SERVICE MANUAL

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

Document TR0112S

Revision 1

GE Signa® 1.5T and/or 1.0T
Open Neurovascular Array

GE Catalog Part Number:	**M1087NB**	**(1.5T)**
	M1887NB	**(1.0T)**
MRIDC Part Number:	**800202**	**(1.5T)**
	800201	**(1.0T)**

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 EQUIPEMENTS TANT QUE LE MANUEL SERVICE N'A PAS ETE CONSULTE ET COMPRIS.**
- **LE NON–RESPECT DE CET AVERTISSEMENT PEUT ENTRAINER CHEZ LE TECHNICIEN, L'OPERATEUR OU LE PATIENT DES BLESSURES DUES A DES DANGERS ELECTRIQUES, MECANIQUES 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 SOLO EXISTE EN INGLES**
- **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。

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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。

TABLE OF CONTENTS

SECTION 1 - INTRODUCTION

1-1 Product Identification and Shipping List

This is a service manual for the GE Signa 1.5Tand/or 1.0T Open Neurovascular Array.

1.5T SHIPPING LIST – TABLE 1-1-1

Description	GE Part #	MRIDC Part #	Qty
Neurovascular Assembly with Cable	2293668-2	101413	1
Neurovascular Operator Manual	2293668-3	500067	1
Neurovascular Service Manual	2293668-4	TR0112S	1
Phantom Positioner	2293668-7	101655	1
Wedge Pad	E8800NB	101407	2
Pad	E8800NC	101408	1

1.0T SHIPPING LIST – TABLE 1-1-2

Description	GE Part #	MRIDC Part #	Qty
Neurovascular Assembly with Cable	2293669-2	101423	1
Neurovascular Operator Manual	2293668-3	500067	1
Neurovascular Service Manual	2293668-4	TR0112S	1
Phantom Positioner	2293668-7	101655	1
Wedge Pad	E8800NB	101407	2
Pad	E8800NC	101408	1

1-2 Compatibility

This coil is compatible with the following hardware configurations:

- Signa 1.5T LX/Horizon and CVNV
- Signa 1.0T LX/Horizon and CVNV

1-3 Related Documentation

- Signa LX Service Methods CD, 2160623-1
- 1.5T/1.0T Open Neurovascular Array Operator Manual, 2293668-3

1-4 Environmental Requirements

Storage Requirements

The Coil should be stored in the Scanner Room.

Dimensions

1.5T Coil Dimension:	679.5 mm x 394.0 mm x 415.9 mm	(26.75 in x 15.50 in x 16.375 in)
1.0T Coil Dimension:	679.5 mm x 394.0 mm x 415.9 mm	(26.75 in x 15.50 in x 16.375 in)
Phantom Holder	453.6 mm x 381.0 mm x 142.2 mm	(17.86 in x 15.00 in x 5.60 in)

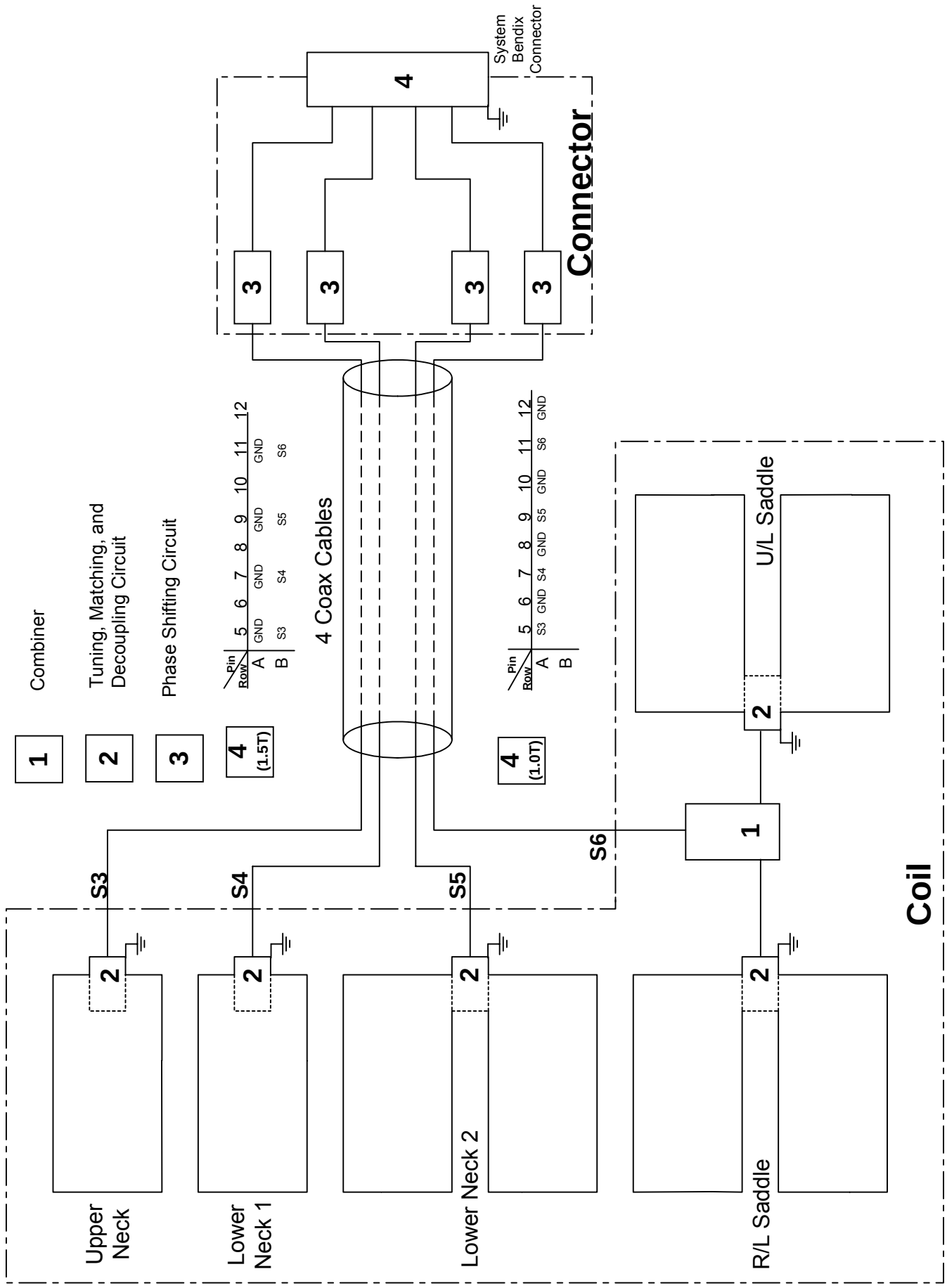
Weight

1.5T Coil Weight:	9.77 Kg	(21.5 lb.)
1.5T Coil Weight:	9.77 Kg	(21.5 lb.)

1-5 Theory of Operation

Refer to the block diagram on the following page.

The Phased Array Neurovascular coil consists of a top and bottom piece which must be securely fastened together for safe effective operation. The coil utilizes four channels of the multi-coil system. The head channel on S6 is a quadrature saddle coil which uses the combiner labeled (1). The neck coverage comes from three channels, one for the anterior neck and the other two for the posterior neck. The coils are tuned/matched and decoupled through the circuits labeled (2). Decoupling is actively controlled using the system bias current and trap circuits which produce high impedance in the coil loops when PIN diodes are forward biased. If bias current is not available due to a system failure, the traps will be activated passively by the RF power during transmission. These trap circuits ensure safe artifact free operation. Phase shift circuits (labeled {3}) are employed to improve inductive isolation using the system preamplifier impedance mismatch. Item 4 is the system interface which defines the pins associated with each coil channel.


Connector
System Bendix Connector
4
3
3
3
3
4 Coax Cables
Pin Row
5 6 7 8 9 10 11 12
A GND GND GND GND GND S6
B S3 S4 S5
Pin Row
5 6 7 8 9 10 11 12
A S3 GND S4 GND S5 GND S6 GND
B
1 Combiner
2 Tuning, Matching, and Decoupling Circuit
3 Phase Shifting Circuit
4 (1.5T)
4 (1.0T)
Coil
U/L Saddle
2
1
S6
S3
S4
S5
2
2
2
2
Upper Neck
Lower Neck 1
Lower Neck 2
R/L Saddle

SECTION 2 - SETUP AND CALIBRATION

2-1 Coil Installation

2-1-1 Special Install Notes

None

2-1-2 Installing the Coil

The names for this coil are: NVHEAD, NVARRAY, and NVFASTHD.

Add the coil using the Configuration File Manager. Refer to: Service Methods CD; System Level Procedures; Software Utilities.

If the coil does not exist in Coil Config File refer to the Adding New Coils to Config File Manager procedure and use the coil configuration information in Section 7-3 of this manual.

2-2 Installation Functional Checks

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

2. 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 #	Supplier Part #	Qty
18cm diameter spherical TLT Phantom	46-265826G6	N/A	1
10cm diameter spherical phantom	46-317586G1	N/A	1
Phantom Positioner	2293668-7	101655	1

3-2-2 Explanation of Procedure

The Open Neurovascular Array coil can be used in 3 modes of operation and has 3 coil names: NVHEAD, NVARRAY and NVFASTHD. SNR measurements must be made for 2 of these modes, NVHEAD and NVARRAY, requiring 2 sets of signal and noise scans. Refer to the Data Sheet in Appendix 7-1 to understand the data required to calculate the individual element SNR for each mode of operation. All ROI measurements are made on the individual element images, **not** on the composite image.

The image quality check uses two different protocols for signal and noise image acquisition. The signal scan is an **FSE** sequence used to minimize susceptibility and B_0 inhomogeneity effects. The noise scan is a **GRE** sequence that has a Control Variable (do_noise) to eliminate the transmit RF completely during the scan. The signal scan **must** be run prior to the noise scan as the R1, R2, and TG values from the signal scan are used for the noise scan.

3-2-3 Signal Scan

The following procedure is specific to the LX platform but can be easily adapted for 5.x systems.

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.

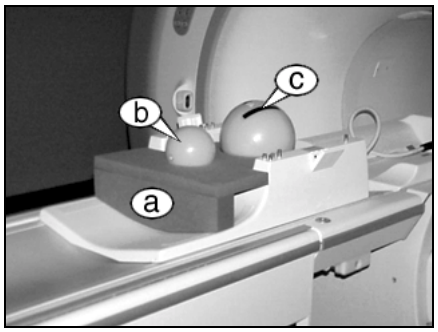
2. Remove any other surface coils from the cradle. Referring to Figure 1, place the Neurovascular coil on the patient table with the cable oriented into the magnet. Lock the base into the slots in the table. Plug the phased array plug into the phased array port on the Signa system.

Unlatch and remove the coil top, placing it in a safe location. Place the phantom positioner into the coil as seen in Figure 2a. Then place the 10cm spherical phantom and the 18cm spherical TLT phantom onto the phantom positioner as seen in Figure 2b and 2c, respectively. Replace and latch the coil top.

Figure 1

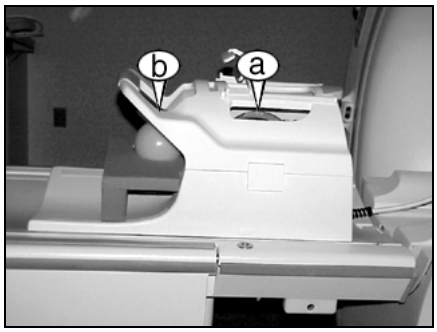
Coil Orientation

Figure 2



Phantoms and Positioner

Figure 3



Landmark

3. At the magnet, press "**Alignment Light**" button to turn on the light. Move the cradle to align the coil to the alignment lights as follows:
   - For the first set of signal and noise scans, landmark in the center of the Head TLT phantom, as indicated in Figure 3a. [Use NVHEAD]
   - For the second set of signal and noise scans, landmark in the center of the 10cm phantom, as indicated in Figure 3b. [Use NVARRAY]

   IMPORTANT - First landmark on the center of the Head TLT phantom and perform an axial signal, and noise scan. Next, landmark on the center of the 10 cm sphere and perform a signal, and noise scan.

4. Press "**Landmark**" button to landmark the alignment.

5. Move the coil to scan position by pushing the "**Move to Scan**" button, ensuring cable does not get snagged.

6. At the console, set the protocols per the Signal section from Table 3-2-4: Signal and Noise Protocols.

7. Click [**Save Series**] to download the protocols, then click [**Prepare to Scan**].

8. Open [**Display CVs**] menu under [**Research Operations**] (click right mouse button). Set the "**saveinter"** CV to "*1*" (saves the intermediate images so ROI measurements can be performed).

9. Run [**Auto Prescan**]. Record the R1, R2 and TG values on the SNR Data Sheet (found at the end of this manual).

10. Run [**Scan**].

3-2-4 Noise Scan

A signal scan must be run **prior** to the noise scan as the same R1, R2 and TG values must be used for both the signal and noise scans. Do **not** run an Auto Prescan prior to the noise scan as the values will be changed.

1. Copy the signal scan series. Use [**Copy Series**] (highlight signal series and click right mouse button) and [**Paste Series**] in **RX Manager**.

2. Click [**View Edit**] and set the protocols per the Noise section from Table 3-2-4: Signal and Noise Protocols.

3. Click [**Save Series**] and click [**Prepare to Scan**].

4. Open [**Display CVs**] menu under [**Research Operations**]. Set the "**saveinter**", "**rhformat**", and "**do_noise**" CVs to "*1*".

5. Run [**Manual Prescan**], do **not** make any changes, and click [**Done**].

6. Run [**Scan**].

SIGNAL AND NOISE PROTOCOLS – TABLE 3-2-4

Protocol		Signal	Noise
Patient/Exam Information			
Patient ID		qeservice	qeservice
Patient Name	First Scan	NVHEAD	NVHEAD
	Second Scan	NVARRAY	NVARRAY
Patient Weight		111 lbs. (50 kg)	111 lbs. (50 kg)
Patient Position			
Patient Position		Supine	Supine
Patient Entry		Head First	Head First
Coil	First Scan	NVHEAD	NVHEAD
	Second Scan	NVARRAY	NVARRAY
Series Description		Signal	Noise
Imaging Parameters			
Plane		Axial	Axial
Mode		2D	2D
Pulse Seq		FSE	GRE
Imaging Options		None	None
PSD Name		*leave blank*	*leave blank*
Protocol		*leave blank*	*leave blank*
Scan Timing			
# of Echoes		1	1
TE		17	minfull
TR		500	34
Echo Train Length/Flip Angle		4	1
Bandwidth		15.63	15.63
Additional Parameters			
no entries required in this area			
Acquisition Timing			
Freq		256	256
Phase		256	256
NEX		1	1
Phase FOV		1	1
Freq DIR		S/I	S/I
Auto Center Freq		Peak	Peak
Autoshim		On	On
Phase Correct		On	On
Contrast		Off	Off
# of Reps B4 Pause		0	0
Scanning Range			
FOV		24	24
Slice Thickness		3.0	3.0
Spacing		1.5	1.5
Start R/L		0	0
P/A Center		A27.0	A24.0
I/S Center		0	0
End R/L		0	0
Slices		1	1
Table Delta		0.00	0.00

3-2-5 SNR Image Analysis

SNR Measurement

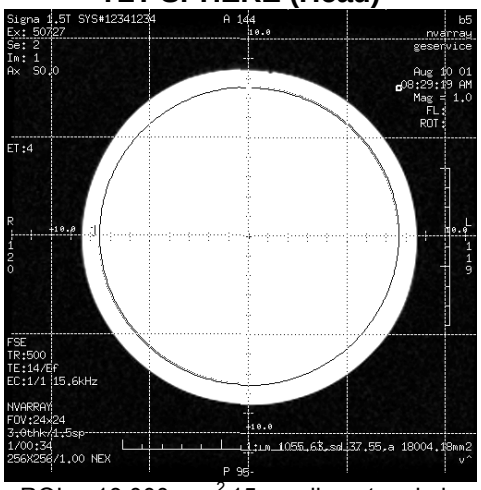
For the signal measurement, choose a rectangular ROI covering the appropriate section of the phantom for the receiver channel being scanned. rectangular ROI should be about 14000 mm^2. ROIs are shown in Figures 1 through 3 below.

The SNR shall be calculated using the signal to noise ratios of the individual receiver channels. Individual receiver SNR is defined as the mean of data within the signal ROI divided by the standard deviation of data within the noise ROI:

$$SNR_i = \frac{\text{mean of signal within ROI}}{\text{standard deviation of noise within ROI}}$$

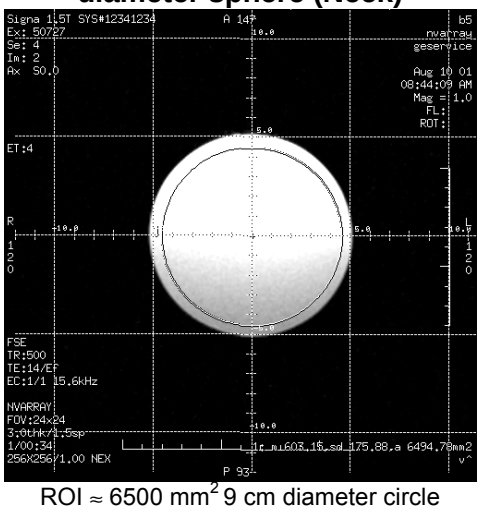
SNR_i is the individual receiver SNR.

Figure 1: NVARRAY HEAD TLT SPHERE (Head)



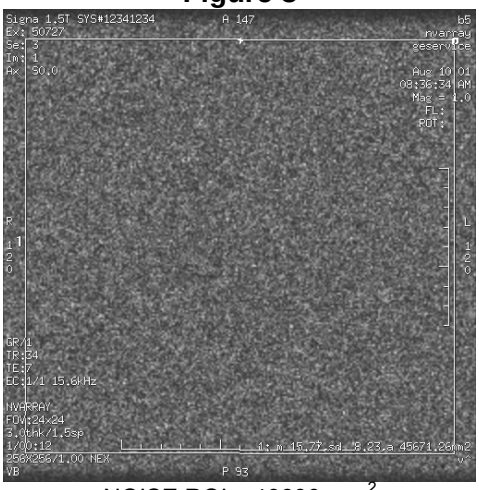
ROI ≈ 18,000 mm^2 15 cm diameter circle

Figure 2: NVARRAY 10 cm diameter sphere (Neck)



ROI ≈ 6500 mm^2 9 cm diameter circle

Figure 3



NOISE ROI ≈ 46600 mm^2

Individual Element Performance

Regions of interest in both signal and noise images can be measured directly in the image browser. Click the user interface button Measure, select the circular or rectangular shape, and adjust its size and orientation when the shape is displayed in the selected image. Mean, standard deviation, and area of the ROI will appear in the lower right corner of the image. Examples of typical Receiver Images are shown in Figures 4 through 8 below.

Figure 4: NVHEAD Receiver 1

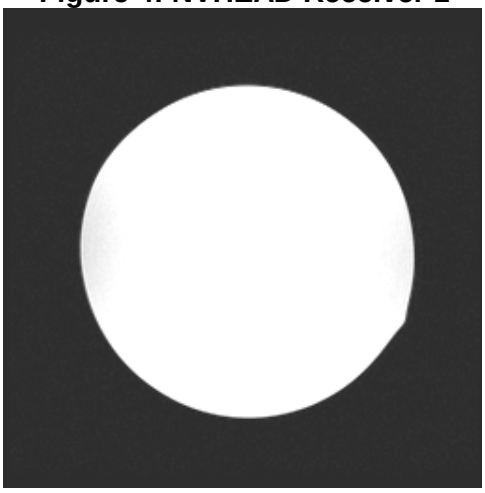
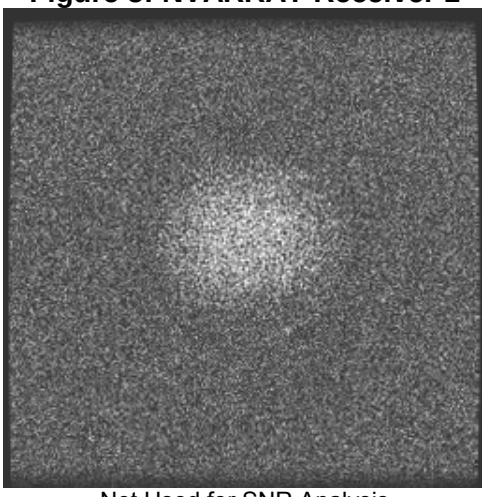


Figure 5: NVARRAY Receiver 1



Not Used for SNR Analysis

Figure 6: NVARRAY Receiver 2

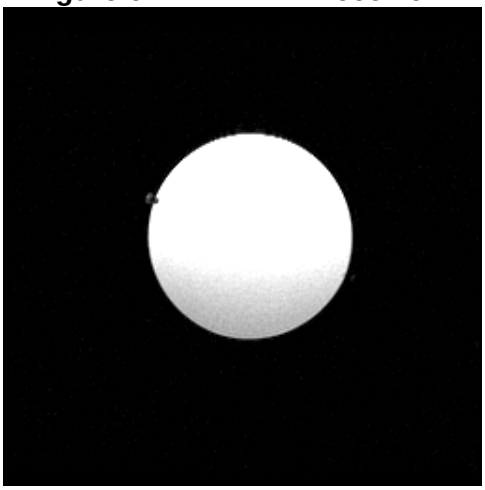


Figure 7: NVARRAY Receiver 3

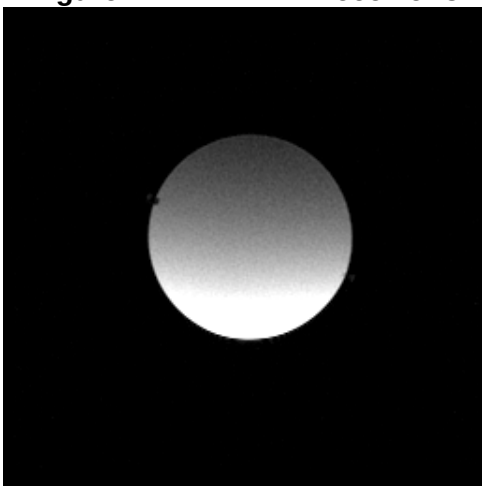


Figure 8: NVARRAY Receiver 4

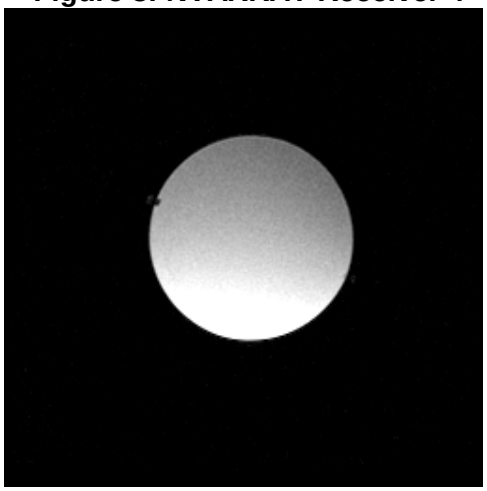
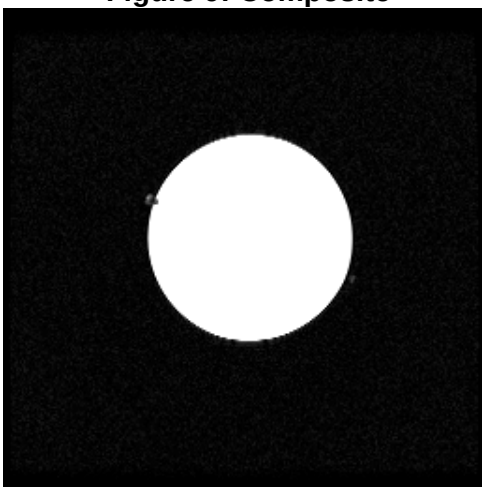


Figure 9: Composite



SNR Specification

The SNR measurements must be greater than or equal to the following specifications:

SNR SPECIFICATIONS – TABLE 3-2-5

Channel	SNR	
	1.5T	1.0T
0	140	82
1	84	42
2	62	37
3	65	44

3-3 External Cable Check

Not Applicable

3-4 PIN Diodes Check

A digital multimeter can be used to measure the PIN diode drop in each of the four elements. A single PIN diode drop of ~0.7 volts should be seen according to the block diagram at each of the inputs for S3, S4, and S5. The positive lead should go to the signal pins, S3-S6, and the negative lead should go to any of the ground pins, GND. Reversing the leads should read ~2.4 volts. For S6, which drives two loops, the typical forward drop is ~0.6 volts, while the reverse measurement is ~1.9 volts. If either reading is a short circuit, the diode(s) or the cable is shorted and a replacement cable should be used to retest the coil. If forwarding biasing the diode results in an open circuit or voltage over 1 volt, the diode(s) or cable is open and the coil must be replaced. The scanner will typically detect open and shorted channels and display a scan error.

PIN DIODE EXPECTED READINGS – TABLE 3-4

Positive Lead	Negative Lead	Reading
S3	GND	~0.7 Volts
S4	GND	~0.7 Volts
S5	GND	~0.7 Volts
S6	GND	~0.6 Volts
GND	S3	~2.4 Volts
GND	S4	~2.4 Volts
GND	S5	~2.4 Volts
GND	S6	~1.9 Volts

3-5 Mechanical Hardware Check

Not Applicable

3-6 Troubleshooting Tips

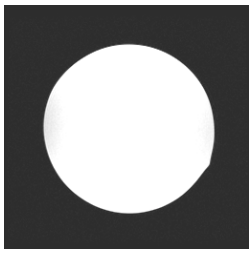
If poor image quality or dead channels are present, use the following setup information and compare the resulting images to isolate any defective part(s).

NVHEAD TROUBLESHOOTING – TABLE 3-6-1

Element Name	Receiver 1	Receiver 2	Receiver 3	Receiver 4	not used	not used	not used	not used	not used
channel number	1	2	3	4	5	6	7	8	
selected channel	See Below				no	no	no	no	
mc bias driver #	1	2	3	4	5	6	7	8	
active bias driver	yes	yes	yes	yes	no	no	no	no	

selected channel	yes	no	no	no

Receiver 1 ►



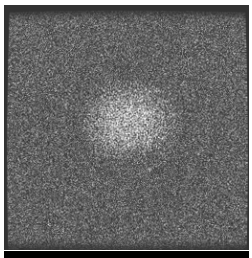
NVARRAY TROUBLESHOOTING – TABLE 3-6-2

Element Name	Receiver 1	Receiver 2	Receiver 3	Receiver 4	not used	not used	not used	not used	not used
channel number	1	2	3	4	5	6	7	8	
selected channel	See Below				no	no	no	no	
mc bias driver #	1	2	3	4	5	6	7	8	
active bias driver	yes	yes	yes	yes	no	no	no	no	

selected channel	yes	no	no	no

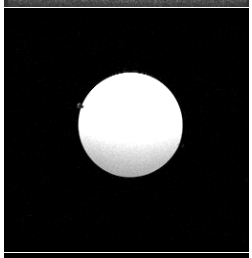
NOTE: Not used for SNR analysis. Image of the 10cm phantom using receiver 1 (head).

Receiver 1 ►



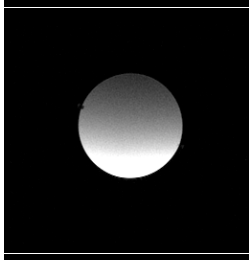
selected channel	no	yes	no	no

Receiver 2 ►



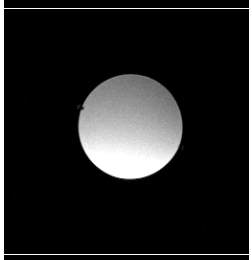
selected channel	no	no	yes	no

Receiver 3 ►



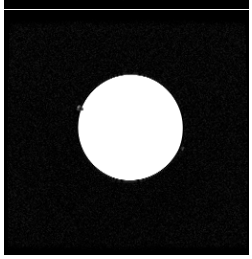
selected channel	no	no	no	yes

Receiver 4 ►



selected channel	yes	yes	yes	yes

Composite ►



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 Neurovascular Array 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

Not Applicable

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

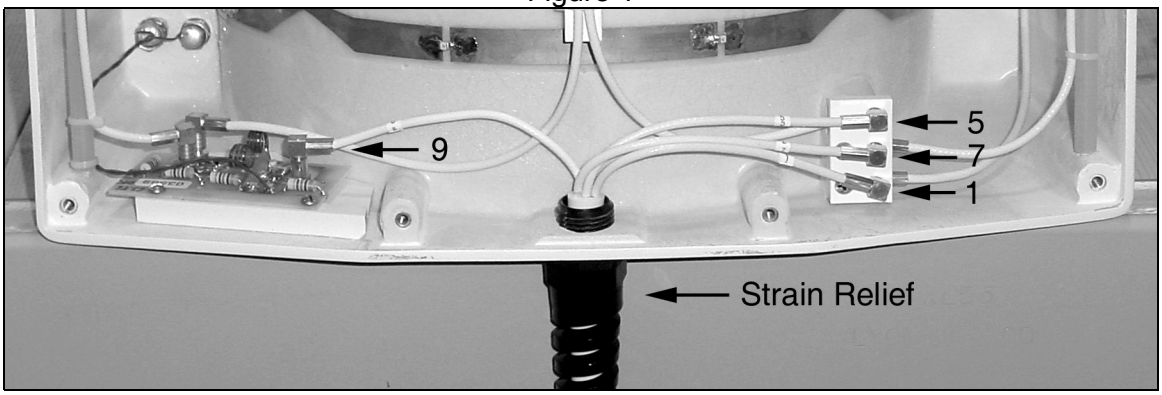
5-2 External Cable Replacement

To remove the external cable [for part number see Table 6-1 Field Replaceable Units]:

1. Remove the12 Phillips head screws located around the perimeter of the coil bottom. The coil bottom cover will now lift out of place.

2. Remove the bottom cover and place it in a safe location. Figure 1 is the bottom view of the coil with the cover removed.

Figure 1



Coil Bottom View with Cover Removed

The coil cable assembly contains 4 individual coaxial cables as seen in Figure 1. Each individual coaxial cable is tagged for identification [1,5,7,9].

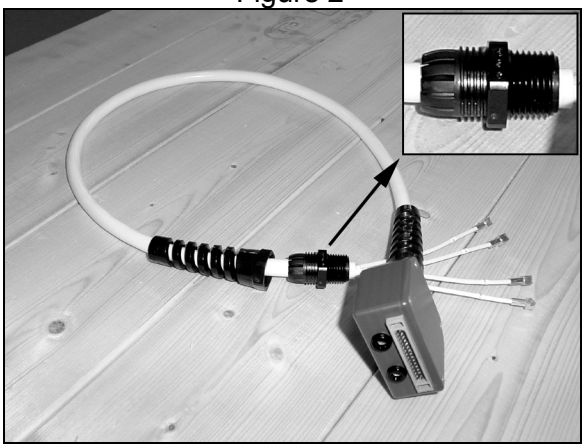
3. Disconnect each individual coaxial cable by pulling the connector out and away from the connector block or circuit board.

4. Group the individual coaxial cables and, using an adjustable open end wrench, loosen the strain relief plastic nut closest to the coil cover [counterclockwise] and remove the coil cable assembly.

Figure 2

The Coil Cable Assembly uses a threaded plastic piece [Figure 2 Inset] that attaches the cable assembly to the coil cover **and** tightens the strain relief around the cable assembly.

The threads on the right, and the plastic nut, attach the cable assembly to the cover. The threads on the left tighten the strain relief around the cable assembly when the strain relief nut is tightened.



Coil Cable Assembly

The steps for re-assembly using the replacement coil cable are as Follows:

1. One by one, thread the individual coaxial cables through the threaded hole in the coil cover.

2. Grouping the individual coaxial cables, screw the coil cable assembly plastic connector into the threaded hole in the coil cover. Snug the plastic nut down using an open end adjustable wrench.

3. Loosen the strain relief nut enough to allow the coil cable to rotate in the strain relief. Orient the coil cable such that, when the coil is laying with the bottom cover [and 12 screws] facing up, the system connector cover [and 4 screws] is also facing up. Snug down the strain relief nut using an open end adjustable wrench.

4. Connect the 4 individual coaxial cables using the cable tags and identifiers in Figure 1.

5. Using a Phillips head screw driver, replace the coil cover and 12 Philips head screws.

Verify coil operation according to Section 3-2, Coil Imaging Performance Verification.

5-3 Mechanical Hardware Replacement

Not Applicable

SECTION 6 – RENEWAL PARTS

6-1 Field Replaceable Units

1.5T FIELD REPLACEABLE UNITS LIST – TABLE 6-1-1

Description	GE Part #	MRIDC Part #
1.5T Coil with Cable	2293668-2	101413
1.5T Cable only	2225476-3	100014
Latches	2225476-6	900214
Phantom Positioner	2293668-7	101655

1.0T FIELD REPLACEABLE UNITS LIST – TABLE 6-1-2

Description	GE Part #	MRIDC Part #
1.0T Coil with Cable	2293669-2	101423
1.0T Cable only	2225477-3	100015
Latches	2225476-6	900214
Phantom Positioner	2293668-7	101655

6-2 Other Replaceable Accessories

OTHER REPLACEABLE ACCESSORIES LIST – TABLE 6-2

Description	GE Part #	MRIDC Part #
Wedge Pad	E8800NB	101407
Pad	E8800NC	101408

SECTION 7 – APPENDIX

7-1 SNR Data Sheet

Use the table provided below to record the calculated signal to noise ratio (SNR) data obtained from the Functional Checks section.

Date	Comments							
R1	R2	TG	Element	Signal Mean	Noise Std Dev	SNR	Spec Limit 1.5T	Spec Limit 1.0T
			0				140	82
			1				84	42
			2				62	37
			3				65	44

Date	Comments							
R1	R2	TG	Element	Signal Mean	Noise Std Dev	SNR	Spec Limit 1.5T	Spec Limit 1.0T
			0				140	82
			1				84	42
			2				62	37
			3				65	44

Date	Comments							
R1	R2	TG	Element	Signal Mean	Noise Std Dev	SNR	Spec Limit 1.5T	Spec Limit 1.0T
			0				140	82
			1				84	42
			2				62	37
			3				65	44

Date	Comments							
R1	R2	TG	Element	Signal Mean	Noise Std Dev	SNR	Spec Limit 1.5T	Spec Limit 1.0T
			0				140	82
			1				84	42
			2				62	37
			3				65	44

7-2 Schematic

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

7-3 Coil Configuration

Parameter	1.5T	1.5T	1.5T	1.0T	1.0T
Coil Name	NVHEAD	NVARRAY	NVFASTHD	NVHEAD	NVARRAY
Coil Type	3	3	3	3	3
Extremity Coil	no	no	no	no	no
Cable Loss	1.05	1.05	1.05	1.24	1.24
Coil Loss (BRM/CRM)	1.72/0.952	1.72/0.952	1.72/0.952	0.549	0.549
Recon Scale Factor	1	1	1	1	1
Linear vrs Quadrature	1	1	1	1	1
Multiple Receiver Coil?	Yes	yes	yes	yes	yes
Number of Receivers	1	4	1	1	4
Starting Receiver ID	0	0	0	0	0
Ending Receiver ID	0	3	0	0	3
Multi-Coil Port Enable	4	6	4	4	6
Multi-Coil Part Error Enable	4	6	4	4	6
Additional Transmit Attenuation	0	0	0	0	0
Number of Fast Receivers	1	0	1	0	0
Starting Fast Receiver ID	4	4	4	4	4
Ending Fast Receiver ID	4	4	4	4	4
Start TA Value	90	90	90	90	90
Start RG Value	12	12	12	12	12
Multi-Coil Recon Enable	0	0	0	0	0
Head Default Freq. Direction	1	1	1	1	1
SCIC Axial	0	0	0	0	0
SCIC Saggital	0	0	0	0	0
SCIC Coronal	0	0	0	0	0
Auto Shim Receiver	-1	-1	-1	-1	-1

REVISION HISTORY

Rev	Date	Author	Primary Reason for Change	DCN
01	03-15-01	L. Hyler	Initial Issue	0149
1A	10-08-01	L. Hyler	Add SNR Sections [Not for Distribution]	
1B	10-08-01	L. Hyler	Add MCAT Numbers	
1C	10-10-01	L. Hyler	Add Troubleshooting Tables & Final Part Numbers	
1D	10-24-01	L. Hyler	Change 1-2 Compatibility	