

Development of RF Preamplifiers and RF Coils for High Field MRI

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High Field MRI Technology

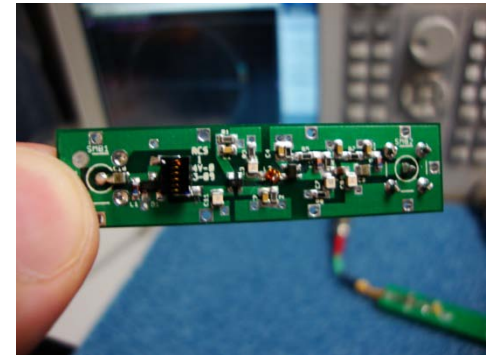
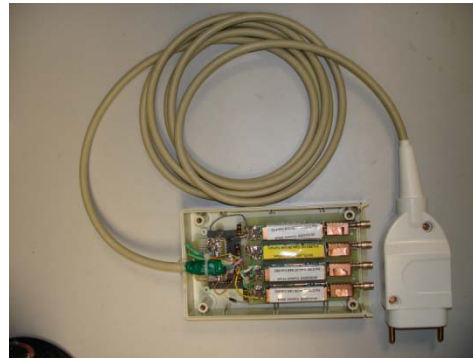
- ❖ MRI is a major technology in biomedical research and clinical practice.
- ❖ Novel technology: higher magnetic fields
 - ❖ 7T-11.7T for animal and human systems
 - ❖ 7-17T for animal systems
- ❖ High magnetic fields
 - ❖ demand high performance receivers and present specific challenges
 - ❖ unmet by industry, to date
- ❖ Development of building blocks for MRI signal detection
 - ❖ Low-impedance, low-noise preamplifiers at 7T (300MHz) and 11.7T (500Mhz)
 - ❖ Receive-only RF Coils with Phased-Array technology



Current Stage of Product Development

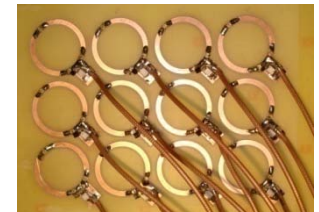
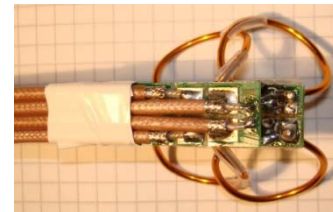
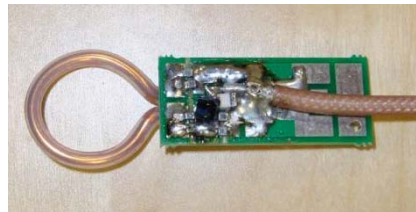
⊕ Preamplifiers

- ⊞ Designs developed and tested at 300MHz and 500 MHz
 - Modular Design
 - Compatible with Multiple Interfaces: SIEMENS, GE, BRUKER, VARIAN, etc.
- ⊞ Typical characteristics:
 - Input Impedance < 1 Ohm
 - Gain 28-30 dB
 - Output Impedance 50 Ohm



⊕ RF Coils

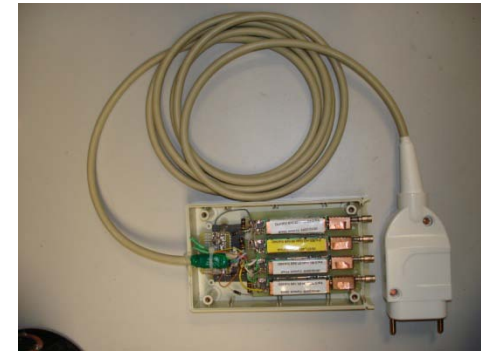
- ⊞ Several Designs Available for Animal and Human Applications
- ⊞ Single Coil
- ⊞ Phased-Arrays



Advantages and Opportunities

Unique Advantages

- ❖ Modular design supports different architectures/vendors
- ❖ Optimized electronic characteristics
- ❖ Improved image quality and sensitivity



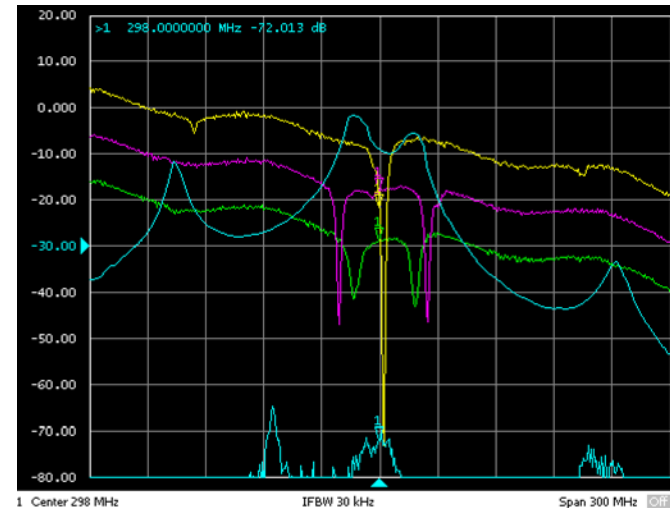
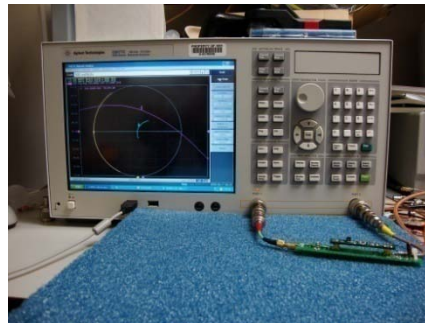
Market Opportunities

- ❖ Applications in both animal and human MRI
- ❖ Opportunities in both clinical and research fields
- ❖ Devices not currently commercially available
 - Low impedance, low-noise amplifiers are not commercially available at frequencies ≥ 300 MHz

Collaboration and Licensing Opportunities

Collaboration:

- ❖ Improvement of the circuitry and layout of the preamplifiers
- ❖ Access to scientific expertise and NIH resources
 - Tested and proven prototype
 - NINDS can assist with commercial development



Licensing:

- ❖ RF coils: design patents available
- ❖ Preamplifiers: NIH design available
- ❖ Advantage - Minimal development to market needed

Contact Information

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