhanced Tape
C11	1	1	2	36	3.0	400Mb/800Mb

Maximum

A single C11 is the maximum control unit configuration, however, more than one C11 may be attached to a single host processor.

Normally, one C11 is shipped in the top of a 7202 RS/6000 Expansion Rack. Two units also may be ordered in one rack, but bending down to insert or remove cartridges from

the lower unit may be inconvenient. It would be more convenient to use the lower part of the rack for disk storage, rather than tape.

Customer Setup (CSU)

None.

Devices Supported

Not available.

Model Conversions

- C11 to C22
- C11 to C1A

The model C11 to model C22 upgrade adds an additional drive with ACL. This maximizes unattended save/restore by allowing up to 28.8 GB (assuming a three times compaction ration) of compacted data to be saved without operation intervention. Field Installation: Yes.

The model C11 to model C1A upgrade allows the unit to be placed in a 3494 Tape Library Dataserver. The C1A can be upgraded to a model C2A. Field Installation: Yes.

Technical Description

The 3490 Magnetic Tape Subsystem Enhanced Capability Model C11 is a rack-mountable unit designed for mid-range systems providing the following functions:

3490E Model C11 has an Enhanced Capability format (36-track, bi-directional recording) read/write head providing approximately 2X the cartridge capacity of the previous models of the 3480 or 3490 Base models, independent of IDRC. The bi-directional head writes 18 tracks from load point to physical end of tape and then writes the other 18 tracks from physical end of tape to load point. Therefore, fully written tapes are positioned at load point, virtually eliminating the rewind operation. The 2Mb buffer and microcode load provide improved autoblocking increasing cartridge capacity and performance. Autoblocking is always invoked; IDRC invoked is considered normal operations. IDRC may be suppressed, via software only, for special requirements (such as writing tape labels). Half full cartridges (written to physical end of tape) rewind at an average speed of 5 meters per second. The "LOCATE" function has been enhanced to accommodate the bi-directional format. For instance, if the desired record is close to the load point but on the inbound tracks, "LOCATE" reads down the outbound tracks past

the desired record, stop, switch to the inbound tracks, and read the desired record, eliminating the time required to search the entire recorded tape.

The 3490E Model C11 writes only the 36-track format introduced with the previous models of the 3490E A10, A20, B20, B40, D41, and D42; however, for migration purposes the model C11 reads previous 3480 and 3490 formats, with or without IDRC.

Control Unit reliability/availability is provided by reducing the number of electronic cards providing room for a maximum of two in any combination of ESCON Adapters, Parallel Adapters, or SCSI-2 Adapters. ESCON provides enhanced connectivity.

Unique microcode and host software is required to support this product. The customer may need JCL changes for 3490 generics or esoterics.

Physical Specifications

- Width: 480mm (19.0 inches)
- Depth: 980mm (38.6 inches)
- Height: 622mm (24.5 inches)
- Weight: 118kg (260 lbs)

Operating Environment

- Temperature: 16.0 to 32.0C (60 to 90F)
- Relative Humidity: 20 to 80 percent
- Wet Bulb Temperature: 25.6C
- Calorific value: 731
- BTU: 2.90
- Electrical power: KVA 0.90
- Capacity of Exhaust: Cubic meter/min 9.6
- Noise Level:

 Declaration of IBM Product Noise Emission Values

Type	LWAd		LpAm		<LpA>m		I	T
	Operate (Bels)	Idle (Bels)	Operate (dB)	Idle (dB)	Operate (dB)	Idle (dB)		
3490 C11 50 Hz	6.5	6.5	NA	NA	48	47	Yes	Yes

Note:

LWAd is the declared (upper limit) sound power level.

LpAm is the mean value of the A-weighted sound pressure level at the

operator position (if any).

<LpA>m is the mean value of the A-weighted sound pressure levels at the

one-meter (bystander) positions.

I Impulsive noise emission (yes or no).

T Prominent tone(s) present in noise emission (yes or no).

NA Indicates "not applicable" (e.g., having no defined operator position).

All measurements made in accordance with ANSI S12.10, and reported in conformance with ISO 9296.

- Leakage and Starting Inrush Current: 3.3mA/50 ampere for 250u, secondary Starting Inrush Current 13 ampere.

Limitations

When the SCSI adapter is installed, the 3490E cannot support block sizes above 256KB. Block sizes above 256KB are used by the seismology industry in some older tape formats.

Linked commands are not supported.

The Differential SCSI-2 Adapter (#5040) is a fast and wide 16-bit SCSI-2 interface. When attaching to a 8-bit SCSI-2 interface, such as the RS/6000 SCSI-2 High Performance Controller (#2420) an Interposer Single Byte Wide RS/6000) is employed. Or when attaching to the 16-bit IBM SCSI-2 Differential Fast/Wide Adapter/A (#2416) or Enhanced SCSI-2 Differential Fast/Wide Adapter/A (#2412) an Interposer Double Byte Wide RS/6000 (#9702) is employed. The 3490E must be located physically at one end of the bus. If multiple 3490E models are attached to a RS/6000 bus, only one of them must be at the end of the bus.

Only one AS/400 system can be attached to a SCSI adapter. Attachment of the SCSI adapter to each AS/400 system requires the use of an AS/400 interposer feature #9410 on the 3490 drive. A new 3490 with the SCSI adapter cannot be ordered for plant shipment in a 9309 rack, and must therefore include feature #9983 routing code for US shipment, and NO routing code for non-US shipment.

Hardware Requirements

The 3490E Model C11 may be attached to any of the following host processors:

- AS/400 9406 All Models
- ES/9000

- ES/9370* (Note: Only supported by VSE/ESA* Version 1 Release 2.0)
- 4381
- 3090*
- RS/6000 models that support System/370* Channel Emulator/A (#2759)
- RS/6000 models that support S/390* ESCON Channel Emulator (#2754)
- RS/6000 models that support IBM SCSI-2 Differential Fast/Wide Adapter/A (#2416) or Enhanced SCSI-2 Differential Fast/Wide Adapter/A (#2412)
- RS/6000 models that support #2420 SCSI-2 Differential Controller

Note: For RS/6000 a 7202 rack is required. For other than Rack Mounted systems, a 9309 002 Rack Enclosure is required.

Software Requirements

Support for the 3490E Model C11 is supported in the OS/400, VSE, VM, MVS, TPF, and AIX/6000* environments.

- OS/400 Version 2 Release 1.1
- VSE/ESA* Version 1 Release 2.0
- VM/ESA* Version 1 Release 1.1
- AIX/6000* Version 3.2.0 Attaching using FC #2759
- AIX/6000* Version 3.2.4 and Above Attaching using FC #2420
- AIX/6000* Version 3.2.5 + PTFs Attaching using FC #2416 or FC #2412
- AIX/6000* Version 3.2.0 and Above Attaching using FC #2754

MVS support is provided with the current JES2 or JES3 for the following MVS releases:

- MVS/ESA* SP Version 4 Release 2.0 + PTF
- MVS/SP* Version 3 Release 1.3 + PTF
- MVS/SP Version 2 Release 2.3 + PTF
- MVS/DFP* Version 3 Release 1.1 + PTF
- MVS/DFP Version 3 Release 2.0 + PTF
- MVS/DFP Version 3 Release 3.0 + PTF
- RMF Version 3 Release 5.1 (Supports MVS/SP 2.2.3) + PTF
- RMF Version 4 Release 1.2 (Supports MVS/SP 3.1.3)
- RMF Version 4 Release 2.1 (Supports MVS/ESA 4.2.0)
- DFDSS Version 2 Release 5.0 + PTF
- EREP Version 3 Release 4.2 + PTF
- DFHSM Version 2 Release 6.0
- DFSORT Release 11.0 + PTF
- DFSORT Release 11.1
- TPF Version 3.1 + PTF

Operating systems which support 3490E Model C11 while operating as a guest on a VM system is able to use the device as an unsupported device in the following VM releases.

- VM/XA SP* Release 2.1
- VM/ESA Release 1.0

Enhanced Capability Format Recognition

A toleration PTF is available on the following Data Facility Product (DFP) levels to permit 3480 and previous 3490 devices to recognize a 3490E format tape, and display a meaningful message to the operator. This eliminates the problem of a 3490E formatted cartridge placed on a drive other than a 3490E drive and having it confused with an uninitialized volume.

Note: Unpredictable results can occur if a cartridge with this format is loaded on a 3480 or 3490 when the operating system is at a down-level version other than those listed below.

- MVS/370 DFP Version 1 Release 1.2 PTF
 - MVS/370 DFP Version 1 Release 1.3 PTF
 - MVS/XA* DFP Version 2 Release 4.0 PTF
-

Publications

The following publications are shipped with the product. Additional copies are available immediately.

- GA32-0218 IBM 3490 Magnetic Tape Subsystem Enhanced Capability Models C10, C11, and C22 Operators Guide
 - GA32-0047 Care and Handling of the IBM Magnetic Tape Cartridge
-

Features -- Specify/Special/Exchange

No Charge Specify Codes

Unless indicated otherwise, these features are available only at time of manufacture.

- Machine Nomenclature
 - English #2924
 - Canadian French #2935
 - German #2929
 - Italian #2932
 - Spanish #2931
 - Korean #2987

- Hong Kong #2988
- Japanese #2930

If no language is specified, language is assigned based on country code of the order or English (#2924) is supplied.

The Message Display is provided in the same language as the machine Nomenclature (except Korean, Hong Kong, and Japanese). During installation the Customer Engineer can set the unit to display ICONs.

The following Specify Codes should be ordered if External Channel Cables are required: Factory/Field installable.

- #9927 Channel Input Cable Adapter
- #9985 6.0M (20 ft) External Cable (AS/400 only, if satisfactory)

The following Specify Code should be ordered if attaching to Bus/Tag: Factory/Field installable.

- #9926 Channel Output Cable Adapter

Otherwise cable limitations are identified in the "IBM Input/Output Equipment Installation - Physical Planning" (GC22-7064).

The following Specify Codes should be ordered if Internal Channel Cables are required: Factory/Field installable.

- #9928 1.7M (5.6 ft) Internal Channel Cable - Models C10, C11, C22 Only (1)
- #9929 6.6M (21.7 ft) Internal Channel Cable (1)
- #9930 24.0M (78.7 ft) Internal Channel Cable (1)
- #9931 6.6M (21.7 ft) Internal Channel Cable (2)
- #9932 24.0M (78.7 ft) Internal Channel Cable (2)
- #9601 Factory Merge 3490E CxA with 3494 Model L10
- #9611 Factory Merge 3490E CxA with FC #5300

- (1) For AS/400 9406 Orders Only
- (2) For AS/400 9404 Orders Only

The following feature code numbers apply for RS/6000 attachment to 3490E Model C11 SCSI-2 interface using the RS/6000 system's SCSI-2 Differential High Performance I/O Controller (#2420) or IBM 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 by ordering RS/6000 cables. Using the RISC System feature #2420, #2416, or #2412, the maximum distance the 3494 can be attached to RS/6000 is 19.0 meters.

An interposer is required when the 3490E Model C11 is connected to feature #2420, #2416, or #2412 on the RS/6000. One interposer is supplied for each feature. Additional interposers may be obtained by ordering feature code #9701 for the #2420 and feature code #9702 for the #2416 on the 3490E. See the IBM Input/Output Equipment Installation Manual - Physical Planning (GC22-7064).

- Feature code #6006: 0.6 meter SCSI cable
- Feature code #6045: 4.5 meter SCSI cable
- Feature code #6120: 12.0 meter SCSI cable
- Feature code #6140: 14.0 meter SCSI cable
- Feature code #6180: 18.0 meter SCSI cable

Cabling Information: AS/400

1. The following are the adapter and cable features required to attach 3490 Cxx tape drives to 9406 B models:
 2. a. On the 9406 - #2604 (tape attachment).
 - 3.
 4. b. On the 3490 Cxx - #5037 (parallel channel attachment).
 5. - #9927 (Channel Input Cable Adapter).
 6. - #9985 (6.0 meter/20 foot external
 7. cable).

The 9406 and 3490 Cxx racks are connected with external cables. If 6 meter external cables (#9985) are not adequate, see "Physical Planning" (GC22-7064) and order other external (bus/tag) cable lengths. One 3490 Cxx feature #5037 and appropriate cable features must be ordered for each AS/400 to be attached.

8. The following are the adapter and cable features required to attach 3490 Cxx tape drives to 9406 D/E models with tape attachment feature #2622:
 9. a. On the 9406 - #2622 (tape attachment).
 - 10.
 11. b. On the 3490 Cxx - #5037 (parallel channel attachment).
 12. - #9927 (Channel Input Cable Adapter).
 13. - #9985 (6.0 meter/20 foot external
 14. cable).

The 9406 and 3490 Cxx racks are connected with external cables. If 6 meter external cables (#9985) are not adequate, see "Physical Planning" (GC22-7064) for other external (bus/tag) cable lengths.

One 3490 Cxx feature #5037 and appropriate cable features must be ordered for each AS/400 to be attached.

15. The following are the adapter and cable features required to attach 3490 Cxx tape drives to 9406 D/E models with tape attachment feature #2644 (there are two options):

First option (the 9406 and 3490 Cxx racks are connected with an internal cable):

- a. On the 9406 - #2644 (tape attachment/high performance).
- b. On 3490 Cxx - #5037 and,
 - either #9928, #9929, or #9930 (internal 1.7, cables 1.7 M (5.6 FT), 6.6 M (21.1 FT), or 24.0 M (78.7 FT) maximum length).

Second option (the 9406 with feature #2644 and 3490 Cxx models are connected using external (bus/tag) cable):

- a. On the 9406 - #2644 and,
 - #9980 (3490-Cxx external cable connection for 9406 model D/E only).
- b. On the 3490 Cxx - #5037 (parallel channel attachment).
 - #9927 (Channel Input Cable Adapter).

The bus/tag cable option can be used when cable lengths greater than 24 meters are required or when existing external cables are preferred.

One 3490 Cxx feature #5037 and appropriate cable features must be ordered for each AS/400 to be attached.

16. The following are adapter and cable features required to attach 3490 Cxx tape drives to 9404 models with tape attachment feature #2644 (there are two options):

- 17. a. on the 9404 - #2644 (tape attachment high performance)
- 18. b. on 3490 Cxx - #5037
- 19. - either 9931 6.6 M (21.1 ft) or 9932
- 20. 24.0 M (78.7 ft) Max Length

Second option the 9404 with feature #2644 and 3490 Cxx models are connected using external (bus/tag)cables:

- a. on the 9404 - #2644
 - #9980 (3490-Cxx external cable connection for 9404 models
- b. on 3490 Cxx - #5037 (parallel channel attachment)
 - #9927 (channel input cable adapter)

21. The following are the adapter and cable features required to attach 3490 CXX tape drives to the feature #6501 tape IOP on any Stage 2 AS/400 9402/4/6 Model DXX and up:

- 22. a. On the 9402/4/6 - #6501 (Magnetic Tape Subsystem Controller).
- 23.
- 24. b. On the 3490 CXX - #5040 (Differential SCSI-2 Adapter).
- 25. - #5045 (Performance Enhancement).
- 26. - #9401 (Interposer for AS/400).

- 27. cable). - #6045, #6120, #6140, or #6180 (SCSI)
- 28. - #9983 (field merge)

Cabling Information: ES/9000 (9221)

1. The following are the adapter and cable features required to attach 3490 Cxx tape drives to 9221:

First option (the 9221 and 3490 Cxx racks are connected with an internal cable):

- a. On the 9221 - See the ES/9000 Sales Manual for Internal Channel Cable ordering information
- b. On the 3490 Cxx - #5037 (parallel channel attachment)

Second option (the 9221 and 3490 Cxx models are connected using external (bus/tag) cable):

- a. On the 9221 - See the ES/9000 Sales Manual for External Channel Cable ordering information
- b. On the 3490 Cxx - #5037 (parallel channel attachment).
- #9926 (Channel Output Cable Adapter).
- #9927 (Channel Input Cable Adapter).

The 9221 and 3490 Cxx racks connected with external cables: See "Physical Planning" (GC22-7064) for other external (bus/tag) cable lengths.

One 3490 Cxx feature #5037 and appropriate cable features must be ordered for each processor is attached.

Third option, ESCON connections between the 9221 and 3490 Cxx models:

- a. On the 9221 - See the ES/9000 Sales Manual for Internal Channel Cable ordering information
- b. On the 3490 Cxx - #3319 (ESCON channel attachment)

Cabling Information: RS/6000

The following are the adapter and cable features required to attach a 3490 C11 tape subsystem to RS/6000 500 and 900 series systems:

- a. On RS/6000 - #2420 SCSI-2 Differential High-Performance External I/O Controller and one interposer

- b. On the 3490 Cxx
 - #5040 Differential SCSI-2 Adapter
 - #6XXX SCSI Cable
- c. 7202 Expansion Rack - space in an existing rack
or a 7202 order for shipment
with the 3490

The RS/6000 processor and the 3490E tape subsystem are connected by SCSI cables (features #6006, #6045, #6120, #6140, and #6180). At least one cable is required. The minimum length needed to connect the 3490E to a RS/6000 is #6045 the 4.5 meter cable. Each RS/6000 connected directly to the 3490E with RS/6000 feature #2420 must have an interposer. One interposer is supplied with each 3490E SCSI feature. Additional interposers for additional systems may be ordered using feature #9701, Additional Interposer, on the 3490E.

3490 Model C11 Order Routing Specify Codes

All 3490 Cxx orders require an Order Routing Specify Code, unless specifically exempted in the following table. Which code to use depends upon whether a rack is on order and upon the geographical location of the order. The 3490 Cxx models are rack-mounted units that require a rack. The rack must either be ordered at the time of the 3490 Cxx order or the customer must have room in an existing rack. The HONE configurator must be used to generate the correct order code and configuration. Ordering the incorrect routing code can result in a significant delay in shipment.

For AS/400, 9221, S/370, S390, and 4381 orders a 9309 Expansion Rack is required. For attachment to AS/400 systems with the SCSI adapter feature #5040, Plant Shipment in 9309 Rack feature #9990 cannot be used. For the U.S. you must specify feature #9983, for all other geographies no routing feature code should be specified.

For RS/6000 orders a 7202 RS/6000 Expansion Rack is required. Either space within a customer's existing rack is needed or a new 7202 rack must be ordered. In EMEA only, the 3490 can be installed in a 7202 rack at the plant. In the US, Canada, AP, and LA the 3490 is field installed in a 7202 rack.

The following table should be used to determine the correct routing specify code:

	U.S.	CANADA	EMEA	AP	LA
-					
RS/6000					
Plant Shipment in 7202 Rack	NA	NA	Note #3	NA	NA
Customer Supplied Rack	#9983	Note #1	Note #3	Note #1	Note #1
Field Install In Ordered 7202	#9983	Note #1	NA	Note #1	Note #1

AS/400 SYSTEMS:

Plant Shipment in 9309 Rack	#9990	#9990	Note #3	#9990
#9990				
Plant Shipment w/o 9309 Rack	#9983	Note #1	Note #3	Note #1
#1				

ES/9000 - 9221 SYSTEMS:

Plant Shipment in 9309 Rack	#9991	#9991	#9992	#9996
#9996				
Plant Shipment w/o 9309 Rack	#9991	Note#1	#9992	Note #1
#1				

S/370 - S/390 (incl. 9121 9021) / 4381 SYSTEMS:

Plant Shipment in 9309 Rack	(a)	Note #1	Note #2	Note #1
#1				
Plant Shipment w/o 9309 Rack	#9983	Note #1	Note #2	Note #1
#1				

NA: Not available. For these geographies, the 3490-C11 is installed in the 7202 rack at the customer location. If there is not room in an existing customer rack, a new rack must be ordered when the 3490 is ordered.

(a)NOTE: For 9121 and 9021 only, place an order for a 9309 stand-alone rack. Place a second order for the 3490-Cxx drive using the routing code indicated in the above table. The 9309 and 3490-C11 is merged at the customer location. The 3490-C11 is supported on the 9121 and 9021 ONLY as a field merge product. For support on all other systems, contact the Tucson Tape Product Planning department.

- #9983 = Plant Shipment 3490 Only
- #9990 = Shipment in 9309 - AS/400
- #9991 = Valencia - U.S./Canada Shipments
- #9992 = Valencia - EMEA Shipments
- #9996 = Sumare

Notes:

- Note #1: Routing code NOT required - order defaults to MARTINEZ
- Note #2: Routing code NOT required - order defaults to VALENCIA
- Note #3: Routing code NOT required - order defaults to SANTA PALOMBA

Order Tie Codes/Special Handling:

- #9995 Used with 9221 MES orders. This feature is used to tie the 3490-Cxx order to the 9309 rack order - Used by SUMARE for AP/LA orders and Valencia for EMEA orders. For EMEA orders only, F/C #9995 excludes the use of F/C #9992.
- #9909 Specifies that 3490E model C11 must be installed in a 9309 Rack Enclosure prior to shipment to the customer.
- #9991 Can be used by Brazil customers only for special routing with prior approval - Routes 3490-Cxx orders to VALENCIA

- #9983 Can be used by Brazil customers only for special handling with approval - Routes 3490-Cxx orders to SAN JOSE

Special Feature Codes -- Chargeable

Minimum Channel Attachment Configuration

Every model C11 must be configured with a minimum of one feature code #5037, #3319, or #5040.

(#5037) Parallel Channel Attachment

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

Allows the 3490E Model C11 to attach to an AS/400, any ES/9000, or S370* parallel channel. Required if this is the only channel attachment. Maximum: Two. Field Installation: Yes.

3490E Model C11 Parallel Channel Adapters can be attached to ESCON channels at extended distances by using the 9034 ESCON Converter Model 1.

The maximum cable distance of the 3490E Model C11, using parallel channels, can be extended using the IBM 3044 Fiber-Optic Channel Extender Link Models C02 with the Enhanced Tape Attachment feature (#6053).

(#3319) ESCON Adapter

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

Provides one ESCON Adapter as a channel attachment for the Model C11.

Note: For details on configuring mixed ESCON and parallel environments or ESCON connectivity, see the ESCON Adapter Features section at end of this document.

Note: This feature only applies on S/390 or S/370 processors. Maximum: Two. Field Installation: Yes.

(#5045) Performance Enhancement

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

The Performance Enhancement feature together with the ESCON Adapter (#3319) provides performance improvements up to 9 Mb/Sec and distances up to 23 Km. The Performance Enhancement feature together with SCSI-2 differential (#5040) provides improvements up to 6.3 Mb/Sec. Maximum: 1. Field Installation: Yes.

(#9701) Additional Interposer

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

Feature #9701 supplies one 2 byte to 1 byte interposer. It is field- or plant-installable. This feature applies to Model C11. One interposer is supplied with each feature #5040. If more than one RS/6000 is attached, an additional interposer should be ordered for each one, after the first one, that is directly attached with the 3490E SCSI cable.

See Special Features for the description of the SCSI cables needed for the Differential SCSI-2 Adapter. At least one is required. The minimum length that should be ordered to connect a RS/6000 to the 3490E is 4.5 meters, #6045.

(#5040) Differential SCSI-2 Adapter

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

Feature (#5040) is a SCSI-2 Fast and Wide (16 bit) Differential SCSI adapter to allow the 3490E Model C11 to attach to RS/6000 series 500 and 900 systems, or to any Stage 2, AS/400 9402/4/6 Model DXX and up that is capable of attaching the Magnetic Media Subsystem Controller feature #6501. Only one AS/400 system can be attached to a SCSI adapter. Attachment to each AS/400 system requires the use of an AS/400 interposer feature #9410 on the 3490 drive, and in the U.S. routing code feature #9983 must be specified. Both 8-bit and 16-bit transfer are supported. An interposer provides attachment to 8 bit SCSI-2 buses. The feature comes with one interposer, one wrap tool, and one terminator. A differential SCSI controller must be available on RS/6000. If the RS/6000 SCSI-2 Differential High Performance Controller, feature #2420, or IBM SCSI-2 Differential Fast/Wide Adapter/A is used, for maximum effective performance, no other I/O devices should be attached with the 3490E. If other I/O devices are attached, their throughput may be limited if the 3490E is used simultaneously. The 3490E adapter is a 2 byte wide SCSI-2 Fast interface. It has a SCSI-3 68 pin P connector interface. This system attachment accommodates 16 bus addresses. When attaching to a single byte (8 bit) SCSI-2 interface, such as the RS/6000 SCSI-2 Differential High Performance Controller, feature #2420, a 1 byte to 2 byte interposer (#9701) must be employed. When attaching to a 2 byte (16-bit) SCSI-2 interface, such as the IBM SCSI-2 Differential Fast/Wide Adapter/A, feature #2416, or Enhanced SCSI-2 Differential Fast/Wide Adapter/A #2412, an interposer (#9702) must be employed. The interposer must be used on any RS/6000 directly connected to the 3490E. The adapter feature supplies one interposer. If additional interposers are needed, they can be supplied by ordering one or more of feature #9701 or #9702 on the 3490E. Using the 1 byte to 2 byte interposer limits the bus addresses to a maximum of 8. This allows for up to 7 3490E Cxx SCSI interfaces to be attached to one initiator, or 1 3490E Cxx SCSI interface to be attached to up to 7 initiators. Cable length restrictions for SCSI limits the actual number of attachments possible. Any combination of initiators and 3490E Cxx SCSI interfaces is permissible up to a total of 8 provided the following rules are observed:

- The 3490E Cxx SCSI interfaces are located physically at one end of the bus. This is important to insure proper bus termination when using the interposer. If there is more than one 3490E, only one need be at the end.

- Cable restrictions are followed in accordance with the SCSI-2 specifications. With the SCSI-2 Differential High Performance Controller (feature #2420) on the RS/6000 the total cable length is limited to not more than 19 meters.
- Mixing of Tape and Disk units, on the same SCSI-2 bus, is not recommended.
- Only one initiator or RS/6000 can use the 3490E at a time.

Refer to the Planning and Migration Guide (GC35-0219) for more information. On the Model C11 both drives can be accessed with one (#5040) SCSI adapter. A second SCSI adapter on the C11 can be used to attach the tape subsystems to more RS/6000 systems than can be accommodated within the cabling of one SCSI bus. The maximum SCSI cable length supported for RS/6000 SCSI-2 Differential High-Performance External I/O Controller (#2420) is 19 meters. Maximum: Two. Field Installation: Yes.

(#6006) 0.6 Meter SCSI Cable

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

Used to link two SCSI adapters installed on the same C11. Linking the two SCSI adapters features (#5040) allows them both to be accessed from one SCSI I/O controller on a RS/6000. It is not necessary to link the SCSI adapters on a C11. Either SCSI adapter can access either tape drive. The 0.6 meters should be included in the maximum allowable SCSI cable length supported by the RS/6000 SCSI I/O Controller feature. The 0.6 Meter cable by itself, is too short to connect a RS/6000 and a rack mounted 3490E tape subsystem.

(#6045) 4.5 Meter SCSI Cable

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

A 4.5 Meter SCSI cable is provided for use with the Differential SCSI-2 Adapter (#5040). A 4.5 Meter cable is the minimum length needed to connect a rack mounted RS/6000 and a 3490E tape subsystem in an immediately adjacent 7202 RS/6000 Expansion Rack. The 4.5 meter cable is the shortest orderable cable for connecting to a 500 series RISC System.

(#6120) 12.0 Meter SCSI Cable

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

A 12.0 Meter SCSI cable is provided for use with the Differential SCSI-2 Adapter (#5040).

(#6140) 14.0 Meter SCSI Cable

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

A 14.0 Meter SCSI cable is provided for use with the Differential SCSI-2 Adapter (#5040).

(#6180) 18.0 Meter SCSI Cable

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

A 18.0 Meter SCSI cable is provided for use with the Differential SCSI-2 Adapter (#5040). An 18.0 meter SCSI cable plus a 0.6 meter SCSI cable is the maximum combined cable length supported by the RS/6000 Differential SCSI-2 High Performance I/O Controller (feature #2420).

Feature Exchanges

Not available.

Accessories

Not available.

Customer Replacement Parts

Not available.

Machine Elements

Not available.

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

None.

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