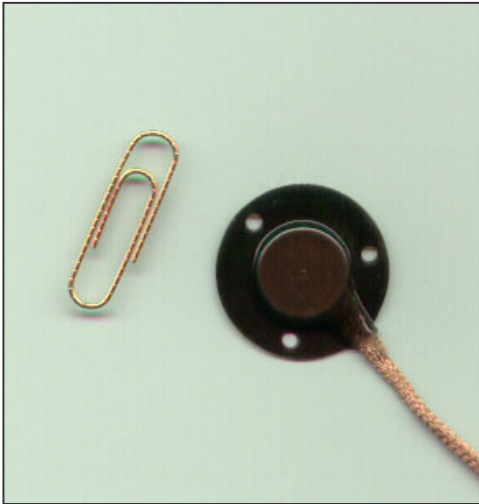


R-2 Rototactor



The R-2 Rototactor is a sub-miniature vibrotactile transducer for tactile displays. A tactile display consists of an array of vibrators (often called “tactors”) applied to the user’s skin. By controlling the timing, frequency, and intensity of these tactors, information is transmitted to the user through his body’s sense of touch. For some applications a single tactor may be useful, such as for an alarm. But for other applications, the user is fitted with an extensive array. For example, current prototype displays for fighter pilots transmit flight information through 96 tactors dispersed over the torso and upper limbs.

Tactile displays are a cutting edge technology for improving the man-machine interface. Tactile displays are intrusive on the user’s consciousness, yet they can remain stealthy to outside observers. They can convey both directional and quantitative information. They are becoming important in enhancing situation awareness for flight crew and other vehicle operators. They will be used in linking dismantled infantry to GPS-based navigation systems.

Tiny size and weight make the Rototactor easily to integrate into clothing, straps or bands, or adhesive patches. It may be operated in any orientation. The outer flange is flexible, to provide a comfortable means of stitching the R-2 into clothing. The R-2 Rototactor is not easily damaged. The tactile signal strength is excellent, and the operating frequency is half that of the R-1 Rototactor, providing a different feel. The R-2 is

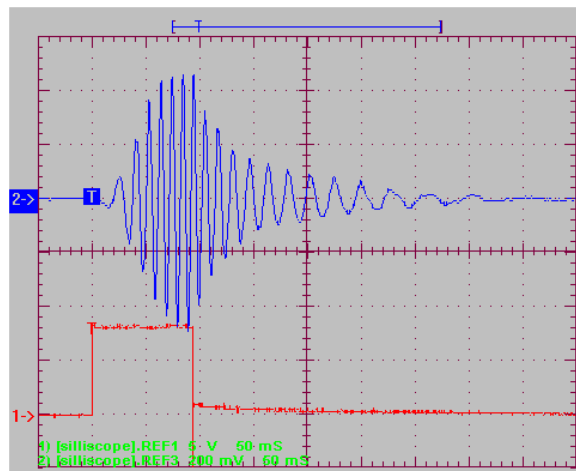
electrically driven. Voltage and current requirements are minimal, and the R-2 is electrically shielded, so it should be considered for both vehicular and portable applications.

Driver circuits are available for your computer interface. Steadfast also has circuits for addressable two-dimensional arrays, to reduce the number of leads required for larger tactile displays.

Specifications

Diameter	
-of flexible flange	27mm (1.1”)
-of rigid core	14.7 mm (0.6”)
Thickness	4.7 mm (0.2”)
Weight	2.7 grams
Operating Voltage	10 Volts DC nominal
Operating Current	80 mA
Vibrating Frequency	100 Hz
Tactile Wave Form	Sinusoidal and in plane of skin
Duty Cycle	20% max.

Performance



The oscilloscope plot above shows the R-2 Rototactor responding to a 92 ms, 8 volt pulse, i.e. the red line. The blue line shows the pressure wave generated by the Rototactor in a standard skin and flesh simulator. Note the 50 ms time to reach full output, the 200 ms signal decay time, and the sinusoidal tactile signal waveform. Also note the 100 Hz vibration frequency.

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