
MRI DEVICES CORPORATION

Technical Report

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TITLE: GE MEDICAL SYSTEMS SERVICE MANUAL – OEM VERSION –
PHASED ARRAY SHOULDER COIL, E8800M and E8800MA

REPORT #: TR0003S

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PARENT PART:

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SCOPE: This is a service manual for the Phased Array Shoulder Coils for 1.5T, E8800M, and 1.0T, E8800MA.

REVISION HISTORY

Rev Level	Date	Change Description	
A	11/2/98	First issue	
1	11/20/98	Workcenter Release	
1.1	4/30/99	Modification	

I. Scope

This is a service manual for the Phased Array Shoulder Coils for 1.5T and 1.0T.

II. Reference Documents

2202492GSP	GE Medical Systems Surface Coil ECAT Requirements Specification
2111842DRS	GE Medical Systems Design Requirements Specification for Surface Coils
TR0003B	MRIDC OEM Design Specification – GE PA and Quad Shoulder Coils
2124201-3	GE Service Documentation
2160623-3	GE Service Documentation

III. Products Included

<u>MRIDC No.</u>		<u>GE Part No.</u>
800012	1.5T Phased Array Shoulder Coil System	2225252
800013	1.0T Phased Array Shoulder Coil System	2225474

IV. Service Information

Theory of operation: (refer to block diagram)

The Phased Array Shoulder Coils consist of a pair of large and small coils. The both coils contain 4 elements. Two of the elements are loop coils and two of the elements are Helmholtz coils. Each element contains items 1, 2, and 3. 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 system preamplifier and item 2 to create the phased array decoupling required during receive.

Configuration file and setup/calibration information:

The configurations below are for programming soft keys for the *Array Shoulder Coil Set* on the plasma display console. The selection is 4SHOULDR.

1. If not already in C Shell window touch [UTILITIES] then [C Shell] at operator's console to open up a tty window.
2. **Touch the Touch Screen** in the window to get input control, then perform the following in the window.

Signa software of release 5.5 and newer supports the **AUTOSHIM** feature using a 4 channel coil by defaulting to the body coil for shimming. Once the operator has prescribed the proper offsets and FOV for the patient's shoulder, **AUTOSHIM** using the 4SHOULDR coil selection, and proceed with the scan.

Scanner and coil verification testing procedures:

Be sure that you choose the correct coil, and activate the desired coils from the menu selection on the surface coil screen. The coil chosen must be **4SHOULDR**.

Position the Array Coil at the head end of the patient cradle. Place the 16 cm diameter head phantom in the shoulder portion of the coil. Activate the 4SHOULDR coil from the soft key on your operator's console.

Scan using Auto Pre-scan. If Auto Pre-scan does not complete successfully, do not use the coil clinically. Upon completion of pre-scan, execute the scan. Window the scan as you normally would (window levels vary from system to system depending upon your hardware revision level). The scan should appear uniform.

If the image has signal voids, distortions, or black streaks, discontinue use of the coil. If the image is excessively noisy, repeat the scan using the **GE 5 inch general purpose coil for 1.5T or alternate coil for 1.0T** supplied with your system. If the 5 inch coil image or alternate coil image exhibits similar artifacts, the problem likely lies with the MRI system.

Scanner and digital multimeter diagnostic procedure:

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 four inputs. The positive lead should go to the signal pins, S3-S7, and the negative lead should go to any of the ground pins, GND. Reversing the leads should read an open circuit. If either reading is a short circuit, the diode or the cable is shorted and the coil must be replaced. If forwarding biasing the diode results in an open circuit, the diode or cable is open and the coil must be replaced. The scanner will typically detect open and shorted channels and display a scan error. The back to back passive diodes cannot be checked external to the coil.

List of applicable FRUs:

<u>MRIDC No.</u>		<u>GE Part No.</u>
100165 (QSC-200-4C)	Phased Array Large Shoulder, 1.5T	2225252-6
100164 (QSC-165-4C)	Phased Array Small Shoulder, 1.5T	2225252-7
100167 (QSC-200-4C-42)	Phased Array Large Shoulder, 1.0T	2225474-3
100166 (QSC-165-4C-42)	Phased Array Small Shoulder, 1.0T	2225474-2
100181	Baseplate	2225252-5
100180	Pad	E8800MD

Block Diagram:

