IBM INSTALLATION INSTRUCTIONS

FC 5046. PCI Library Manager for 3494 Model L10/L12/L14/HA1 Tape Library

Document Number 18P7458 EC H28116A

SSD, Tucson

Written by: J. Johnson / A. Tzou / D. Martinez / P. Abbott

Checked / Modeled by: J. Dowell / J. Rose / C. Nelson

Approved by: J. Lowy

Support/DPCE Review by: S. Latham

Status: Field Use

Note: Install this Field Feature Bill Material (FFBM) only on the 3494 Tape Library Dataserver for which it was shipped.

Contents

Before Install (Sections 1 through 8)

1.0 Machines Affected

This FFBM applies only to those 3494 Subsystems for which FC 5046 (“PCI Library Manager”) has been ordered.

2.0 Prerequisites / Concurrent / Companion

If “Remote Library Manager Console” (FC 5226) was previously installed, refer to installation instructions “Remote Library Manager Console with TCP/IP” (P/N 05H7277, supplied) or “Remote Library Manager Console with APPC ” (P/N 05H4084, supplied) to reinstall the *Remote Library Manager Console*.

Also, the Customer's Remote Console Version number will be needed. This can be obtained by opening up an OS/2 window and typing in **syslevel**. Look for the text “Distributed Access Control Facility”. The next line after this text should be the version number. Record the information.

Note: If the communications protocol being used is APPC, go to Appendix A (at the end of this installation instruction) to remove the old configuration from the controlling workstation before reinstalling.

3.0 FFBMs To Be Installed

3.1 Library Manager Replacement

Note: One of the following FFBMs will be supplied.

3.1.1 Non HA1 Subsystem

Note: The following FFBM will be supplied for 3494 Models L10/L12/L14 that **DO NOT CONTAIN** FC 9040 (“High Availability Attachment”).

FFBM	Description
18P7004	Installation Instructions and Hardware

3.1.2 HA1 Subsystem

Note: The following FFBM will be supplied for 3494 Models L10/L12/L14 that **DO CONTAIN** FC 9040 (“High Availability Attachment”).

FFBM	Description
18P7457	Installation Instructions and Hardware

3.2 MIC3/LPC3 Card Replacement

Note: The following FFBM will be furnished if EC C35035 (“MIC3 Card Assembly”) is not reflected as currently installed within the MLC system.

EC CHECKPOINT:

- *EC C35035*: MIC card reflects part number 05H8144.

FFBM	Description
05H8297	MIC3/LPC3 Card Replacement

3.3 Library Manager Feature Installations

Note: The following features will be *factory installed* within the new **“PCI Library Manager**, if any of them have been **previously installed, shipped or ordered on the same MES order as FC 5046**:

- FC 5219 (“IBM Token Ring LAN Attachment”): See Section 3.3.1, “IBM Token Ring LAN Attachment”; and/or
- FC 5220 (“Ethernet LAN Attachment”): See Section 3.3.2, “Ethernet LAN Attachment” on page 6; and/or
- FC 5229 (“Expansion Attachment Card”): See Section 3.3.3, “Expansion Attachment Card” on page 6; and/or
- FC 5227 (“32 Port Attachment”): See Section 3.3.4, “32-Port Attachment” on page 7.

Proceed to Section 3.4, “Library Manager Microcode Update” on page 8 if none of the Library Manager features met the installation criteria listed within Section 3.3, “Library Manager Feature Installations.”

3.3.1 IBM Token Ring LAN Attachment

Note: The following FFBM will be supplied if the addition of FC 5219 has been previously installed, shipped or ordered on the same MES order as the addition of FC 5046.

Hardware required to be installed within the new “PCI Library Manager” will be *factory installed*. Any additional hardware requiring installation external to the new “PCI Library Manager” will be shipped along with the appropriate installation instructions within the FFBM listed below.

Proceed to Section 3.4, “Library Manager Microcode Update” on page 8 if this was the only (or last) Library Manager feature that met the installation criteria listed within Section 3.3, “Library Manager Feature Installations.”

FFBM	Description
18P7064	IBM Token Ring LAN Attachment FFBM

3.3.2 Ethernet LAN Attachment

Note: The following FFBM will be supplied if the addition of FC 5220 has been previously installed, shipped or ordered on the same MES order as the addition of FC 5046.

Hardware required to be installed within the new "PCI Library Manager" will be *factory installed*. Any additional hardware requiring installation external to the new "PCI Library Manager" will be shipped along with the appropriate installation instructions within the FFBM listed below.

Proceed to Section 3.4, "Library Manager Microcode Update" on page 8 if this was the only (or last) Library Manager feature that met the installation criteria listed within Section 3.3, "Library Manager Feature Installations" on page 5.

FFBM	Description
18P7067	Ethernet LAN Attachment FFBM

3.3.3 Expansion Attachment Card

Note: One of the following FFBMs will be supplied if FC 5229 has been previously installed, shipped or ordered on the same MES order as the addition of FC 5046.

Hardware required to be installed within the new "PCI Library Manager" will be *factory installed*. Any additional hardware requiring installation external to the new "PCI Library Manager" will be shipped along with the appropriate installation instructions within the FFBM listed below.

Proceed to Section 3.4, "Library Manager Microcode Update" on page 8 if this was the only (or last) Library Manager feature that met the installation criteria listed within Section 3.3, "Library Manager Feature Installations" on page 5.

3.3.3.1 Model L1x MES Addition

Note: The following FFBM will be supplied if FC 5229 has been ordered on this same MES order for addition within a 3494 Model L10, L12 or L14.

FFBM	Description
05H4072	Instructions and Miscellaneous Hardware

3.3.3.2 Model HA1 MES Addition

Note: The following FFBM will be supplied if FC 5229 has been ordered on this same MES order for addition within a 3494 Model HA1.

FFBM	Description
05H7344	Instructions and Miscellaneous Hardware

3.3.3.3 Non MES Addition

Note: The following FFBM will be supplied if FC 5229 has been previously installed or shipped.

FFBM	Description
05H8660	ARTIC Card

3.3.4 32-Port Attachment

Note: One or two of the following FFBMs will be supplied if FC 5227 has been previously installed, shipped or ordered on the same MES order as the addition of FC 5046.

Hardware required to be installed within the new “PCI Library Manager” will be *factory installed*. Any additional hardware requiring installation external to the new “PCI Library Manager” will be shipped along with the appropriate installation instructions within the FFBM listed below.

Proceed to Section 3.4, “Library Manager Microcode Update” on page 8 if this was the only (or last) Library Manager feature that met the installation criteria listed within Section 3.3, “Library Manager Feature Installations” on page 5.

3.3.4.1 Model HA1 MES Addition

Note: The following FFBM will be supplied if FC 5227 has been ordered on this same MES order for addition within a 3494 Model HA1.

FFBM	Description
19P1134	Instructions and Miscellaneous Hardware

3.3.4.2 Model L1x MES Addition

Note: The following FFBM will be supplied if FC 5227 has been ordered on this same MES order for addition within a 3494 Model L10, L12 or L14.

FFBM	Description
19P1082	Instructions and Miscellaneous Hardware

3.3.4.3 ARTIC Block Bracket

Note: The following FFBM will be supplied if FC 5227 has been ordered on this same MES order for addition within a 3494 Model L10, L12 or L14 whose plant MLC record reflects that EC H27323, (which began plant shipments on 11/14/2000), was not previously plant installed.

FFBM	Description
19P1135	4-ARTIC Block Bracket

3.3.4.4 4-ARTIC Block Bracket

Note: The following FFBM will be **supplied two additional times** if FC 5227 has been previously installed or shipped.

FFBM	Description
05H8660	ARTIC Cards

3.4 Library Manager Microcode Update

FFBM	Description
19P5409	LM523.01 microcode update

4.0 Preparation

__ 1. **Verify which Library Manager is currently installed** by referring to Figure 1 (*PS/ValuePoint System Unit*), Figure 2 (*IBM Model 7585 Industrial Computer System Unit*), Figure 3 (*IBM Model 7588 Industrial Computer System Unit*), and Figure 4 on page 10 (*IBM Model 7581 Industrial Computer System Unit*).

__ 2. Read and understand the purpose and details of this installation instruction.

__ 3. Check all items listed on the bill(s) of material supplied to determine that all parts **requiring FIELD INSTALLATION** have been received.

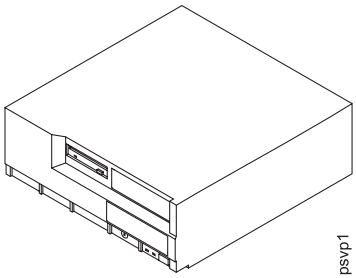


Figure 1. PS/ValuePoint System Unit

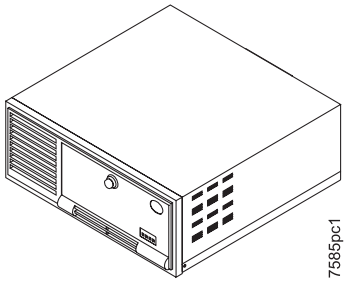


Figure 2. Model 7585 Industrial Computer System Unit

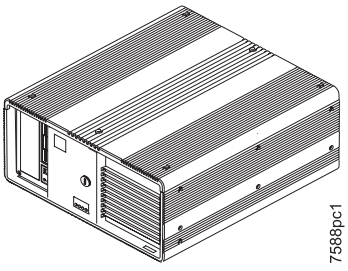


Figure 3. Model 7588 Industrial Computer System Unit

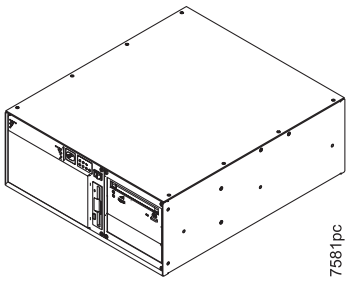


Figure 4. Model 7581 Industrial Computer System Unit

5.0 Programming Updates

None.

6.0 Purpose and Description

Replaces the existing Library Manager (within the 3494 Model L10, L12 or L14 control unit, or HA1 High Availability option right service bay frame) with the *latest production practice level* of the *IBM Model 7581 Industrial Computer System Unit*. See Figure 4.

The library manager furnished with this FFBM includes the equivalent function of FC 5214 (2nd Hard Drive).

7.0 Installation Times

Machine Hours	System Hours	CE Hours
4.0	0.0	2.3

8.0 Special Tools, Materials, and/or Procedures Required

You will require a copy of the following documents:

- *IBM 3494 Tape Library Maintenance Information* manual (P/N 18P7156, supplied).
  - Sections **Locations** and **Checks, Adjustments, Removals and Replacements** provide the required information for the installation of Library Managers.
  - Familiarize yourself with “System Unit, Library Manager Cards, Display Adapter Card, Ethernet Adapter, ARTIC186 Adapter, Servo Control Card and Token Ring Adapter” procedure found within the **Locations** Section.
  - Familiarize yourself with the “**Configuration Utility Program**” procedure found within the **Checks, Adjustments, Removals and Replacements** Section.
- One of the following documents:
  - “IBM PS/ValuePoint Installing Options” manual that was shipped with the 3494 Subsystem. Familiarize yourself with Chapter 1, “Option Installation Overview” or
  - “IBM 7585 Industrial Computer Information, Installation, Operation and Hardware Maintenance” manual (S06H-2298) that was shipped with the *IBM Model 7585 Industrial Computer System Unit*. Familiarize yourself with Chapter 3 (“Installing Options”) or
  - “IBM 7588 Industrial Computer Information, Installation, Operation and Hardware Maintenance” manual (S76H-4349) that was shipped with the *IBM Model 7588 Industrial Computer System Unit*. Familiarize yourself with Chapter 3 (“Installing Options”); and Chapter 6 (“Location of Primary and Secondary IDE Ports”) or
  - “IBM 7581 Library Manager Console Maintenance Information ” manual (P/N 18P7157) that was shipped with the *IBM Model 7581 Industrial Computer System Unit*.

Details of Installation (Sections 9 through 12)

9.0 Safety

9.1 Electrostatic Discharge (ESD)

Warning: Some parts handled during this installation are **very sensitive** to electrostatic discharge (ESD). See *Working With ESD-Sensitive Parts* in the **Checks, Adjustments, Removals and Replacements** Section of the 3494 Maintenance Information Manual.

9.2 Library Manager Preparation

None.

9.3 Feature Code Removal

This section determines if any features are installed and if installed, collects the necessary configuration information to transfer to the new enhanced library manager. **Be sure you start with the standby library manager**.

__ 1. Select **Service menu** from the **Mode** pulldown on the Library Manager action bar. If prompted for a password enter: **service**.

__ 2. Select **Service window** from the **Utilities** pulldown menu.

__ 3. To check for features installed type in the following command in the Service Window:
"chkfins c"

The features installed will be displayed within the Service Window. If any of the below features are installed, proceed to the appropriate FC step(s) below. If the feature is not displayed but should have been, proceed to the appropriate step(s) below for additional instructions to check for feature installation. Otherwise, type **exit** at the command prompt, and press **Enter** and proceed to section 9.4, "Which Library Manager To Replace" on page 14. If this is an HA1, check both library managers.

- FC 5219 = **Feature 5219 Token Ring Install EC=xxxxxxx**
- FC 5220 = **Feature 5220 Ethernet Install EC=xxxxxxx**
- FC 5226 = **Remote Library Manager Console Version X.X**
- FC 5050 = **IBM 3494 Dual Active Accessors Version X.X**

__ 4. FC 5219 ("IBM Token Ring LAN Attachment")

__ a. To check for installation, type in the following in the Service Window:
"dir C:\lm\5219.yes"
If the file exists, then FC 5219 is installed. Proceed to 18.0, "Appendix C FC 5219/ FC 5220 Removal Procedure" on page 58.

__ 5. FC 5220 (“Ethernet LAN Attachment”)

__ a. To check for installation, type in the following in the Service Window:
“dir C:\lm\5220.yes”
If the file exists, then FC 5220 is installed. Proceed to 18.0, “Appendix C FC 5219/ FC 5220 Removal Procedure” on page 58.

__ 6. FC 5226 (“Remote Library Manager Console”)

__ a. To check for installation, type in the following in the Service Window:
SET REMT_CON and press **Enter**
AND type:
SET REMOTE_CONSOLE and press **Enter**.

__ b. Remote Console can be considered as **NOT INSTALLED** if the response is:
REMT_CON=(NULL) AND **REMOTE_CONSOLE=(NULL)**.
Proceed to step 6d; OR

__ c. Remote Console can be considered as **INSTALLED** if any other response is received.
If you received a response for **SET REMT_CON**, then Remote Console for **APPC** is installed. Proceed to step 2 on page 56 to save the configuration information. When finished, return to this step.

If you received a response for **SET REMOTE_CONSOLE**, then Remote Console for **TCP/IP** is installed. Proceed to step 1 on page 55 to save the configuration information. When finished, return to this step.

__ d. If this is an HA1 library, the above steps need to be performed on the **Standby Library Manager** also. Go back to step 6a.

__ 7. FC 5050 (“Dual Active Accessors”)

__ a. To check for installation of this feature on the **Active Library Manager** from the **Mode** pulldown, select **Accessor**. If **BOTH** the **Enable Dual Active Accessors** and the **Disable Dual Active Accessors** are greyed out then FC 5050 is **NOT** installed.

__ b. If FC 5050 is installed perform the following steps.

__ 1) Insert Dual Active Accessors Feature diskette (Disk 1 of 2) in the diskette drive of the Standby Library Manager.

__ 2) Open up a Service Window by selecting **Service Window** from the Shutdown Menu. If prompted for a password enter: **service**.

__ 3) Type **a:\daainst uninstall** at the prompt in the Service Window and press **Enter**.

Note: The uninstall process is automatic. No intervention should be necessary.

__ 4) When the uninstall is complete, you are returned to the prompt.

__ 5) Repeat the above steps on the Active Library Manager using the disk in step 7b1.

Proceed to section 9.4, “Which Library Manager To Replace” on page 14.

9.4 Which Library Manager To Replace

__ 1. If this a **Single Library Manager** go to section 9.5, “Single Library Manager Procedure” on page 14.

__ 2. If this is an HA1 library there are three possible replacement scenarios listed below.

- __ a. Go to the active library manager and verify if it is A or B by looking at the title bar.
- __ b. If only one library manager is to be replaced go to section 9.6, “HA1 Library Manager Procedure” on page 18.
- __ c. If both library managers are to be replaced there are two options listed below.
  - __ 1) To minimize customer downtime, replace the Standby Library Manager first, then replace the Active Library Manger. When taking this approach you must wait until a remote copy completes after the Standby Library Manager is restarted. The time for the remote copy to complete varies depending on the number of logical and physical volumes. On average, it takes a half hour to process 50,000 volumes. If this is the desired choice of replacement, go to section 9.6, “HA1 Library Manager Procedure” on page 18.
  - __ 2) Replace both library managers at the same time. This requires that the library be offline to the customer until the Active Library Manager is restarted. However, it does not require waiting for a remote copy to complete after restarting the Standby Library Manager. If this is the desired choice of replacement, go to section 9.5, “Single Library Manager Procedure”

9.5 Single Library Manager Procedure

Note: If installing code on a Library Attached to a Peer-to-Peer VTS, first refer to the *IBM Magstar 3494 Peer-to-Peer Virtual Tape Server Maintenance Information Manual* before taking the Library Manager offline. Perform the steps in the **Entry into Start**; specifically the **Flow Introduction** section. Then return here and continue.

__ 1. If this is **NOT** a Peer-to-Peer Virtual Tape Server ask the operator to complete or cancel jobs in the queue.

__ 2. Ask the operator to vary all remaining NON Peer-to-Peer library devices and control units (B10, B16, B18, B20, Axx) offline.

__ 3. Place the library manager in **Pause** mode.

__ 4. If any cartridges are left in the drives proceed to the next step, if **NO** cartridges were left in the drives or error recovery cell go to step 8

__ 5. Remove cartridges left in drives and place them in the error recovery cell (1A1 if the machine is without the Dual Gripper feature; and 1A3 if the Dual Gripper feature is installed) or an empty storage cell.

__ 6. Return to **Auto-Online** and wait until all the cartridges have been returned to their home cell.

__ 7. If any cartridges were put away in an empty storage cell from step 5 make sure to perform a partial inventory update on the frame(s) where the cartridges were placed.

__ 8. Place the library manager in **Offline** mode.

__ 9. Place the library in **Pause** mode.

__ 10. Save the following information from the **OLD Library Manager** in case the Database Restore procedure fails. Record the information in the table provided in 19.0, “Appendix D Teach Configuration Table” on page 59.

__ a. From the Library Manager menu select:

- **Mode**
- **Service menu**
- **Teach**
- **Teach current configuration**

__ b. If asked if you want to backup the database, answer **No**.

__ c. A **"Teach-Box Configuration"** window will appear. Record all the Box (frame) configurations, High-Capacity I/O Facility and ARTIC Card Configuration. Select **OK**.

__ d. Next the **"Teach-Base Information"** window will appear. Record the Library Serial Number, VTS library serial number if installed, Dual Gripper type, Default Cartridge Type, Convenience I/O type, Password required, Home Cell Mode and Adjacent frame inventory update information. Select **OK**.

__ e. If a message box appears warning about library sequence numbers, select **OK**.

__ f. Next the **"Teach-Device Identifiers"** window will appear. Record the device identifiers information. Select **OK**.

__ g. If the **"Teach Components"** window appears, skip the next substep.

__ h. If the library contains a VTS subsystem a **"Teach-Virtual Device Identifiers"** window will appear. Record the virtual device identifiers information.

__ i. This completes the information needed for teach, select **Cancel teach**.

__ 11. Select **Inventory** from the **Commands** pulldown. Then, select **Disable Inventory Update** if it is highlighted (selectable).

__ 12. Before shutting down the Library Manager, check the currently installed version of Library Manager microcode by selecting **Help** and **About**. Record the EC identifier (Library Manager microcode level), it will be needed for step 15

Note: The first digit will be missing. For example, the EC identifier for 523.01 will be displayed as 23.01.

__ 13. Select **Shutdown** from the **Mode** pulldown menu. If this is an HA1 library select **Shutdown** from the **Active** library manager.

__ 14. From the shutdown menu, select **"Service window"**. If prompted for a password, enter **service** (HINT: MAXIMIZE screen).

__ 15. If the Current library manager microcode is the same as the new enhanced library manager, go to step 17 on page 16.

__ a. **If the machine has a CD-ROM drive**, you must install the microcode revision plus fix pack that was **SHIPPED** with the new enhanced library manager on your **current** platform **before exporting** the Library Manager database to disk. This will ensure that the database backup will be compatible with the microcode when restored after hardware modifications have been made.

__ b. **If the machine does not have a CD-ROM drive**, you must install microcode version LM523.01 base code on your **current** platform **before exporting** the Library Manager database to disk. This will ensure that the database backup will be compatible with the microcode when restored after hardware modifications have been made.

__ 16. To install the latest microcode revision follow the **Library Manager Software Revision Installation** procedure listed within the **Checks, Adjustments, Removals and Replacements** Section of the 3494 MI. Use the 3494 microcode diskettes that were shipped with the new enhanced library manager. After installation of the latest microcode, shutdown the library manager.

__ 17. From a Service Window, enter **"C:\lm\exe\backold"** to export the LM database and necessary system files to floppy disk(s) (P/N 1619667, 5 supplied within the MES) in a compressed format. It should take two or less to complete the export, depending on how efficiently your database compresses. This "Database Export Copy" will be used later to "Restore and Migrate" the library manager to your new library manager computer. You should key on the message "Database/ System File backup successful" to determine if you have valid export disks that can be used later for restore and migrate. It is **recommended** that the **C:\lm\exe\backold** be performed twice to two different sets of diskettes.

If this is an **HA1** library the **"C:\lm\exe\backold"** needs to be performed on the **Active Library ONLY**.

If the database export fails, a **Teach New** will be required. Continue to the next step if the database export failed. If the database export was successful go to step 29 on page 17.

Note: Be sure to use diskettes formatted to 1.44 MB. **DO NOT USE** diskettes formatted to 2.88 MB.

Note: You cannot use the **Backup database** option under the **Utilities** pulldown from the library manager to create backup database diskettes. You can create the diskettes, but they will not be usable for restoring the database on the new enhanced library manager.

__ 18. You will need the data saved from step 10 on page 15. Also you will need to copy the file sysrange.pri to a diskette by typing in the following command from the service window:

copy c:\lm\pri\sysrange.pri a: and press **Enter**.

If the Dual Hard Drive feature is installed, type in the following from the Service Window:

copy d:\lm\sec\sysrange.sec a: and press **Enter**, otherwise, if no Dual Hard Drive feature is installed:

copy c:\lm\sec\sysrange.sec a: and press **Enter**.

If the library contains a VTS, continue to the next step to save the the customer's VTS data. If the library does not contain a VTS, type **exit** at the command prompt, press **Enter**, then go to step 29 on page 17.

__ 19. From the service window, type in the following command to save the file sysvtsmp.pri to a diskette:

copy c:\lm\pri\sysvtsmp.pri a: and press **Enter**

If the Dual Hard Drive feature is installed, type in the following from the service window:

copy d:\lm\sec\sysrange.sec a: and press **Enter**, otherwise, if no Dual Hard Drive feature is installed:

copy c:\lm\sec\sysrange.sec a: and press **Enter**

__ 20. Restart the old Library Manager workstation and bring up **Pause-Offline**.

__ 21. To save the customer's logical types perform the following:

From the Library Manager menu select

- **Database**
- **List database volumes...**

A "List Database Volumes" window will appear. You will need to create a database query to retrieve the logical information. From the **Output Column 1** drop-down list select **Volser**, from the **Output Column 2** drop-down list box select **Media Type**. Next click on the radio button next to **Specific Media Type**, then display the drop-down list next to Specific Media Type and highlight the first VTS media type. The Output Device will be A: and the Filename for the first query can be listdb.000. You will need to run the query for all VTS media types. Each time you run the query for each media type make sure and change the filename.

__ 22. To save the customer's Fast Ready categories perform the following:

From the Library Manager menu select

- **Commands**
- **System management**
- **Set VTS category attributes...**

A "Define Fast Ready Categories" window will appear, if the customer has defined any Fast Ready Categories they will be displayed in the bottom left window under the Category VTS heading. Record the information.

__ 23. Shutdown the Library Manager.

__ 24. If this is an HA1 library and FC 5050 (Dual Active Accessors) is installed it will need to be uninstalled from the old library manager and reinstalled on the new enhanced library manager. To uninstall use the following steps. If not installed go to step 29.

__ 25. Insert Dual Active Accessors Feature diskette (Disk 1 of 2) in the diskette drive of the Standby Library Manager.

__ 26. Open up a Service Window by selecting **Service Window** from the Shutdown Menu.

__ 27. Type **a:\daainst uninstall** at the prompt in the Service Window and hit the **Enter** key.

Note: The uninstall process is automatic. No intervention should be necessary.

__ 28. When the uninstall is complete, you are returned to the prompt.

__ 29. When you are ready to start this installation, select **Shutdown for Power Off** from the Shutdown Menu. If this is an HA1 library remember to shutdown both library managers. When the message is displayed that it is OK to turn the power off use the library Unit Power switch on the library operator panel to power the library down and proceed to section 10.0, “Details Of Installation” on page 20.

9.6 HA1 Library Manager Procedure

The following section applies only to an **HA1 library**.

Note: If installing code on a Library Attached to a Peer-to-Peer VTS, first refer to the *IBM Magstar 3494 Peer-to-Peer Virtual Tape Server Maintenance Information Manual* before taking the Library Manager offline. Perform the steps in the **Entry into Start**; specifically the **Flow Introduction** section. Then return here and continue.

__ 1. Check the current level of library manager microcode installed by selecting **Help** and **About** from the library manager pulldown.

__ 2. You must install the microcode revision plus fix pack that was **SHIPPED** with the new enhanced library manager on your **current platform before continuing**. If the current library manager microcode is the same as the new enhanced library manager go to step 5.

__ 3. To install the latest microcode revision follow the **Library Manager Software Revision Installation** procedure listed within the **Checks, Adjustments, Removals and Replacements** Section of the 3494 MI. Use the 3494 microcode diskettes that were shipped with the new enhanced library manager. Remember to install microcode on **BOTH** library managers.

__ 4. After both library managers have initialized, return the Active Library Manager to **Auto-Online**.

__ 5. The new PCI Library Manager will be installed first on the Standby Library Manager. If LM A is the standby library manager and Accessor A is active, or if LM B is the standby library manager and Accessor B is active, or both accessors are active (Dual Active Accessors feature), take action as follows:

   __ a. If both accessors are active, on the active LM disable the Dual Active Accessors feature by selecting **Disable Dual Active Accessors** under Accessor on the Mode pulldown. Select the default (Accessor local to Active LM will be active).

   __ b. If the Dual Active Accessors feature is **NOT** installed, select **Switch active Accessor to standby** under Accessor on the Mode pulldown.

__ 6. Shut down the standby library manager application by selecting **Shutdown** from the Mode pulldown menu.

__ 7. If FC 5050 (Dual Active Accessors) is installed it will need to be uninstalled and reinstalled on the new enhanced library manager. If installed continue to the next step, else go to step 8 on page 19

   __ a. Insert Dual Active Accessors Feature diskette (Disk 1 of 2) in the diskette drive of the Standby Library Manager.

   __ b. Open up a Service Window by selecting **Service Window** from the Shutdown Menu. If prompted for a password enter: **service**.

   __ c. Type **a:\daainst uninstall** at the prompt in the Service Window and hit the **Enter** key.

      Note: The uninstall process is automatic. No intervention should be necessary.

   __ d. When the uninstall is complete, you are returned to the prompt.

   __ e. Remove the diskette.

   __ f. Type **exit** in the Service Window.

__ 8. From the Shutdown menu select **Shutdown Computer for Power Off**. When the Library Manager has completed its shutdown turn off the +24 volt power supply first then the +36 volt power supply. Turn off the library manager computer. Proceed to section 10.0, “Details Of Installation” on page 20

10.0 Details Of Installation

10.1 Prepare the Library Manager System Unit for Service

WARNING

Some parts to be handled during the DI/DO cable and card removal are **very sensitive** to electrostatic discharge (ESD). See "Working with ESD-Sensitive Parts" in the CARR section of the 3494 Maintenance Information Manual.

Note: The following section deals with the preparation of removing the Library Manager Unit from the 3494 Library Control Unit. This applies to all three Library Manager types of *PS/ValuePoint Library Manager*, *IBM 7585 Industrial Computer Library Manager*, and *IBM 7588 Industrial Computer Library Manager*.

See Figure 5 on page 21 when performing the following step.

__ 1. Loosen the screw holding the braided strap to the MIC card **1** .

__ 2. Open the cable clamps **2** that secure the library manager cables to the control unit frame.

__ 3. Disconnect the DI/DO Card cable **3** from the MIC card **4** , and remove the DI/DO cables from cable clamps.

__ 4. Proceed to Section 10.1.1, “Library Manager Removal” on page 22

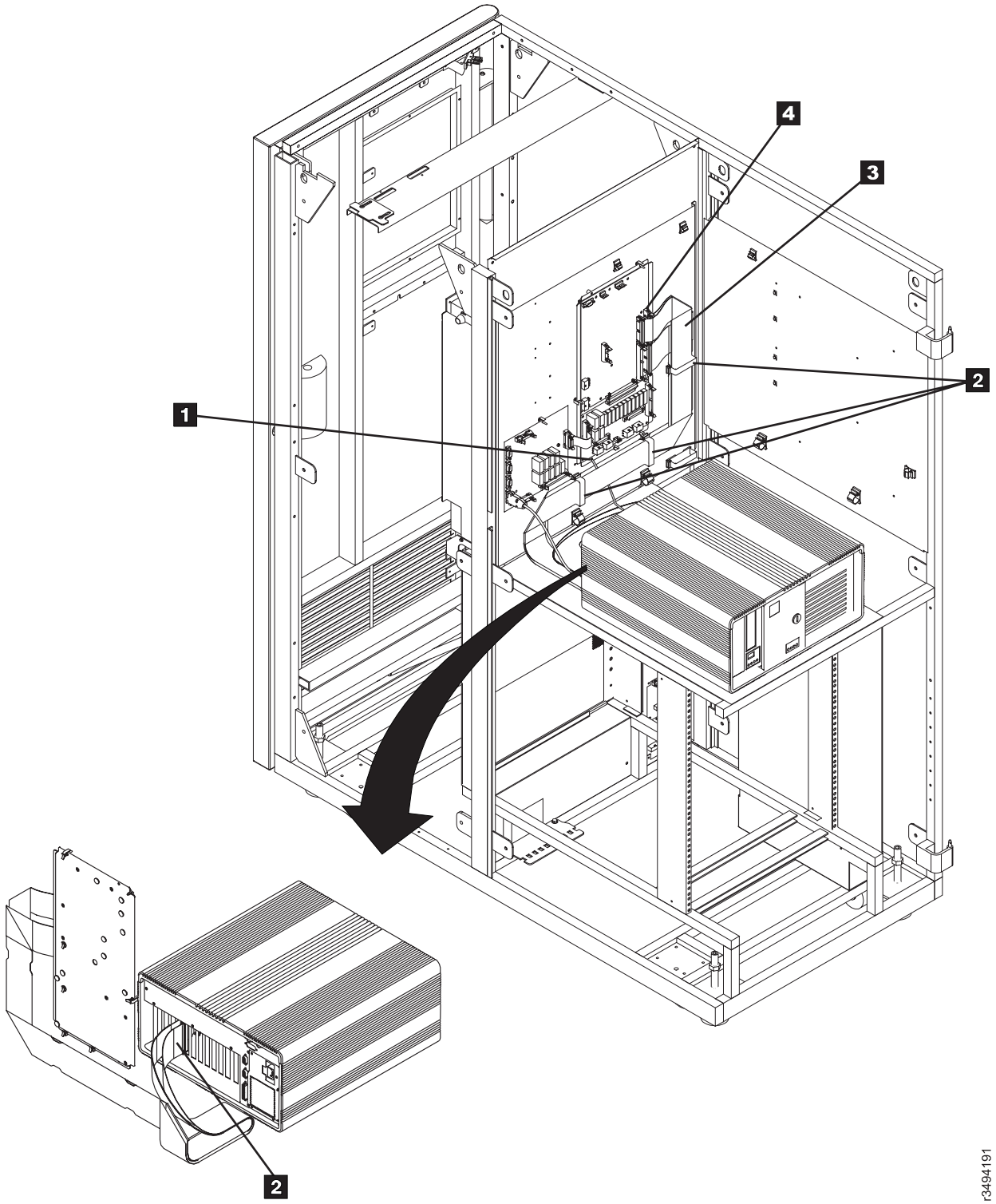


Figure 5. DI/DO cabling to MIC1 Card (Interior View)

10.1.1 Library Manager Removal

__ 1. Disconnect and label all of the cables from the Library Manager.

Check off the cables disconnected:

- __ Flat panel display cable
- __ Ethernet/Token Ring (optional)
- __ Servo control cable
- __ ARTIC cable 0
- __ ARTIC cable 1 (optional)
- __ ARTIC cables 2 and 3 (optional)
- __ Serial port A - EBTerm cable (optional)
- __ Serial port B - Barcode reader
- __ Keyboard
- __ Mouse
- __ Etherjet cable (7588 only) primary
- __ Etherjet cable (7588 only) alt.
- __ AC cable

__ 2. Disconnect the DI/DO cables from the MIC card

__ 3. Remove the AC power cables except if you are replacing a 7588. Set the cable to the side for parts disposition as defined within Section 14.0, “Parts Disposition” on page 46

__ 4. Remove the Library Manager with the DI/DO cables still connected to the Library Manager.

__ 5. Remove and dispose of the existing 24V/36V power cables **1**. See Figure 12 on page 34.

Proceed to Section 10.2, “Relocate Breakout Box Bracket” if you just replaced either a *PS/ValuePoint Library Manager* or a *Model 7585 Industrial Computer System Unit*.; OR

Proceed to Section 10.4, “Install Industrial Computer System Unit” on page 33 if you just replaced *Model 7588 Industrial Computer System Unit*.

10.2 Relocate Breakout Box Bracket

See Figure 6 on page 23 when performing the following steps.

__ 1. Remove the ARTIC breakout box(es), but **do not** disconnect the ARTIC breakout box cables.

- __ a. Remove the two screws **2** that secure the base Library Manager ARTIC breakout box **1** to the side of the control unit frame. Set the screws to the side for future reinstallation.
- __ b. If the “Expansion Attachment Card” ARTIC breakout box **3** is installed, remove the two screws **4** that secure it to the side of the control unit frame. Set the screws to the side for future reinstallation.

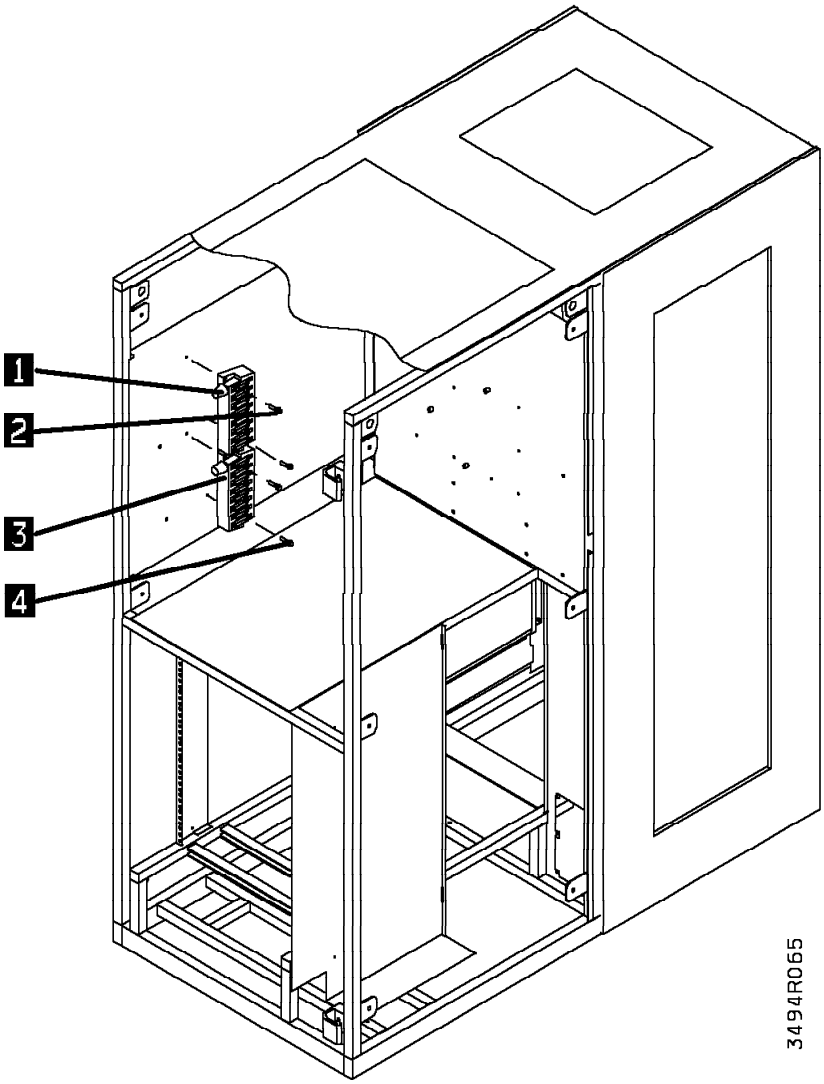


Figure 6. Breakout Box(es) Bracket Removal

See Figure 7 on page 25 when performing the following steps.

__ 2. Using three screws **1** and **2** (P/N 1624776, provided), install the bracket **3** (P/N 05H7774, provided).

__ a. As displayed, two of the screws **1** will be installed in the same two holes from which you removed the base Library Manager ARTIC breakout box.

__ b. As displayed, the third screw **2** will be installed in the top hole that normally accommodates the installation of the “Expansion Attachment Card” ARTIC breakout box.

__ 3. Using the screws **4** (removed in step 1a on page 22, Section 10.2, “Relocate Breakout Box Bracket” on page 22) and **5** (removed in step 1b on page 22, Section 10.2, “Relocate Breakout Box Bracket” on page 22), reinstall the ARTIC breakout box(es):

__ a. Install the base library manager ARTIC breakout box at the top of the bracket; and

__ b. If the “Expansion Attachment Card” is currently installed, reinstall the second ARTIC breakout box directly below the first ARTIC breakout box.

Go to Section 10.3, “Install the Card Panel Adapter” on page 26.

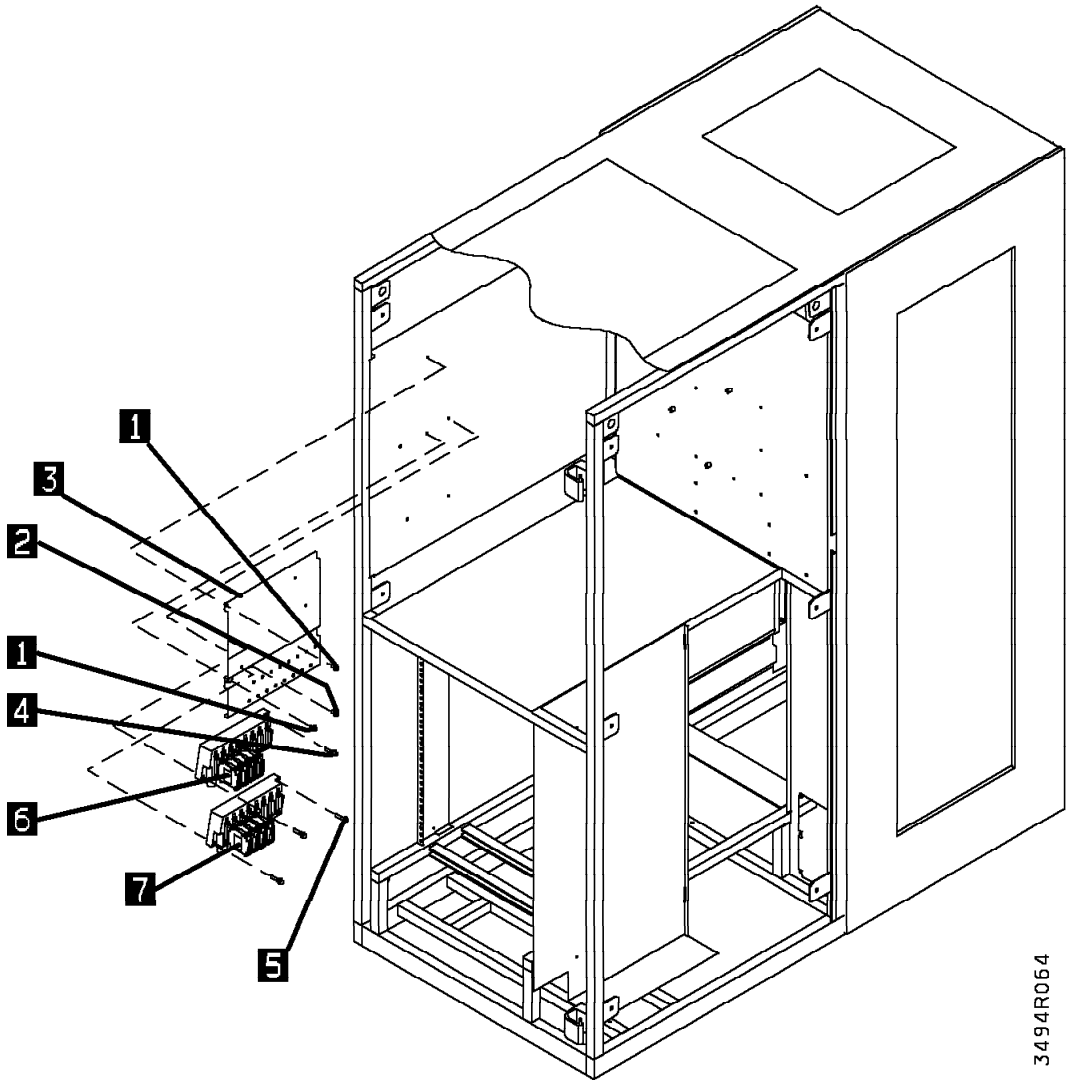


Figure 7. Breakout Box Bracket Relocation

10.3 Install the Card Panel Adapter

EC CHECKPOINTS:

- *EC C88519*: MIC card is sitting on a metal pan.
- *EC C35035*: MIC card reflects part number 05H8144.

Proceed to 10.3.1, "Remove MIC1 Card" if **NEITHER EC C88519 ("MIC2 Card Assembly") AND EC C35035 ("MIC3 Card Assembly") ARE INSTALLED**; OR

Proceed to 10.3.2, "Remove MIC2 Card" on page 32 if EC C88519 ("MIC2 Card Assembly") **IS CURRENTLY INSTALLED**.

10.3.1 Remove MIC1 Card

See Figure 8 on page 27 when performing the following steps.

__ 1. Unplug the cables from the LCC card **66** and the MIC1 card **60**.

__ 2. Remove the LCC card **66**:

- __ a. Remove the screws holding the card.
- __ b. Unclip the card from the nylon clips.
- __ c. Unplug the card from the MIC1 card.
- __ d. Remove the MIC1 card **60**.
- __ e. Set the card to the side for parts disposition as defined within Section 14.0, "Parts Disposition" on page 46.

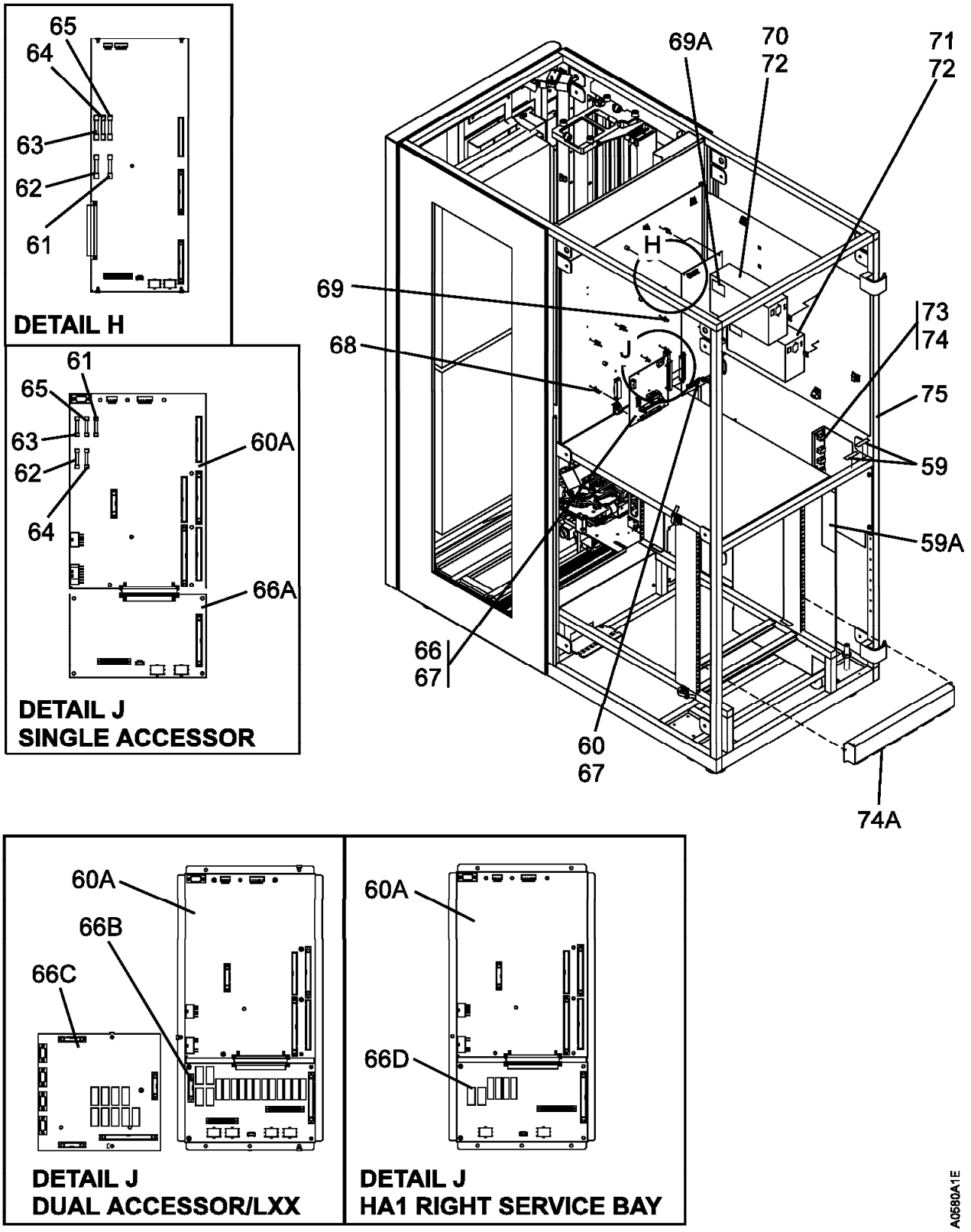


Figure 8. 3494 Control Unit Frame (Rear View)

See Figure 9 when performing the following steps.

__ 3. Before you can install the card panel adapter (P/N 05H8255, supplied), perform the following procedure on the rear panel located behind the previously installed MIC1 card:

__ a. Be sure to trim the spacers and support clips close enough to the rear panel to allow the card panel adapter to contact the rear panel.

__ b. You must also trim the one cable clamp on the rear panel, which is located just above the card/pan assembly **1** (P/N 05H8147, supplied). Open the cable clamp, remove the cables and trim the clamp to allow the card panel to contact the rear panel **2**.

__ 4. Place the top lip of the card panel adapter **2** (P/N 05H8255, supplied) over the top edge of the rear panel, and secure as follows:

__ a. Using the three pan head screws (P/N 1621190, provided) and three star washers (P/N 1622346, provided), secure the card panel adapter to the three standoffs on the rear panel.

__ b. Install the two support clips (P/N 34G8117, provided) into the two free holes on the right side of the card panel adapter.

__ 5. Using three allen head screws (P/N 1621511, supplied), attach the MIC3 card to the card panel adapter.

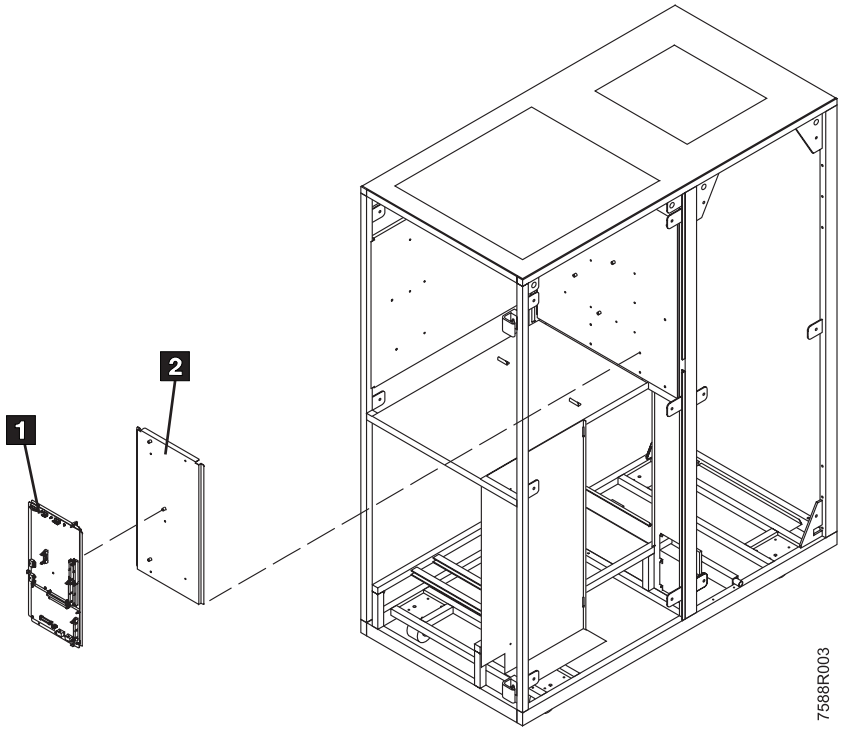


Figure 9. Install Card Panel Adapter

Refer to Figure 10 on page 30 and Figure 11 on page 31 for the new connector locations.

__ 6. Plug the cables into the card assembly. Refold the cables and change the connector labels as appropriate.

__ a. Plug cable connector labeled MIC P4 into MIC3 P4 **8** .

__ b. Plug cable connector labeled MIC P5 into MIC3 P5 **7** .

__ c. Plug cable connector labeled MIC P6 into LPC3 P6 **3** . Change the cable label to LPC P6.

__ d. Plug cable connector labeled MIC P7 into LPC3 P7 **11** . Change the cable label to LPC P7.

__ e. Plug cable connector labeled MIC P8 into LPC3 P8 **10** . Change the cable label to LPC P8.

__ f. Plug cable connector labeled MIC P9 into LPC3 P9 **5** . Change the cable label to LPC P9.

__ g. Plug cable connector labeled MIC P10 into LPC3 P10 **8** . Change the cable label to LPC P10.

__ h. Plug cable connector labeled LCC P1 into MIC3 P12 **10** . Change the cable label to MIC P12.

Note: It may be necessary to route the following to the right side of the Library Manager shelf.

__ i. Plug cable connector labeled LCC P2 into MIC3 P14 **14** . Change the cable label to MIC P14.

__ j. Plug cable connector labeled LCC P3 into MIC3 P15 **15** . Change the cable label to MIC P15.

__ k. Plug cable connector labeled LCC P4 into MIC3 P13 **18** . Refold this cable in the middle inline with the card connector so the cable connector is past the card connector, then fold the cable connector back under the cable and plug it into the card connector. Change the cable label to MIC P13.

__ l. Plug cable connector labeled LCC P5 into MIC3 P1 **9** . Change the cable label to MIC P1.

__ m. Plug cable connector labeled LCC P7 into MIC3 P16 **1** . Change the cable label to MIC P16.

Go to Section 10.4, “Install Industrial Computer System Unit” on page 33.

1. CR5 LED (24V power control)
2. P18 connector
3. P6 connector
4. K4 Relay (UEPO return)
5. P9 connector
6. K3 Relay (UEPO return)
7. K2 Relay (UEPO return)
8. P10 connector
9. K1 Relay (UEPO return)
10. P8 connector
11. P7 connector

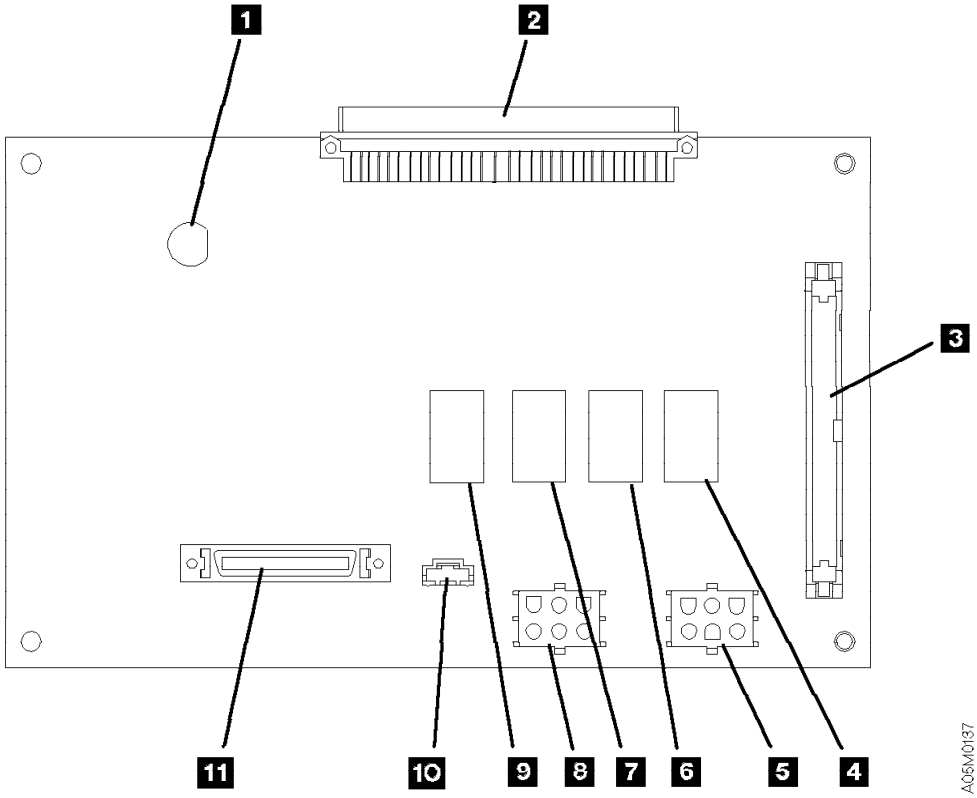


Figure 10. Library Power Control Card (LPC)

1 P16 connector
2 P2 connector
3 K3 Relay (reset safety interlock)
4 P3 connector
5 K4 Relay (24V from door switches)
6 P11 connector (no removable cable)
7 P5 connector
8 P4 connector
9 P1 connector
10 P12 connector
11 P17 connector
12 K2 Relay (X motor back EMF)
13 K1 Relay (Y motor back EMF)
14 P14 connector
15 P15 connector
16 CR12 LED (K2 picked)
17 CR10 LED (K1 picked)
18 P13 connector
19 K5 Relay (servo power on)
20 K6 Relay (power sequence)
21 CR7 LED (K4 picked)
22 CR6 LED (K6 picked)
23 CR5 LED (K3 picked)
24 F5 1.5A SB fuse (24V motors/solenoid)
25 F3 5A fuse (36V servo)
26 CR4 LED (K5 picked)
27 F4 1.5A SB fuse (24V UEPO detect)
28 F1 1.5A SB fuse (24V operator panel)
29 F2 1.5A SB fuse (24V sensors)

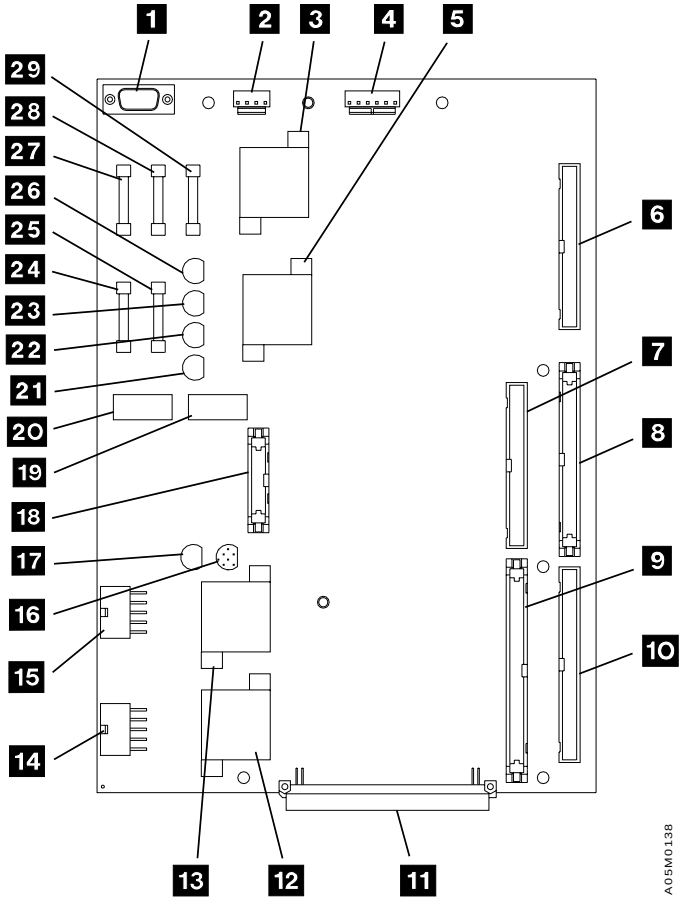


Figure 11. Machine Interface Control Card 2 (MIC3)

10.3.2 Remove MIC2 Card

__ 1. Disconnect the cables to the MIC card (up to ten cables), and then disconnect the cables from the LPC card (up to five cables).

__ 2. Remove the following allen head screws. Set the parts to the side for parts disposition as defined within Section 14.0, “Parts Disposition” on page 46.

  __ a. From the upper and lower left corners of the card pan.

  __ b. From the center of the MIC card.

__ 3. Free the card/pan assembly from the support clips, and place the card/pan assembly to the side for parts disposition as defined within Section 14.0, “Parts Disposition” on page 46.

__ 4. Using three allen head screws (P/N 1621511, supplied), attach the card/pan assembly (P/N 05H8147, supplied).

__ 5. Using the 3494 MI's to ensure that the cables have been attached correctly, reattach the cables to the MIC and LPC cards.

10.4 Install Industrial Computer System Unit

See Figure 12 on page 34 when performing the following step.

__ 1. Install new 36V/24V power cables **1** to the power supply units **2**. The pigtail will be connected in a later step.

__ 2. Attach the new DI/DO cable of P4 and P5 to the MIC card. (supplied as part of FC 5046).

__ 3. Connect the new DI/DO cables by starting at P4 and P5 **4** connectors of the MIC card.

__ a. Route the cables through the three cable clamps.

__ b. Connect the pigtail wires **5** from the 36V power supply and the DI/DO cable.

__ 4. Move the new *Model 7581 Industrial Computer System Unit* **3** to the 3494 control unit.

__ 5. From the new PCI Library Manager, connect the DI/DO cables and the flat panel display cable:

__ a. Align the arrows **6** of the DI/DO cable connector and the adapter connector.

__ b. Connect the DI/DO cable connector with the adapter connector making sure that the two clamps **7** of the cable connector are snapped in as the two connectors are mated.

__ c. Connect the flat panel display cable in slot 9. **8**

__ d. Connect the keyboard and mouse cable to the Y-cable **9**. One wire is marked as keyboard and the other is the mouse.

__ e. Attach the Y-cable to the SBC port in slot 3 **10**.

__ 6. Attach the braided strap (P/N 50G1046, supplied) to the top-left power supply screw **11** at the back of the new PCI Library Manager.

__ 7. With the exception of the ground strap and the DI/DO cables, attach the rest of the Library Manager cables. If this is an HA1 library **DO NOT** connect the **ALTERNATE** link etherjet cable, **PRIMARY** link etherjet cable or the **Serial B** - Barcode Reader cable. Refer to section 10.1.1, “Library Manager Removal” on page 22 for the list of cables removed. Refer also to Figure 13 on page 35.

Note: Refer to the *IBM 7581 Library Manager Console Maintenance Information* manual; and to the *Industrial Computer System Unit* figure display in the **Locations** Section of the 3494 Maintenance Information manual.

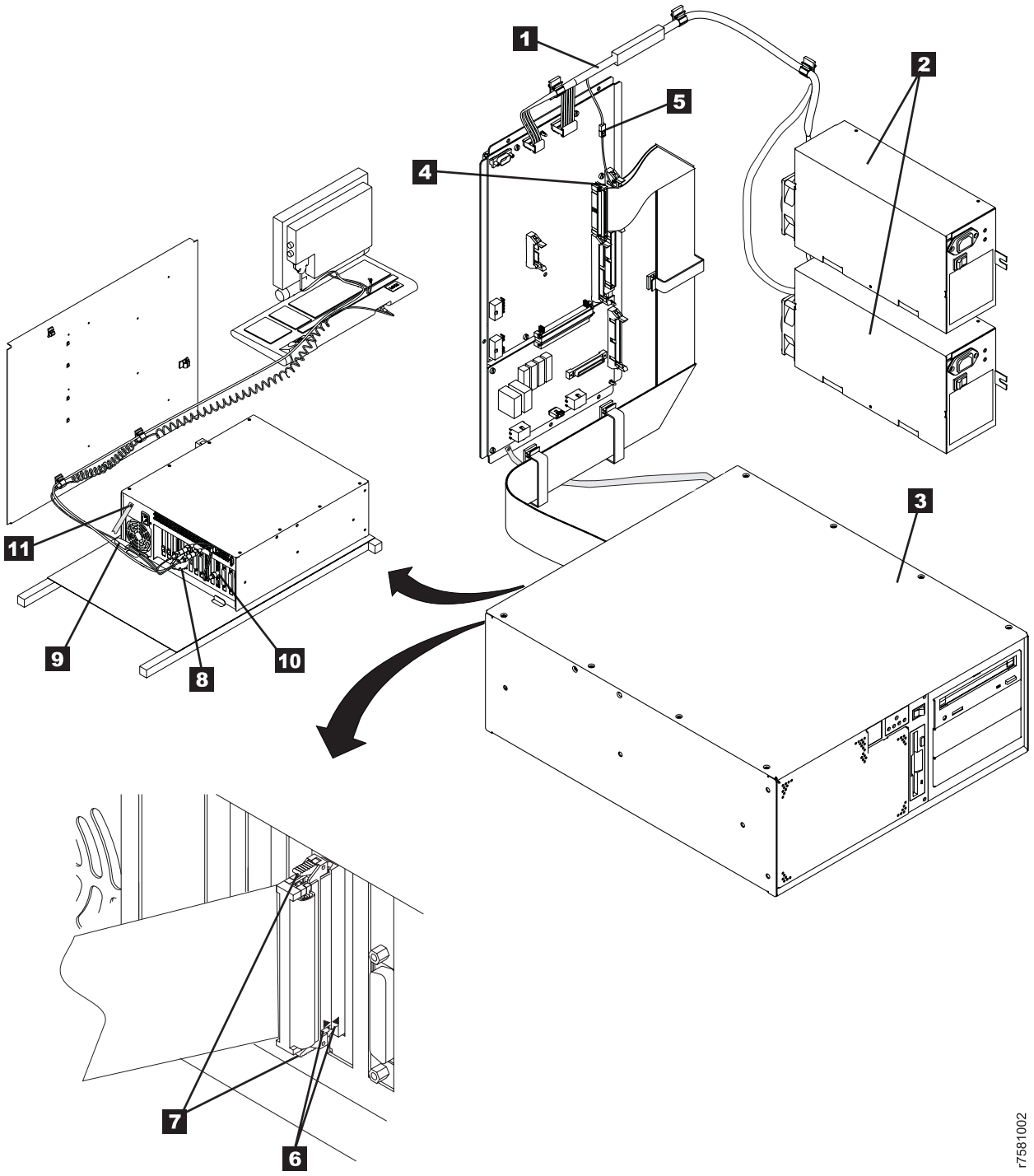


Figure 12. Installing the DI/DO Cable

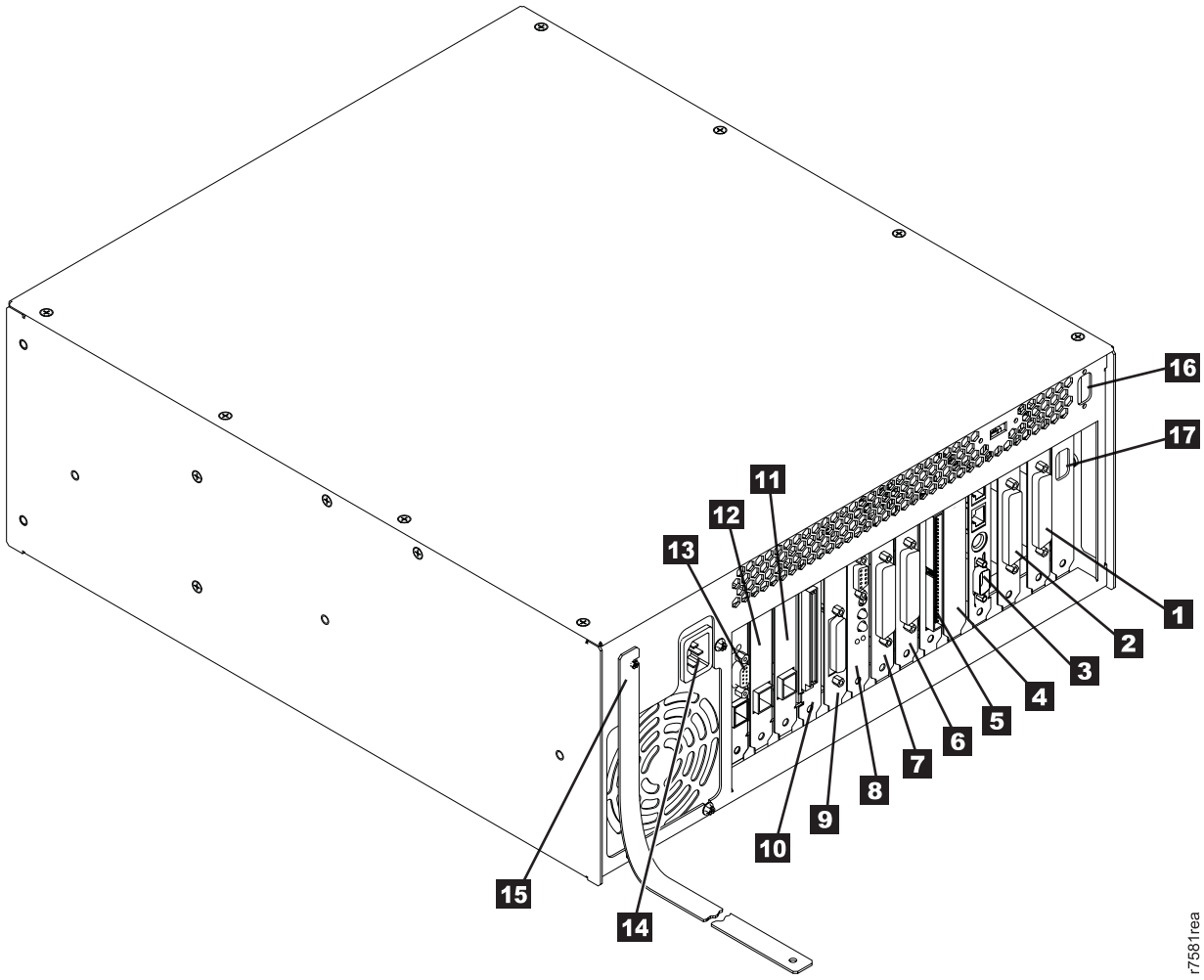


Figure 13. Model 7581 Industrial Computer System Unit (Rear View)

1	ARTIC 0	2	ARTIC 2
3	SBC	4	Not Used (SBC needs this slot)
5	Servo	6	ARTIC 3
7	ARTIC 1	8	DupliDisk-2
9	Display	10	DI/DO
11	Etherjet (Alternate)	12	Etherjet (Primary)
13	Token Ring/Ethernet (Optional)	14	AC Cable
15	Braided Strap	16	Serial Port B - Barcode Reader
17	Serial Port A - EBTerm (Optional)		

10.5 Library Manager Bring-Up

__ 1. If this is a **Single** Library Manager OR this is an HA1 Library and **BOTH** Library Managers were replaced at the same time, proceed to the next step. If not, go to step 2.

__ a. Power **ON** the Library by turning on the Unit Power switch located on the library operator panel.

__ b. Bring up **Pause-Offline**.

__ c. If this is an HA1 Library verify that one Library Manager is configured as LM-A and the other Library Manager as LM-B. **3494 Tape Library Dataserver - A** or **- B** is displayed on the title bar. If not configured as expected, proceed to the next sub step.

- If not configured correctly, shutdown both Library Managers.
- Once Shutdown has completed from the Library Manager that needs changing, open up a Service Window by selecting the **Service Window** button on the **3494 Tape Library Dataserver Shutdown** panel. If prompted for a password, enter:service. From the Service window type in **dlm94** and press **enter**. Follow the displayed instructions.
- After **dlm94** has completed reboot both Library Managers and bring up **Pause-Offline**.

__ d. Shutdown the Library Manager. If this is and HA1 Library shutdown both Library Managers by selecting **Shutdown** from the active Library Manager.

__ e. If FC 5219, FC 5220, FC 5226 or FC 5050 was installed proceed to the next section 10.5.1, “Feature Code Installation” on page 37.

__ f. If **NO** feature codes were installed proceed to section 10.6, “Restore and Migrate Library Manager Database” on page 41.

__ 2. If this is an HA1 Library and **ONLY ONE** Library Manager was replaced at this time, proceed to the next step.

__ a. Turn **ON** the Standby Library Manager PC using the On-Off switch on the 7581 PC.

__ b. Verify the new 7581 PC is configured correctly as LM-A or LM-B. This will be displayed on the title bar of the Library Manager as **3494 Tape Library Dataserver - A** or **- B**. If not configured correctly proceed to the next sub step, else go to step 2c

- **Shutdown** the Standby Library Manager.
- Open a Service Window by selecting the **Service Window** button on the **3494 Tape Library Dataserver Shutdown** panel.
- From the Service Window type in **dlm94** and press **enter**. Follow the displayed instructions.
- Set this Library Manager to either A or B depending on what it was found as in section 2a on page 14.
- After **dlm94** is complete select **Shutdown for reboot** from the **3494 Tape Library Dataserver Shutdown** panel. After shutdown is complete go to step 2d

__ c. Shutdown the Standby Library Manager. When the **3494 Tape Library Dataserver Shutdown** panel is displayed select **Shutdown for reboot**.

__ d. Power **OFF** the Library Manager using the On-Off switch on the 7581 PC.

__ e. Reconnect the **Alternate** link etherjet cable, the **Primary** link etherjet cable and the **Serial B** Barcode Reader cable.

__ f. Turn **ON** the Standby Library Manager PC using the On-Off switch on the 7581 PC. After the Standby Library Manager begins database initialization turn on the +36 volt power supply then the +24 volt power supply.

__ g. If FC 5219 , FC 5220 , FC 5226 or FC 5050 were installed Shutdown the Standby Library Manager and proceed to section 10.5.1, “Feature Code Installation”

__ h. If **NO** feature codes were installed proceed to section 10.5.2, “HA1 Library Manager Procedure.” on page 39.

10.5.1 Feature Code Installation

__ 1. **If FC 5050** (“Dual Active Accessors”) was installed continue to the next sub step. If **NOT** installed go to step 2e.

__ 2. Open a Service Window by selecting the **Service window** button on the **3494 Tape Library Dataserver Shutdown** panel. A Service window is opened for you. If prompted for a password enter: **service**.

__ a. Insert Dual Active Accessors Feature diskette (Disk 1 of 2) in the diskette drive.

__ b. Type **a:\daainst** at the prompt in the Service Window and press the **Enter** key and follow the instructions on the screen

__ c. When complete, you are returned to the prompt.

__ d. To enable DAA, put the library in pause mode. Wait thirty seconds, then return to Auto. The library will transition to DAA.

__ e. If **FC 5226**, **FC 5219** or **FC 5220** was installed proceed to the next step, if not installed go to step 8 on page 39.

__ 3. If **FC 5226** (“Remote Library Manager Console”) was installed continue to the next sub step. If **NOT** installed go to step 4 on page 38.

__ a. Remote Console should have been already installed at the factory, the only action needed is to Configure DCAF. Insert disk 1 of 4 (Remote Console Feature Install Diskette) into the diskette drive. From the Service Window type in: **a:\remote**. Select the type of communication protocol the customer is using **TCP/IP** or **APPC**. When presented with the 3 options, choose option 2 **Configure TCP/IP** or **Configure APPC**. Use the table from 17.0, “Appendix B FC 5226 Removal Procedure” on page 55 to Configure DCAF.

__ b. Check the level of Remote Console installed on the library manager(s) by typing in **syslevel** from a Service window. Look for the text “Distributed Access Control Facility”. The next line after this is the version number.

The Remote Console version on the customer's supplied computer should have been checked prior to this installation, this will now be needed to determine if Remote Console will need to be updated on the customer computer. The Remote Console version on the customer's computer **MUST** be at the **HIGHEST** version level, if not the customer's computer must be updated to the new version.

__ c. If the communication protocol used for Remote Console is APPC, make sure to perform the procedure listed in 16.0, “Appendix A FC 5226 Controller Procedure” on page 47 on the customer supplied computer.

__ d. Proceed to the next step.

__ 4. If **FC 5219** (“IBM Token Ring LAN Attachment”) or **FC 5220** (“Ethernet LAN Attachment”) was installed proceed to the next sub step. If not installed, go to step 8 on page 39.

__ a. If the library manager will be connected to LAN-attached hosts, you must configure the library by following the instructions in Appendix A of either the FC 5219 installation instructions (P/N 18P7459) or the FC 5220 installation instructions (P/N 18P7460). When you get to the step that begins with, “At the end of the 3494 Host Device Driver Features install, three or four steps will be displayed....”, currently step 14, stop there, do not **Shutdown** the Library Manager. Proceed to the next sub step.

__ b. When the Token-ring LAN feature (5219) or Ethernet LAN feature (5220) is installed in the factory, it is setup for the adapter card's Universally Administered Address (UAA). If the customer has defined a Locally Administered Address (LAA) for the library manager, modify the configuration using the following steps. If the customer does not want to use a LAA, See the Note below.

__ 1) If not already opened, open up a Service Window from the **3494 Tape Library Dataserver Shutdown** panel.

__ 2) Insert the appropriate LAN Attachment Feature Diskette into the diskette drive. This diskette should be located in your 3494 LIC (licensed Internal Code) binder or in the feature package.

- P/N 18P7461 for EC 5219, Token-Ring LAN.
- P/N 18P7462 for EC 5220, Ethernet LAN.

__ 3) Type **a:\lansetup** at the prompt and press the **Enter** key.

__ 4) Follow the instructions on the screen. When asked for the LAA, enter it at the prompt and press the **Enter** key.

Note: When the Token-ring LAN feature (5219) and Ethernet (5220) is installed in the factory, the data rate is set to AUTO NEGOTIATE.

Note: FC 5220 only supports CAT5 cabling with RJ45 connector.

__ 5. Connect the customer's LAN cable to the LAN adapter:

__ a. From the **3494 Tape Library Dataserver Shutdown** panel select **Shutdown computer for reboot**. Wait for the "Shutdown has completed" message to appear on the display. Turn the +24 volt power supply off then the +36 volt power supply off. Turn off the Library Manager PC.

__ b. Loosen the screw holding the braided strap to the metal stiffener around the MIC2-4/LPC cards (or to the MIC1 card) and disconnect the strap.

__ c. Open the cable clamps that secure the library manager cables and remove the cables from the clamps

__ d. Pull the library manager system unit out until you can reach the LAN connectors on the back of the library manager.

__ e. If you have an Ethernet Adapter, connect the customer's cable to the appropriate connector on the back of the library manager. Run the cable so it does not interfere with the tape subsystem service positions. Go to step 5h on page 39.

__ f. If you have a Token-ring Adapter and the customer is using telephone cable, plug the customer's LAN cable into the RJ-45 connector on the back of the library manager. Run

the cable so it does not interfere with the tape subsystem service positions. Go to step 5h on page 39.

__ g. If you have a Token-ring Adapter and the customer is using IBM cabling system, connect the IBM Token-ring Network PC Adapter Cable (P/N 6339098, supplied) to the D-Shell connector on the LAN card. Run the cable so it does not interfere with the tape subsystem service positions.

Note: Some versions of the Token-ring Adapter only have a RJ-45 connector. Use the IBM-RJ-45 STP/D-Shell Conversion cable (P/N 60G1066, supplied) to connect the LAN cable.

__ h. Push the library manager back in place and reconnect the braided strap. Secure the library manager cables in their cable clamps.

__ i. Connect the LAN cable to the customer's network.

__ j. Power up the Library Manager PC by turning on the PC first. After the Library Manager begins database initialization turn on the +36 volt power supply then the +24 volt power supply.

__ 6. If this is an HA1 Library and they were replaced one at a time proceed to the next section 10.5.2, “HA1 Library Manager Procedure.”

__ 7. If **Both** Library Managers were replaced at the same time repeat steps 10.5.1, “Feature Code Installation” on page 37 for the second Library Manager and continue to step 8.

__ 8. If this is a **Single** Library Manager Library go to section 10.6, “Restore and Migrate Library Manager Database” on page 41.

10.5.2 HA1 Library Manager Procedure.

__ 1. If **only** the Standby Library Manager has been replaced and the Active Library **will be replaced** now, go to step 4.

__ 2. If only the Standby Library Manager has been replaced and the Active Library **will NOT be replaced** go to section 10.8, “Creating a Delta Image File” on page 44.

__ 3. If **BOTH** Library Managers have been replaced go to section 10.8, “Creating a Delta Image File” on page 44.

__ 4. After the Standby library manager comes up a remote copy will start. The progress can be monitored by selecting **Operational Status** from the **Status** pull down on the Active Library Manager. The **Operational Status** window will appear, scroll down until the **Database Dual Write** line appears. The status should display “Copying Remote xx%”. Wait until “Enabled” is displayed.

Note: The time for the remote copy to complete varies depending on the number of logical and physical volumes. On average it takes about 1/2 hour to process 50,000 volumes.

Note: If installing code on a Library Manager attached to a Peer-to-Peer VTS, first refer to the *IBM Magstar 3494 Peer-to-Peer Virtual Tape Server Maintenance Information Manual* before taking the Library Manager offline. Perform the steps in the **Entry into Start**; specifically the **Flow Introduction** section. Then return here and continue.

__ 5. If this is **NOT** a Peer-to-Peer Virtual Tape Server ask the operator to complete or cancel jobs in the queue.

__ 6. Ask the operator to vary all remaining NON Peer-to-Peer library devices and control units (B10, B16, B18, B20 Axx) Off-line.

__ 7. Place the library manager in **Pause** mode.

__ 8. If any cartridges are left in the drives proceed to the next step, if **NO** cartridges were left in the drives or error recovery cell go to step 12

__ 9. Remove cartridges left in drives and place them in the error recovery cell (1A1 if the machine is without the Dual Gripper feature; and 1A3 if the Dual Gripper feature is installed) or an empty storage cell.

__ 10. Return to **Auto-Online** and wait until all cartridges have been returned to their home cell.

__ 11. If any cartridges were put away in an empty storage cell from step 9 make sure to perform a partial inventory update on the frame(s) where the cartridges were placed.

__ 12. Place the library manager in **Offline** mode.

__ 13. When the machine is offline, place the Library Manager in Pause Mode by selecting the **Pause** option from the **Mode** pull-down menu. Click on **Yes**, wait for the Pause to complete.

__ 14. Switch library managers by selecting **Switch active library to standby...** from the **Mode** pulldown on the Active Library Manager.

__ 15. Wait for the Library Manager switchover to complete. Check the new Active Library Manager to detect when the switchover has completed.

__ 16. If LM A is the standby library manager and Accessor A is active, or if LM B is the standby library manager and Accessor B is active, or both accessors are active (Dual Active Accessors feature), take action as follows:

__ a. If both accessors are active, on the active LM disable the Dual Active Accessors feature by selecting **Disable Dual Active Accessors** under Accessor on the Mode pulldown. Select the default (Accessor local to Active LM will be active).

__ b. If the Dual Active Accessors feature is **NOT** installed, select **Switch active Accessor to standby** under Accessor on the Mode pulldown.

__ 17. Return the Active Library Manager to **Auto-Online**.

__ 18. Inform the operator that the library is available for use. However, until the Standby Library Manager is replaced, the Library will be in **Degraded** mode.

__ 19. Shut down the standby library manager application by selecting **Shutdown** from the Mode pulldown menu.

__ 20. When the Shutdown menu appears select **Shutdown for Reboot**. When the “Shutdown has completed” message appears on the display, turn the +24 volt power supply off first, then the +36 volt power supply. Then power off the Library Manager PC.

__ 21. Go back to Section 10.0, “Details Of Installation” on page 20 to remove the 2nd library manager.

10.6 Restore and Migrate Library Manager Database

Note: Skip the following section, and proceed to section 10.7, “Recovery Procedure” on page 43 if you were **UNABLE** to successfully complete the export step within Section 9.2, “Library Manager Preparation” on page 12 step 17 on page 16.

__ 1. Open a Service Window by selecting the **Service window** button on the **3494 Tape Library Dataserver Shutdown** panel. A Service window is opened for you. If prompted for a password enter: **service**.

__ 2. Insert the 3494 Tape Library Manager Microcode CD shipped with the FC 5046 into the CD-ROM drive. Within this OS/2 window enter **H:\52712\DROPEM** to prepare the Library Manager for restoration and migration of your original database exported earlier. Ignore the SYSRANGE file message. This command must be run on both LMA and LMB from a Service Window.

__ 3. If step 15b on page 16 was performed on the **OLD** Library Manager, the following steps must be completed to restore the library manager database on the **NEW** Library Manager. If not, go to step 4.

   __ a. From a Service Window type in **delbdb2**.

   __ b. Load the **LM523.01** microcode on the **NEW** Library Manager. When finished **DO NOT** re-start the Library Manager, proceed to the next step.

   __ c. Insert the first disk from the backup disks (created in step 17 on page 16 in Section 9.2, “Library Manager Preparation” on page 12) in the *A* drive. Within the service window on the LM, (LMA if a HA1 library) enter “**RESTOLD**” to restore and migrate the original database export taken before the machine was shut down for hardware conversion.

   __ d. Remove the diskette form the diskette drive.

   __ e. Install the new Library Manager microcode that was shipped with this FFBM.

   __ f. Proceed to step 6.

__ 4. Insert the first disk from the backup disks (created in step 17 on page 16 in Section 9.2, “Library Manager Preparation” on page 12) in the *A* drive. Within the service window on the LM, (LMA if a HA1 library) enter “**RESTOLD**” to restore and migrate the original database export taken before the machine was shut down for hardware conversion.

   Please follow the instructions carefully and to the letter. You will be asked to insert the disk(s) from the export you created earlier. Your key to success will be the system response “*Database/System File restore successful*”. All steps must complete without error or a “*Teach New and ReInventory Complete System*” will be necessary later. The “**RESTOLD**” only needs to be performed on LMA.

__ 5. Remove your diskette from the diskette drive.

__ 6. After the database has been restored a command file called DB2BIND must be executed. If not already there, go to the C drive by typing in **c:** and pressing **enter** from the Service window, then change directories by typing in **cd\lm\exe** and pressing **enter**. Next type in **db2bind** and then press **enter**. If this is an HA1 library perform the procedure on LMA.

   Note: You may see warning messages displayed while DB2BIND is running, these messages are expected.

__ 7. If this is a **Single** Library Manager and the library contains a VTS or LAN attached A60 continue to the next step, else go to step 10 on page 42.

__ 8. If not already opened, open up a Service Window. From the service window at the C prompt type in **SLM94**.

__ 9. Follow the directions displayed.

__ 10. Close the Service Window by typing in **exit** and pressing **enter**.

__ 11. On the LM, select **Shutdown for reboot** from the 3494 Tape Library Dataserver Shutdown window.

__ 12. Reconnect both Etherjet Cables, (Primary and Secondary) and the Serial Port B cable on both Library Managers.

__ 13. When the “Shutdown has completed” message appears on the display, reboot the library manager(s) by pressing **Ctrl-Alt-Del**.

If the **RESTOLD** failed proceed to Section 10.7, “Recovery Procedure” on page 43.

Go to Section 10.8, “Creating a Delta Image File” on page 44.

10.7 Recovery Procedure

If the **"RESTOLD"** procedure **FAILED**, there are two options:

- Continue to step 1 and perform a Teach New.
- Call the next level of support for instructions.

1. **Teach New option**

   a. You **MUST** run **"Teach new configuration"** to identify all devices, racks, I/O, Service Bays, etc. This will **not** maintain existing cartridge/volume tables from the initial subsystem.

      Note: Refer to the table you completed from step 10 on page 15 to determine the configuration values.

   b. After the Teach New restart has completed and step 18 on page 16 was performed, execute the following to restore the customer's volser ranges:

      Shutdown the Library Manager.

      From the shutdown menu select "Open a service window". Insert the floppy disk that was created from step 18 on page 16. From the service window type in the following:
      copy a:\sysrange.pri c:\lm\pri and press enter.
      copy a:\sysrange.sec d:\lm\sec and press enter.

      If the library contains no VTS, restart the Library Manager and go to step 1g on page 44.

      If the library Manager contains a VTS and you completed steps 19 on page 16 through 22 on page 17, go to the next step. Otherwise, go to step 1g on page 44.

   c. Insert the floppy disk that was created from step 19 on page 16. From the service window type in the following command to restore the file sysvtsmp.pri from the diskette to the library manager:
      copy a:\sysvtsmp.pri c:\lm\pri and press enter.
      copy a:\sysvtsmp.sec d:\lm\sec and press enter.

   d. Restart the Library Manager workstation and bring up **Pause- offline.**

   e. To restore the customer's logical types perform the following: From the Library Manager menu select

      - **Commands**
      - **System management**
      - **Insert VTS logical volumes...**

      An "Insert Logical Volumes" window will appear. You will need to query the listdb.xxx files that were created from step 21 on page 17 to determine the volser ranges and cartridge type to be inserted.

      Note: Inserting 100,000 logical volumes takes approximately one hour.

   f. If the customer had any Fast Ready categories defined, perform the following: From the Library Manager menu select

      - **Commands**
      - **System management**

- **Set VTS category attributes...**

A "Define Fast Ready Categories" window will appear, type in the appropriate category from the data saved during step 22 on page 17 and Add the Category. Perform this operation for each category defined.

g. After the Teach new configuration has completed successfully, an **"Inventory New Storage"** must be run.

Note: The Host will have to update category data on the inserted logicals.

2. After the **Teach** and **Inventory** have completed refer to the **Checkout** procedure in the **Installation** section of the 3494 MI's and complete steps 17 thru 26.

Go to Section 11.0, “Test Procedure.”

10.8 Creating a Delta Image File

__ 1. Create a delta image on the **D:partition** of the **C:partition** This provides a faster way to restore if the **C:partition** should fail.

__ a. Ensure that the 3494 Image CD-ROM is inserted in the CD-ROM drive.

__ b. Open a Service Window, and at **C:** enter **H:\deltaimg**.

__ c. Follow the instructions to create a delta image file.

Go to Section 11.0, “Test Procedure.”

11.0 Test Procedure

Using the **SERVICE** menu, invoke and run the “Verify Installation“ procedure.

__ 1. If this library configuration includes a Peer-to-Peer Virtual Tape Server, after the Library Manager is **Auto-Online**, take the VTS out of **Service Prep. Mode.**. Then put the VTS **Online** to the Library Manager from the SMIT panel.

__ 2. To verify the status of the mirror drives from the Active Library Manager select:

- **Status**
- **Operational Status**

Scroll down and find Hard Drive Mirroring it should be **Enabled**.

__ 3. To obtain additional status from the Hard Drive Mirroring card select:

- **Service Menu**
- **Service**
- **Test Interface**
- **Hard drive mirroring**

A **Test Interface - Hard Drive Mirroring** window should appear, the data displayed gives the current status of the mirroring card. Both the primary drive and the mirrored drive status should be

OK. If this is an HA1 library the hard drive mirroring test can be performed from both the Active and Standby Library Managers.

__ 4. If this is a HA1 library with FC 5050 installed, create a DAA backup diskette using the steps below.

a. Insert Dual Active Accessor Feature Diskette (Disk 1 of 2) in the diskette drive.

b. Type **a:\daainst copy** at the prompt in the Service Window and press the **Enter** key.

c. You will be prompted with the following:

```
Insert disk to be copied into drive A:
The disk MUST be an already formatted 1.44MB diskette
Press any key to continue...
```

At this point, insert the DAA Feature backup diskette, (Disk 2 of 2), into the diskette drive.

d. When the copy is complete, you will be returned to the prompt.

Go to Section 12.0, “Field Updating.”

12.0 Field Updating

None

After Installation (Sections 13 through 15)

13.0 Field Support Publications

Replace existing 3494 MI's with those supplied within this MES.

14.0 Parts Disposition

All removed parts will remain as the property of the customer.

15.0 Machine Records

__ 1. Update all field records to reflect that FC 5046 “PCI Library Manager” has been installed.

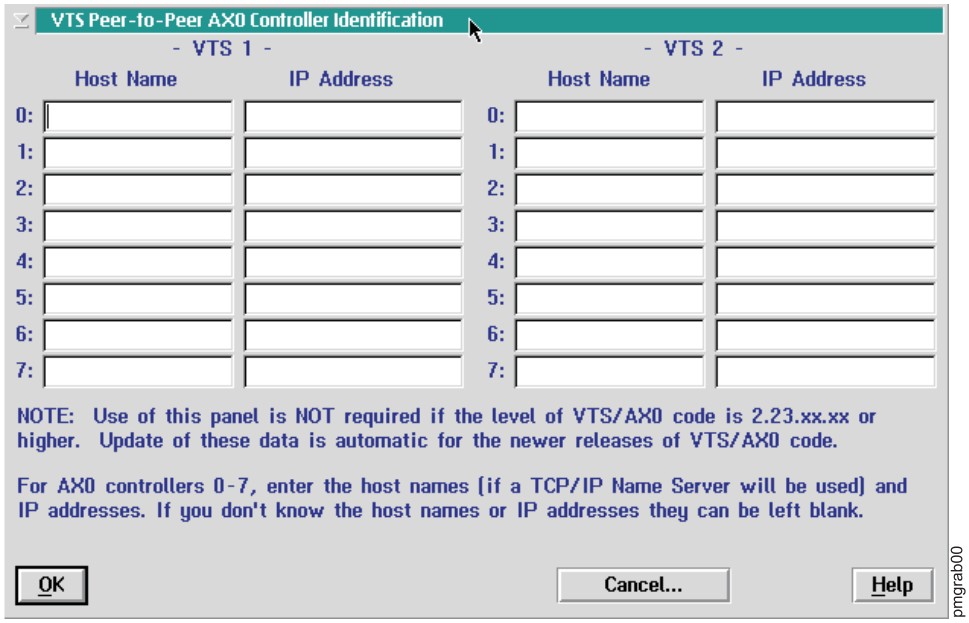
__ 2. Update the “Teach Configuration Table” in the *3494 Maintenance Information* manual with the information filled out in the table from 19.0, “Appendix D Teach Configuration Table” on page 59. The “Teach Configuration Table” is located in **Checkout** in the **Installation** section. Refer to the table of contents at the beginning of the **Installation** chapter for **Checkout**.

__ 3. Using existing procedures to report the installation and quality.

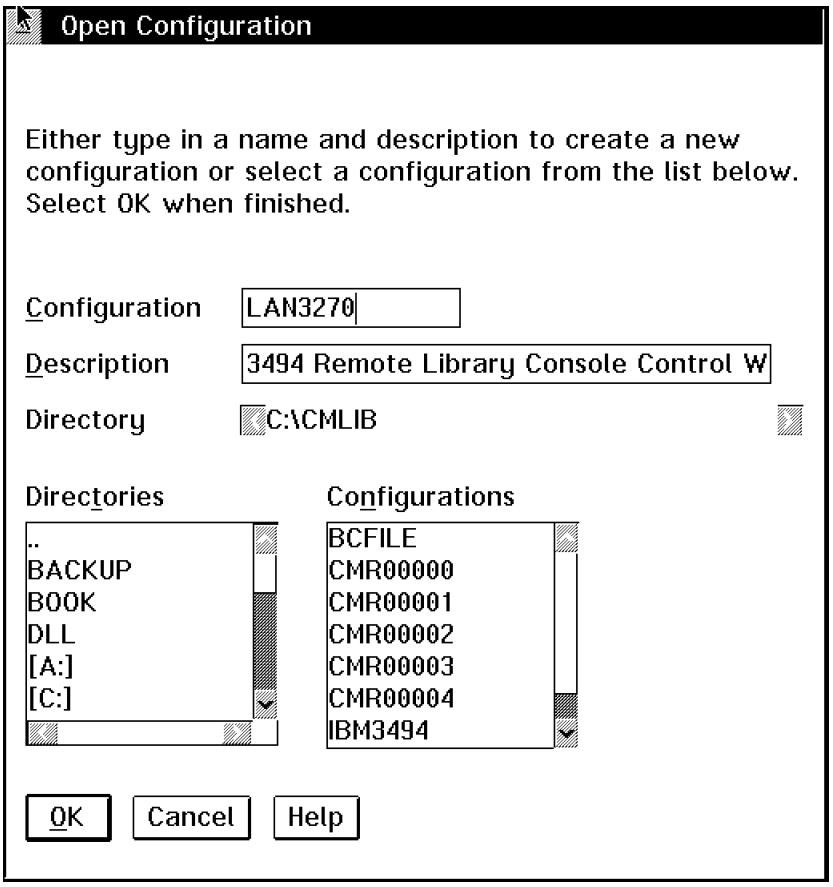
16.0 Appendix A FC 5226 Controller Procedure

Before the old Library Manager was removed you were asked to save the fully qualified adjacent cp name in the form of xxx.yyy. (for example MIDRLM.MIDRLM1A in this example MIDRLM is the network ID and MIDRLM1A is the Link Name) You will need the Link Name and the Partner LU Alias to delete the old configuration.

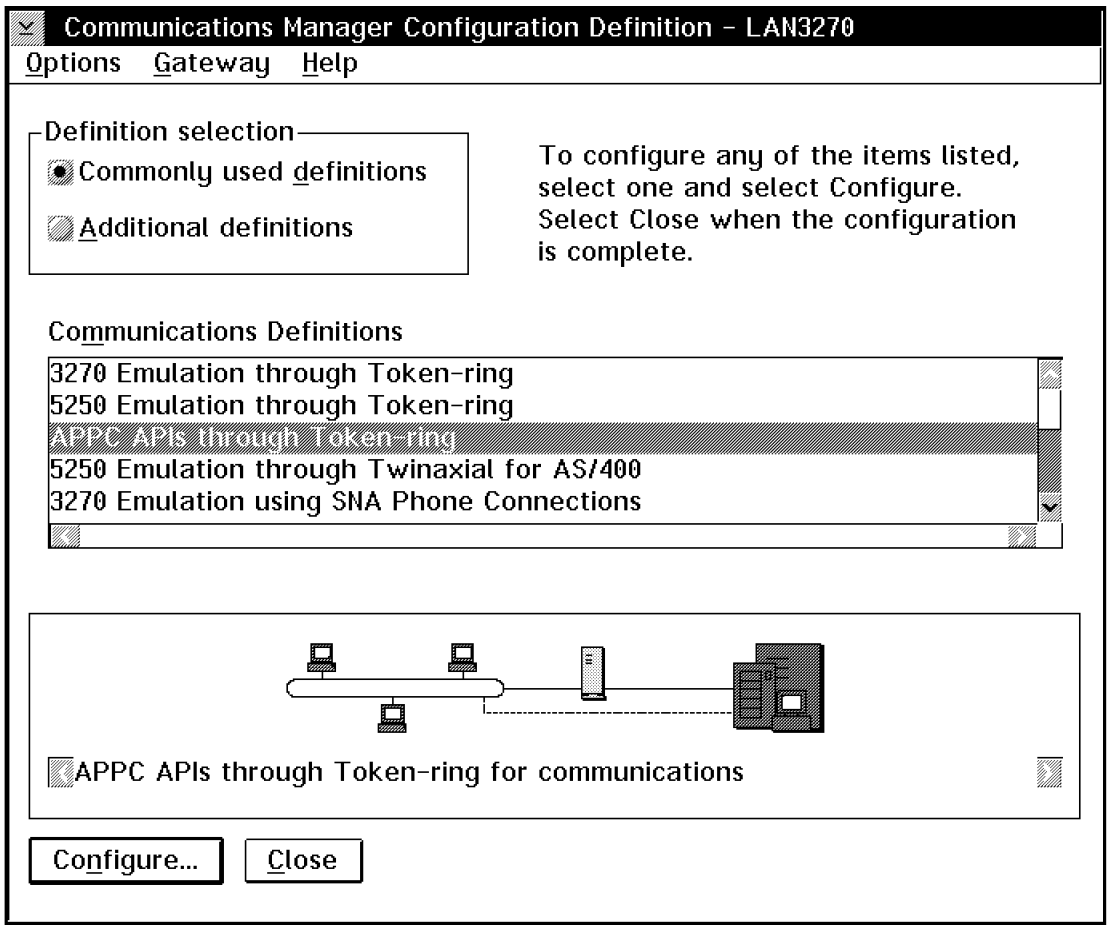
1. On the controlling workstation you need to edit the ndf file to get the Partner LU Alias
   a. To get the name of the ndf file being used type **type c:\cmlib\cm.ini**. The configuration file being used is the name following CMDefaultCFG=. (for example CMDefaultCFG=REMTCONS)
   b. Type **EPM c:\cmlib\zzzzz.ndf** where zzzzz is the configuration file name (in this example remtcons).
   c. Search for the line DEFINE_PARTNER_LU FQ_PARTNER_LU_NAME(xxx.yyy) where xxx.yyy is the fully qualified adjacent cp name you saved from the old Library Manager.
   d. The line following this line will say PARTNER_LU_ALIAS(wwwww) you need to save the Partner LU alias.
2. To delete the old configuration type **cmsetup** at the command prompt in an OS/2 window on the controlling workstation.



   a. In the Communication Manager Setup Window click on **Setup**.



b. In the Open Configuration window select the correct configuration file name from the list in the Configurations box and click on **OK**.



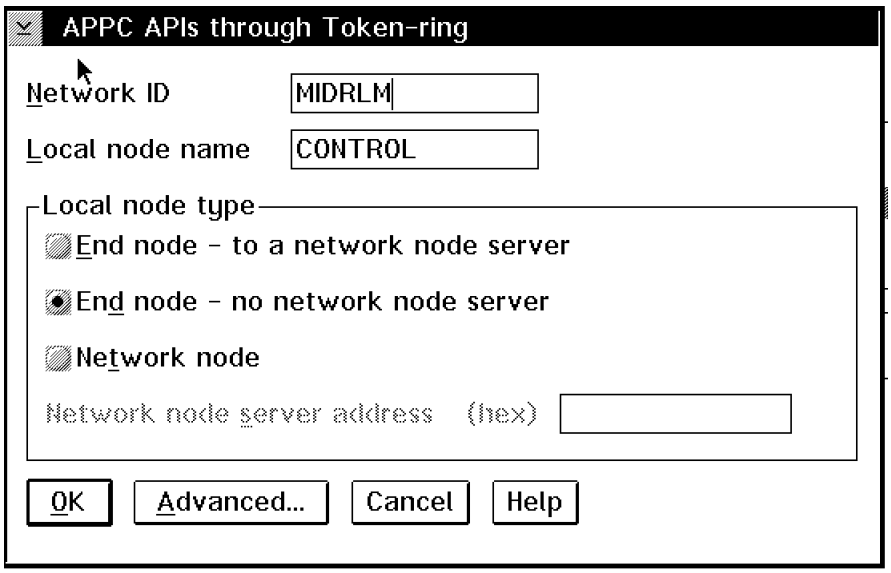
c. In the Communications Manager Configuration Definition window

1) Select **Commonly Used Definitions**.

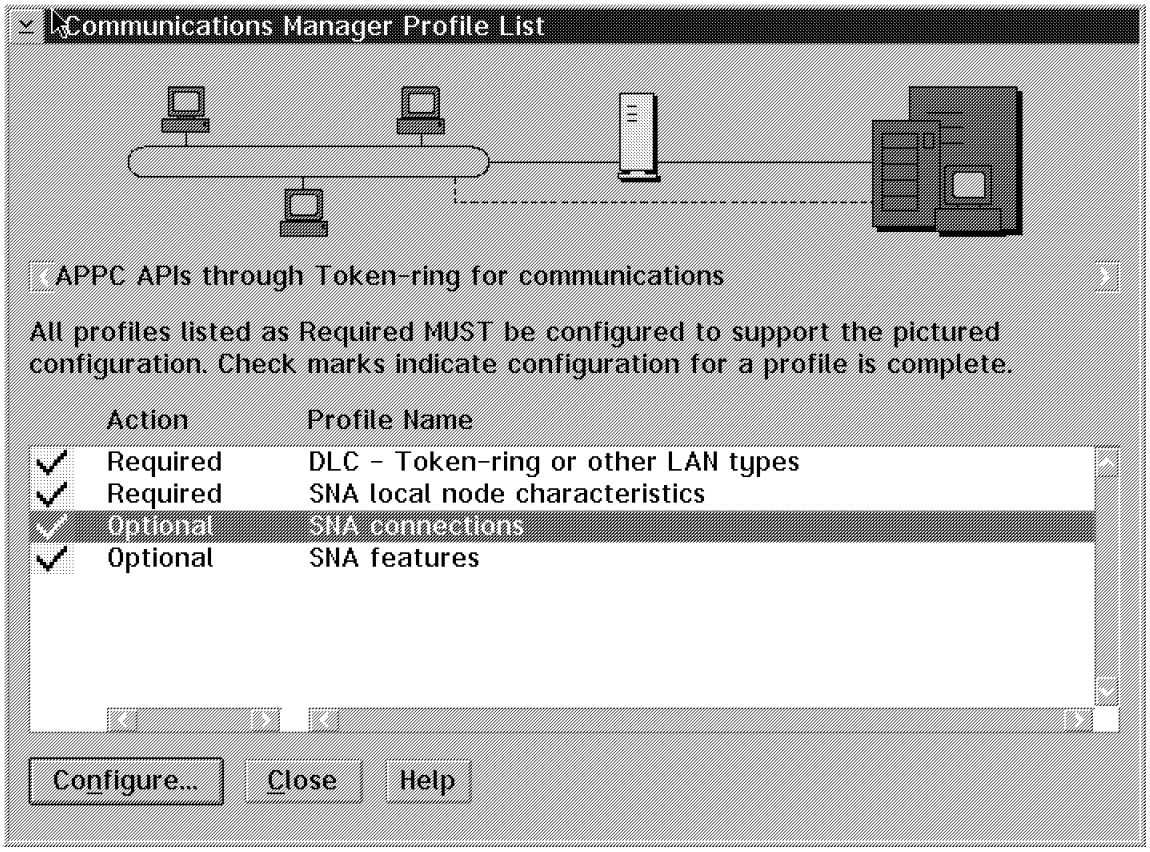
2) Select **APPC APIs through Token-Ring** if the LAN is token-ring or **APPC APIs through Ethernet (ETHERAND) Network** if the LAN is ethernet.

   Note: If you are using Communications Server you will select **APPC APIs over Token-Ring** or **APPC APIs over Ethernet Network**.

3) Click on **Configure...**



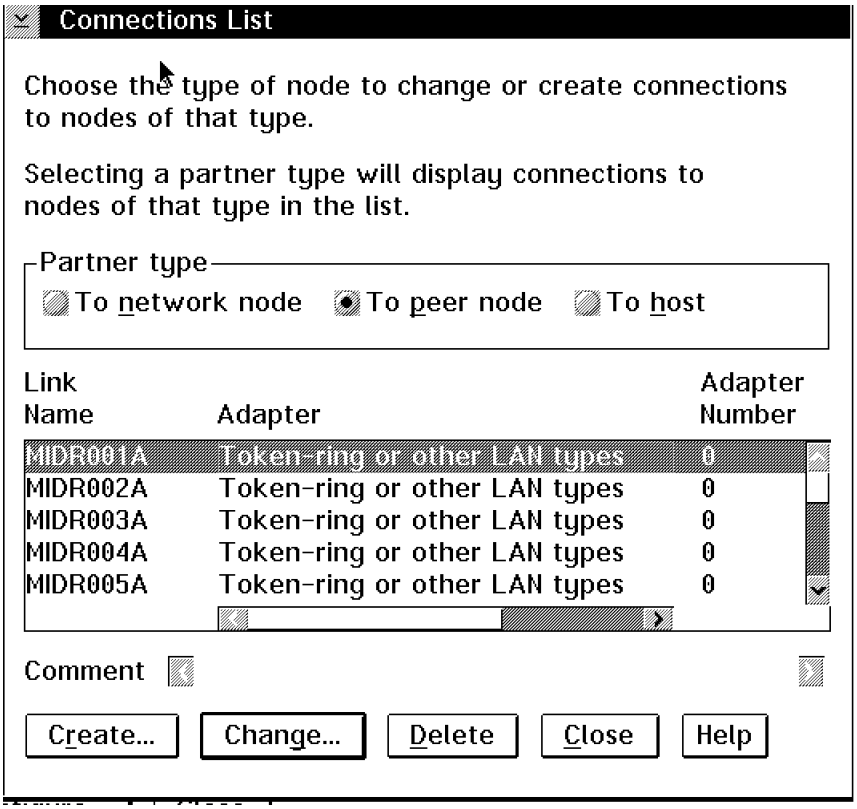
d. In the APPC APIs through Token-Ring/Ethernet window click on **Advanced. ...**.



e. In the Communications Manager Profile List window

1) Select **Optional SNA Connections**.

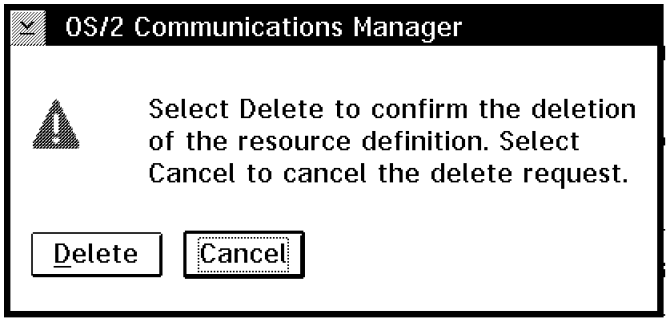
2) Click on **Configure...**



f. In the Connections List Window

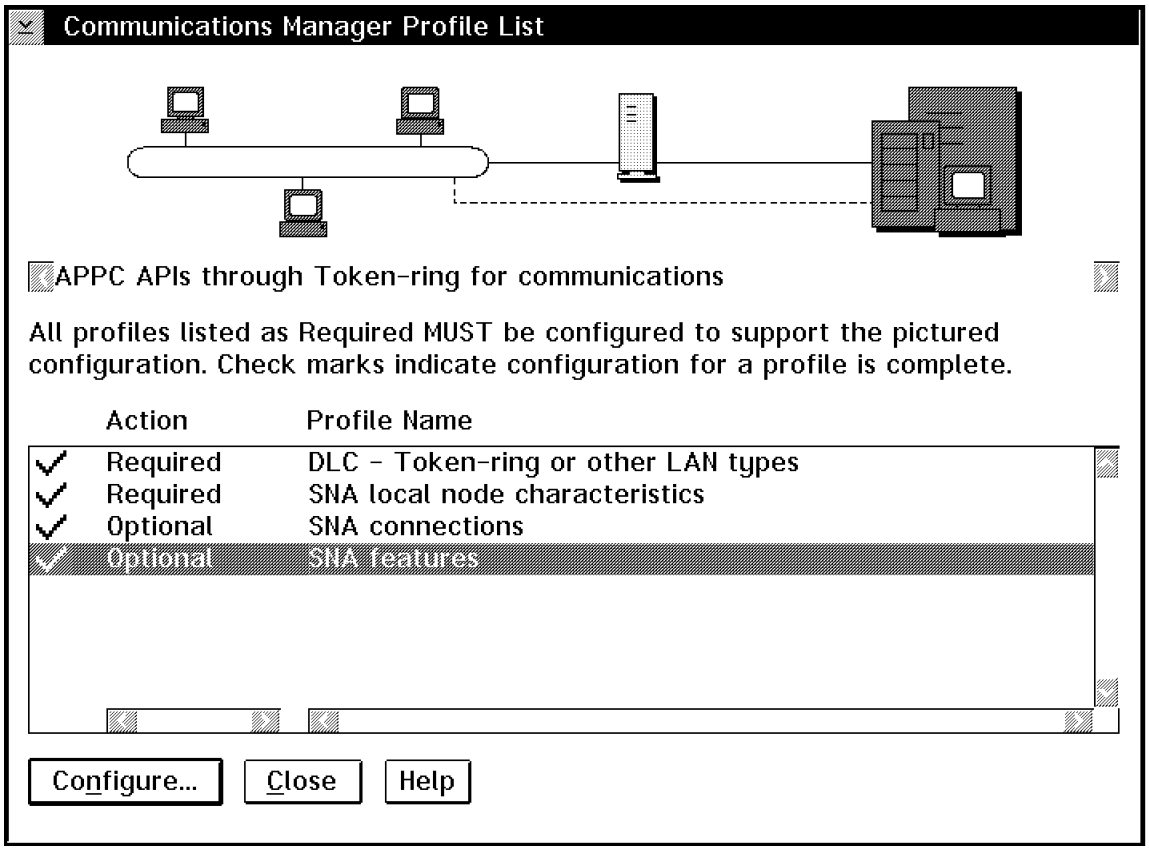
1) Select the Link Name you want to delete (this will be the name you saved from the old Library Manager).

2) Click on **Delete**.



3) In the OS/2 Communications Manager window click on **Delete**.

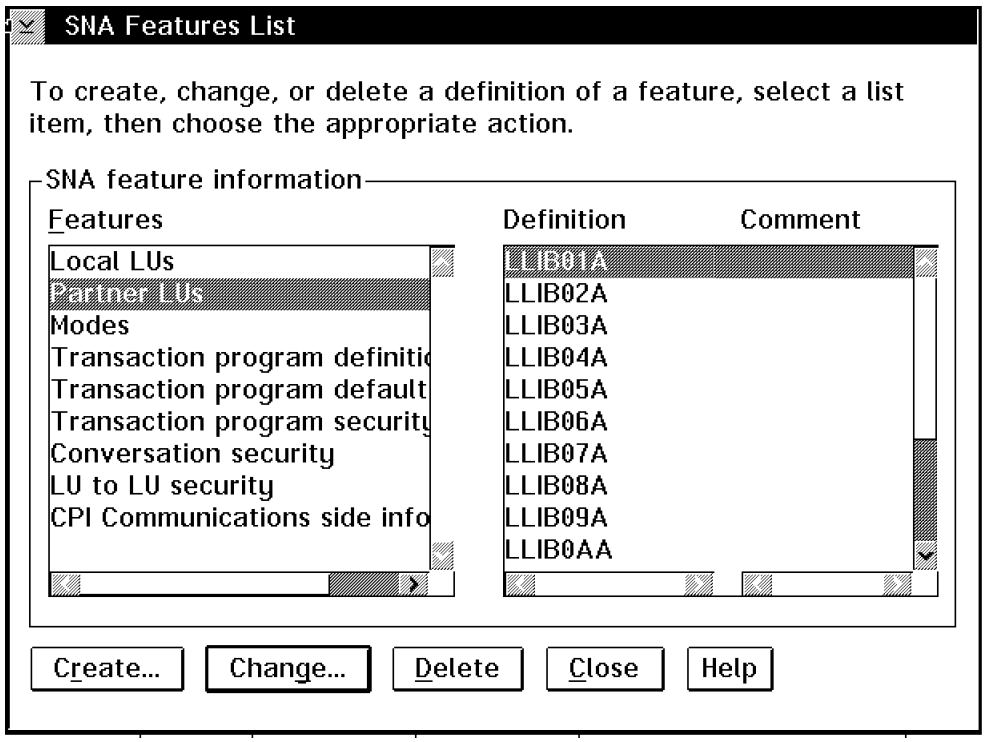
4) In the Connections List window click on **Close**.



g. In the Communications Manager Profile List window

1) Select **Optional SNA features**.

2) Click on **Configure...**

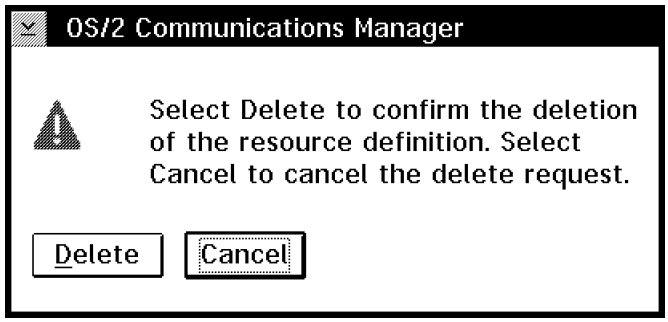


h. In the SNA features List window

1) Select **Partner LUs**

2) Select the Definition you want to delete (this will be the name you were instructed to save in 1d on page 47)

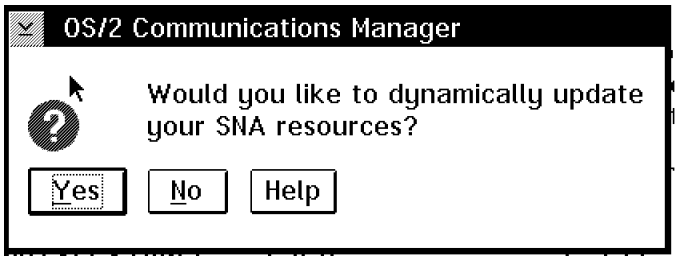
3) Click on **Delete**



4) In the OS/2 Communications Manager window click on **Delete**

i. In the SNA Features List window click on **Close**

j. In the Communications Manager Profile window click on **Close**



k. In the OS/2 Communications Manager window click on **Yes** to dynamically update the SNA resources.

l. In the Communications Manager Setup window click on **Close**.

17.0 Appendix B FC 5226 Removal Procedure

Perform the following steps to save the configuration information for **FC 5226** (“Remote Library Manager Console”).

Note: Record the information in Table 1 or 2 at the end of this Appendix.

__ 1. If TCP/IP is the communications protocol being used, perform the following commands from the service window:

__ a. The operating system version will be needed for the proceeding steps, from the Service Window type in the following:
ver

If the response received is **The Operating System/2 Version is 4.00** then **OS/2 4.0** is installed.

If the response received is **The Operating System/2 Version is 2.11** then **OS/2 2.11** is installed.

__ b. Type **Hostname** and press **Enter.**

__ 1) You should see something like the following:

```
lma.tucson.ibm.com
```

__ 2) lma is the hostname; and tucson.ibm.com is the domain name.

__ 3) Save this information.

__ c. If the operating system is OS/2 2.11 type in:
type c:\tcpip\etc\resolv and press **Enter.**

If the operating system is OS/2 4.0 type in:
type c:\mptn\etc\resolv2 and press **Enter.**

Note: If no nameserver is being used the **RESOLV(2)** file will not exist.

__ 1) You should see something like the following:

```
domain tucson.ibm.com
nameserver 9.115.0.250
nameserver 9.115.1.250
```

__ 2) This gives you the domain name again and any nameservers if nameservers are being used.

__ 3) Save this information.

__ d. If the operating system is OS/2 2.11 type in:
type c:\tcpip\bin\setup.cmd and press **Enter.**

If the operating system is OS/2 4.0 type in:
type c:\mptn\bin\setup.cmd and press **Enter.**.

__ 1) You should see something like the following:

```
route -fh
arp -f
ifconfig lan0 9.115.23.207 netmask 255.255.254.0
REM ifconfig lan1
REM ifconfig lan2
REM ifconfig lan3
REM ifconfig lan4
REM ifconfig lan5
REM ifconfig lan6
REM ifconfig lan7
REM ifconfig sl0
route add default 9.115.23.254 1
route add net 9 9.115.23.254 1
```

__ 2) Save the information highlighted above. (This gives you the IP address (9.115.23.207) for lan0, the netmask (255.255.254.0) and any router information (9.115.23.254))

__ 2. If APPC is the communications protocol being used, perform the following commands from the service window.

__ a. Type **EPM c:\ibmcom\lantran.log**

__ 1) Look for the line:

"Adapter 0 is using node address xxxxxxxxxxxx."
(where xxxxxxxxxxxx is the UAA of the adapter)

If you are using ethernet the line will read:
"Adapter 0 is using node address xxxxxxxxxxxx. The Token-Ring format is xxxxxxxxxxxxxx."

__ 2) Save the Token_Ring format of the address.

__ b. Type **EPM c:\cmlib\ibm3494.ndf**

__ 1) Look for the line:

DEFINE_LOCAL_CP FQ_CP_NAME(xxx.yyy)

__ 2) Save xxx.yyy (the fully qualified CP name)

__ c. **REMINDER**: Using the above information, Appendix A needs to be performed on the **Controlling Work Station**. Until this update is performed, the Remote Console will not be operational.

__ 3. The above information will be needed when Remote Console is configured on the new **PCI Library Manager** workstation.

Table 1. Remote Console Worksheet	
TCP/IP Configuration Values For Library Manager A	
Host Name	
Domain Name	
Nameserver	
TCP/IP Address	
Subnet Mask	
Router	
TCP/IP Configuration Values For Library Manager B	
Host Name	
Domain Name	
Nameserver	
TCP/IP Address	
Subnet Mask	
Router	

Table 2. Remote Console Worksheet	
APPC Configuration Values For Library Manager A	
Adapter 0 Token Ring Address	
CP Name	
APPC Configuration Values For Library Manager B	
Adapter 0 Token Ring Address	
CP Name	

18.0 Appendix C FC 5219/ FC 5220 Removal Procedure

Perform the following steps to save the configuration information for **FC 5219** (“IBM Token Ring LAN Attachment”) OR **FC 5220** (“Ethernet LAN Attachment”).

__ 1. If the customer has defined a Locally Administered Address (LAA), it will need to be saved. To check for this type in the following command:
type c:\ibmcom\protocol.ini

If **FC 5219** is installed look under the section [ibmtok_nif] if the field **NETADDRESS** is present, then the address to the left is the LAA. Save this in the table provided.

If **FC 5220** is installed look under the section [ibmeindi_nif] if the field **NETADDRESS** is present, then the address to the left is the LAA. Save this in the table provided.

__ 2. If the Library is connected to any APPC hosts (such as AS/400 or a VSE device driver) proceed to the next sub step.

__ a. The Network ID and Network Location will need to be saved. To save, type the following command from the Service Window:
EPM c:\cmlib\ibm3494.ndf.

__ 1) Look for the line:

DEFINE_LOCAL_CP FQ_CP_NAME(xxxxxx.yyyyyy)

__ 2) The xxxxx represents the Network ID and the yyyyy represents the Network Location. Save this in the table provided.

__ 3) If the customer is **NOT** using an Locally Administered Address (LAA) then the AS/400 or the VSE device driver Hosts must be reconfigured to use the new Universally Administered Address (UAA).

Table 3. Token Ring / Ethernet Worksheet

Configuration Values For Library Manager A	
Locally Administered Address (LAA)	
Network ID	
Network Location	
Configuration Values For Library Manager B	
Locally Administered Address (LAA)	
Network ID	
Network Location	

19.0 Appendix D Teach Configuration Table

Table 4 (Page 1 of 3). Teach Configuration	
Teach Parameter	**Value for Library S/N _____**
Total number of boxes	
High-Capacity I/O Facility	_____, Rack ____, ____ cells
RTIC Card Configuration	Card 1 - ____DAs ____CUs, Card 2 - ____DAs ____CUs
Box 1	Model L_____-_____ ____RTIC ____LAN
Box 2	Model _____-_____ ____RTIC ____LAN
Box 3	Model _____-_____ ____RTIC ____LAN
Box 4	Model _____-_____ ____RTIC ____LAN
Box 5	Model _____-_____ ____RTIC ____LAN
Box 6	Model _____-_____ ____RTIC ____LAN
Box 7	Model _____-_____ ____RTIC ____LAN
Box 8	Model _____-_____ ____RTIC ____LAN
Box 9	Model _____-_____ ____RTIC ____LAN
Box 10	Model _____-_____ ____RTIC ____LAN
Box 11	Model _____-_____ ____RTIC ____LAN
Box 12	Model _____-_____ ____RTIC ____LAN
Box 13	Model _____-_____ ____RTIC ____LAN
Box 14	Model _____-_____ ____RTIC ____LAN
Box 15	Model _____-_____ ____RTIC ____LAN
Box 16	Model _____-_____ ____RTIC ____LAN
Non-VTS Library sequence number	
VTS 1 Library sequence number	
VTS 2 Library sequence number	
Plant of manufacture	LM: 13 / 78 VTS1: 13 / 78 VTS2: 13 / 78
Customer Identifier	
Dual Grippers	____Installed ____Not Installed
Default Cartridge Type	____CST ____ECCST ____HPCT ____EHPCT ____None
Convenience I/O	____Installed (10) ____Installed (30) ____Not Installed
Password required?	____Yes ____No
Home Cell Mode	____Fixed ____Floating

Table 4 (Page 2 of 3). Teach Configuration	
Teach Parameter	**Value for Library S/N _____**
Dual Accessors	____Installed ____Not Installed
Adjacent frame inventory update?	____Yes ____No
Device Identifiers:	
Box 1	0_____ 1_____
Box 2	0_____ 1_____ 2_____ 3_____ 4_____ 5_____
Box 3	0_____ 1_____ 2_____ 3_____ 4_____ 5_____
Box 4	0_____ 1_____ 2_____ 3_____ 4_____ 5_____
Box 5	0_____ 1_____ 2_____ 3_____ 4_____ 5_____
Box 6	0_____ 1_____ 2_____ 3_____ 4_____ 5_____
Box 7	0_____ 1_____ 2_____ 3_____ 4_____ 5_____
Box 8	0_____ 1_____ 2_____ 3_____ 4_____ 5_____
Box 9	0_____ 1_____ 2_____ 3_____ 4_____ 5_____
Box 10	0_____ 1_____ 2_____ 3_____ 4_____ 5_____
Box 11	0_____ 1_____ 2_____ 3_____ 4_____ 5_____
Box 12	0_____ 1_____ 2_____ 3_____ 4_____ 5_____
Box 13	0_____ 1_____ 2_____ 3_____ 4_____ 5_____
Box 14	0_____ 1_____ 2_____ 3_____ 4_____ 5_____
Box 15	0_____ 1_____ 2_____ 3_____ 4_____ 5_____
Box 16	0_____ 1_____ 2_____ 3_____ 4_____ 5_____
VTS 1 Virtual Device Identifiers:	
Virtual Subsystem 0	0 _____
Virtual Subsystem 1	0 _____
Virtual Subsystem 2	0 _____
Virtual Subsystem 3	0 _____
Virtual Subsystem 4	0 _____
Virtual Subsystem 5	0 _____
Virtual Subsystem 6	0 _____
Virtual Subsystem 7	0 _____
Virtual Subsystem 8	0 _____
Virtual Subsystem 9	0 _____
Virtual Subsystem 10	0 _____
Virtual Subsystem 11	0 _____
Virtual Subsystem 12	0 _____
Virtual Subsystem 13	0 _____
Virtual Subsystem 14	0 _____
Virtual Subsystem 15	0 _____

Table 4 (Page 3 of 3). Teach Configuration

Teach Parameter	**Value for Library S/N _____**
VTS 2 Virtual Device Identifiers:	
Virtual Subsystem 0	0 _____
Virtual Subsystem 1	0 _____
Virtual Subsystem 2	0 _____
Virtual Subsystem 3	0 _____
Virtual Subsystem 4	0 _____
Virtual Subsystem 5	0 _____
Virtual Subsystem 6	0 _____
Virtual Subsystem 7	0 _____
Virtual Subsystem 8	0 _____
Virtual Subsystem 9	0 _____
Virtual Subsystem 10	0 _____
Virtual Subsystem 11	0 _____
Virtual Subsystem 12	0 _____
Virtual Subsystem 13	0 _____
Virtual Subsystem 14	0 _____
Virtual Subsystem 15	0 _____