

# IBM INSTALLATION INSTRUCTIONS

## FC 5780 (3590 Model B11/B1A) FC 5781 (3590 Model E11/E1A) Drive Update to Support Extended High Performance Tape

Document Number 35L2021 EC D19600A

SSD - Tucson

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**Service Planning Review by:** V. Nordstrom  
**Status:** Field Use

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3590  
B1XE1X

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## Before Installation (Sections 1 through 8)

### 1.0 Machines Affected

3590 Model B1X/E1X approved for the field installation of feature code 5780 or 5781.

### 2.0 Prerequisites

#### 2.1 PTFs and PSP bucket updates.

Attention: The 3590 Extended Length Media is a new tape technology. Software updates are required. PTFs are required for MVS, ADSM, OS400, and other operating environments. The account team should check the appropriate PSP buckets for their corresponding account's software environment. Insure that your account team has performed the necessary system assurance and software upgrades prior to the installation of the MES.

#### 2.2 System Microcode

The following system code levels are required.

- AS/400 - V3R2, V4R1
- DFSMS/MVS - 1.4.0 or higher.
- VM/ESA - 2.1.0 or higher.
- Vse/ESA - 2.2.0 or higher.
- TPF - 4.1 or higher.

Have the customer install these level before using Extended High Performance Tape.

### 2.3 Control Unit Microcode

If the drive being updated is attached to an A00, A50 or A60 control unit the control unit microcode must be updated using the CD supplied with FC 9780 on the A14 or C14. This control unit code will also contain the drive microcode.

### 2.4 AS/400 Systems Support

3590 drives with FC 5780 or 5781 are supported on AS400 systems with the following adapters:

- Magnetic Media Subsystem Controller FC 6501
- Magnetic Media Subsystem Controller FC 6534
- External Tape Drive Controller FC 2927

**IMPORTANT:** A new PTF is required for 3590 drives with FC 5780 or 5781 attached to FC 6534 or FC 2729 adapters. Please refer to Information APAR II 11472 for detailed information. Please obtain and apply the required PTF before attempting to attach the 3590 FC 5780 or FC 5781. Additionally, if the Magstar 3590 drive is used as an Alternate Load Device (Boot Manager), a new SLIC CD will be required. Refer to the Info APAR II 11472 to procure the CD.

### 2.5 3494 L12/D12/D14 Tape Library Support

If the Library manager code is at level 522 or higher the Library Manager code must be updated to LM 523.06 or higher Import/Export Advanced function. If the Library manager code is at level 521 or lower the Library Manager code must be updated to LM 521.17 or higher. These levels of code will be supplied with FC 9780 ordered on the 3494. Use the instructions supplied with the code or refer to the 3494 MI for instructions to load the code.

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## 2.6 3494 B16/B18 Virtual Tape Server (VTS) Support

**Note:**

3590 drives with FC 5780 or FC 5781 are NOT supported on 3494 B16/B18 Virtual Tape Server (VTS) at this time.

## 2.7 3466

**Note:**

3590 drives with FC 5780 or FC 5781 are NOT supported on 3466 at this time.

## 2.8 Open Systems Support

3590 drives with FC 5780 or FC 5781 require the following device drivers:

- AIX (Atape) 5.0.1.0 or later releases
- Solaris (IBMtape) 4.0.3.0 or later releases
- HP-UX 10.20 (ATDD) 2.9.0.0 or later releases

- HP-UX 11.0 (ATDD) 4.9.0.0 or later releases
- Windows NT (Magstar.sys) 1.1.4.8 or later releases

The most current device drivers available when this feature was manufactured are included. Changes to these devices drivers can be found on the SSD anonymous ftp site on the external internet. The ftp site is:

ftp://ftp.software.ibm.com/storage/devdvr.

Please provide the included device drivers to the customer for their installation. Installation of this hardware upgrade can proceed while the customer is updating the device drivers. The customer must have the minimum device driver levels prior to using Extended High Performance Tape.

## 3.0 FFBM to be Installed

FFBM to be Installed	Description
35L2020	FC 5780 Upgrade for B11/B1A models Install Instructions and hardware
35L0972	FC 5781 Upgrade for E11/E1A models Install Instructions and hardware

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### 3.1.1 Extended High Performance Tape FFBM content.

P/N	QTY	Description
35L2021	1	Install Instructions
35L0988	1	Flow Chart
09L5446	1	Machine reel hub kit
-1621192	2	Screw (M4 x 12mm)
-34L2659	1	Take-up Hub
-35L0814	1	Upper Flange
-35L0815	1	Lower Flange
-09L5117	1	Retainer Plate
-05H4671	1	Gap set tool
09G7781	1	Ferrite Ring
35L0584	2	'D' Bearing shims
09L4687	1	In line connector
05H3188	1	Cartridge "Extended High Performance" (Green)
34L2660	3	Label (2X)
35L1471	1	B Model FMR Cartridge
-	OR	-
35L1479	1	E Model FMR Cartridge
35L1466	1	Diskette "B" model
35L1472	1	Diskette "B" Ultra model
35L1480	1	Diskette "E" model
35L0715	1	Device Driver kit
05H9018	1	3590 MI
08L5891	1	3590 Op Guide
08L5890	1	3590 IPG

## 4.0 Preparation

Inventory all parts supplied in this FFBM.

Refer to the *IBM 3590 Tape Subsystem Models B11, B1A, E11 and E1A MI*, shipped with this model upgrade, for any problems or failures that may occur.

## 5.0 Programming Updates

RS6000 programming must be at AIX level 4.3.2 or higher.

AS400 programming must be at OS/400 level V3R2 or V4R1 or higher. Please refer to the "Prerequisites" section or Informational APAR II 11472.

## 6.0 Purpose and Description

### 6.1 Purpose

Update an existing 3590 model B1A/B11 or E1A/E11 to support the 3590 Extended High Performance Tape Cartridge.

### 6.2 Description

Provide the hardware, instructions and code to support the upgrade of a 3590 drive to use the 3590 Extended High Performance Tape Cartridges.

## 7.0 Installation Time

Machine Hours	System Hours	# of CEs
1.8	* 0.0	1

**Note:** There may be some system outage if any prerequisite conditions as described in section 2.0 exist.

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## 8.0 Special Tools and/or Materials Required

- Customer-supplied cleaning cartridge (refer to *IBM 3590 Tape Subsystem Models B11, B1A, E11 and E1A MI*)

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## Installation (Sections 9, 10, and 11)

### 9.0 Safety

**CAUTION:**  
 The 3590 Model B11 or E11 weighs 40.5 kilograms (89 pounds), so remove the ACF before lifting the 3590. The 3590 drive weighs 28.6 kilograms (63 pounds) without the ACF attached; it requires two persons to safely lift this unit.

### 10.0 Details of Installation

#### 10.1.1 Flow Chart

Begin this installation by following the flow chart Part number 35L0988 supplied with this feature. Return to these instructions as directed by the flow chart.

**Note:** For most situations, these update procedures do not require removal of the drive.

**Note:** Ensure all prerequisites in section 2.0 are planned for and complete.

### 10.2 Begin Installation

#### 10.2.1 Install Microcode.

**VERY IMPORTANT:** Use the following steps to install the microcode update before installing any of the hardware changes. The diagnostics that have to be run after the hardware updates will require the new microcode to test the drive properly.

- \_\_\_ 1. Have the customer vary the device off-line and unload the drive.
- \_\_\_ 2. Follow the "Updating Microcode" procedure in the **Common Procedures** section of the *IBM 3590 Tape Subsystem Models B11, B1A, E11 and E1A MI*. Use the FMR cartridge or diskettes provided with this FFBM.

#### 10.2.2 Prepare the tape drive for service.

- \_\_\_ 1. Follow the procedure in "Prepare the Tape Drive for Service" in the **Common Procedures** section of the *IBM 3590 Tape Subsystem Models B11, B1A, E11 and E1A MI*, and then return here.

#### 10.2.3 Power Off the Drive

- \_\_\_ 1. Switch the power off.
- \_\_\_ 2. Disconnect the power cord from its source and then from the drive. Set aside for reinstallation.

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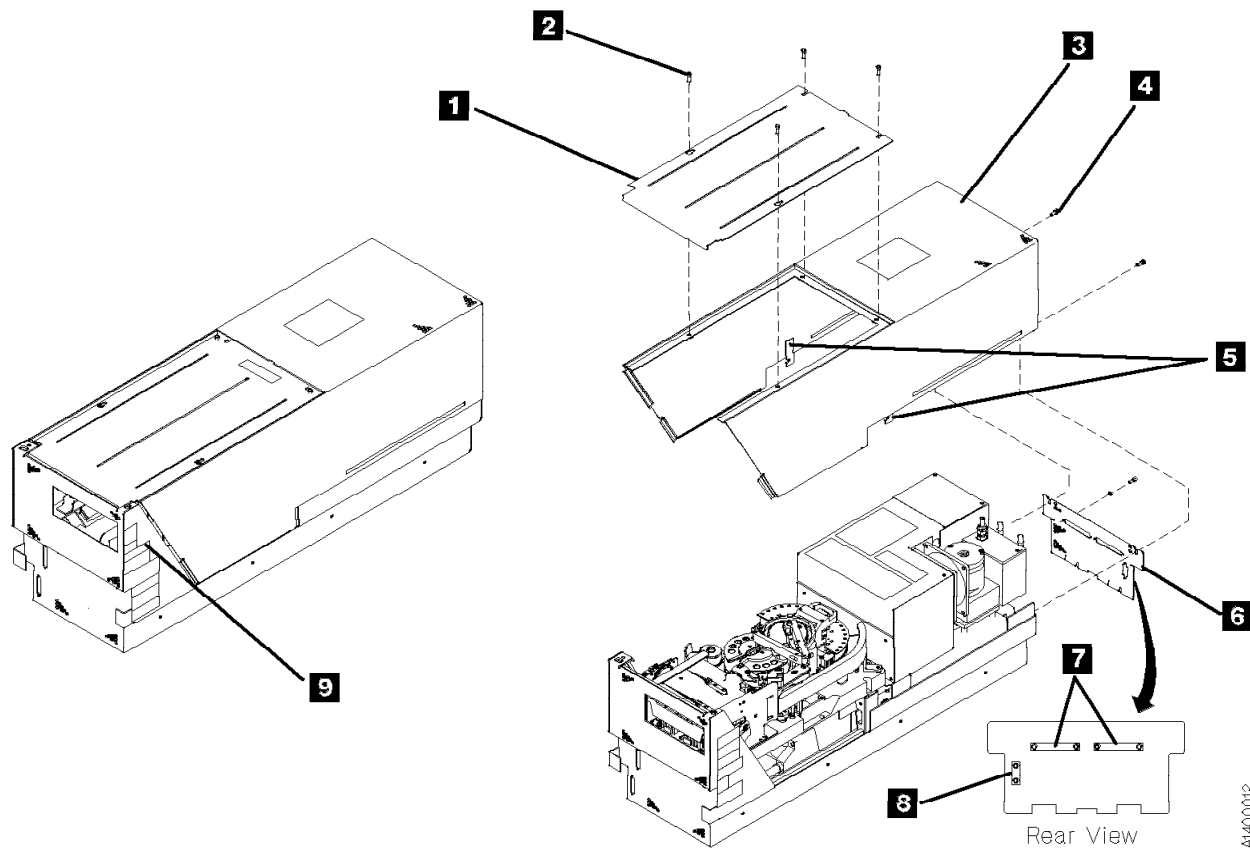
### 10.2.4 Remove Deck Enclosure Back Cover

Refer to Figure 1.

- 1. Remove the two screws **4** that secure the back cover **3**. Set aside for reinstallation.

**Note:** Removal of four screws **2** and the top access panel **1** are not required.

- 2. Slide the cover toward the rear of the drive to disengage the two hooks **5** and lift off the back cover.




Alt400012

Figure 1. Deck Enclosure Covers

### 10.2.5 Remove Cleaner Blade

be done in step 10.2.10, "Complete Installation" on page 19.

**Attention:**  The head guide assembly has ESD-sensitive components. Do not touch the circuit board on the head guide assembly. Also, do not touch the surface of the read/write head or the bristles on the cleaning brush as finger prints cause corrosion on the head.

See Figure 2.

**Attention:** If the HGA has a cleaner blade attached **2** use the following procedure to remove it. **Not removing the cleaner blade can damage the new Extended High Performance Tape!**

- 1. Remove the two screws **3** holding the cleaner blade on the HGA **1**.
- 2. Remove and discard the cleaner blade **2**.
- 3. Remove and discard the cleaner blade vacuum hose **4**.
- 4. Install the in-line connector (P/N 09L4687) **6** in place of the tee connector **5**.

**Note:** If the cleaner blade is removed it will be necessary to readjust the vacuum at the end of this Feature Installation. This will

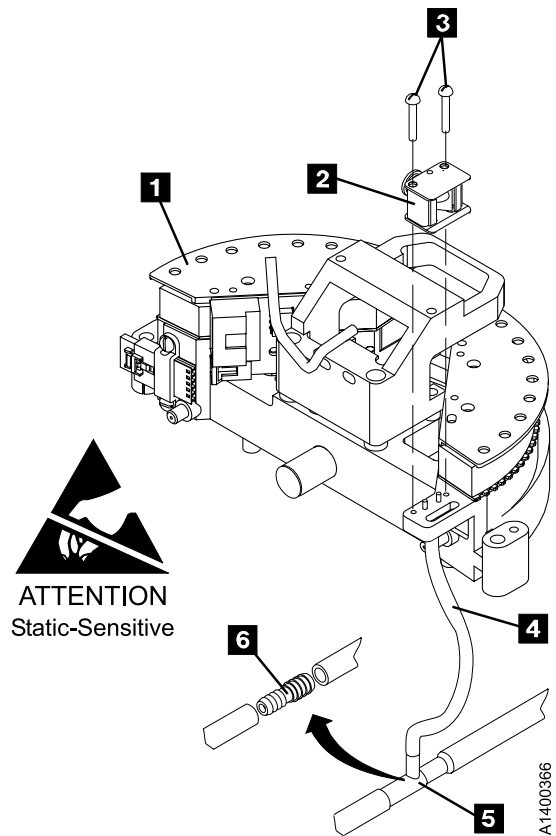



Figure 2. Cleaner Blade Removal

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### 10.2.6 Loosen Pantocam Assembly and Remove Machine Reel Hub Assembly.

See Figure 3 on page 13.

**Note:** If your drive already has the **green** Machine reel motor flanges and hub assembly ( **1** , **18** , and **20** ) the following steps will not be required because the parts have been factory installed. Go to step 10.2.9, "Install HGA Shims" on page 17.

- \_\_\_ 1. Remove the large hose **5** from the tape-lifter solenoid and the tee connection **4** .
- \_\_\_ 2. Remove the right D-bearing hose **16** and the rear decoupler hose **15** .
- \_\_\_ 3. Remove the tape-lifter solenoid mounting bracket screw **10** .
- \_\_\_ 4.  Disconnect the VPD cable connector **6** .
- \_\_\_ 5. **Attention:** When disconnecting the small hose from the tape-lifter solenoid, **do not** pull the other end of the hose out of the head guide.  
  
Carefully disconnect the small hose from the tape-lifter solenoid (under the tape-lifter solenoid mounting bracket **9** ) and move the tape-lifter solenoid out of the way.
- \_\_\_ 6. When positioning the pantocam, always grip the arm next to the pantocam motor shaft. **Never grip the outer pantocam arm to reposition the pantocam.** Now position the pantocam arm so the threader pin **13** is away from the loader.

- \_\_\_ 7. Position the machine reel **12** to gain access to the front pantocam-base mounting screw (located under the edge of the pantocam).
- \_\_\_ 8. Unscrew the three pantocam-base mounting screws **11** and leave in place. Carefully lift the pantocam assembly up approximately 13 mm (1/2 in.) and let it rest at this position.
- \_\_\_ 9. Remove and discard the two screws **22** in the top of the upper flange **1** then remove and discard the flange. (A new flange and longer screws are provided in the FFBM.)  
  
**Note:** Some later model 3590 drives will have a retainer (item **2** in Figure 6 on page 16) on top of the upper flange. If this retainer is present, remove and discard it.
- \_\_\_ 10. **Attention:** Do not get the old and new retainers mixed up. They are both black metal parts, but the old level retainer has a raised ridge on one side. The new level retainer is flat on both sides, and is thicker than the old level retainer.
- \_\_\_ 11. **Do not use tools to remove the hub; damage to the hub may result.** Rotate the hub **18** so the opening is toward you. Use both thumbs to spread the opening apart **19** then lift off and discard the hub.
- \_\_\_ 12. Remove and discard the lower flange **20** .
- \_\_\_ 13. Some early 3590 drive models have a shim under the lower flange. If present, **remove and discard any shims under the flange.**

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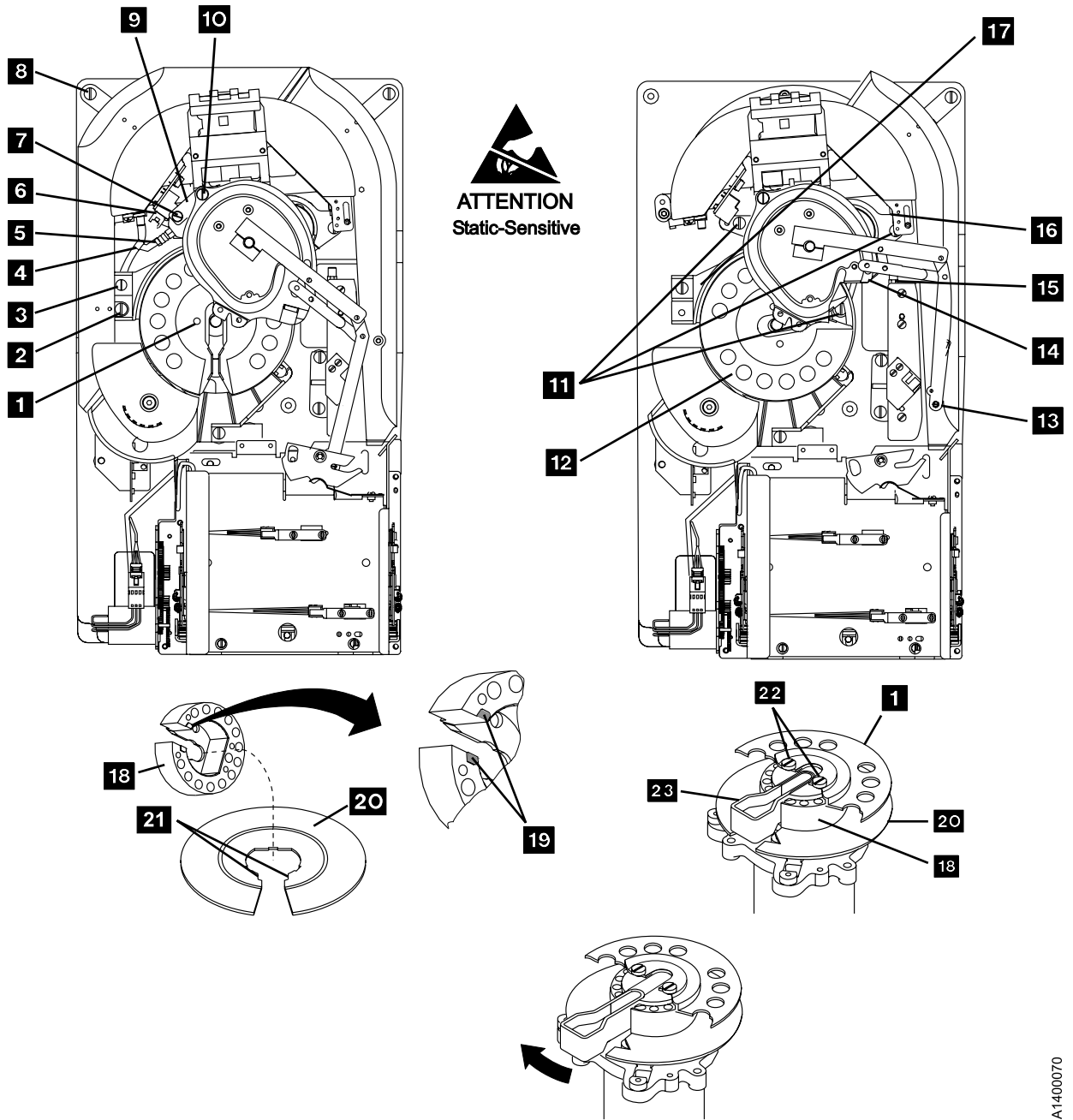


Figure 3. Pantocam

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### 10.2.7 Install Ferrite

The ferrite supplied with the upgrade kit is to be installed on the leads of the Pantocam motor.

**Note:** If there is already a ferrite installed on the pantocam motor leads it will not be necessary to perform the following procedure.

\_\_\_ 1. See Figure 5.

Disconnect the two pantocam motor leads:

- Black motor lead: right terminal **2**
- Yellow motor lead: left terminal **1**

**Note:** The two motor leads should be separated from the other leads back to the break-out.

\_\_\_ 2. See Figure 4.

Install the ferrite (PN 09G7781) by passing the pantocam motor leads through the ferrite, then wrap each separate wire through two more times. The ferrite should be located approximately 38mm (1 1/2") from the terminals. Route the leads directly to the motor and do not allow the leads to contact any other cables.

\_\_\_ 3. See Figure 5.

Connect the two pantocam motor leads:

- Black motor lead: right terminal **2**
- Yellow motor lead: left terminal **1**

**Note:** If the motor leads are too short, loosen the cable clamp to relieve the strain, then tighten the cable clamp.

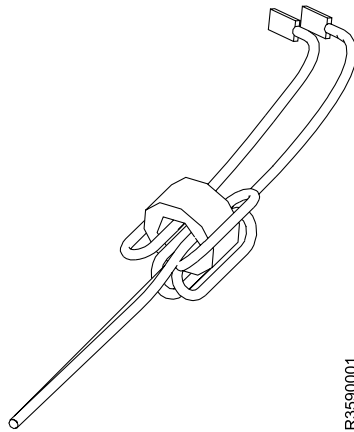


Figure 4. Install Ferrite

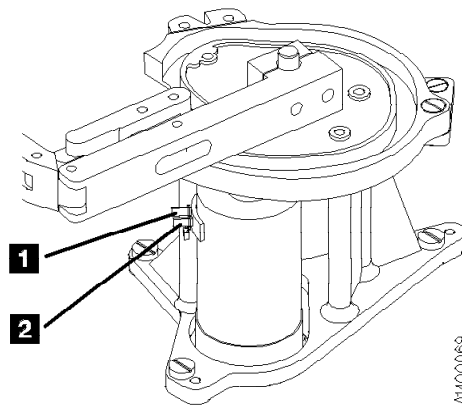


Figure 5. Pantocam Motor Connectors

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### 10.2.8 Install Machine Reel Hub, Flanges, and Pantocam

Refer to Figure 6 on page 16.

- \_\_\_ 1. Ensure that any shims **7** on the motor hub **6** have been removed and discarded.
- \_\_\_ 2. Place the new lower flange (PN 35L0815) **5** onto the motor hub **6**. Ensure that the groove on lower flange **5** is facing up as shown in Figure 6 on page 16.
- \_\_\_ 3. Install the new take-up hub (PN 34L2659) **4** onto motor hub **6**.
- \_\_\_ 4. Refer to Figure 3 on page 13.

Ensure that the keys **19** at the bottom of the hub **18** are set into the cutouts **21** in the lower flange **20**. The hub should sit flat on the lower flange with no gaps between the two parts. Rotating the lower flange may be required to ensure proper seating.

- \_\_\_ 5. Insert the gap set tool (PN 05H4671) **23** into the gap in the hub **18**.
- \_\_\_ 6. Now refer to Figure 6 on page 16.

Install the upper flange (PN 35L0814) **3**, retainer plate (PN 09L5117) **2** and the two screws (PN 1621192) **1**.

**Note:** The screw tightening procedure is very important. If it is not done correctly the hub gap will not be adjusted properly.

**Note:** When removing or replacing the screws on the HUB assembly it is strongly recommended that the following screwdriver be used. It is very important that the size of the screwdriver bit matches and fits the screw slot as close as possible. Part number 73G5374; Blade size 5/16" X 6".

- \_\_\_ 7. With the gap set tool inserted all the way into the hub, tighten the two screws **1**


enough to ensure that the hub and flanges are seated all the way down on the motor hub.

- \_\_\_ 8. Then loosen the screws and re-tighten them so they are finger tight against the retainer plate.
- \_\_\_ 9. Now tighten the two screws a minimum of 1/4 turn (maximum of 3/8) each.

**Note:** If the screws are not tight enough, the pressure of the tape wrapped around the machine reel hub will cause the hub gap to close up tight on the leader block. This may result in load or unload errors.

- \_\_\_ 10. After the screws are tightened, ensure that the gap set tool slides in and out of the hub with just a slight amount of drag or the leader block on the tape will bind in the slot. If the gap set tool is still tight, the screws may not have been tightened correctly. Loosen the screws and repeat steps 7 through 10.

Now refer to Figure 3 on page 13

- \_\_\_ 11. Reinstall the Pantocam assembly on the locating pins.
- \_\_\_ 12. Tighten the pantocam screws **11**.
- \_\_\_ 13. Connect the small hose from the tape-lifter solenoid (under the tape-lifter solenoid mounting bracket **9**). Allow the solenoid to rest in place under the pantocam for VPD connector access.
- \_\_\_ 14.  Reconnect the VPD cable connector **6**.
- \_\_\_ 15. Reinstall the tape-lifter solenoid mounting bracket screw **10**.
- \_\_\_ 16. Reinstall the right D-bearing hose **16** and the rear decoupler hose **15**.
- \_\_\_ 17. Reinstall the large hose **5** to the tape-lifter solenoid and the tee connection **4**.

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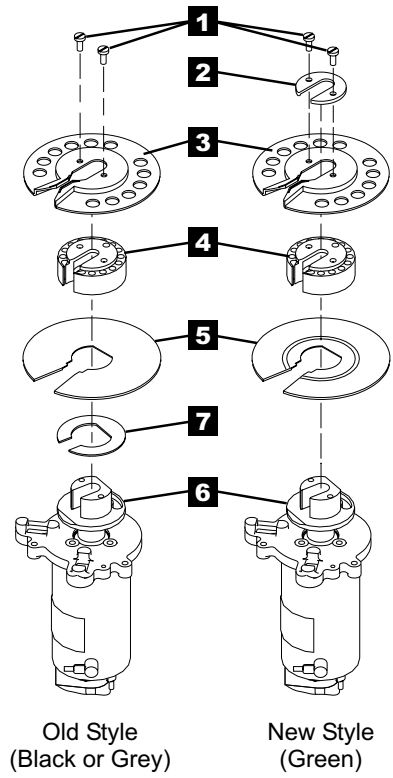


Figure 6. Machine Reel Motor



### 10.2.9 Install HGA Shims

See Figure 8 on page 18.

**Note:** If your HGA assembly has 2X labels on the top of the compliant guides **2** and **7** the following steps will not be required because the shims have been factory installed. Go to step 10.2.10, "Complete Installation" on page 19.

**Attention:** The HGA 'D' bearings contain **VERY** sensitive parts. Read and understand all of the following warnings before beginning this procedure. Failure to follow these instructions may result in damaged or broken tapes.

**Warning:** Oil from finger prints in the tape path will cause R/W head failures. Do not touch the white ceramic guides on the bottom of the compliant guide **2**, or the surface of the 'D' bearing **5**.

**Warning:** The suspension springs in the floating head assembly, and the surface of the R/W head, can be damaged very easily. Be **VERY** careful **NOT** to touch the head assembly while performing this procedure.

See Figure 7 on page 18.

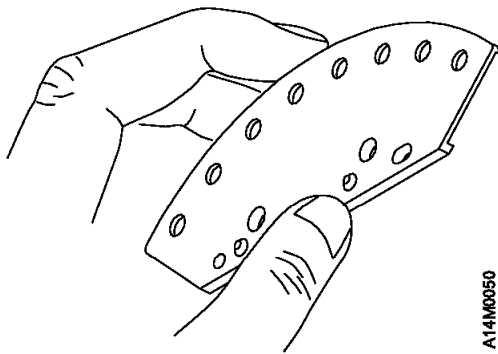
**Warning:** The white ceramic buttons on the compliant guides are mounted on very sensitive springs. These buttons and springs can be damaged very easily. When handling the compliant guides, hold them by the edges as shown in Figure 7 on page 18. If you have to lay the guide down while installing the shim, be sure the white buttons are facing **UP**. When you pick up the guide be **VERY** careful not to touch the white buttons. **DO NOT** attempt to clean the white buttons.

See Figure 8 on page 18.

**Attention:** The left compliant guide **2** and the right compliant guide **7** are identical parts, but they should **NOT** be interchanged. The surfaces develop a unique wear pattern with use, and may cause intermittent problems if they are installed on the wrong side. Complete the shim installation procedure on one side before removing the guide on the other side.

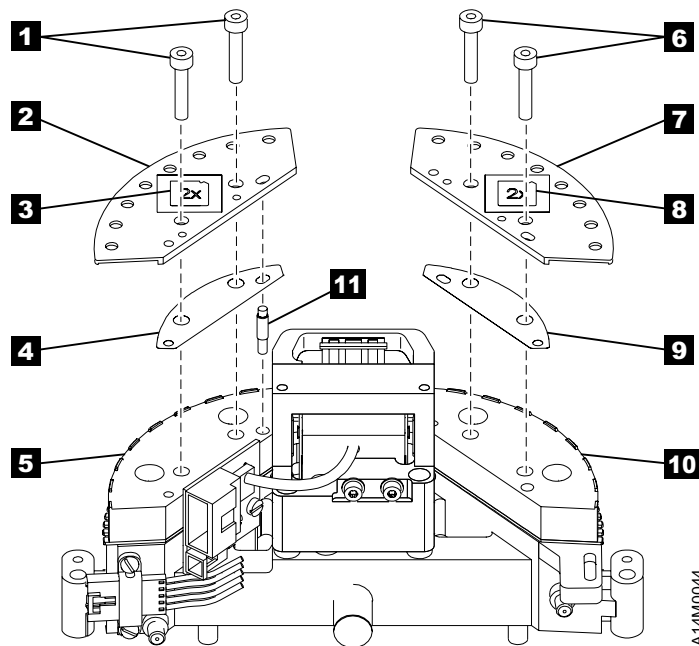
- 1. Remove the 2 screws **1** from the left 'D' bearing assembly **5**.
- 2. The locating pin **11** closest to the R/W head on the left 'D' bearing is designed to be loose in the hole in the 'D' bearing. But it may be tight in the hole in the compliant guide. Use a small allen wrench or similar tool to hold the pin down while you lift up on the compliant guide.
- 3. Remove the left compliant guide **2**. Be careful not to let the pin come out of the hole in the 'D' bearing, because it may fall down into the HGA assembly and become lost.  
  
If the pin does come out of the hole, note that the two ends of the pin are different. Refer to Figure 8 on page 18, item **11**, to determine how to put it back in the hole.
- 4. Install one of the red plastic shims (PN 35L0584) **4** on top of the 'D' bearing **5**. Ensure that the holes in the shim line up with the holes and pins on the 'D' bearing.
- 5. Install the compliant guide **2**. Ensure that the shim does not move.
- 6. Install the 2 screws **1** so they are just finger tight against the compliant guide. Tighten the screws 1/8 of a turn.
- 7. Remove the 2 screws **6** from the right 'D' bearing assembly. **10**.
- 8. Remove the right compliant guide **7**.
- 9. Install one of the red plastic shims (PN 35L0584) **9** on top of the 'D' bearing **10**. Ensure that the holes in the shim line up with the holes and pins on the 'D' bearing.
- 10. Install the compliant guide **7**. Ensure that the shim does not move.
- 11. Install the 2 screws **6** so they are just finger tight against the compliant guide. Tighten the screws 1/8 of a turn.
- 12. Install the 2X labels (P/N 34L2660) **3** and **8** as shown.

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A14M0050

Figure 7. How to hold the compliant guide



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Figure 8. Shim Installation

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### 10.2.10 Complete Installation

- \_\_\_ 1. Manually operate the pantocam arm so the pin enters the cam on the loader. It may be necessary to move the cam on the loader so the pin enters the slot properly.
- \_\_\_ 2. Do a final visual inspection of the drive to ensure there are no loose parts or tools in the tape path.
- \_\_\_ 3. Connect the power cable to the drive and source.
- \_\_\_ 4. Power on the drive.
- \_\_\_ 5. When the Power On self test completes, use the following procedure to enable the Extended High Performance microcode.
  - a. Press the change mode  $\uparrow$  push button to place the drive in CE mode.
  - b. Select **Config/Install**.
  - c. Select **Drv Options**.
  - d. Scroll down to the **Hdwr Present/Not Present for Dbl Lngth Tape** option.
  - e. Ensure that it is set for **Present**. If it is set for **Not Present**, pressing the **Enter** button will change it to **Present**.
  - f. Select **Cancel** to return to the **Config/Install** menu.
  - g. Select **Cancel** again to return to the CE options menu.
  - h. Press the change mode  $\uparrow$  push button to return to the operator menus.
- \_\_\_ 6. Load the cleaning cartridge into the drive; the cleaning and pneumatic adjust procedures are done automatically.

**Note:** If the cleaner blade was removed in step 10.2.5, "Remove Cleaner Blade" on page 11, it will be necessary to re-adjust the vacuum. See **Measurement and Adjustment of Pneumatic System** in the 3590 Maintenance Information manual. Re-adjust the vacuum and then return to this procedure.

- \_\_\_ 7. Power off the drive and disconnect the power cable from the drive.
- \_\_\_ 8. Install the deck enclosure back cover.
- \_\_\_ 9. Install the 2X label (PN 34L2660) **1** next to the Magstar Model label. Refer to Figure 9.
- \_\_\_ 10. Connect the power cable to the drive.
- \_\_\_ 11. Power on the drive.

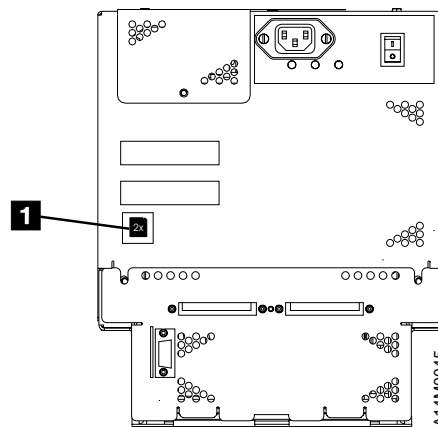


Figure 9. Label Attachment to Rear of 3590E Drive

## 11.0 Test Procedure

Perform the "End of Call" procedure as defined within the **PROC** section of the 3590 MI.

The "End of Call" procedure includes the following routines:

1. Verify Fix Diagnostics
  - Note:** Use an Extended High Performance Tape cartridge (PN 05H3188) for the verify fix diagnostics. The test will take approximately 10 min. to run.
2. Interrogate and/or clear the error log.
3. Return the drive to operation position.
4. Setting device on-line.

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## After Installation (Sections 12 through 15)

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### 12.0 Field Updating

None

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### 13.0 Field Support Publications

Replace the existing *IBM 3590 Tape Subsystem Models B11/B1A MI*, with the new MI provided with this FFBM.

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### 14.0 Parts Disposition

Scrap all removed parts locally.

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### 15.0 Machine Records

- 1. Update field records to reflect that EC F23125C has been installed.
- 2. Using existing procedures, report installation and quality.

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