SERVICE MANUAL

MRI Devices Corporation
3545 SW 47th Avenue
Gainesville, FL 32608

Document TR0092S

Revision 02

GE Signa® Ovation™
0.35T Open Breast Coil

GE Catalog Part Number: M20052BC

MRIDC Part Number: 800092

DAMAGE IN TRANSPORTATION

All packages should be closely examined at time of delivery. If damage is apparent, have notation **"damage in shipment"** written on **all** copies of the freight or express bill **before** delivery is accepted or "signed for" by a General Electric representative or a 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.

Immediately complete a "Damage Loss Claim Form", available via MS Exchange Mail, after the damage is found.

MS Exchange Path:

Outlook/Public Folder/All Public Folders/Medical Systems/!Global Initiatives/Information Management/Forms/Common Forms/DAMAGE LOSS CLAIM FORM.

Send the completed form to the email address listed in the form.

For more information about the Transportation Claim Procedure, access the GE Medical Systems Intranet and enter the following URL address (case sensitive):

ftp://3.87.40.2/globepro/qualsys/Docs/190016MF.PDF

Rev. 11/15/2000

Language Policy For Service Documentation (Dir. 2128126)

W A R N I N G

- **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.**

ATENÇAO

- **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.**

警告

・このサービスマニュアルは英語版しかありません。

・GEMS以外でサービスを担当される業者が英語以外の言語を要求される場合、翻訳作業はその業者の責任で行うものとさせていただきます。

・このサービスマニュアルを熟読し、理解せずに装置のサービスを行わないでください。

・この警告に従わない場合、サービスを担当される方、操作員あるいは患者さんが、感電や機械的又はその他の危険により負傷する可能性があります。

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。

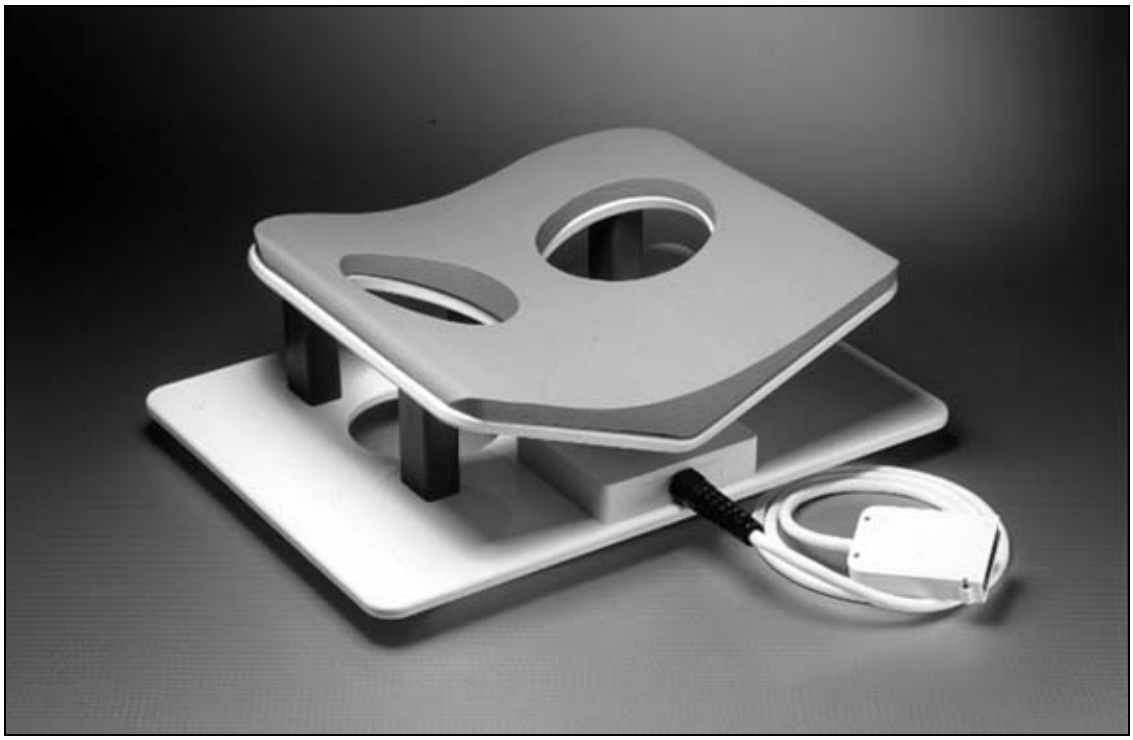
TABLE OF CONTENTS

SECTION 1 - INTRODUCTION

1-1 Product Identification and Shipping List

This is a service manual for the GE Signa® Ovation™ 0.35T Open Breast Coil.

Figure 1-1-1



SHIPPING LIST – TABLE 1-1-1

Description	GE Part #	MRIDC Part #	Qty
0.35T Open Breast Coil System	2282852	101181	1
OBC Service Manual	2284541	TR0092S	1
OBC Operator Manual	2282842	500044	1
Phantom Holder	2263556	100679	2
Sphere Phantom	46-317586G1	101129	1
Ramp Pad	2261597	100740	1
Sternum Pad	2261589	100433	1

1-2 Compatibility

This coil is compatible with the GE Signa® Ovation™ 0.35T System

1-3 Related Documentation

0.35T Open Breast Coil Operator Manual 2282842
GE MR Service Methods CD, 2283084

1-4 Environmental Requirements

Storage Requirements

The Open Breast Coil has no special storage requirements.

Dimensions

Coil Dimension:	559 mm x 406 mm x 176mm	(22.00 in x 15.98 in x 6.93 in)
Phantom Dimension:	100 mm diameter	(4.38 in diameter)

Weight

Coil Weight:	7.4 kg	(16.31 lb.)
Phantom Weight:	3.4 kg	(1.55 lb.)

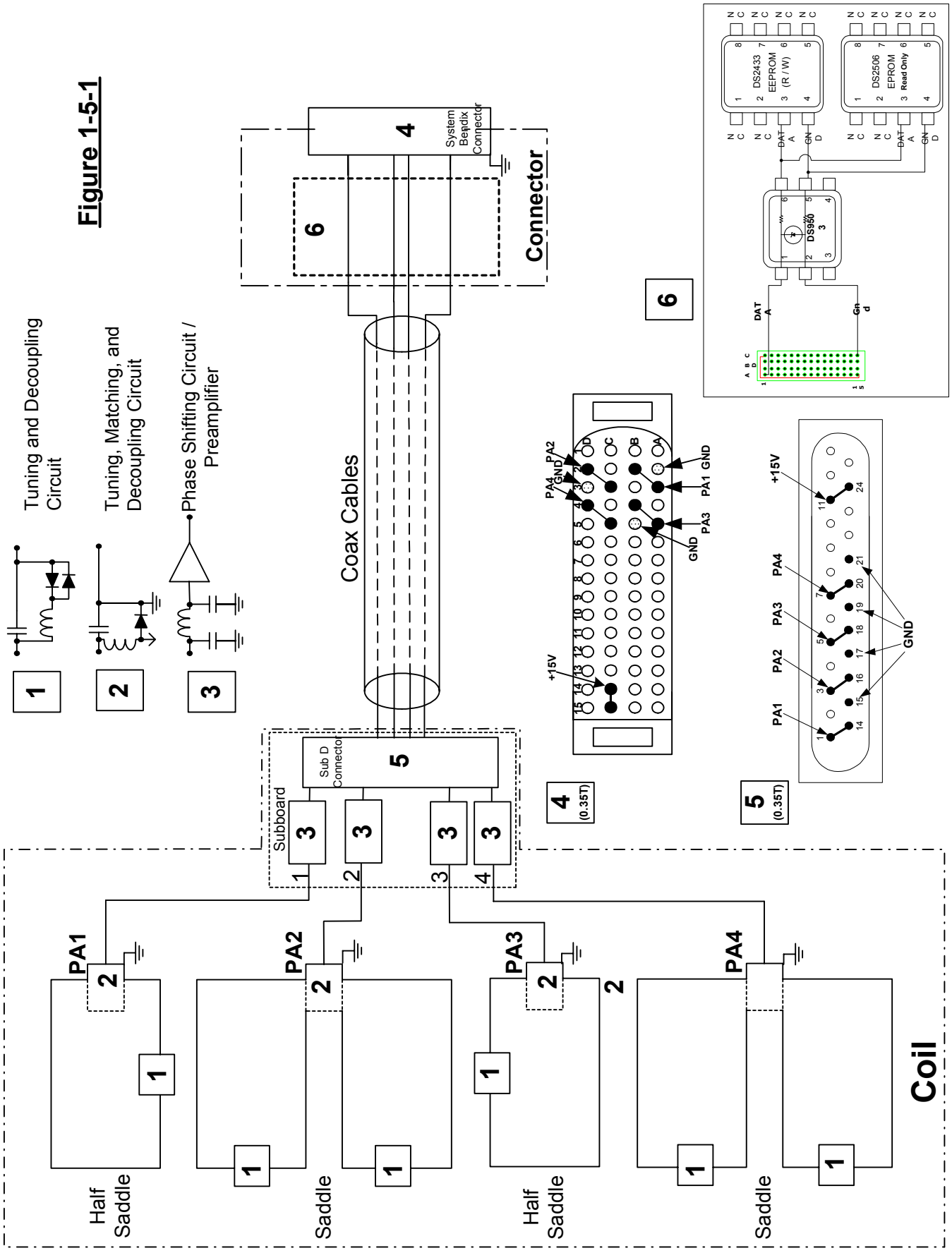
1-5 Theory of Operation

Refer to the Block Diagram, Figure 1-5-1, on the following page.

The Phased Array Open Breast Coil consists of one coil with 4 elements. Two of the elements are saddle coils and two of the elements are half saddle coils. The coil can be used in three modes of operation: Breast-BOTH, Breast-RIGHT and Breast-LEFT. Breast-BOTH uses all 4 elements. Breast-RIGHT uses the right loop and right saddle elements. Breast-LEFT uses the left loop and left saddle elements.

Each element contains items 1, 2, and 3, as labeled on block diagram. Item 1 is a tuning and decoupling circuit, which uses passive decoupling via back to back fast acting diodes which are enabled by the RF pulses. When the diodes short, the network creates a high impedance block to eliminate decoupling artifact and interaction with the excitation field. Item 2 is a tuning, matching, and decoupling circuit which not only tunes and matches the coil to the system resonant frequency, and matches the coil to 50 ohms when loaded, it also provides decoupling when the DC bias on the center conductor of the input cable is positive. Item 3 provides the proper phase shift between the preamplifier and item 2 to create the phased array decoupling required during receive. The coil ID circuit is located in the system connector, item 6.

Figure 1-5-1


Tuning and Decoupling Circuit
Tuning, Matching, and Decoupling Circuit
Phase Shifting Circuit / Preamplifier
1
2
3
Coax Cables
Connector
4
System Bendix Connector
6
5
Sub D Connector
Subboard
3
1
2
3
4
PA1
PA2
PA3
PA4
Half Saddle
Saddle
Half Saddle
Saddle
Coil
DS2433 EEPROM (R / W)
DS2506 EEPROM Read Only
DS9503
DAT A
Gnd
PA4 PA2 GND
PA1 GND
PA3
GND
+15V
4 (0.35T)
5 (0.35T)

SECTION 2 - SETUP AND CALIBRATION

2-1 Coil Installation

2-1-1 Special Install Notes

None

2-1-2 Configuration

The system will automatically recognize the coil using the Coil ID feature. No configuration should be required. For reference, the configuration information, Table 7-3-1, is included in the Appendix. Check the system coil configuration file and verify that it is the same as the coil configuration table in the latest manual.

2-2 Installation Functional Checks

1. From the Scan Desktop, start new scan by selecting [**New Pt**]; set **Patient ID** to "*geservice*" and **Patient Weight** to "*111*" pounds. Click [**Patient Position**] to open protocols window.

2. Plug the coil into the patient table and verify the coil indicator light, on the side of the port, turns green. A green light indicates the system hardware identifies the coil.

3. At the console, verify the Coil has been properly identified by the system: correct name in **Coil** field and correct picture on the screen.

4. Perform system level Signal to Noise Check. Refer to Service Methods CD; System Level Procedures; Functional Checks; Signal to Noise Check.

5. Perform Section 3 - Coil Imaging Performance Verification.

2-3 Periodic Quality Assurance Check

On a periodic basis, such as during planned maintenance, perform the quality assurance checks as outlined below to ensure the coils is operating properly.

1. Check external cable for cracks or cuts.

2. Perform Section 3 - Coil Imaging Performance Verification and record data values in Data Sheet.

SECTION 3 - FUNCTIONAL CHECKS

3-1 Scanner Verification

Perform system level Signal to Noise Check. Refer to Service Methods CD; System Level Procedures; Functional Checks; Signal to Noise Check.

3-2 Coil Imaging Performance Verification

3-2-1 Tools Required

TOOLS REQUIRED – TABLE 3-2-1

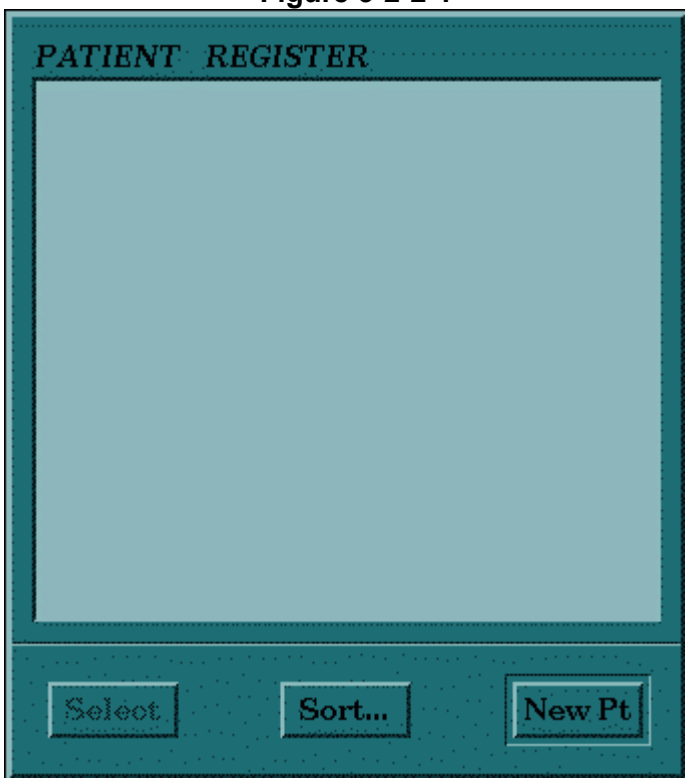
Description	GE Part #	MRIDC Part #	Qty
Phantom Holder	2263556	100679	2
Sphere Phantom*	46-317586G1	101129	2

** The coil package contains only one phantom, another is contained in the system phantom set.*

3-2-2 Scan Setup

1. Select [New Pt] to set a new landmark. [Figure 3-2-2-1]

Figure 3-2-2-1



2. Remove any other surface coil (if present) from the cradle. Place the coil near the top of the cradle. Place the two phantoms and the two phantom holders on the coil (See Figure 3-2-2-2). Connect the coil connector to the coil port.

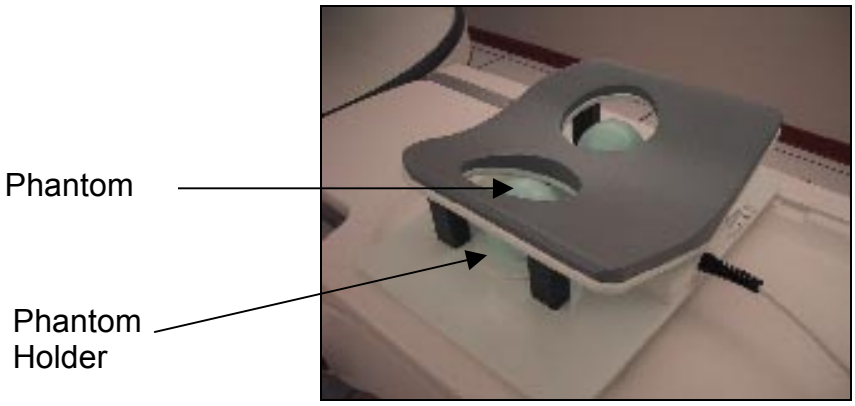
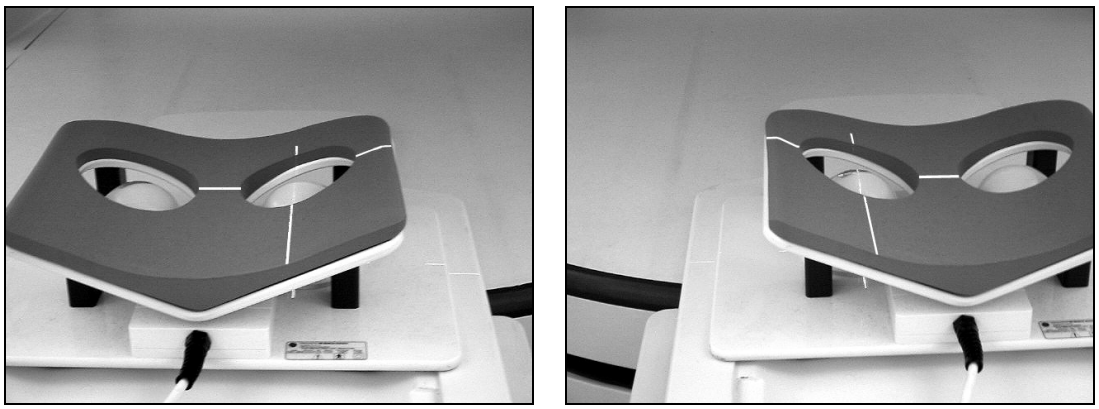


Figure 3-2-2-2: Phantom Setting

3. At the magnet, press the “Alignment Light” button to turn on the light. Move the cradle to align the coil to the alignment lights as shown in Figure 3-2-2-3. Use the lateral handle to set the phantom at the center. Press the “Landmark” button to landmark the alignment.



Breast-RIGHT Landmark Breast-LEFT Landmark

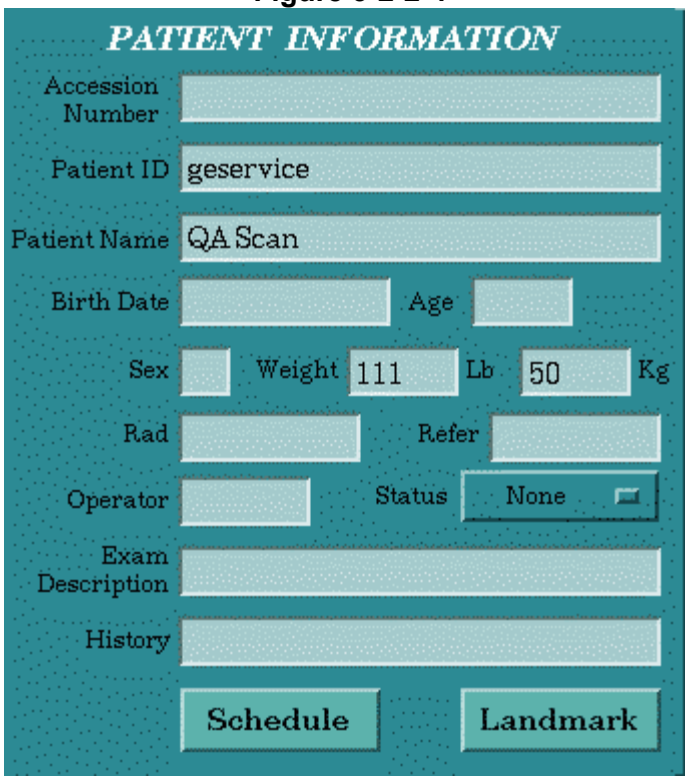
Figure 3-2-2-3: Coil Landmarks

4. Move the coil to scan position by pushing the “Move to Scan” button, ensuring cable does not get snagged.

5. Enter “geservice” for [Patient ID]. [Figure 3-2-2-4]

6. Enter “QA Scan” for [Patient name]. [Figure 3-2-2-4]

Figure 3-2-2-4



7. Enter “111” lbs for [Weight]. [Figure 3-2-2-4]

8. Select [Patient Position].

9. At the console, verify the Coil has been properly identified by the system: correct picture on the screen and correct name in Coil field. If system does not recognize coil, refer to Section 2 - Setup and Calibration.

10. Enter the following parameters;

SNR PROTOCOL SHEET - TABLE 3-2-2-1

Patient/Exam Information	
Patient ID	geservice
Patient Name	QA Scan
Patient Weight	111 lbs (50kg)
Landmark	Nasion
Table Entry	Center
Patient Position	
Patient Position	Supine
Patient Entry	Head first
Coil	**Breast-Right Breast-Left**
Series Description	*leave blank*
Imaging Parameters	
Plane	Axial
Mode	2D
Pulse Seq	Spin Echo
Imaging Options	None
PSD Name	*leave blank*
Protocol	*leave blank*
Scan Timing	
# of Echoes	1
TE	25.0
TR	500
Bandwidth	10.42
Additional Parameters	
no entries required in this area	
Acquistion Timing	
Freq	256
Phase	256
NEX	1.0
Phase FOV	1.0
Freq DIR	L/R
Auto Center Freq	Peak
Auto Shim	On
Contrast	Off
Scannning Range	
FOV	25
Slice Thickness	5
Spacing	0

	I/S	**P/A center**	**R/L center**
start	0	**P100**	0
End	0		
# Slices	1		

11. Select [Save Series].

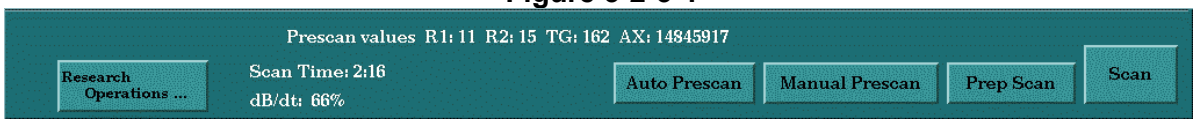
3-2-3 Phantom Scan

1. Choose the saved series and select [Prepare to scan]

2. Bring the mouse pointer to [Research Operations]. Then click right button on the mouse.

3. Select [Display CVs].

Figure 3-2-3-1



4. Enter “saveinter” for CV name, set the current value to 1. Press enter key to save the changes made in the “saveinter” window. Press [Accept] to close window.

5. Select [Auto Prescan]

6. Select [Scan]

7. Wait for scan to finish before proceeding.

8. After first scan, select [Scan] again

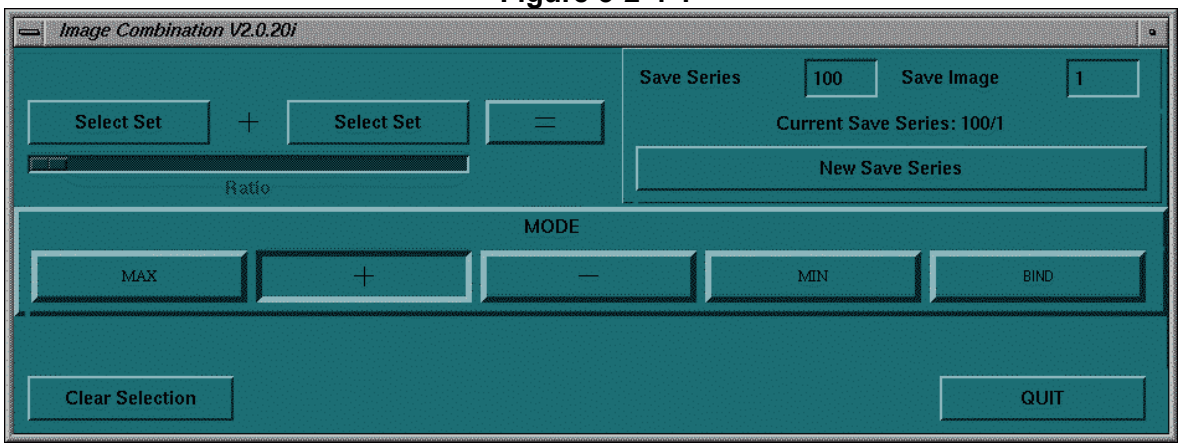
3-2-4 Create Subtraction Images

1. Select [Display Icon] to display the Browser.

2. Select the exam named “QA Scan”

3. After the phantom scan, select [Add / Sub] from browser.

Figure 3-2-4-1



4. Select MODE [-] and Check [Accept Negative Pixels].

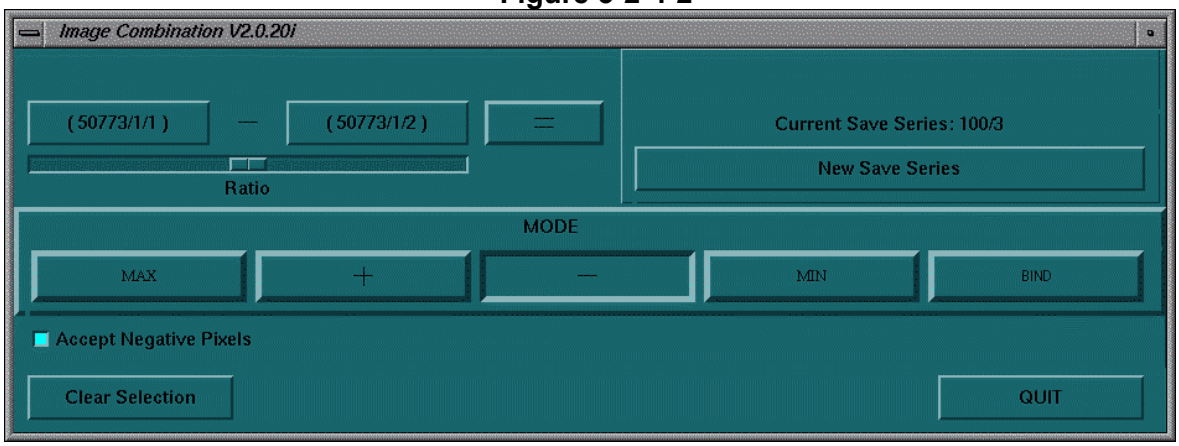
5. Select image#1 from browser and then Select [Select Set](left button on the Image Combination window).

6. Select image#4 from browser and then Select [Select Set] (right button on the Image Combination window).

7. Select [=].

8. Also create Subtraction Images using, (image#2 – image#5) and (image#3 – image#6).

Figure 3-2-4-2



SETTING CURSOR

1. Select [Display Icon] to display the Browser.
2. Select the exam named “QA Scan”.
3. Select image #1. Select [Mini Viewer]
4. Select [Grid] to set cursor.
5. Select [Measure] button. Select circular cursor and set 2800mm^2 (+/-100mm^2)
6. Set cursor at the center of the phantom.
7. Use cursor copy [CTRL]+[C] and paste [CTRL]+[V] to easily set the cursor to each image.

3-2-5 SNR Image Analysis

Signal measurement

1. Measure the mean value of image#1 and record it on the table on Appendix SNR worksheet
2. Open image#4 and measure the mean value with same size ROI.
3. Measure the mean of other images #2, #3, #5 and #6.

Noise measurement

1. Select subtracted image#1 in the series#100s from browser and select [Mini Viewer].
2. Record SD value using with same size ROI on SNR Worksheet on Appendix.
3. Repeat this procedure for image#2 and #3 in series#100s.

SNR Calculation

1. SNR is caluclated as below.

SNR = ((mean value1)+(mean value2)) / ((SD) x 1.414)

Spec. ≧ 113

Right Breast Element 1 Images - Figure 3-2-5-1

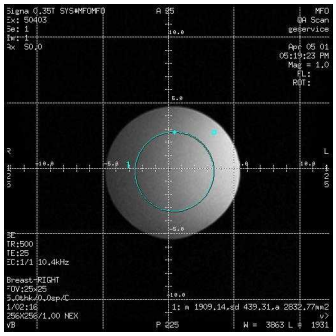
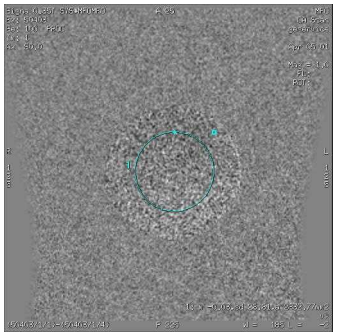


Image 1 / 4



Subtraction

Right Breast Element 2 Images - Figure 3-2-5-2

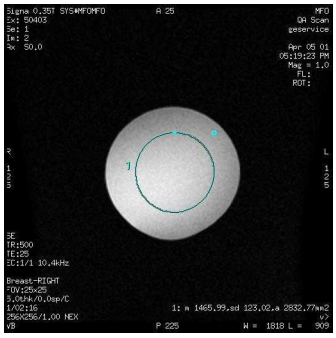
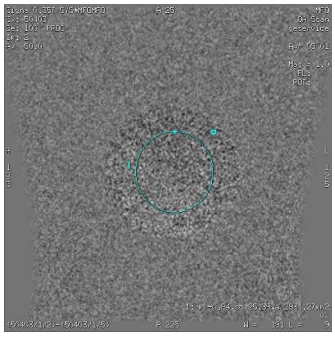


Image 2 / 5



Subtraction

Right Breast Composite Images - Figure 3-2-5-3

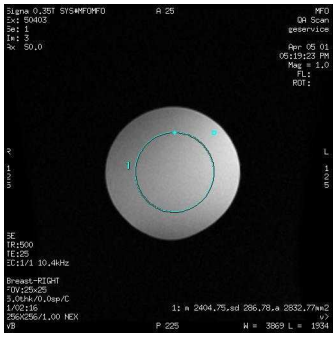
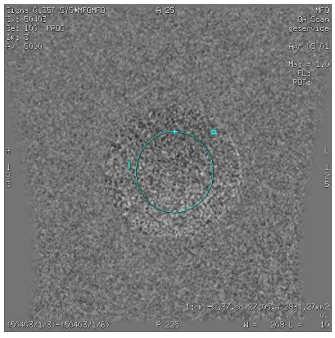


Image 3 / 6



Subtraction

Left Breast Element 1 Images - Figure 3-2-5-4

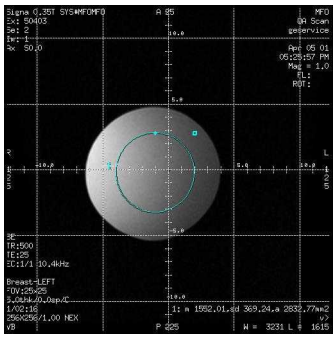
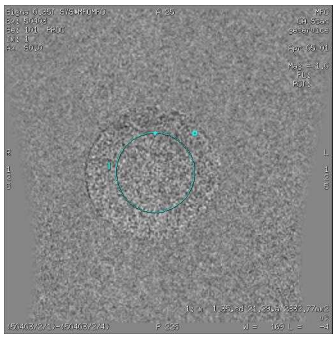


Image 1 / 4



Subtraction

Left Breast Element 2 Images - Figure 3-2-5-5

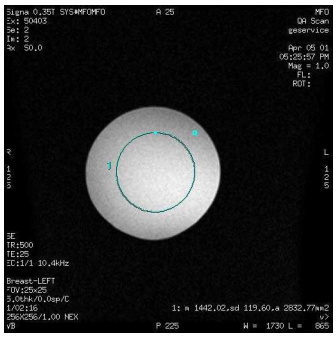
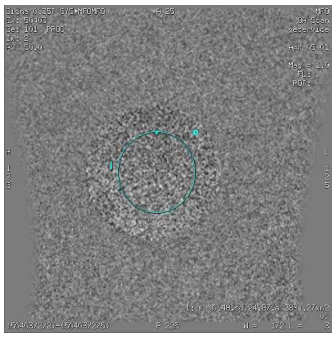


Image 2 / 5



Subtraction

Left Breast Composite Images - Figure 3-2-5-6

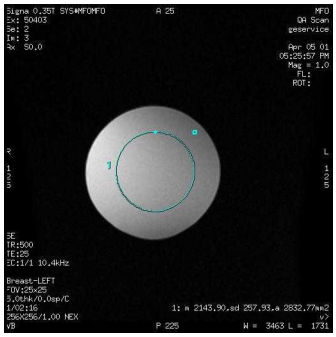
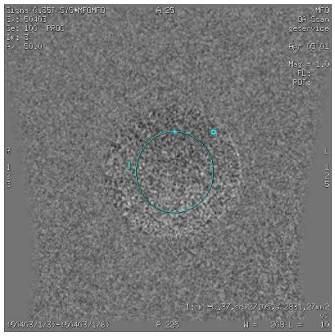


Image 3 / 6



Subtraction

3-3 External Cable Check

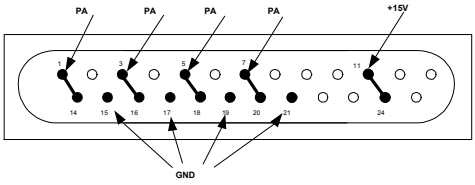
Check the system cable using the following procedure. Remove four screws on the bottom of the coil housing and disconnect the Sub D connector (No. 5 in block diagram, Figure 1-5-1). Using a digital multimeter, measure continuity through the connections detailed in External Cable Expected Readings – Table 3-3-1. Also verify that signal pins are not shorted to GND.

EXTERNAL CABLE EXPECTED READINGS – TABLE 3-3-1

Signal	Coil Sub D Connector (No.5) (27W2) Pin	System Bendix Connector (No.4) (Bendix60) Pin
Channel 1 & T/R 1	1, 14	A3, B2
Channel 1 & T/R 2	3, 16	C3, D2
Channel 1 & T/R 3	5, 18	A5, B4
Channel 1 & T/R 4	7, 20	C5, D4
+ 15 V	11, 24	C1, C2
GND	2,4,6,8,15,17,19,21	A2,A4,B1,B3,B5,C4,D3,D5

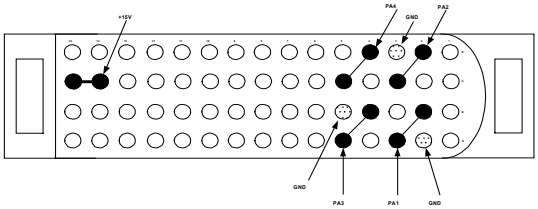
If all readings are < 3 ohms, proceed to **Diode Check.**

Figure 3-3-1



Coil Connector SubD

Figure 3-3-2



System Connector Bendix

3-4 PIN Diodes Check

Measure the following pins in Sub D connector (27W2, No.5 in block diagram) with a multimeter.

PIN DIODE EXPECTED READINGS – TABLE 3-4-1

Positive lead	Negative lead	Reading
Pin 1 (PA1)	GND (Pin 15)	One diode drop
GND (Pin 15)	Pin 1 (PA1)	Open
Pin 3 (PA2)	GND (Pin 17)	One diode drop
GND (Pin 17)	Pin 3 (PA2)	Open
Pin 5 (PA3)	GND (Pin 19)	One diode drop
GND (Pin 19)	Pin 5 (PA3)	Open
Pin 7 (PA4)	GND (Pin 21)	One diode drop

If one or more readings indicate a short, reconnect coil system cable and replace coil. If all of the above readings are correct, redo *Scanner and coil verification testing procedures* from above. If problem still exist, replace breast coil.

3-5 Mechanical Hardware Check

Not Applicable

3-6 Troubleshooting Tips

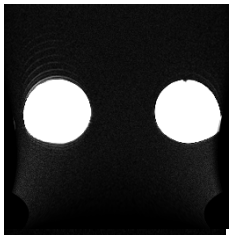
If poor image quality or dead channels are present, use the following setup information and compare the resulting images to isolate any defective part(s).

COIL ELEMENT INFORMATION – TABLE 3-6-1

Breast-BOTH									
element name	right loop	right saddle	left loop	left saddle	not used	not used	not used	not used	not used
channel number	1	2	3	4	5	6	7	8	n/a
selected channel	See Below				no	no	no	no	n/a
mc bias driver #	1	1	2	2	3	3	4	4	n/a
active bias driver	yes	yes	yes	yes	no	no	no	no	n/a

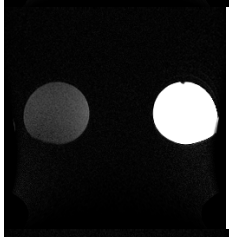
selected channel	Yes	Yes	Yes	Yes

Breast-BOTH Image Composite ►



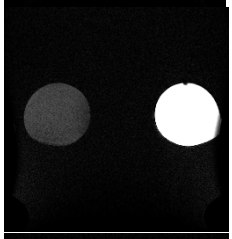
selected channel	Yes	No	No	No

Breast-BOTH Image Receiver 1 ►



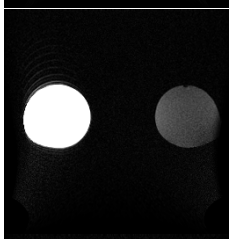
selected channel	No	Yes	No	No

Breast-BOTH Image Receiver 2 ►



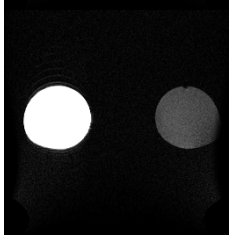
selected channel	No	No	Yes	No

Breast-BOTH Image Receiver 3 ►



selected channel	No	No	No	Yes

Breast-BOTH Image Receiver 4 ►



Breast-LEFT – TABLE 3-6-2

Breast-LEFT									
element name	right loop	right saddle	left loop	left saddle	not used	not used	not used	not used	not used
channel number	1	2	3	4	5	6	7	8	n/a
selected channel	no	no	yes	yes	no	no	no	no	n/a
mc bias driver #	1	1	2	2	3	3	4	4	n/a
active bias driver	no	no	yes	yes	no	no	no	no	n/a

Breast-RIGHT – TABLE 3-6-3

Breast-RIGHT									
element name	right loop	right saddle	left loop	left saddle	not used	not used	not used	not used	not used
channel number	1	2	3	4	5	6	7	8	n/a
selected channel	yes	yes	no	no	no	no	no	no	n/a
mc bias driver #	1	1	2	2	3	3	4	4	n/a
active bias driver	yes	yes	no	no	no	no	no	no	n/a

The Breast-LEFT and Breast-RIGHT tables are presented here to provide complete channel information for comparative troubleshooting.

SECTION 4 - MAINTENANCE

4-1 Coil Care

Detach coil connector from scanner before attempting to clean. Do not reattach after cleaning until coil has dried completely. Having the coil attached to the system during cleaning or when it is wet may result in electrical shock.

Do not spray or pour cleaning solution directly on coil. Do not submerge coil in solution. The coil contains sensitive electronics components that could be damaged by the solution.

The Open Breast Array coil, Sternum pad and Ramp pad may be cleaned by wiping with a cloth dampened with a solution of 30% isopropyl alcohol and 70% tap water or a 10% Bleach solution.

4-2 Special Care Requirements

None

SECTION 5 - REPLACEMENT

Simple removals that are clearly obvious are not described here.

Unless otherwise noted, the steps for re-assembly are simply the reverse order of the steps described for disassembly.

5-1 Disassembly of Coil

Not Applicable

5-2 External Cable Replacement

Remove four screws on bottom of coil housing and disconnect Sub D connector (No. 5 in block diagram). Remove cable. After replacement, verify that signal pins are not shorted to GND.

5-3 Mechanical Hardware Replacement

Not Applicable

SECTION 6 - RENEWAL PARTS

6-1 Field Replaceable Units

FIELD REPLACEABLE UNITS LIST – TABLE 6-1-1

MRIDC No.	Description	GE Part No.
101181	0.35T Open Breast Coil System	2282852
101197	System Cable, Open Breast Coil 0.35T	2284540
100679	Phantom Holder	2263556
101129	Sphere Phantom	46-317586G1

6-2 Other Replaceable Accessories

OTHER REPLACEABLE ACCESSORIES LIST – TABLE 6-2-1

MRIDC No.	Description	GE Accessory Part No.
100740	Ramp Pad	2261597
100433	Sternum Pad	2261589

SECTION 7 - APPENDIX

7-1 SNR Data Sheet

Use tables 7-1-1 and 7-1-2 to record the Signal to Noise Ratio (SNR) data obtained from the Functional Checks in Section 3.

Breast-RIGHT SNR DATA SHEET – TABLE 7-1-1

Date Tested	Receiver ch.#	Coil Element #	Image #	Signal Mean 1	Signal Mean 2	Noise SD from Subtraction image	SNR	Spec.
	1	1	1&4					N/A
	2	2	2&5					N/A
	composite	composite	3&6					≧113
		R1=		R2=				
		TG=		Freq=				

Breast-LEFT SNR DATA SHEET – TABLE 7-1-2

Date Tested	Receiver ch.#	Coil Element #	Image #	Signal Mean 1	Signal Mean 2	Noise SD from Subtraction image	SNR	Spec.
	1	3	1&4					N/A
	2	4	2&5					N/A
	composite	composite	3&6					≧113
		R1=		R2=				
		TG=		Freq=				

7-2 Schematic

Refer to Block Diagram, Figure 1-5-1, under Section 1-5 Theory of Operation

7-3 Coil Configuration

Breast-BOTH COIL CONFIGURATION – TABLE 7-3-1

coilCode	BREAST								
coilName	Breast-BOTH								
element name	left loop	left saddle	right loop	right saddle	not used	not used	not used	not used	not used
channel number	1	2	3	4	5	6	7	8	n/a
selected channel	yes	yes	yes	yes	no	no	no	no	n/a
mc bias driver #	1	1	2	2	3	3	4	4	n/a
active bias driver	yes	yes	yes	yes	no	no	no	no	n/a

mcPortEnable	**3**	bit mask driver 1 = 1, 2 = 2, 3 = 4, 4 = 8
mcErrorEnable	**3**	must be same as mcPortEnable
mcChannelSel	**15**	see truth table
mcReconEnable	**0**	bit mask to cut out receivers: rcvr 0 = 1, 1 = 2, 2 = 4, 3 = 8
startRec	**0**	value 0 through 3 must be <= endRec
endRec	**3**	value 0 through 3 must be >= startRec
numRec	**4**	(endRec - startRec) + 1
startFastRec	**4**	always 4
endFastRec	**4**	always 4
numFastRec	**0**	always 0 except single channel coils with fast receiver present
ATTN_Q	**0**	Q channel attenuation. Range 0.0 to 15.5 dB in 0.5 dB steps.
ATTN_I	**0**	I channel attenuation. Range 0.0 to 15.5 dB in 0.5 dB steps.
quadRotation	**0**	selects quadrature shifter for single channel quadrature coils: 1=+90, 0=-90
coilType	**3**	1 = head T/R, 2 = body T/R, 3 = receive only
extremity	**no**	must be "yes" or "no", only meaningful if coilType = 1
cableLoss	**1**	linear attenuation factor representing loss between RF amp and T/R coil
coilLoss	**1.165**	transmit energy lost in coil (joules per standard pulse)
reconScale	**0.87**	Gain factor for T/R coils. Rcv only coils multiply this times head coil value.
multiCoil	**yes**	must be "yes" or "no"
linearQuad	**1**	0 = linear, 1 = quadrature. Applies to transmit coils only.
xmitAtten	**0**	equivalent to attenuation added between sys & RF cabs in TG units
fastTGstartTA	**90**	subtract this value from 200 to get TG at which fast TG starts
fastTGstartRG	**12**	default R1 setting for fast TG
autoshimRcvr	**-1**	for T/R phased arrays, tells autoshim which rcvr (0-15) to use, otherwise -1
headDefaultFreqDir	**0**	1 means default frequency direction is same as head coil, 0 is not
quadRcvCoil	**0**	0 = linear, 1 = quadrature. Only applies to single channel receive & TR coils.
cfoption	**0**	Special Sequence Coefficient

Breast-RIGHT COIL CONFIGURATION – TABLE 7-3-2

coilCode	BREAST								
coilName	Breast-RIGHT								
element name	right loop	right saddle	not used	not used	not used	not used	not used	not used	not used
channel number	1	2	3	4	5	6	7	8	n/a
selected channel	yes	yes	no	no	no	no	no	no	n/a
mc bias driver #	1	1	2	2	3	3	4	4	n/a
active bias driver	yes	yes	no	no	no	no	no	no	n/a

mcPortEnable	**1**	bit mask driver 1 = 1, 2 = 2, 3 = 4, 4 = 8
mcErrorEnable	**1**	must be same as mcPortEnable
mcChannelSel	**3**	see truth table
mcReconEnable	**0**	bit mask to cut out receivers: rcvr 0 = 1, 1 = 2, 2 = 4, 3 = 8
startRec	**0**	value 0 through 3 must be <= endRec
endRec	**1**	value 0 through 3 must be >= startRec
numRec	**2**	(endRec - startRec) + 1
startFastRec	**4**	always 4
endFastRec	**4**	always 4
numFastRec	**0**	always 0 except single channel coils with fast receiver present
ATTN_Q	**0**	Q channel attenuation. Range 0.0 to 15.5 dB in 0.5 dB steps.
ATTN_I	**0**	I channel attenuation. Range 0.0 to 15.5 dB in 0.5 dB steps.
quadRotation	**0**	selects quadrature shifter for single channel quadrature coils: 1=+90, 0=-90
coilType	**3**	1 = head T/R, 2 = body T/R, 3 = receive only
extremity	**no**	must be "yes" or "no", only meaningful if coilType = 1
cableLoss	**1**	linear attenuation factor representing loss between RF amp and T/R coil
coilLoss	**1.165**	transmit energy lost in coil (joules per standard pulse)
reconScale	**0.87**	Gain factor for T/R coils. Rcv only coils multiply this times head coil value.
multiCoil	**yes**	must be "yes" or "no"
linearQuad	**1**	0 = linear, 1 = quadrature. Applies to transmit coils only.
xmitAtten	**0**	equivalent to attenuation added between sys & RF cabs in TG units
fastTGstartTA	**90**	subtract this value from 200 to get TG at which fast TG starts
fastTGstartRG	**12**	default R1 setting for fast TG
autoshimRcvr	**-1**	for T/R phased arrays, tells autoshim which rcvr (0-15) to use, otherwise -1
headDefaultFreqDir	**0**	1 means default frequency direction is same as head coil, 0 is not
quadRcvCoil	**0**	0 = linear, 1 = quadrature. Only applies to single channel receive & TR coils.
cfoption	**0**	Special Sequence Coefficient

Breast-LEFT COIL CONFIGURATION – TABLE 7-3-3

coilCode	BREAST								
coilName	Breast-LEFT								
element name	not used	not used	left loop	left saddle	not used	not used	not used	not used	not used
channel number	1	2	3	4	5	6	7	8	n/a
selected channel	no	no	yes	yes	no	no	no	no	n/a
mc bias driver #	1	1	2	2	3	3	4	4	n/a
active bias driver	no	no	yes	yes	no	no	no	no	n/a

mcPortEnable	**2**	bit mask driver 1 = 1, 2 = 2, 3 = 4, 4 = 8
mcErrorEnable	**2**	must be same as mcPortEnable
mcChannelSel	**15**	see truth table
mcReconEnable	**0**	bit mask to cut out receivers: rcvr 0 = 1, 1 = 2, 2 = 4, 3 = 8
startRec	**2**	value 0 through 3 must be <= endRec
endRec	**3**	value 0 through 3 must be >= startRec
numRec	**2**	(endRec - startRec) + 1
startFastRec	**4**	always 4
endFastRec	**4**	always 4
numFastRec	**0**	always 0 except single channel coils with fast receiver present
ATTN_Q	**0**	Q channel attenuation. Range 0.0 to 15.5 dB in 0.5 dB steps.
ATTN_I	**0**	I channel attenuation. Range 0.0 to 15.5 dB in 0.5 dB steps.
quadRotation	**0**	selects quadrature shifter for single channel quadrature coils: 1=+90, 0=-90
coilType	**3**	1 = head T/R, 2 = body T/R, 3 = receive only
extremity	**no**	must be "yes" or "no", only meaningful if coilType = 1
cableLoss	**1**	linear attenuation factor representing loss between RF amp and T/R coil
coilLoss	**1.165**	transmit energy lost in coil (joules per standard pulse)
reconScale	**0.87**	Gain factor for T/R coils. Rcv only coils multiply this times head coil value.
multiCoil	**yes**	must be "yes" or "no"
linearQuad	**1**	0 = linear, 1 = quadrature. Applies to transmit coils only.
xmitAtten	**0**	equivalent to attenuation added between sys & RF cabs in TG units
fastTGstartTA	**90**	subtract this value from 200 to get TG at which fast TG starts
fastTGstartRG	**12**	default R1 setting for fast TG
autoshimRcvr	**-1**	for T/R phased arrays, tells autoshim which rcvr (0-15) to use, otherwise -1
headDefaultFreqDir	**0**	1 means default frequency direction is same as head coil, 0 is not
quadRcvCoil	**0**	0 = linear, 1 = quadrature. Only applies to single channel receive & TR coils.
cfoption	**0**	Special Sequence Coefficient

REVISION HISTORY

Rev	Date	Author	Primary Reason for Change	DCN
A	1/8/2000	T. Holzworth	First Issue	
B	4/25/2000	L. Hyler	Revise Document Format	
C	7/5/2001	L. Hyler	Revise according to YMS Comments	
D	7/16/2001	L. Hyler	Further YMS Revision	
01	10/16/01	L. Hyler	Release to Phase 5	242
02	6/3/02	L. Hyler	Add SNR Spec.	