FIELD SERVICE PROCEDURE
POSTERIOR CERVICAL SURFACE COIL
M1085 AM

DOCUMENT # 87305-T-110

REV 0 NOVEMBER 7, 1988

SERVICE PROCEDURE FOR POSTERIOR CERVICAL COIL M1085 AM

1.0 Tools and Equipment

- Decoupling test phantom [P/N #46-287399P1].
- Battery-powered DVM. Beckwith 3030 or equivalent [P/N #46-194427P49].
- Vector impedance meter [P/N #46-255836P40].

2.0 Scanner Verification

2.1 Scanner head and body modes of operation must be separately verified prior to surface coil verification. Set up decoupling test phantom [P/N #46-287399P1] at magnet isocenter of head coil and then body coil using the following protocol with auto prescan. Align test phantom with its long axis transverse to the magnet axis. If auto prescan fails, attempt verification using manual prescan.

SCAN PRESCRIPTION

MAIN MENU [NEW STUDY]
PATIENT STUDY PARAMETERS
ID: TEST
Patient Weight: 10 lbs. Monitor SAR? N
[NEXT PAGE]

PATIENT POSITION
Patient Entry [Head First]
Patient Position [Supine]
Coil Type [Head Coil] or [Body Coil]
Axial/Sag. Landmark [Sternal Notch]
[NEXT PAGE]

IMAGING PARAMETERS
Image Mode [Multi Scan]
Scan Plane [Axial]
Pulse Sequence [Multi Echo]
Imaging Options [None]
Graphic Prescription [NO]
Enter PSD Filename:
[NEXT PAGE]

SCAN TIMING
Number of Echoes [1]
Echo Time (TE) [20 msec]
Rep Time (TR) [500 msec]
[NEXT PAGE]

SCANNING RANGE
Field of View [24 cm]
Scan Thickness [5 mm]
Scan Location: (S/I) SO
FOV Center: (R/L) RO (A/P) AO
[NEXT PAGE]

ACQUISITION TIME
Acq. Matrix [256 x 128]
Imaging Time [1 NEX 1:11]
Frequency Direction [R/L] (for Body Coil)
[A/P] (for Head Coil)
[NEXT PAGE]

REVIEW PAGE
[NEXT PAGE]

SCAN OPERATIONS

3.0 Surface Coil Verification

3.1 If the images obtained in 2.0 are acceptable, connect the surface coil BNC cable to quarter wave cable [P/N #46-251710G7] in RF Cable Kit [P/N #46-287402G1] and connect the free end to the head coil input BNC port. Set up the scanner with the following protocol and perform the scan using the decoupling test phantom [P/N #46-287399P1]. See Figure 1 for proper placement of decoupling phantom with respect to surface coil. Landmark along the transverse and longitudinal markers indicated on the coil.

3.2 If scan can be executed, inspect image at window width 350 and window level 1100. See Figure 3 for representation of a successful scan.

SCAN PRESCRIPTION	
MAIN MENU [NEW STUDY] PATIENT STUDY PARAMETERS ID: TEST Patient Weight: 10 lbs. Monitor SAR? N [NEXT PAGE] PATIENT POSITION Patient Entry [Head First] Patient Position [Supine] Coil Type [Surface Coil] Axial/Sag. Landmark [Sternal Notch] [NEXT PAGE] IMAGING PARAMETERS Image Mode [Multi Scan] Scan Plane [Axial] Pulse Sequence [Multi Echo] Imaging Options [None] Graphic Prescription [NO] Enter PSD Filename: [NEXT PAGE]	SCAN TIMING Number of Echoes [1] Echo Time (TE) [20 msec] Rep Time (TR) [500 msec] [NEXT PAGE] SCANNING RANGE Field of View [24 cm] Scan Thickness [5 mm] Scan Location: (S/I) SO FOV Center: (R/L) RO (A/P) AO [NEXT PAGE] ACQUISITION TIME Acq. Matrix [256 x 128] Imaging Time [1 NEX 1:11] Frequency Direction [R/L] (for Body Coil) [A/P] (for Head Coil) [NEXT PAGE] REVIEW PAGE [NEXT PAGE] SCAN OPERATIONS

3.3 If prescan ends abnormally, or the surface coil images show hot spots, light and dark bands, or gross distortion as shown in Figure 2, the transmit decoupling network is suspect. Follow procedure in Sec. 4 and 5 for repair.

3.4 If no image is obtained, suspect a broken cable, shorted PIN diode or failed component in the coil. Follow procedure in Sec. 4 and 5 for repair.

3.5 If the image is present, but appears excessively noisy, an intermittant connection, or a bad component in the tuning or matching network is suspected. Follow service procedure in Sec. 4 and 5 for repair or return to vendor for service/replacement. Defective coil return form *must* accompany all returned coils.

WARNING!

COIL WARRANTY IS VOIDED IF REPAIRS OTHER THAN CABLE, DIODE, OR BNC CONNECTION REPLACEMENT IS MADE.

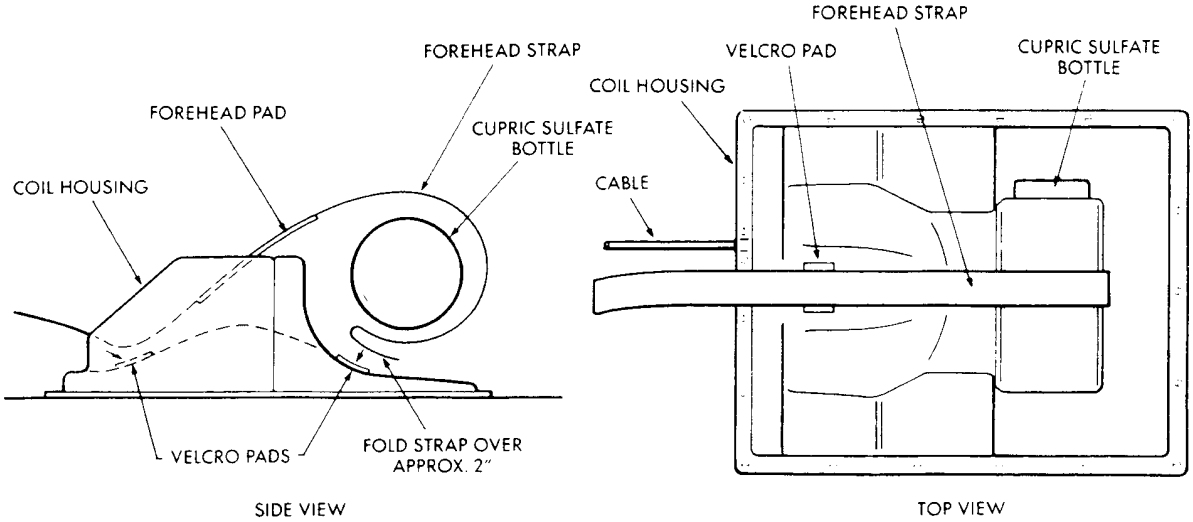

FIGURE 1—DECOUPLING PHANTOM POSITIONING

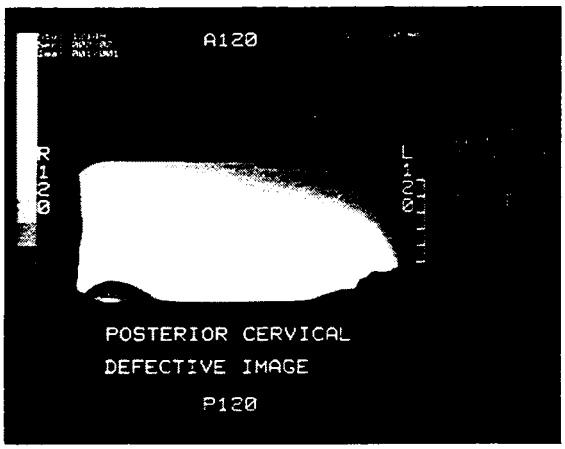

FIGURE 2—UNSUCCESSFUL DECOUPLING

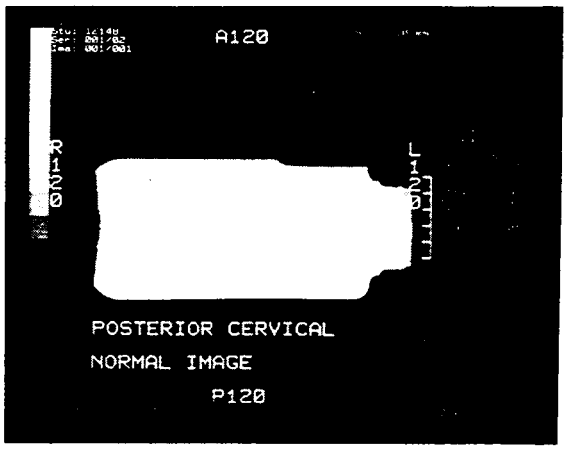

FIGURE 3—SUCCESSFUL DECOUPLING

4.0 Troubleshooting Procedures

4.1 Measure coil impedance at the BNC cable connector with a vector impedance meter. The coil measurements should be made away from any magnetic fields with the coil placed on a human subject to ensure that it is properly loaded. Impedance should measure 40 to 60 ohms with phase angle of −10 to +10 degrees. The coil can be tested in free space by measuring with a VIM at the cable and suspending coil at arm's length by the velcro head or chin straps. The impedance magnitude should be 3 to 7 ohms, and the phase angle should be +5 to +25 degrees if the coil is working properly.

4.2 Gently tap the coil at various locations while measuring input impedance at the BNC connector. No intermittent operation should be observed.

4.3 Measure across the BNC connector with a battery powered DVM (Beckman 3030 or equivalent) so that the positive lead is applied to the center conductor and the negative lead to the shield. Put the meter in diode test mode. If the PIN diode is functioning in circuit, the meter will read about 0.5 volts. If the diode is shorted, the meter will read 0 volts. An open diode will read over-range. Reverse DVM leads to coil and check diode reverse bias condition. A good pin diode should reflect meter over range readings. Follow procedure Sec. 5.3 for replacement of the diode.

4.4 Inspect the cable for signs of damage. If insulation is cut or cable is damaged in any way it should be replaced per procedure in Sec. 5. Inspect BNC connector for signs of damage. If damaged or suspected of intermittent connection it should be replaced. Follow procedure Sec. 5.4 for replacement of the BNC connector.

5.0 Service Procedures

5.1 Service Kit Contents

Replacement Cable Kit P/N #46-287402G1	Consisting of:
• Cable/PCB assembly	P/N #46-287931P1
• Nylon 1/4" flathead screws (5)	P/N #46-287931P2

5.2 Replacement of Cable/PCB Assembly

- Remove the nylon screws from the bottom perimeter of the coil (Fig. 5).
- Remove the bottom cover plate assembly from the coil.
- Remove the 3 hex nuts from the cable/PCB assembly.
- Use a sharp knife or pick to scrape away the conformal coating from the two soldered connection tabs which join the cable/PCB assembly to the decoupling board.
- Apply a 25 Watt soldering iron to the tabs. The conformal coating will recede and start to flake. Clean off this residue.
- Hold the coil on its side such that the cable/PCB assembly is below the decoupling board. Apply a 25 Watt soldering iron to the connecting tabs and remove the solder while prying up the tabs with a pick. Take care not to melt the solder around adjacent components on the decoupling board or burn the coil housing.
- Lift off the cable/PCB assembly.
- Prepare the new cable/PCB assembly by pretinning the connection tabs.
- Place the cable/PCB assembly on the screw posts. Replace the hex nuts, leave loose, do not tighten.
- Solder the tabs and tighten the hex nuts. Remove any eccess flux by scrapping. DO NOT USE SOLVENTS.
- Install the bottom cover plate assembly and gasket. The cover should fit securely. Do not over tighten the nylon screws.
- Cut excess nylon screw length flush with cover plate. (Use wire snips or equivalent.)
- Test the coil per section 3 and section 4.

5.3 Replacement of PIN-diode

- Obtain replacement UM9415 pin diode P/N #46-221735P1.
- Remove the bottom cover plate assembly.
- With a sharp knife or pick, cut away the conformal coating around the diode body.
- Carefully desolder the diode leads, avoiding overheating of adjacent components. (Use 25 Watt iron)
- When the diode is removed, clean the pads of conformal coat by scrapping and retin. DO NOT USE SOLVENTS.
- Prepare the replacement 9415 PIN-diode by pretinning and cutting the leads.
- Position the diode in the cut out slot. Refer to Figure 5 for proper orientation of the anode.
- Apply enough solder to wick around the leads.
- Install the plate assembly and gasket cover. The cover should fit securely. Do not over tighten the nylon screws.
- Test the coil per Section 3 and Section 4.

5.4 BNC Connector Placement

- Obtain replacement BNC connector P/N #46-271494P1.
- Cut off defective BNC connector leaving sufficient cable length for proper coil operation. Multiple connector replacement can be performed as long as sufficient cable length for proper coil operation is maintained.
- Prepare cable for BNC connector by stripping adequate amount of insulation from outer shield and center conductor. See Figure 4.
- Crimp BNC connector in place using 46-255841 crimp tool and 46-255841 P100 insert.
- Test coil per Section 3 and 4.

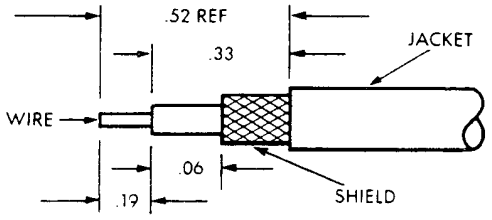

FIGURE 4

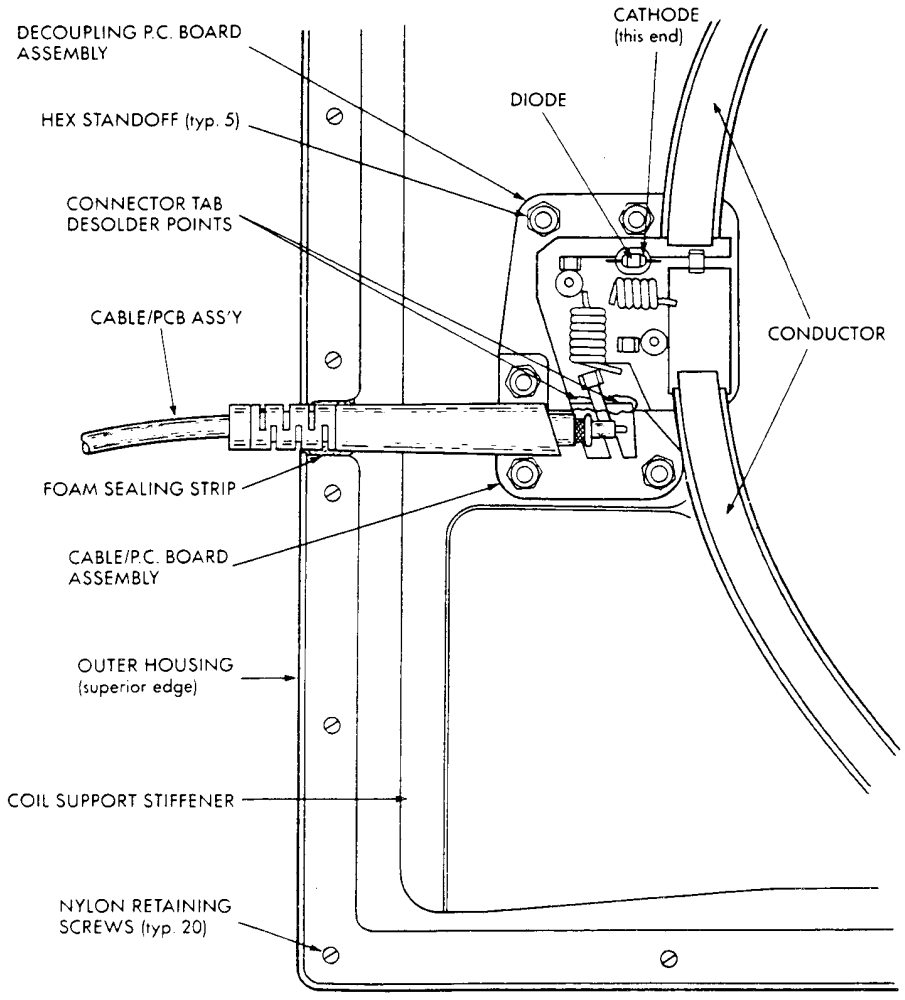

FIGURE 5—COIL PARTIAL BOTTOM INTERNAL VIEW
(Bottom cover removed)

DEFECTIVE COIL RETURN FORM

NOTE To allow for proper assessment of defective returned coils, this form must be completely filled out and accompany all returned coils. Include films or prints of any image quality related complaints with a description of scan protocol used.

Date_____

Site Name_____

Site Address_____

Service Engineer_____

Coil Serial Number_____

Date Coil Installed_____

Description of Coil Problem_____

_____

_____

_____

ELECTRICAL CHECKS

Vector Meter Checks—Coil Loaded With Human Subject In Free Space
Magnitude
Phase

Vector Meter Checks—Coil Unloaded In Free Space
Magnitude
Phase

Pin Diode Test
Diode Drop Forward Bias
Diode Drop Reverse Bias