University of Rochester Ring Transducer System

Ring Transducer System Photograph and Diagram. The ring transducer contains 2048 elements with a center frequency of 2.4 MHz and a -6 dB bandwidth of 70% (1.5-3.2 MHz). The element spacing is 0.23 mm or 0.37\,\textmu\text{m} at 2.4 MHz. The -6 dB beamwidth at the focus in the elevation direction is 1.8 mm with a depth of field, defined as $4f/\#^2$, of 22 mm. A mask may be used to obtain a 60 mm depth of field with some sacrifice of beamwidth in elevation. A multiplexer (Mux) provides access to any contiguous 128 elements in the 2048 element ring for transmission and also provides access to any contiguous 16 elements for simultaneous reception. The transmit electronics (T) have independently programmable waveforms on each of the 128 channels. The receive electronics (R) have independently programmable time varied gain functions on each channel and each channel includes a 20 MHz, 12-bit A/D converter. The control electronics (Control) provide convenient access to the multiplexer, transmit electronics, and receive electronics through an IBM-compatible personal computer with a Pentium Pro processor and 22 gigabytes of disk storage. The electronics permit synthesis of an aperture of up to 2048 elements in sets of up to 128 elements for transmission and a receive aperture of up to 2048 elements in groups of up to 16 elements.