



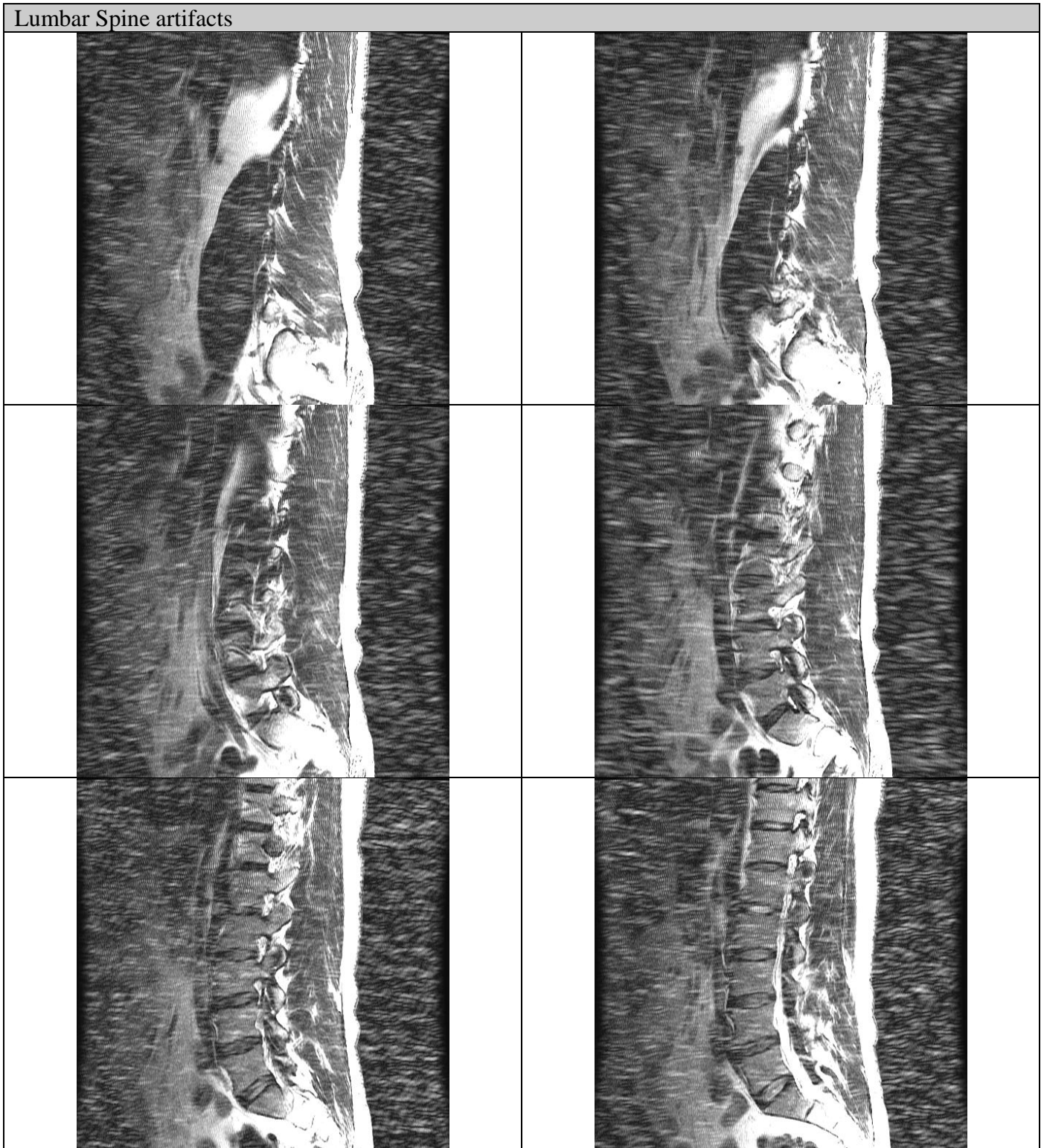
United Medical Maintenance Services

Engineering Publications

GE MRi artifacts involving SRI

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This article involves an artifact that took several attempts of testing and isolating before it was found. See photos below.



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Symptoms of the problem:

- Artifact shows up only on body and all phased array coils using FSE T2, FSE PD, STIR, FLAIR, and Localizer protocols.
- Knees, Extremity and Head coil studies are free of the artifacts.
- SNR for the head, body and phased array pass with no artifacts seen in the image.
- TNS counter logging over 400,000 hits in a one week period.
- SRI display erratic during Body and Phased array studies.

I would like to expand upon the SRI problem that was parallel to the artifact problems but started before the artifact problems. During a prescan or scan, after land marking the patient and the table at the 0 position, the SRI during each pulse of the system would intermittently jump around. To explain further, it would jump from 0 to the end of table or home position value. Sometimes it would stay at that this value or it would revert back to 0.

Due to the jumping around of the table counters the table could not find its home position when the HOME button was pressed at the magnet controls. Also at times the table lost its docking position when the table was lowered.

In the mits of T/S, I discovered that when RF was turned off, the SRI would function fine. Ran dozens of scans to prove this. But as soon as RF was enabled, the SRI display would go out to lunch. Also observed that the TNS counter would do the same. Depending on the phased array or body protocol and its timing on the receiver would determine the number hits it was seeing. Also found in T/S that at the TNS inputs for body, head and phased, only the head and body inputs showed the hits of interference during a phased array study.

NOTE – Head, extremities and knee coils studies with RF on would not interfere with the SRI

This was unusual due to the body receiver in not used on phased array but was sending hits to the TNS counter. There had to be something in common between the artifacts and the SRI malfunction. I then resorted to the schematic of the SRI control system. Refer to figure 1 and technical publication GE MRI Transmit Receive paths on this web site.

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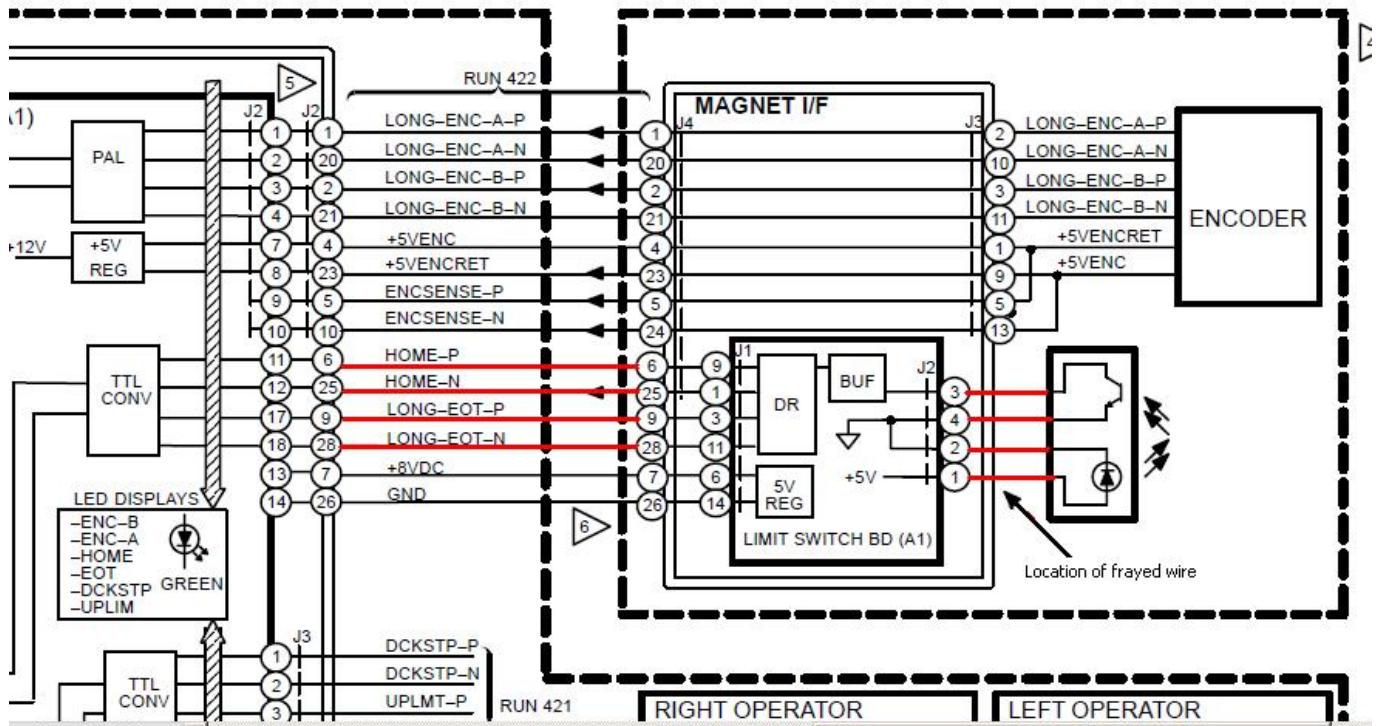


Figure 1

In figure, I discovered that 4 signals are derived from the sensor switch located in the rear pedestal of the table.

- Home – P
- Home - N
- Long-EOT-P
- Long-EOT-N

The **(Home)** signal is simple and self explanatory. It flags the SRI when the table is at the physical Home position clearing SRI table counter to 0. The **(Long-EOT)** or otherwise known as Longitudinal End of Table, tells the SRI that it is at the end of table travel. Since, discovered during T/S, the SRI counter went to a random value. This correlated to the exact distance of table travel to the end of the table. Now given the SRI was replaced and several other components lead us closer to solving the problem. The magnet IF and optical sensor was examined and found a fray wire on the +5 feed to the optical sensor. This with the interaction of the RF power output was the culprit to both the artifacts and the SRI erratic behavior.

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