

Functional Decomposition

Team 314: Abbott Reusable RF Probes

Explanation of Results

To understand precisely what was needed to redesign the reusable RF probe, a functional decomposition was performed to break down the desired function and design of the final product. After talking with the sponsor for this project, Abbott, we laid out the different requirements for our design and precisely what was needed to fulfill these design requirements. The outcome of this process is laid out below.

The components of our functional decomposition were gathered through research and discussion. At the time of writing, Abbott has not released any schematics to the team regarding their current RF probe design, so other probes were researched and analyzed to understand how the probe would be utilized for Abbott's designated purpose.

Action and Outcome

Our data was generated by research and discussion. Once we asked questions to the sponsor to clarify what is expected of us, research was done on how reusable RF probes currently work, including pictures of what the tools and equipment look like in use. A discussion was held amongst the team to confirm understanding of the RF ablation process. Once we understood how the process works and had an understanding of the components and the roles that they play in this procedure, we were able to look at the probe from its most complete level and break it down to its most basic level. We discussed each component's functions that make up the probe, the shaft, and the hub.

We decided to use an FD flowchart (see figure 1) to illustrate how the RF probe breaks down into its two main components and how those components work with other parts of the RF ablation process to reach the end goal of treating nerve pain. We put together an FD cross-reference table (see table 1) to illustrate the functions of the RF probe when it is in use and what outcomes those functions impact.

Overall, we concluded that the RF probe has the hub and the shaft as its interior components. The hub's purpose is to transmit RF signal and voltage, while the shaft is tasked with converting the RF signal into thermal energy and reading the temperature at the ablation site. The hub effectively works as an adapter for the shaft, and both of these components work towards the goal of heating the tissue of the affected area as well as to measure the temperature at the site.

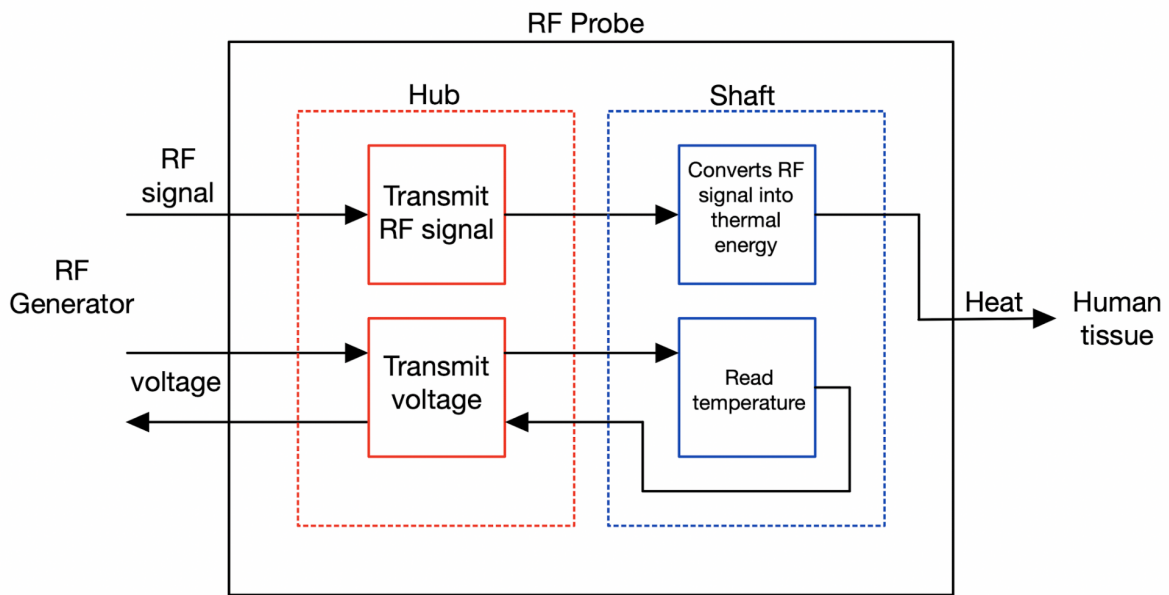


Figure 1. Functional Decomposition RF Probe Flow Chart

Table 1. Functional Decomposition Cross Reference Table

Functional Decomposition Cross Reference Table		
	Measure Temperature	Heat Tissue
Transmit RF signal		X
Transmit Voltage	X	
Converts RF signal into thermal energy		X
Read temperature	X	