GE Medical Systems

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Revision 2

GE Medical Systems
PET Advance Imaging System
Planned Maintenance Manual

LEGAL NOTES

TRADEMARKS

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IMPORTANT PRECAUTIONS

LANGUAGE

WARNING

- **THIS SERVICE MANUAL IS AVAILABLE IN ENGLISH ONLY.**
- **IF A CUSTOMER'S SERVICE PROVIDER REQUIRES A LANGUAGE OTHER THAN ENGLISH, IT IS THE CUSTOMER'S RESPONSIBILITY TO PROVIDE TRANSLATION SERVICES.**
- **DO NOT ATTEMPT TO SERVICE THE EQUIPMENT UNLESS THIS SERVICE MANUAL HAS BEEN CONSULTED AND IS UNDERSTOOD.**
- **FAILURE TO HEED THIS WARNING MAY RESULT IN INJURY TO THE SERVICE PROVIDER, OPERATOR OR PATIENT FROM ELECTRIC SHOCK, MECHANICAL OR OTHER HAZARDS.**

AVERTISSEMENT

- **CE MANUEL DE MAINTENANCE N'EST DISPONIBLE QU'EN ANGLAIS.**
- **SI LE TECHNICIEN DU CLIENT A BESOIN DE CE MANUEL DANS UNE AUTRE LANGUE QUE L'ANGLAIS, C'EST AU CLIENT QU'IL INCOMBE DE LE FAIRE TRADUIRE.**
- **NE PAS TENTER D'INTERVENTION SUR LES ÉQUIPEMENTS TANT QUE LE MANUEL SERVICE N'A PAS ÉTÉ CONSULTÉ ET COMPRIS.**
- **LE NON-RESPECT DE CET AVERTISSEMENT PEUT ENTRAÎNER CHEZ LE TECHNICIEN, L'OPÉRATEUR OU LE PATIENT DES BLESSURES DUES À DES DANGERS ÉLECTRIQUES, MÉCANIQUES OU AUTRES.**

WARNUNG

- **DIESES KUNDENDIENST-HANDBUCH EXISTIERT NUR IN ENGLISCHER SPRACHE.**
- **FALLS EIN FREMDER KUNDENDIENST EINE ANDERE SPRACHE BENÖTIGT, IST ES AUFGABE DES KUNDEN FÜR EINE ENTSPRECHENDE ÜBERSETZUNG ZU SORGEN.**
- **VERSUCHEN SIE NICHT, DAS GERÄT ZU REPARIEREN, BEVOR DIESES KUNDENDIENST-HANDBUCH NICHT ZU RATE GEZOGEN UND VERSTANDEN WURDE.**
- **WIRD DIESE WARNUNG NICHT BEACHTET, SO KANN ES ZU VERLETZUNGEN DES KUNDENDIENSTTECHNIKERS, DES BEDIENERS ODER DES PATIENTEN DURCH ELEKTRISCHE SCHLÄGE, MECHANISCHE ODER SONSTIGE GEFAHREN KOMMEN.**

AVISO

- **ESTE MANUAL DE SERVICIO SÓLO EXISTE EN INGLÉS.**
- **SI ALGÚN PROVEEDOR DE SERVICIOS AJENO A GEMS SOLICITA UN IDIOMA QUE NO SEA EL INGLÉS, ES RESPONSABILIDAD DEL CLIENTE OFRECER UN SERVICIO DE TRADUCCIÓN.**
- **NO SE DEBERÁ DAR SERVICIO TÉCNICO AL EQUIPO, SIN HABER CONSULTADO Y COMPRENDIDO ESTE MANUAL DE SERVICIO.**
- **LA NO OBSERVANCIA DEL PRESENTE AVISO PUEDE DAR LUGAR A QUE EL PROVEEDOR DE SERVICIOS, EL OPERADOR O EL PACIENTE SUFRAN LESIONES PROVOCADAS POR CAUSAS ELÉCTRICAS, MECÁNICAS O DE OTRA NATURALEZA.**

ATENÇÃO

- **ESTE MANUAL DE ASSISTÊNCIA TÉCNICA SÓ SE ENCONTRA DISPONÍVEL EM INGLÊS.**
- **SE QUALQUER OUTRO SERVIÇO DE ASSISTÊNCIA TÉCNICA, QUE NÃO A GEMS, SOLICITAR ESTES MANUAIS NOUTRO IDIOMA, É DA RESPONSABILIDADE DO CLIENTE FORNECER OS SERVIÇOS DE TRADUÇÃO.**
- **NÃO TENTE REPARAR O EQUIPAMENTO SEM TER CONSULTADO E COMPREENDIDO ESTE MANUAL DE ASSISTÊNCIA TÉCNICA.**
- **O NÃO CUMPRIMENTO DESTE AVISO PODE POR EM PERIGO A SEGURANÇA DO TÉCNICO, OPERADOR OU PACIENTE DEVIDO A' CHOQUES ELÉTRICOS, MECÂNICOS OU OUTROS.**

AVVERTENZA

- **IL PRESENTE MANUALE DI MANUTENZIONE È DISPONIBILE SOLTANTO IN INGLESE.**
- **SE UN ADDETTO ALLA MANUTENZIONE ESTERNO ALLA GEMS RICHIEDE IL MANUALE IN UNA LINGUA DIVERSA, IL CLIENTE È TENUTO A PROVVEDERE DIRETTAMENTE ALLA TRADUZIONE.**
- **SI PROCEDA ALLA MANUTENZIONE DELL'APPARECCHIATURA SOLO DOPO AVER CONSULTATO IL PRESENTE MANUALE ED AVERNE COMPRESO IL CONTENUTO.**
- **NON TENERE CONTO DELLA PRESENTE AVVERTENZA POTREBBE FAR COMPIERE OPERAZIONI DA CUI DERIVINO LESIONI ALL'ADDETTO ALLA MANUTENZIONE, ALL'UTILIZZATORE ED AL PAZIENTE PER FOLGORAZIONE ELETTRICA, PER URTI MECCANICI OD ALTRI RISCHI.**

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注意:

本维修手册仅存有英文本。
非 GEMS 公司的维修员要求非英文本的维修手册时，
客户需自行负责翻译。
未详细阅读和完全了解本手册之前，不得进行维修。
忽略本注意事项会对维修员，操作员或病人造成触电，机械伤害或其他伤害。

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All packages should be closely examined at time of delivery. If damage is apparent write “Damage In Shipment” on ALL copies of the freight or express bill BEFORE delivery is accepted or “signed for” by a GE representative or hospital receiving agent. Whether noted or concealed, damage MUST be reported to the carrier immediately upon discovery, or in any event, within 14 days after receipt, and the contents and containers held for inspection by the carrier. A transportation company will not pay a claim for damage if an inspection is not requested within this 14 day period.

Call Traffic and Transportation, Milwaukee, WI (262) 785 5052 or 8*323 5052 immediately after damage is found. At this time be ready to supply name of carrier, delivery date, consignee name, freight or express bill number, item damaged and extent of damage.

Complete instructions regarding claim procedure are found in Section S of the Policy And Procedures Bulletins.

CERTIFIED ELECTRICAL CONTRACTOR STATEMENT

All electrical Installations that are preliminary to positioning of the equipment at the site prepared for the equipment shall be performed by licensed electrical contractors. In addition, electrical feeds into the Power Distribution Unit shall be performed by licensed electrical contractors. Other connections between pieces of electrical equipment, calibrations and testing shall be performed by qualified GE Medical personnel. The products involved (and the accompanying electrical installations) are highly sophisticated, and special engineering competence is required. In performing all electrical work on these products, GE will use its own specially trained field engineers. All of GE's electrical work on these products will comply with the requirements of the applicable electrical codes.

The purchaser of GE equipment shall only utilize qualified personnel (i.e., GE's field engineers, personnel of third-party service companies with equivalent training, or licensed electricians) to perform electrical servicing on the equipment.

IMPORTANT...X-RAY PROTECTION

X-ray equipment if not properly used may cause injury. Accordingly, the instructions herein contained should be thoroughly read and understood by everyone who will use the equipment before you attempt to place this equipment in operation. The General Electric Company, Medical Systems Group, will be glad to assist and cooperate in placing this equipment in use.

Although this apparatus incorporates a high degree of protection against x-radiation other than the useful beam, no practical design of equipment can provide complete protection. Nor can any practical design compel the operator to take adequate precautions to prevent the possibility of any persons carelessly exposing themselves or others to radiation.

It is important that anyone having anything to do with x-radiation be properly trained and fully acquainted with the recommendations of the National Council on Radiation Protection and Measurements as published in NCRP Reports available from NCRP Publications, 7910 Woodmont Avenue, Room 1016, Bethesda, Maryland 20814, and of the International Commission on Radiation Protection, and take adequate steps to protect against injury.

The equipment is sold with the understanding that the General Electric Company, Medical Systems Group, its agents, and representatives have no responsibility for injury or damage which may result from improper use of the equipment.

Various protective materials and devices are available. It is urged that such materials or devices be used.

OMISSIONS & ERRORS

Customers, please contact your GE Sales or Service representatives.

GE personnel, please use the GEMS CQA Process to report all omissions, errors, and defects in this publication.

Revision History

Revision	Date	Reason for change
0	March, 1999	Initial Documentation Release
1	December, 2001	Convert existing documentation into new format; modify existing instructions
2	May, 2002	Updated PM schedules and log sheets; added run pmtAnalysis

List of Effected Pages

PAGES	REVISION	PAGES	REVISION	PAGES	REVISION
1 through 208	0				
1 through 82	1				
1 through 84	2				

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Chapter 1 General Information

Please read the entire chapter before attempting to maintain the PET Advance system. This chapter contains the recommended maintenance schedule.

Section 1-1: Introduction

Follow the procedures in this manual to maintain optimal PET Advance system operation and detect system problems before they become catastrophic failures.

This manual assumes the person conducting the PM has received PET Advance training, can operate the system, acquire Blank scans, assess sinograms, and decipher the error codes and messages.

1-1.1 PM Schedule Introduction

Schedule 8 hours per quarter to complete all the procedures described in this manual. Talk with the customer to determine how to best incorporate this time into their patient schedules. Table 1-2 on page 12 contains the list of procedures to follow each quarter.

Start every PM session with the Readiness Checks, found in Chapter 2. Upon successful completion of the these checks, start the scheduled planned maintenance. The procedures follow in the same order as the list in Table 1-2.

1-1.2 PM Log Sheets

Chapter 7 contains PM Log signature pages and Log sheets. The Log sheets contain tables that list each task in the order it appears in the manual. Each PM Chapter has its own section of tables in Chapter 7. See Table 1-1. Each section contains enough tables to record 12 years of planned maintenance. See Table 1-2.

Once each task is completed, initial and enter the date of completion into the corresponding Quarterly Column. Please write directly into the book. Use the Notes and Comments pages to record PM related notes and reminders.

Table 1-1: Sample PM Task Table

Log applicable notes in the Site Log		**Year: _____**				**Year: _____**			
Tasks		**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
	Date								
	Init.								
	Date								
	Init								

Section 1-2: PM Schedule

Table 1-2 contains the recommended list of PM Tasks and frequency interval.

Table 1-2: Recommended PM Frequency

Task	Frequency Interval (Fiscal Quarters)				Notes
	Q1	Q2	Q3	Q4	
System Readiness Checks:					Run the Readiness Checks at the start of **each** PM session
Reboot the PET Advance system	X	X	X	X	
View Error Log	X	X	X	X	
Run a 5 minute Blank Scan	X	X	X	X	
Inspect the Sinograms	X	X	X	X	
Run/Review pmtAnalysis	X	X	X	X	
Full System Backup	X		X		2x each year
Check remaining Raw Data capacity	X	X	X	X	4x each year
Check Emergency Stops		X		X	2x each year
Inspect Gantry Fans	X	X	X	X	4x each year
Inspect and Clean Gantry Filters	X	X	X	X	4x each year
Check Gantry Lamps and Displays	X	X	X	X	4x each year
Clean and Inspect the Transmission Ring Belt		X		X	twice each year
Lubricate the Collimator				X	once each year
Lubricate the Gripper	X	X	X	X	4x each year
Test the Source Load Function	X	X	X	X	4x each year
Check and Clean the Table Base	X		X		2x each year
Check and Clean the Cradle Area		X		X	2x each year
Check Patient Safety Grounds	X		X		2x each year
Clean the G1 Electronics Cabinet Filters	X	X	X	X	4x each year
Check the G1 and G2 Electronics Cabinet Fans	X	X	X	X	4x each year
Check OWS & AWS air flow	X	X	X	X	4x each year
Check SCSI Enclosure fans	X	X	X	X	4x each year
Laser Cam Filmer	X	X	X	X	Follow Vendor Manual Instructions
Color Printer	X	X	X	X	Follow Vendor Manual Instructions

Chapter 2 System Readiness Checks

NOTICE **Discuss system performance with the customer when contacted to schedule a PM. If the customer describes errors or artifacts, schedule time for corrective maintenance before starting the scheduled planned maintenance.**

- **Did any quadrants fail to converge during the most recent Update Gain?**
- **Did the Blank Scan sinograms contain any lines or artifacts?**

Section 2-1: Introduction

This chapter contains procedures to determine the health of the system prior to starting the scheduled planned maintenance. Follow the procedures in this chapter at the beginning of each PM session. Use these procedures to:

- Reboot the system to a known starting point, and monitor its progress.
- Quickly test the normal operation of the hardware and software.
- Check the system calibration.

NOTICE Start the scheduled planned maintenance as soon as the system passes these basic readiness checks.

Section 2-2: Reboot the System

Make sure the system successfully reboots and the Error Log remains free of failures and warnings ***before*** proceeding to the first scheduled planned maintenance procedure. When scheduling multiple PM sessions every quarter, follow the instructions in this chapter ***before every PM session.*** If unacceptable failures occur, open a service dispatch, and correct the current problem before starting the PM.

Follow the instructions in this section to reboot all PET Advance subsystems while monitoring the TIP window and error logs for failures and warnings.

2-2.1 Reboot a PET Advance System with Sun Sparc OWS

1.) If necessary, double-click the CDE panel icon to open the panel.

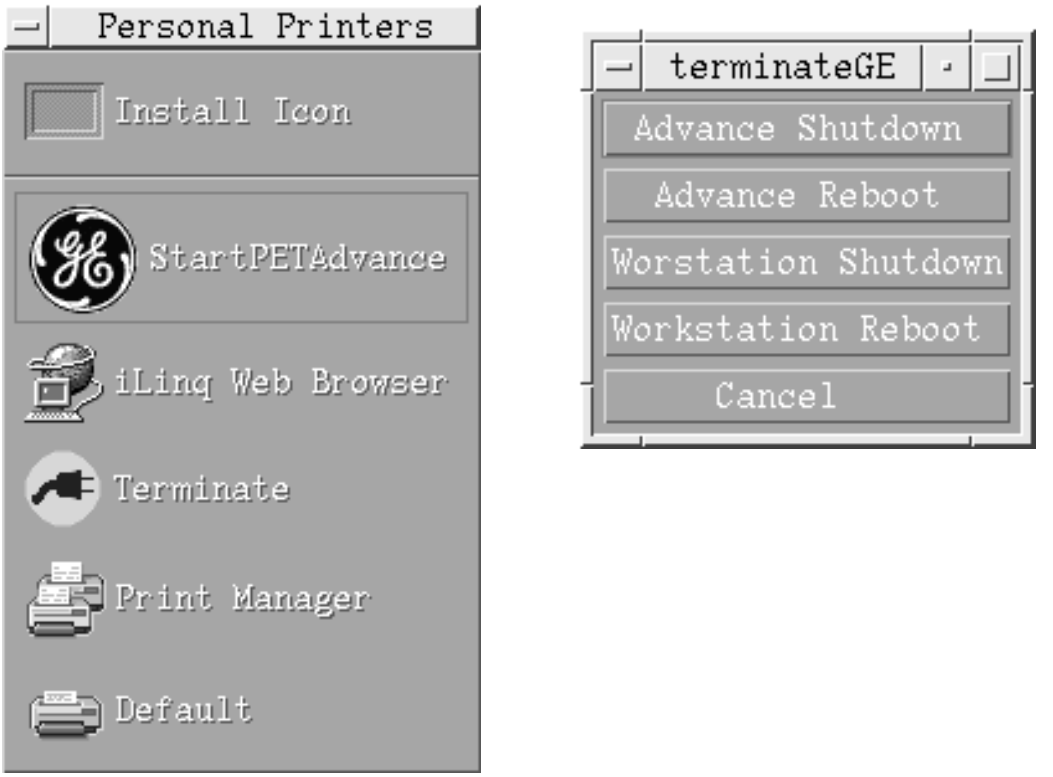
2.) Refer to Figure 2-1. Click on the bar above the GE logo to display the Personal Printer Menu.

3.) Click ***TERMINATE*** to open the terminateGE menu.

4.) Click ***ADVANCE REBOOT***.

5.) After the Login panel appears on the screen, wait an additional *4* minutes before attempting to Acquire, Reconstruct, Network, Archive, or delete raw data.

Figure 2-1: Terminate Button and Submenu



2-2.2 Reboot a PET Advance System with Hewlett Packard OWS

Note: This procedure also works on the Sun Sparc workstation. **Recommended:** Use the automated procedure in Section 2-2.1 to reboot the Sparc, whenever possible.

1.) Logon to the system as root.
   - If logged on as operator, log off, then log on as **root**.
   - Type/enter the root password to display the PET Advance system desktop.

2.) Right-click in the screen to display the menu.

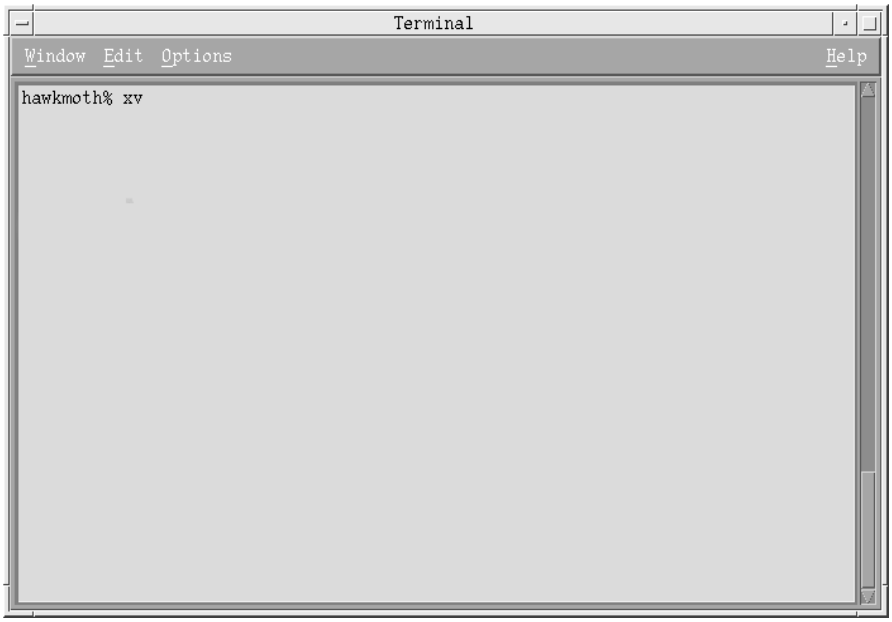
3.) Select ***TOOLS*** to display its submenu.

4.) Select ***TERMINAL*** to open a terminal window. Refer to Figure 2-2.
   - Move the cursor into the window to activate it.

5.) Type/enter: **terminate -reboot all**

6.) After the Login panel appears on the screen, wait an additional *4* minutes before attempting to Acquire, Reconstruct, Network, Archive, or delete raw data.

Figure 2-2: Terminal Window



Section 2-3: Open Tip Windows

Open the four Tip windows on the desktop and monitor the subsystems while they reboot.

1.) Logon as Service and open the Service Desktop.

2.) Click ***SERVICE*** to open its menu.

3.) Click or drag to ***TERMINAL INTERFACE PKG.*** to display its submenu.

4.) Click or drag to ***TIP ALL*** to open the following subsystem windows:

- Table
- Gantry
- SHARC
- EDCAT

5.) Press **<ctrl><X>** in each tip window to reboot the corresponding subsystem.

6.) Monitor the contents of each tip window for failures and warnings.

- IF unacceptable failures occur, open a service dispatch, and correct the current problem before starting the PM.

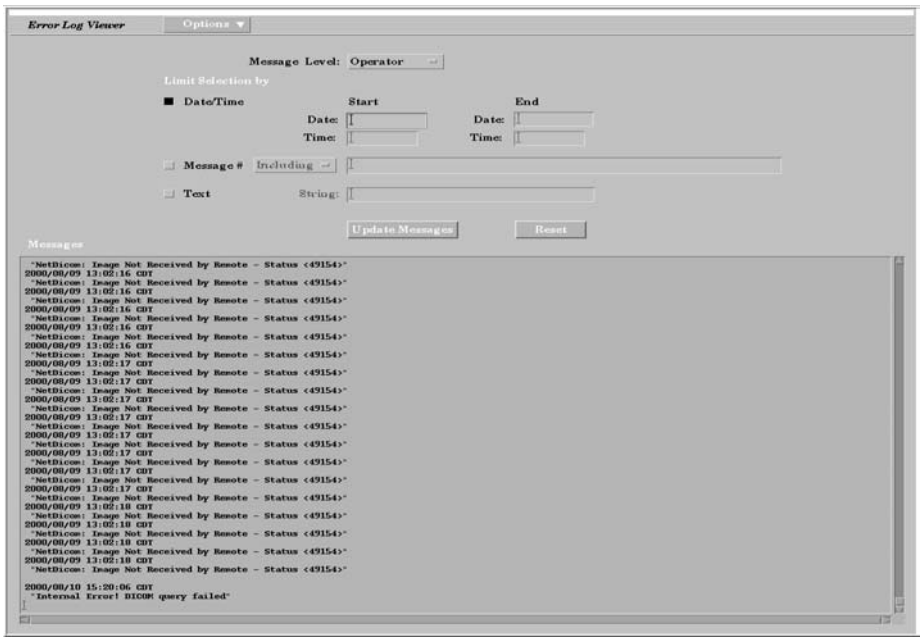
Section 2-4: View Error Log

2-4.1 Introduction

The Error Log Viewer records hardware and software errors as they occur at the corresponding OWS or AWS workstation. (The AWS cannot display OWS's error log, or vice versa.)

The Error Log holds one week's messages. Once every seven days, the Error Log automatically transfers the messages from the past week to a Unix file. The Unix files hold the messages from the past five weeks. When the Error Log starts a new week of messages, the system deletes the oldest week from the Unix file.

Figure 2-3: Error Log Viewer



2-4.2 View the Error Log

The Error Log defaults to the Operator Message Level when opened. Remember to enter the Service or Programmer levels for more detailed messages.

1.) Click on ***UTILITIES*** to open its menu.

2.) Select ***ERROR LOG VIEWER*** to display the corresponding panel.
Refer to Figure 2-3.

- The Error Log lists the messages in the order they occurred, from oldest, to most recent message.
- If the log contains multiple pages, the display defaults to the page with the most recent messages.

3.) Use the scroll bar to view additional messages.

4.) The system defaults to display all available messages.

5.) Select ***UPDATE MESSAGES*** to display:

- The most recently selected Error Log Viewer option(s).
- Any messages that entered the log since being opened.
(The display does NOT automatically update.)

6.) Select ***RESET*** to restore the default mode, which displays all messages.

7.) To exit the Error Log Viewer, click on ***OPTIONS*** to display the following items:

- **Set Aside Screen**: Select this option to collapse the Error Log Viewer to an Icon. Double-click on the icon to reopen the Error Log Viewer panel.
- **Quit Screen**: Select this option to exit the Error Log Viewer function.

2-4.3 Acceptable Errors

The Error Log records:

- Pilot errors
- Normal boot up entries
- Normal system messages
- Errors
- Warnings

With the exception of the "Collimator axis did not reach desired position in time" message, if the Error Log contains error messages that indicate a system failure, open a service dispatch and troubleshoot the error before proceeding with the scheduled PM.

Section 2-5: Acquire a Blank Scan

Run a 5 minute Blank scan and inspect all slices of sinogram for any artifacts.

- **IF** the system doesn't pass evaluation, open a new service dispatch to troubleshoot and correct the problem.

2-5.1 Inspect the Sinograms

Use the diagAnalysis/Show Sino tool to verify blank scan uniformity and rule out the presence of dead modules, blocks or crystals, that appear as dark lines on the sinogram. The system generates a total of 66 sinograms, but only examine the odd numbered sinograms between 1 and 35.

NOTICE **If dead blocks appear, open a service dispatch, then use the diagnostics and Singles calibrations to help diagnose and repair the problem. Do NOT process and save a Blank Scan correction until it is artifact-free.**

The following list contains known artifacts that sometimes appear on Blank Scan sinograms. If the following artifacts occur, open a service dispatch and run additional diagnostics to locate the problem.

- **Single black lines**: At least one channel in the block has fallen out of the DAC Plot limits, defined by the ACEM board. The system could also have a conflict between Energy cals and Position Map cals, or an invalid CTC.
- **Wide black bands**: Multiple blocks are effected by the failure. The system could have a problem with the hardware controlling that group of blocks, or an invalid CTC.
- **Single white lines**: The corresponding crystal map may not be correct for that channel.
- **Plaid wallpaper**: Invalid CTC (when obvious in all slices)
- **Slice 1 or Slice 35 displays a totally different pattern from the remaining slices**: Reposition the collimator.
- **Vertical bars in the Sinogram**: Incorrect Pin Home setting
- **Faint lines in the Sinogram**: Run PMT Update and CTC**.**

2-5.2 Run pmtAnalysis

This section will create files, which will determine if the PMT's are within the systems gain adjustment window. It will generate a text file, which shows adjustment (the number of turns of alignment pot) needed to bring PMT's back within this adjustment window. Refer to Figure 2-4.

1.) From the OWS, open an *xterm window*, type **pmtAnalysis** to run the pmtAnalysis program.

2.) Press **<Enter>**. This will create file **pmtTune.txt** in the **/var/tmp** directory.

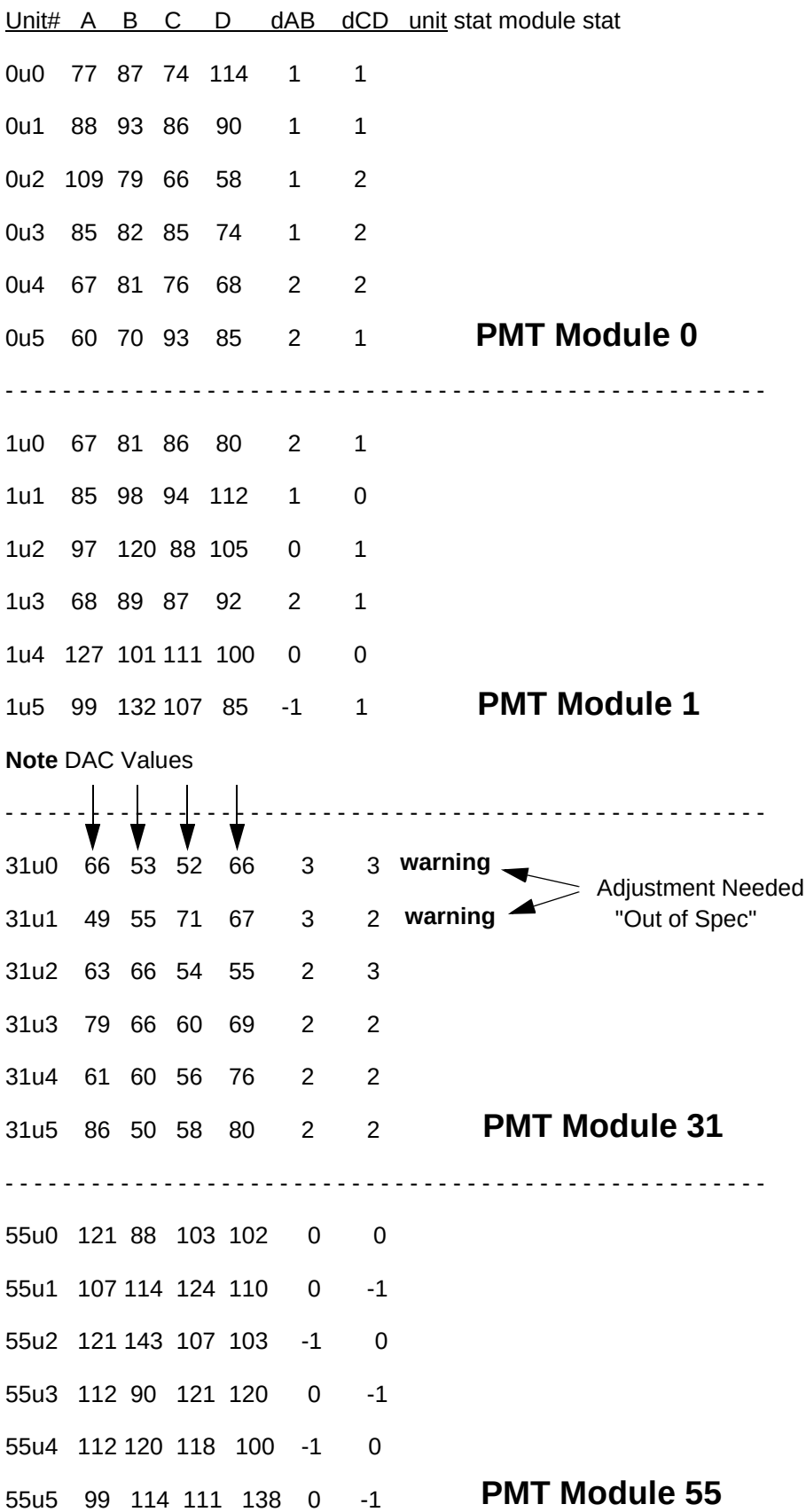
3.) In the *xterm window*, type **mv pmtTune.txt pmtTune1.txt** to rename the **pmtTune.txt** file to **pmtTune1.txt**.

4.) Press **<Enter>**.This creates a new **pmtTune1.txt** file for data comparison later.

5.) Data in the text file **pmtTune1.txt** will list the detector assemblies (0-55), six detector blocks per module, two tubes per block, and two cathodes (channels) per tube (dAB or dCD). Each channel (A, B, C, or D) will have a DAC value listed. Each tube (dAB or dCD) will list how many turns (+/-) to bring associated tube back within the systems calibration window. However, an adjustment is only needed when a **Warning** is listed under the **unit stat** or **module stat** column at the right of file printout. Refer to Figure 2-4.

Important: **If an adjustment is necessary, complete the PM and open a separate service call to adjust the affected PMT's.**

Figure 2-4: Example of PMTtune.txt File



Notes and Comments:

Chapter 3 System/Service Administration Tasks

This chapter contains the procedures used to backup the system and check the SHARC Raw Data disk capacity.

Section 3-1: Full System Backup

Follow the instructions in this section to backup the PET Advance software on the internal AWS or OWS disk. Label each backup tape with the software release, Hostname and date.

NOTICE Power down and/or disconnect all external disk drives to prevent the backup software from attempting to backup all the files on these external drives.

NOTICE Keep at least one current backup tape per workstation, to facilitate recovery after a catastrophic failure or the loss of the system disk. Backup each workstation after a site load and after **any** software update.

3-1.1 Backup the System Files

1.) Logon to the system as root.
   - If logged on as operator, log off, and then log on as root.
   - Type/enter the root password.

2.) Insert a write enabled DAT into the tape drive.

3.) Right-click in the screen to display the menu.

4.) Select ***TOOLS*** to display its submenu.

5.) Select ***TERMINAL*** to open a terminal window.

   a.) Move the cursor into the window to activate it.

   b.) Type/enter the following:

   /usr/PET/install/PET_backup [ENTER]

6.) The window displays a screen of backup options.

7.) Type **F** and/or press **ENTER** to select the default Full Backup function.
   - The screen continues to update and display the backup progress.

NOTICE **It could take 45 minutes to an hour to backup the system. Proceed to other tasks, such as checking the fans during this time.**

NOTICE **During the backup process, the screen displays status information. The system tries to backup the configuration file of every available option. If the system doesn't have an option, the screen will display the notification that it cannot backup the corresponding configuration file. This is not an error.**

8.) When the backup completes, the command prompt appears.
- **Optional**: To view the backup file index, one page at a time, type:

  more /tmp/index [ENTER]
- Type **Q** (Quit) to exit the backup file index.

9.) Remove the 3MB backup file index from the disk by typing:

rm /tmp/index [ENTER]

10.) The system responds with:

rm : remove /tmp/index:? (y/n)

11.) Initiate the removal process by typing:

y [ENTER]

12.) Click the CDE Panel **EXIT** button to Log out.

13.) Eject the DAT from the drive.

14.) Label the DAT with today's date, Hostname and software release number.

NOTICE **Use the PET Application software ARCHIVE function to backup the Blank Scan, 2D/ 3D Normalization and Well Counter corrections on a separate DAT.**

Section 3-2: Check the Raw Data Disk Capacity

Follow the procedure in this section to check the available disk space on the raw data disk in the PET Advance SHARC. **IF** customers consistently operate the system with the database more than 80% full, they will run out of disk space and generate system errors. The PM session provides an opportunity to check the database levels, and teach the customers to regularly archive the patient data and delete it from the disk.

3-2.1 Calculate the Frame Capacity

Note: Use the OWS to access raw data disk space information. This information cannot be accessed from the AWS.

1.) Click on ***UTILITIES*** to open its menu.

2.) Select ***RAW DISK DEFRAGMENTATION*** to display the corresponding panel.

3.) Select the ***FRAME CALCULATOR*** button to display the *Frame Calculator* panel.

4.) Select Scan Type: ***PATIENT ACQUISITION***

5.) Select *Axial Acceptance Angle*: ***2D***

6.) Select *Mode*: ***WORD***

7.) Select *Randoms* area: ***PROMPTS + DELAYS***

8.) The Frame Calculator uses user inputs to determine the *Current Frame Capacity* and the *Additional Frame Capacity after Full Defragmentation.*

- **IF** the Current Frame Capacity falls below **120** frames, notify the customer that the disk is almost full. Urge them to establish a schedule to periodically archive the patient image and raw data files, and remove the old files from the corresponding disks. If they already have a process in place, urge them to archive the files and delete the data more frequently, to keep the raw data disk capacity as far above 120 frames as possible.

9.) **Optional:** If the Current Frame Capacity exceeds 120 frames, proceed to section 3-2.2 and defragment the disk.

- **IF** the Current Frame Capacity falls below 120 frames, defragmentation will not significantly increase the capacity. Ask the customer to archive and delete the old data first, then defragment the disk.

10.) Select ***CANCEL*** to close the Frame Calculator panel.

3-2.2 Defragment the Raw Data Disk

This procedure rearranges the existing information on the raw data disk to create larger contiguous file spaces, which in turn increases the potential frame capacity.

NOTICE **This procedure is applicable to older SHARC (MV147) systems only. This procedure does not apply to the newer SHARC (MV2400) systems which perform automatic defragmentation. To determine system configuration, look at the applicable label on the SBC within the cabinet.**

NOTICE **When selecting this function, the software denies raw data disk access to the rest of the system. Remember to *CANCEL* this function when finished.**

1.) Click ***UTILITIES*** to open its menu.

2.) Select ***RAW DISK DEFRAGMENTATION*** to display the corresponding panel.

3.) Select the ***START*** button to initiate the defragmentation process.

- Select ***STOP*** at any time during the defragmentation operation. The system completes the current file, then stops the defragmentation operation, and returns to the *Idle* Status state.
- The ***START*** selection disables the ***CANCEL*** selection; select ***STOP*** to reactivate the ***CANCEL*** function.

4.) A panel indicator displays system progress and one of the following status indicators:

- **Idle:** System ready and waiting; select ***START*** to defragment the disk, or ***CANCEL*** to close the panel.
- **Initiating:** Select ***START***. The system prepares to defragment the disk.
- **In Progress:** The system started to defragment the disk.
  * The *Percent Complete* slider shows the current progress, by percentage.
  * The *Files Moved* field displays the number of files actually moved.
  * The *Total Free Space* field displays the free raw data disk space in Mbytes.
- **Canceled: *STOP*** was selected before the system finished defragmentation.
- **Complete:** The system successfully finished the disk defragmentation process.

5.) Select ***CANCEL*** to exit the Disk Defragmentation panel, and return raw data access to the rest of the system.

Section 3-3: Check the Emergency Buttons

The PET Advance system has two types of Emergency buttons:

- **Emergency Stop**: The Emergency Stop buttons halt all table and gantry motion, and turn off the laser alignment lights.
- **Emergency OFF**: The Emergency OFF button removes power from all system components. Do NOT check the Emergency OFF function during this PM, because it could cause system failures.

CAUTION Pressing the Emergency Stop or Emergency OFF buttons during a scan, will cause the system to abort the data acquisition.

3-3.1 Emergency Stop Buttons

The Emergency Stop buttons stop scanner operations, while leaving the OWS alone. Press an Emergency Stop Button to halt all table and gantry functions, release the cradle latch, and send the transmission source(s) back to the shield. The system aborts any data acquisition in progress, and attempts to save all data acquired prior to the abort.

RADIATION **IF A PIN SOURCE IS OUT OF THE SHIELD WHEN ANY EMERGENCY STOP IS PRESSED, THE PIN REMAINS OUTSIDE THE SHIELD. MAKE SURE THE PIN SOURCE IS IN THE SHIELD WHEN PRESSING EACH EMERGENCY STOP BUTTON.**

The PET Advance system has four Emergency Stop Buttons:

1.) Refer to Figure 3-1. Each control panel on the front of the gantry has an Emergency Stop button, for a total of two. The rear cover of the gantry has one Emergency Stop button. Locate the Emergency Stop Buttons.

2.) Press and reset each of the three gantry emergency stop buttons.
   - Refer to Figure 3-1. Twist the Emergency Stop button in the direction of the arrows to release and reset it.

3.) Refer to Figure 3-2. The OWS hardkey control panel has one Emergency Stop button.

4.) Press and reset the Emergency Stop button on the OWS hardkey control panel.

Figure 3-1: Gantry Control Panel

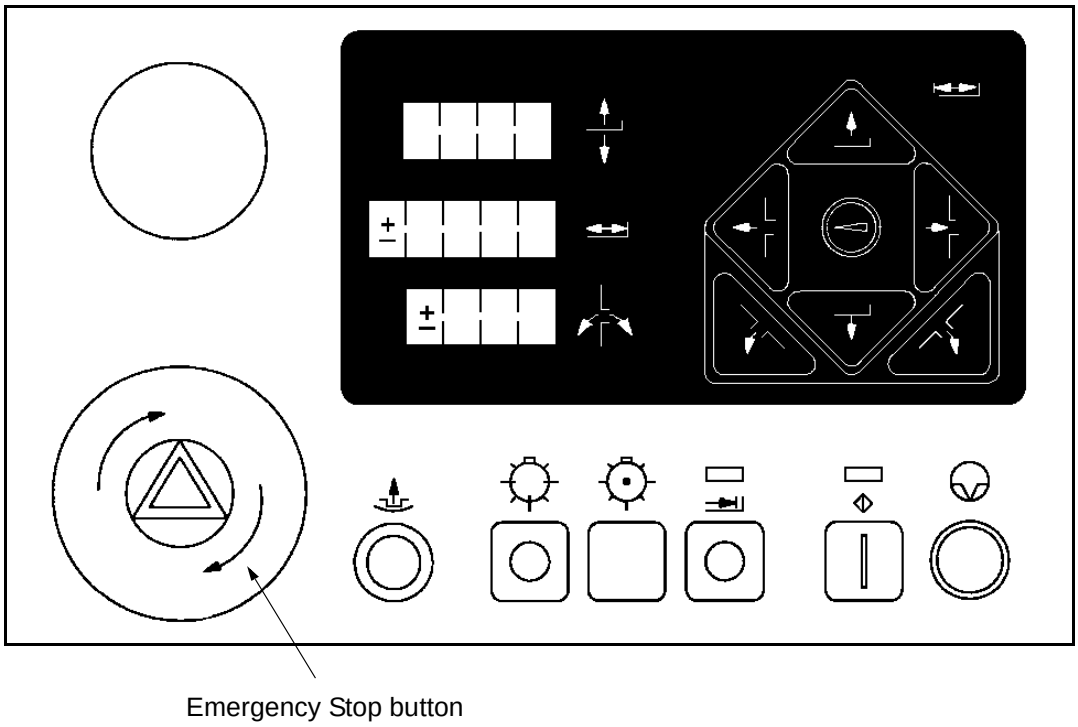
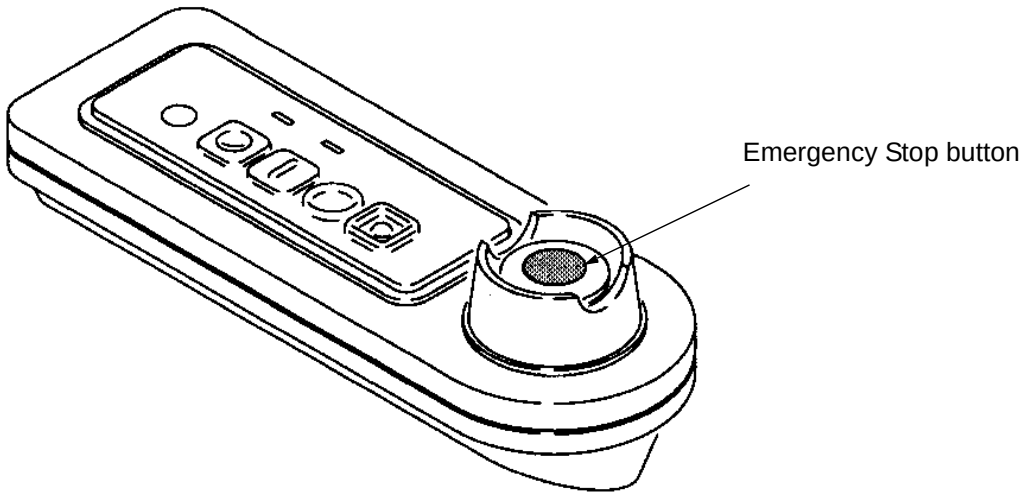


Figure 3-2: Hard Key Control Panel (Emergency Stop)



Chapter 4 Gantry and Table

Follow the procedures in this chapter to check the Gantry fans, filters, lamps, displays, and basic mechanical operations. For best results, stand on a step stool or ladder to check the fans.

Section 4-1: Gantry Fans, Filters and Lamps

Inspect the following five gantry fans for normal operation:

- 2 REDDOG card rack fans
- 2 REDDOG power supply fans
- Top cover fan

WARNING **TAKE CARE TO MAINTAIN A SAFE WORKING DISTANCE FROM THE OPERATING FANS. TO PREVENT INJURY, REMOVE OR SECURE LOOSE CLOTHING OR JEWELRY BEFORE APPROACHING THE FANS.**

4-1.1 Inspect the Gantry Fans

1.) Remove the gantry side covers and open the gantry rear covers.
2.) Locate the REDDOG fans at the top of each card rack.
3.) Check that the REDDOG fans turn at approximately the same speed.
4.) Locate the fans on the REDDOG power supplies.
    - The power supplies are located at the top rear of the gantry mounting plate.
    - The power supply fans are located on the rear of each power supply, and face each other.
5.) Hold the edge of a single sheet of paper, and move it toward the grill of either fan.
    - The paper should pull against the grill.
    - The new Astec Power Supply fans blow air outwards away from the fan grill.
6.) Move the paper toward the second fan grill.
    - The paper should pull against the grill.
    - The new Astec Power Supply fans blow air outwards away from the fan grill.
7.) Locate the fan attached to the top cover of the gantry.
8.) Check for normal top cover fan operation.

4-1.2 Inspect and Clean the Gantry Filters

Note: Power does not need to be removed from the REDDOG card racks to clean the filters.

1.) Locate the REDDOG air intake filters, at the base of each card rack.
2.) Grasp the front edge of the filter, and pull it straight out of its bracket.
   - If the filter offers any resistance, check the bottom of the bracket for screws.
   - If present, loosen the screws that fasten the filter to the bracket.
3.) Vacuum BOTH sides of the filter to remove surface dust and debris.
4.) If necessary, run a stream of hot water over the filters, to flush out any debris.

⚠ **NOTICE** **Let the filters dry COMPLETELY before sliding them back into place.**

5.) Orient each filter so its air indicator points up, and slide it back into its bracket.
6.) Close the rear gantry covers.
7.) Replace the side covers.

4-1.3 Check the Gantry Lamps and Displays

Before starting, ask the operator if he or she noticed any burned out lamps or displays.

Note: If a burned out lamp is found, open a service dispatch and replace the lamp, NOT the board.
Lamp part number: 46-278641P1
Electronic Grade RTV: 46-170137P1

Initiate the Gantry Display Test from the Service Menu:

1.) Click ***SERVICE*** to display its menu.
2.) Click ***DIAGNOTICS*** to display its submenu.
3.) Click or drag to ***GANTRY*** to display its submenu.
4.) Click or drag to ***FRU*** to access the display tests.
   - The Display FRU test places the 3 gantry displays into a diagnostic mode, similar to the sequence it undergoes during power up.
5.) Make sure all display components illuminate; the system doesn't display any status.
   - **For best results** replace the entire group of four lamps whenever a single lamp in that group burns out.
   - If necessary, refer to the service documentation for instructions to remove the panels, replace and RTV the burned out lamps or displays.
6.) Optional: Reboot the gantry to check for burned out lamps or displays.

Section 4-2: Gantry Mechanics

Follow the procedures in this section to check the reliability, range of movement and normal operation of the listed components. Do not attempt to recharacterize the gantry mechanics at this time.

- Transmission Ring Belt (twice each year)
- Collimator (once each year)
- Source Loader and gripper (four times each year)
- Patient Table (four times each year)

4-2.1 Clean and Inspect the Transmission Ring Belt

Every six months:

- Clean the belt drive pulley, belt ring and belt drive with Isopropyl alcohol, to maintain optimal source drive operation.
- Check the belt for proper tension and inspect it for cracks.

⚠ **DANGER** **TO PREVENT INJURY, REMOVE POWER TO THE GANTRY, LOCKOUT AND TAG THE SYSTEM BEFORE PROCEEDING ANY FURTHER.**

If necessary, refer to the Gantry power down and general access procedures in the Advance System Service manual. (Direction 2100507)

1.) Turn off gantry power from the Electronics Cabinet.
2.) Tag and lock out the system.
3.) Remove both side covers and the service access panel.
4.) Open both rear covers.
5.) Measure and record the length of the spring on the T-Ring Drive module. The spring should measure 25mm on both G1 and G2 gantrys.
6.) Remove the spring tensioning knob from the shaft.
7.) Remove screws that fasten the motor plate to the module housing to release the drive belt tension.
8.) Remove four screws that fasten the pulley retainer plate to the module housing.
9.) Remove the plate and two pulleys.
10.) Remove the belt from the drive ring and check it for cracks.
    - If cracks or excessive wear occurs, open a service dispatch and replace the drive belt.
11.) Thoroughly clean the drive ring, drive belt pulley and internal belt drive assembly surfaces with isopropyl alcohol.
12.) Wait until all surfaces dry, then slide the drive belt over the drive ring, and reattach the pulleys and retainer plate to the drive module.
13.) Reattach the spring to the T-Ring Drive module.
14.) Measure the spring, and make sure its length matches the Step 5 value.
    - Do not tighten the motor plate screws until the spring is set.
15.) Manually rotate the ring several times to check belt alignment. The belt should not bind, catch or rub against the outer edge of the drive bearing.
16.) Restore power to the gantry.
17.) Run two or more source load cycles to verify system operation.
18.) Reassemble the gantry covers and restore the system to normal operation.

4-2.2 Lubricate the Collimator

Lubricate the collimator once a year, and any time the Error Log contains the following message:

The collimator axis did not reach desired position in time.

NOTICE **Do NOT apply oil to the Collimator rails. Oil on the collimator rails will generate collimator errors.**

Once a year, lubricate the collimator bearings with Mobiletemp SHC Grease or equivalent, GE part number 46-256047P1. The wrong type of grease will generate collimator errors.

1.) Check the Error Log for collimator related error messages.

2.) The Collimator has grease fittings on each of the four bearings. If necessary, refer to the service documentation for illustrations and additional information.

3.) Apply bearing grease from a grease gun into each of the four fittings.

NOTICE **Do NOT over grease the bearings! Apply a single "pump" of grease to each fitting. Too much grease in the fittings will generate collimator errors.**

4-2.3 Lubricate the Source Loader Gripper

Follow the procedure in this section to lubricate the gripper. Use silicon spray (part number 46-170230P1), metric Allen wrenches and a soft towel or tissues.

CAUTION **Remove gantry power to prevent unintended loader movement or damage. Tag and Lock out system power.**

1.) Remove gantry PCU power to disable the source loader arm.

2.) Refer to Figure 4-1 on page 34. Remove the service access panel from the rear of the gantry to expose the loader arm.

3.) Pull the rotational drive assembly backward to the rear of the gantry and rotate the arm assembly upward, to access the gripper located on the end of the arm. The arm should also be clear of the collimator and source ring.

4.) Remove four screws that fasten the gripper stop plate to the gripper housing.

5.) Remove stop plate and pin bushing from the gripper assembly.

- Carefully remove the three springs from the housing.

6.) Remove the two screws that fasten the cover to the gripper housing.

7.) Remove cover, gripper slide block, and the slide block spring.

8.) Remove slide block spring from the slide block.

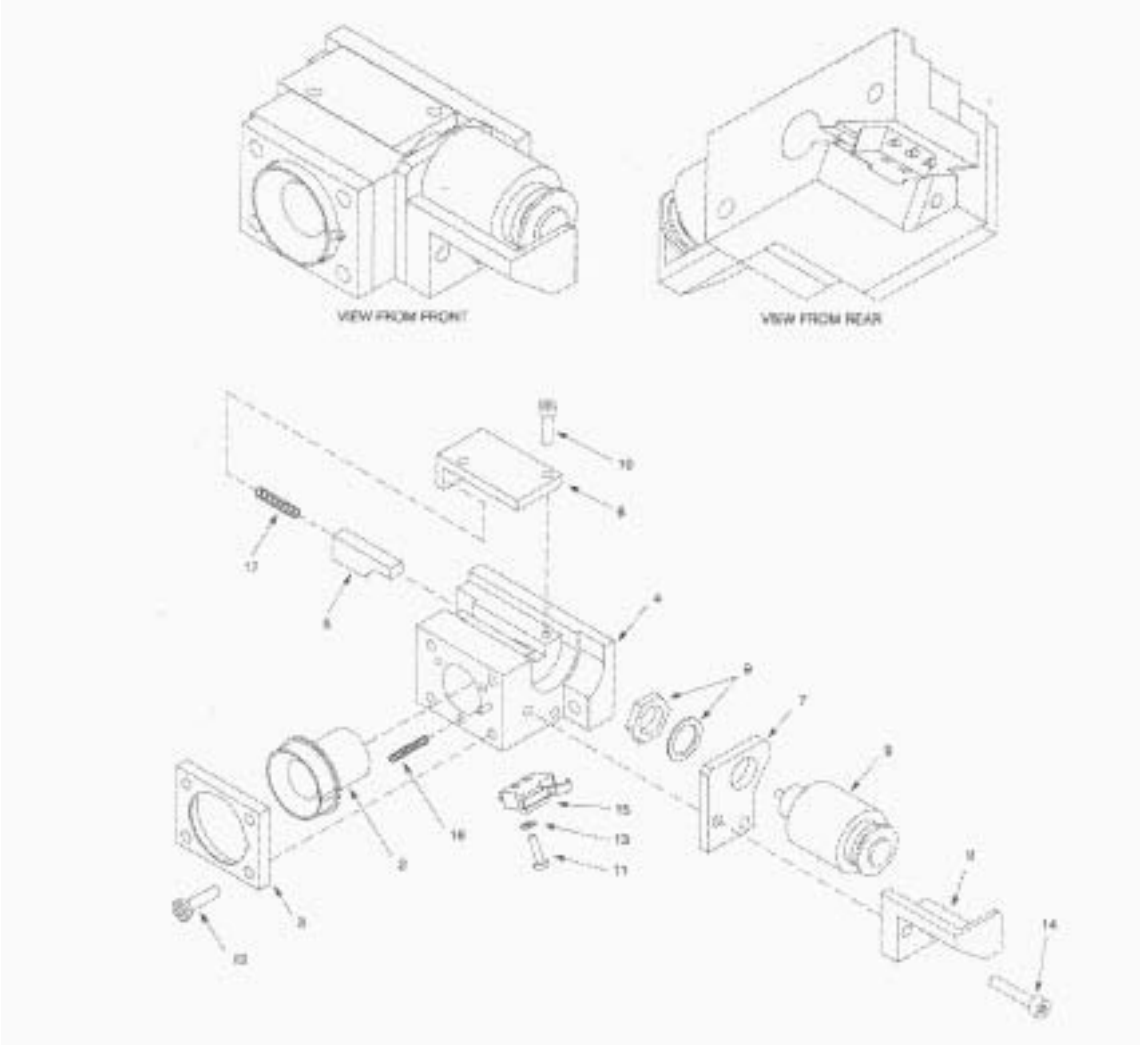
9.) Use a soft towel or tissues to remove all dirt and oil from the slide block and all the interior and exterior surfaces of the bushing.

10.) Use a soft towel or tissue to remove all dirt and oil from the slot on the housing where the slide block slides, and the hole in which the bushing is inserted.

11.) Spray a thin coat of silicon spray on all surfaces of the slide block and bushing.

- Spray the interior and exterior diameter surfaces of the bushing.

Figure 4-1: Pin Gripper Assembly (46-325063)



4-2.4 Test the Source Loader Function

Do NOT run Characterizations on the Source Loader during the PM.

CAUTION **To prevent damage to the system mechanics, take care not to move the SLR or SLT into a mechanical interference position with the transmission ring, cabling, source holder or collimator during this test.**

This section describes the reassembling of the gripper, and checks for normal operation. Avoid touching the lubricated surfaces.

NOTICE **When replacing the gripper housing cover, take care to align the cover with the housing, and hold it firmly while fastening it into place.**

1.) Assemble the gripper, then push in the bushing and let it spring back several times.

2.) Push in the solenoid rod and let it spring back several times to slide the block back and forth and test the gripper housing cover alignment.
   - The solenoid rod should travel freely. It should not bind or catch on the cover.

3.) Remove the Power Lockout lock and tag.

4.) Restore power to the gantry.

5.) Use the gantry Hand Held Service Control Panel to run 5 load/unload sequences, to verify normal operation.

Section 4-3: Basic Table Checks

4-3.1 Check and Clean the Table Base Assemblies

Follow the procedure in this section to check the single cooling fan for the Table electronics, and the table to baseplate connections. This section also contains cleaning instructions.

1.) Remove both bottom covers from the patient table assembly.

2.) Locate the fan next to the power switch and service outlet box.

- Verify normal fan operation.

3.) Check or tighten the 4 (corner) bolts that fasten the table to the baseplates.

- These bolts may loosen with long term activity.

⚠

NOTICE **Remove power from the table, then lockout and tag the system before tightening the the baseplate bolts and vacuuming the table interior.**

4.) Vacuum interior to remove any visible dust and debris from the bottom of the table.

5.) If necessary, use a can of compressed air to blow dust from the table circuit boards and power supplies.

6.) Restore table power.

7.) Fasten two bottom covers back into place.

4-3.2 Check and Clean the Cradle Area of the Table

Follow the procedure in this section to clean and inspect the cradle area of the table.

1.) Remove all accessories from the table top.

2.) Drive the cradle in and out of the gantry, and watch for smooth travel, with no catching or binding.

- If the cradle jerks during travel, check the bottom of the cradle for adhesive residue when removed from the table.

3.) Latch the cradle carriage into the Home position.

WARNING **IF SHARPS (NEEDLES, SYRINGES, SCALPELS) OCCUR OR PATIENT FLUIDS ARE IN THE CRADLE AREA, IMMEDIATELY CONTACT THE DEPARTMENT SUPERVISOR FOR SAFE DISPOSAL AND CLEANUP.**

4.) Remove six plastic covers and six bolts that fasten cradle bed to the cradle carriage assembly.

5.) Inspect cradle carriage and table top interior for sharps or fluids.

6.) Vacuum any dust or debris from the table top interior, and clean the bottom plate.

CAUTION **To prevent damage to the encoder, ALWAYS grasp and hold the cradle carriage when unlatching the cradle drive.**

7.) Unlatch the cradle drive and move the cradle carriage along the length of the table.

- The carriage should move smoothly and freely along the carriage rails.
- When resistance or uneven travel occurs, clean the carriage rails.

8.) Latch cradle carriage into the Home position.

9.) Fasten cradle bed to the carriage with six bolts.

10.) Replace the plastic bolt covers.

11.) Wipe off cradle and table surfaces.

12.) Replace table pads and accessories.

13.) Raise and lower the table, and check for smooth operation.

- **IF** table catches or binds, and fails to move smoothly, open a service dispatch to troubleshoot the problem.

4-3.3 Check Patient Safety Grounds

After restoring the table and gantry to normal operation, follow the procedure in this section to verify the scanner system is safely grounded. Inspect the physical ground connections and measure the system for continuity.

NOTICE **Turn off all system power during this procedure.**

1.) Turn off system power, lock out and tag.

2.) Set multimeter to the most sensitive setting.

3.) Locate Potential Equalization Stud on surface of raceway between the Table and the Gantry, and use it as the reference point.

- Figure 4-2 contains an illustration of the Potential Equalization Stud Label.

Figure 4-2: Potential Equalization Stud Label

4.) Refer to Table 4-1. Measure resistance at each Table 4-1 location, with respect to the Potential Equalization Stud.

- If any reading exceeds the 0.20 Ω resistance limit, open a service dispatch to troubleshoot the problem.

Table 4-1: Resistance Measurements

Location	Resistance Limit
Front frame of the Table	0.20 Ω
Rear base of the Gantry	0.20 Ω
The body of the Foot Switch	0.20 Ω

Chapter 5 Electronics Cabinet

The PET Advance system has two versions of the Electronics Cabinet that houses the SHARC and EDCAT subsystems.

IF the PET Advance has a G1 Cabinet:

- Follow the instructions in Section 5-1 to clean the cabinet filters.
- Follow the instructions in Section 5-2 to inspect the fans.

IF the PET Advance has a G2 Cabinet:

- Follow the instructions in Section 5-2 to inspect the fans.

Section 5-1: Clean the Electronics Cabinet Filters

The G1 Electronics Cabinet has two aluminum mesh filters, one accessed from the front of the cabinet, and one accessed from the rear of the cabinet.

CAUTION **Remove power from the Electronics Cabinet and tag and lock the system.**

1.) Open the lockout door on the rear of the PDU.

2.) Shut OFF the circuit breakers labeled, ELECTRONICS CABINET, and SERVICE OUTLETS.
   - The green LED should extinguish when the CB is turned off.

3.) Open the front Electronics Cabinet door:
   a.) Remove fiber optic connector, J7, from the GASM board.
   b.) Remove 120mm high blank panel, located beneath card rack, and guide fiber optic cable through the bushing in the panel.
   c.) Locate the filter, now visible, beneath the rack.
   d.) Grip the front and rear edge of the filter and pull it straight out.
      •The filter is 416mm long, and may bend if pulled by the front edge.

4.) Open the rear cabinet door by loosening the locking screws located at the top and bottom of the door.

5.) Locate rear filter, beneath bottom of the card rack connector panel.

6.) Check cables and move any that may interfere with the filter removal.

7.) Grip front and rear edges of the 144mm long filter, and pull it straight out of the cabinet. Take care not to bend the filter edges when removed.

8.) Clean filters with soap and warm water, and shake off the excess water.

9.) Let the filters dry completely, then spray the side clips with a light oil to prevent rusting, before sliding them back into place.

NOTICE **To prevent damage to the system circuit boards, make sure the filters are completely dry before sliding them back into the cabinet. Prop the filters upright to dry, and turn them periodically so any water that collected inside the edges has a chance to run out.**

10.) Slide large filter beneath card rack in the front of the cabinet.
11.) Slide small filter into place in the rear of the cabinet.
12.) Guide fiber optic cable back through bushing in the blank panel.
13.) Insert blank panel beneath card rack in front of the cabinet.
14.) Plug J7 back into the GASM board.
15.) Inspect and vacuum the intake grills.
16.) Proceed to the next section **-or-** Close and fasten the rear cabinet door.

Section 5-2: Check the Electronics Cabinet Fans

Each G1 and G2 Electronics Cabinet has four fans, two on the front panel of the PDU, one on the card rack power supply and the main exhaust fan attached to top of the cabinet.

5-2.1 Inspect the Card Rack and PDU Fans

All fans should appear to run smoothly and quietly, at the same speed.

- Open a Service Dispatch to replace any problem fans.
- The System Service Manual has fan replacement procedures.

5-2.2 Inspect the Main Exhaust Fan

Use a step stool or ladder to reach the top of the cabinet and inspect the fan.

1.) Without removing the grill, check that the fan exhausts air.
   - The fan should appear to run smoothly.
2.) If necessary, remove any dust or debris from the top of the cabinet and grill.
3.) Listen for any abnormal vibration of the fan blades.
   - During normal operation, the fan vibrates a little bit. When one of the balance weights falls off the blade, the fan vibrates noticeably.
   - If the fan vibrates excessively, open a service dispatch to replace it. The system service documentation contains fan replacement procedures.

Chapter 6 Peripheral Devices

This chapter contains planned maintenance procedures for the following PET Advance system peripheral devices:

- OWS (Sun or HP)
- AWS (option - Sun or HP)
- 4mm Tape Drive with SCSI enclosure
- Laser Camera Filmer (option - 3M, Kodak)
- Color Printer (option - Kodak, Codonics)

This chapter contains non-invasive functional tests of the peripherals. Some sites may have local contracts with vendors to maintain some peripherals. For most efficient use of scanner downtime, schedule concurrent vendor PMs.

Section 6-1: OWS and AWS

Follow the procedure in this section to check the air flow to the PET OWS and any optional AWS workstations.

1.) Inspect the front grill of the computer and vacuum any visible dust or debris.
2.) Hold a tissue near the front grill.
    - The fan should produce enough suction to pull the tissue against the grill.
3.) Hold a tissue at the back of the computer unit to check the exhaust.
    - If necessary, reposition the unit or cables to increase air flow through the unit.
4.) If the fan is dead or going bad, open a service dispatch.
5.) Vacuum behind the workstation components; check all cable connections.

Section 6-2: SCSI Enclosure Fans

Check two fans on the rear of the enclosure assembly for normal operation.

1.) Use a large scrap of paper to check the air flow to both fans.
    - Both fans are mounted on the rear of the tower.
    - The upper fan is stronger than the lower fan.
2.) Inspect the front grill of the tower and vacuum away any visible dust or debris.
3.) Vacuum behind the DAT tower; check all cable connections.

Section 6-3: Lasercam Filmer

General maintenance is required to achieve a consistent high quality print from the laser camera. For best results, follow the manufacturer’s instructions to clean the film path quarterly, or at least twice each year.

Section 6-4: Color Printer (Codonics or Kodak)

General maintenance is required to achieve a consistent high quality print from the color printer. For best results, clean the print head and path whenever loading a new ribbon cartridge. This may be required every quarter and biannually.

Replacement ribbon cartridges are the responsibility of the customer. If replacing this part as part of the PM, check with the customer to ensure a replacement cartridge is available for the scheduled PM.

The procedure for replacing the ribbon cartridge is documented in the Maintenance and Adjustments section of the User's manual provided with the printer.

Chapter 7 PM Log Sheets

Section 7-1: Introduction

This chapter contains enough quarterly PM Log sheets and signature pages to last 12 years. Use these pages to track progress through each PM list.

- The PM Log sheets should compliment the Site Log, not replace it. For best results, do not mark up these pages with notes that should go into the site log. Use the Notes and Comments pages in this chapter to record PM related reminders and concerns. If multiple people share site responsibility, use the Notes and Comments pages to keep each other up to date on PM progress and results.
- **Advance PM Log Sheet Signature page**: Sign and date the corresponding quarter upon completion of all the assigned PM for that quarter. When planing to schedule multiple PM sessions (recommended) initial and enter the date of each interim PM session in the space beneath the corresponding signature line. Sign name when the last PM of the quarter is completed.
- Synchronize the PM schedule to the GE calendar. For example "Q1" represents PMs in January, February and March, and not the first three months of system use after installation. When using this manual after fiscal quarter 1 (Q1), start with the schedule and log sheet columns that match the current GE fiscal calendar.

Section 7-2: Advance PM Log Sheet Signature Page

Sign and date the corresponding quarter when ALL the PM procedures scheduled for that quarter are completed. When scheduling multiple PM sessions throughout the quarter, initial and enter the date of each interim session beneath the corresponding quarterly signature line.

Note: Start with the current fiscal quarter, to synchronize the PM schedule to the GE calendar, even if it means leaving blank quarters in the first years signature box.

Table 7-1: Signature Page

Year _____	**Year** _____
Q1 Signature _____ Date _____ Q2 Signature _____ Date _____ Q3 Signature _____ Date _____ Q4 Signature _____ Date _____	Q1 Signature _____ Date _____ Signature _____ Date _____ Q3 Signature _____ Date _____ Q4 Signature _____ Date _____
Year _____	**Year** _____
Q1 Signature _____ Date _____ Q2 Signature _____ Date _____ Q3 Signature _____ Date _____ Q4 Signature _____ Date _____	Q1 Signature _____ Date _____ Q2 Signature _____ Date _____ Q3 Signature _____ Date _____ Q4 Signature _____ Date _____

Table 7-2: Signature Page

Year _____	**Year** _____
Q1 Signature _____ Date _____ Q2 Signature _____ Date _____ Q3 Signature _____ Date _____ Q4 Signature _____ Date _____	Q1 Signature _____ Date _____ Signature _____ Date _____ Q3 Signature _____ Date _____ Q4 Signature _____ Date _____
Year _____	**Year** _____
Q1 Signature _____ Date _____ Q2 Signature _____ Date _____ Q3 Signature _____ Date _____ Q4 Signature _____ Date _____	Q1 Signature _____ Date _____ Q2 Signature _____ Date _____ Q3 Signature _____ Date _____ Q4 Signature _____ Date _____

Table 7-3: Signature Page

Year _____	**Year** _____
Q1 Signature _____ Date _____ Q2 Signature _____ Date _____ Q3 Signature _____ Date _____ Q4 Signature _____ Date _____	Q1 Signature _____ Date _____ Signature _____ Date _____ Q3 Signature _____ Date _____ Q4 Signature _____ Date _____
Year _____	**Year** _____
Q1 Signature _____ Date _____ Q2 Signature _____ Date _____ Q3 Signature _____ Date _____ Q4 Signature _____ Date _____	Q1 Signature _____ Date _____ Q2 Signature _____ Date _____ Q3 Signature _____ Date _____ Q4 Signature _____ Date _____

Section 7-3: System Readiness Checks

Advanced PM Log Sheets

System ID _____

Table 7-4: System Readiness Checks

Log applicable notes in the Site Log		**Year:** _____				**Year:** _____			
Tasks		**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Reboot the PET Advance system	Date								
	Init								
View Error Log	Date								
	Init								
5 Minute Blank Scan	Date								
	Init								
Inspect the Sinograms	Date								
	Init								
Run/Review pmtAnalysis	Date								
	Init								

Table 7-5: System Readiness Checks

Log applicable notes in the Site Log		**Year:** _____				**Year:** _____			
Tasks		**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Reboot the PET Advance system	Date								
	Init								
View Error Log	Date								
	Init								
5 Minute Blank Scan	Date								
	Init								
Inspect the Sinograms	Date								
	Init								
Run/Review pmtAnalysis	Date								
	Init								

System Readiness Notes and Comments:

Table 7-6: System Readiness Checks

Log applicable notes in the Site Log		Year: _____				Year: _____			
Tasks		**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Reboot the PET Advance system	Date								
	Init								
View Error Log	Date								
	Init								
5 Minute Blank Scan	Date								
	Init								
Inspect the Sinograms	Date								
	Init								
Run/Review pmtAnalysis	Date								
	Init								

Table 7-7: System Readiness Checks

Log applicable notes in the Site Log		Year: _____				Year: _____			
Tasks		**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Reboot the PET Advance system	Date								
	Init								
View Error Log	Date								
	Init								
5 Minute Blank Scan	Date								
	Init								
Inspect the Sinograms	Date								
	Init								
Run/Review pmtAnalysis	Date								
	Init								

System Readiness Notes and Comments:

Table 7-8: System Readiness Checks

Log applicable notes in the Site Log		Year: _____				Year: _____			
Tasks		**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Reboot the PET Advance system	Date								
	Init								
View Error Log	Date								
	Init								
5 Minute Blank Scan	Date								
	Init								
Inspect the Sinograms	Date								
	Init								
Run/Review pmtAnalysis	Date								
	Init								

Table 7-9: System Readiness Checks

Log applicable notes in the Site Log		Year: _____				Year: _____			
Tasks		**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Reboot the PET Advance system	Date								
	Init								
View Error Log	Date								
	Init								
5 Minute Blank Scan	Date								
	Init								
Inspect the Sinograms	Date								
	Init								
Run/Review pmtAnalysis	Date								
	Init								

System Readiness Notes and Comments:

Section 7-4: System/Service Administration Tasks

Advanced PM Log Sheets System ID _____

Table 7-10: System/Service Administrative PM

Log applicable notes in the Site Log		**Year:** _____				**Year:** _____			
Tasks		**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Full System Backup	Date		N/A		N/A		N/A		N/A
	Init.								
Check Raw Disk Capacity	Date								
	Init.								
Emergency Stops	Date	N/A		N/A		N/A		N/A	
	Init								

Table 7-11: System/Service Administrative PM

Log applicable notes in the Site Log		**Year:** _____				**Year:** _____			
Tasks		**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Full System Backup	Date		N/A		N/A		N/A		N/A
	Init.								
Check Raw Disk Capacity	Date								
	Init.								
Emergency Stops	Date	N/A		N/A		N/A		N/A	
	Init								

System/Services Administration Notes and Comments:

Table 7-12: System/Service Administrative PM

Log applicable notes in the Site Log		Year: _____				Year: _____			
Tasks		**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Full System Backup	Date		N/A		N/A		N/A		N/A
	Init.								
Check Raw Disk Capacity	Date								
	Init.								
Emergency Stops	Date	N/A		N/A		N/A		N/A	
	Init								

Table 7-13: System/Service Administrative PM

Log applicable notes in the Site Log		Year: _____				Year: _____			
Tasks		**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Full System Backup	Date		N/A		N/A		N/A		N/A
	Init.								
Check Raw Disk Capacity	Date								
	Init.								
Emergency Stops	Date	N/A		N/A		N/A		N/A	
	Init								

System/Services Administration Notes and Comments:

Table 7-14: System/Service Administrative PM

Log applicable notes in the Site Log		Year: _____				Year: _____			
Tasks		**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Full System Backup	Date		N/A		N/A		N/A		N/A
	Init.								
Check Raw Disk Capacity	Date								
	Init.								
Emergency Stops	Date	N/A		N/A		N/A		N/A	
	Init								

Table 7-15: System/Service Administrative PM

Log applicable notes in the Site Log		Year: _____				Year: _____			
Tasks		**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Full System Backup	Date		N/A		N/A		N/A		N/A
	Init.								
Check Raw Disk Capacity	Date								
	Init.								
Emergency Stops	Date	N/A		N/A		N/A		N/A	
	Init								

System/Services Administration Notes and Comments:

Section 7-5: Gantry/Table PM Log Sheets

Advanced PM Log Sheets System ID _____

Table 7-16: Gantry/Table PM

Log applicable notes in the Site Log		**Year:** _____				**Year:** _____			
Tasks		**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Inspect Gantry Fans (5)	Date								
	Init.								
Clean REDDOG Filters (2)	Date								
	Init.								
Check Gantry Lamps and Displays	Date								
	Init.								
Clean and Inspect Transmission Ring Belt Every 6 months	Date	N/A		N/A		N/A		N/A	
	Init								
Lubricate the Collimator Once each year	Date	N/A	N/A	N/A		N/A	N/A	N/A	
	Init								
Lubricate the Gripper	Date								
	Init								
Test the Source Load Function	Date								
	Init								
Check and Clean the Table Base	Date		N/A		N/A		N/A		N/A
	Init.								
Check and Clean the Cradle Area	Date	N/A		N/A		N/A		N/A	
	Init								
Check Patient Safety Grounds	Date		N/A		N/A		N/A		N/A
	Init								

Gantry/Table PM Notes and Comments:

Table 7-17: Gantry/Table PM

Log applicable notes in the Site Log		Year: _____				Year: _____			
Tasks		**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Inspect Gantry Fans (5)	Date								
	Init.								
Clean REDDOG Filters (2)	Date								
	Init.								
Check Gantry Lamps and Displays	Date								
	Init.								
Clean and Inspect Transmission Ring Belt Every 6 months	Date	N/A		N/A		N/A		N/A	
	Init								
Lubricate the Collimator Once each year	Date	N/A	N/A	N/A		N/A	N/A	N/A	
	Init								
Lubricate the Gripper	Date								
	Init								
Test the Source Load Function	Date								
	Init								
Check and Clean the Table Base	Date		N/A		N/A		N/A		N/A
	Init.								
Check and Clean the Cradle Area	Date	N/A		N/A		N/A		N/A	
	Init								
Check Patient Safety Grounds	Date		N/A		N/A		N/A		N/A
	Init								

Gantry/Table PM Notes and Comments:

Table 7-18: Gantry/Table PM

Log applicable notes in the Site Log		Year: _____				Year: _____			
Tasks		**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Inspect Gantry Fans (5)	Date								
	Init.								
Clean REDDOG Filters (2)	Date								
	Init.								
Check Gantry Lamps and Displays	Date								
	Init.								
Clean and Inspect Transmission Ring Belt Every 6 months	Date	N/A		N/A		N/A		N/A	
	Init								
Lubricate the Collimator Once each year	Date	N/A	N/A	N/A		N/A	N/A	N/A	
	Init								
Lubricate the Gripper	Date								
	Init								
Test the Source Load Function	Date								
	Init								
Check and Clean the Table Base	Date		N/A		N/A		N/A		N/A
	Init.								
Check and Clean the Cradle Area	Date	N/A		N/A		N/A		N/A	
	Init								
Check Patient Safety Grounds	Date		N/A		N/A		N/A		N/A
	Init								

Gantry/Table PM Notes and Comments:

Table 7-19: Gantry/Table PM

Log applicable notes in the Site Log		Year: _____				Year: _____			
Tasks		**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Inspect Gantry Fans (5)	Date								
	Init.								
Clean REDDOG Filters (2)	Date								
	Init.								
Check Gantry Lamps and Displays	Date								
	Init.								
Clean and Inspect Transmission Ring Belt Every 6 months	Date	N/A		N/A		N/A		N/A	
	Init								
Lubricate the Collimator Once each year	Date	N/A	N/A	N/A		N/A	N/A	N/A	
	Init								
Lubricate the Gripper	Date								
	Init								
Test the Source Load Function	Date								
	Init								
Check and Clean the Table Base	Date		N/A		N/A		N/A		N/A
	Init.								
Check and Clean the Cradle Area	Date	N/A		N/A		N/A		N/A	
	Init								
Check Patient Safety Grounds	Date		N/A		N/A		N/A		N/A
	Init								

Gantry/Table PM Notes and Comments:

Table 7-20: Gantry/Table PM

Log applicable notes in the Site Log		Year: _____				Year: _____			
Tasks		**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Inspect Gantry Fans (5)	Date								
	Init.								
Clean REDDOG Filters (2)	Date								
	Init.								
Check Gantry Lamps and Displays	Date								
	Init.								
Clean and Inspect Transmission Ring Belt Every 6 months	Date	N/A		N/A		N/A		N/A	
	Init								
Lubricate the Collimator Once each year	Date	N/A	N/A	N/A		N/A	N/A	N/A	
	Init								
Lubricate the Gripper	Date								
	Init								
Test the Source Load Function	Date								
	Init								
Check and Clean the Table Base	Date		N/A		N/A		N/A		N/A
	Init.								
Check and Clean the Cradle Area	Date	N/A		N/A		N/A		N/A	
	Init								
Check Patient Safety Grounds	Date		N/A		N/A		N/A		N/A
	Init								

Gantry/Table PM Notes and Comments:

Table 7-21: Gantry/Table PM

Log applicable notes in the Site Log		Year: _____				Year: _____			
Tasks		**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Inspect Gantry Fans (5)	Date								
	Init.								
Clean REDDOG Filters (2)	Date								
	Init.								
Check Gantry Lamps and Displays	Date								
	Init.								
Clean and Inspect Transmission Ring Belt Every 6 months	Date	N/A		N/A		N/A		N/A	
	Init								
Lubricate the Collimator Once each year	Date	N/A	N/A	N/A		N/A	N/A	N/A	
	Init								
Lubricate the Gripper	Date								
	Init								
Test the Source Load Function	Date								
	Init								
Check and Clean the Table Base	Date		N/A		N/A		N/A		N/A
	Init.								
Check and Clean the Cradle Area	Date	N/A		N/A		N/A		N/A	
	Init								
Check Patient Safety Grounds	Date		N/A		N/A		N/A		N/A
	Init								

Gantry/Table PM Notes and Comments:

Section 7-6: Electronics Cabinet PM Log Sheets

Note: If the PET Advance system has the G2 version of the Electronics Cabinet, skip the first task, fill the Quarterly blanks with "N/A", and initial.

Advanced PM Log Sheets System ID _____

Table 7-22: Electronics Cabinet Checks

Log applicable notes in the Site Log		**Year:** _____				**Year:** _____			
Tasks		**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Clean the G1 Cabinet Filters	Date								
	Init.								
Check the G1 and G2 Cabinet fans	Date								
	Init.								

Table 7-23: Electronics Cabinet Checks

Log applicable notes in the Site Log		**Year:** _____				**Year:** _____			
Tasks		**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Clean the G1 Cabinet Filters	Date								
	Init.								
Check the G1 and G2 Cabinet fans	Date								
	Init.								

Table 7-24: Electronics Cabinet Checks

Log applicable notes in the Site Log		**Year:** _____				**Year:** _____			
Tasks		**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Clean the G1 Cabinet Filters	Date								
	Init.								
Check the G1 and G2 Cabinet fans	Date								
	Init.								

Electronics Cabinets PM Notes and Comments:

Table 7-25: Electronics Cabinet Checks

Log applicable notes in the Site Log		Year: _____				Year: _____			
Tasks		**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Clean the G1 Cabinet Filters	Date								
	Init.								
Check the G1 and G2 Cabinet fans	Date								
	Init.								

Table 7-26: Electronics Cabinet Checks

Log applicable notes in the Site Log		Year: _____				Year: _____			
Tasks		**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Clean the G1 Cabinet Filters	Date								
	Init.								
Check the G1 and G2 Cabinet fans	Date								
	Init.								

Table 7-27: Electronics Cabinet Checks

Log applicable notes in the Site Log		Year: _____				Year: _____			
Tasks		**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Clean the G1 Cabinet Filters	Date								
	Init.								
Check the G1 and G2 Cabinet fans	Date								
	Init.								

Electronics Cabinets PM Notes and Comments:

Section 7-7: Workstation and Peripheral PM Log Sheets

Advanced PM Log Sheets System ID _____

Table 7-28: Workstations and Peripheral Devices

Log applicable notes in the Site Log		Year: _____				Year: _____			
Tasks		**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Check OWS & AWS Air Flow	Date								
	Init.								
Check SCSI Enclosure	Date								
	Init								
Check Laser Cam Filmer*	Date								
	Init								
Check Color Printer*	Date								
	Init								
* Follow Vender Manual instructions									

Table 7-29: Workstations and Peripheral Devices

Log applicable notes in the Site Log		Year: _____				Year: _____			
Tasks		**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Check OWS & AWS Air Flow	Date								
	Init.								
Check SCSI Enclosure	Date								
	Init								
Check Laser Cam Filmer*	Date								
	Init								
Check Color Printer*	Date								
	Init								
* Follow Vender Manual instructions									

Peripheral Device PM Notes and Comments:

Table 7-30: Workstations and Peripheral Devices

Log applicable notes in the Site Log		Year: _____				Year: _____			
Tasks		**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Check OWS & AWS Air Flow	Date								
	Init.								
Check SCSI Enclosure	Date								
	Init								
Check Laser Cam Filmer*	Date								
	Init								
Check Color Printer*	Date								
	Init								
* Follow Vender Manual instructions									

Table 7-31: Workstations and Peripheral Devices

Log applicable notes in the Site Log		Year: _____				Year: _____			
Tasks		**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Check OWS & AWS Air Flow	Date								
	Init.								
Check SCSI Enclosure	Date								
	Init								
Check Laser Cam Filmer*	Date								
	Init								
Check Color Printer*	Date								
	Init								
* Follow Vender Manual instructions									

Workstation and Peripheral Device PM Notes and Comments:

Table 7-32: Workstations and Peripheral Devices

Log applicable notes in the Site Log		Year: _____				Year: _____			
Tasks		**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Check OWS & AWS Air Flow	Date								
	Init.								
Check SCSI Enclosure	Date								
	Init								
Check Laser Cam Filmer*	Date								
	Init								
Check Color Printer*	Date								
	Init								
* Follow Vender Manual instructions									

Table 7-33: Workstations and Peripheral Devices

Log applicable notes in the Site Log		Year: _____				Year: _____			
Tasks		**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Check OWS & AWS Air Flow	Date								
	Init.								
Check SCSI Enclosure	Date								
	Init								
Check Laser Cam Filmer*	Date								
	Init								
Check Color Printer*	Date								
	Init								
* Follow Vender Manual instructions									

Workstation and Peripheral Device PM Notes and Comments:

GE MEDICAL SYSTEMS

GE MEDICAL SYSTEMS-AMERICAS: FAX 262.544.3384
P.O. BOX 414; MILWAUKEE, WISCONSIN 53201-0414, U.S.A.

GE MEDICAL SYSTEMS-EUROPE: FAX 33.1.40.93.33.33
PARIS, FRANCE

GE MEDICAL SYSTEMS-ASIA: FAX 65.291.7006