

TactoFlex 2×2 | Data Sheet

4 element three-axial force sensing array

Version 5.0.

General Description

TactoFlex 2×2 is a small three-axial sensor array on a flexible support, designed for finger-mounted applications. TactoFlex 2×2 provides reliable 6 DOF data from the contact between an arbitrary object and one's fingertip. Due to its small size and comfortable fit this prototype can be useful in medical applications, particularly in tele-surgery, or for educational purposes in physical diagnostics, but could also be used in e.g. virtual reality applications in the gaming industry.



Product Highlights

- three-axial force sensing in an array
- highly linear characteristics
- high sensitivity
- flexible layout
- designed ergonomically for finger-mounted applications
- easy connection to PC through read-out electronics
- easy-to-use software for acquiring, visualizing and storing data



Applications

- finger-mounted applications
- medical applications
- tele-surgery
- physical diagnostics
- virtual-reality
- friction estimation
- texture classification



Technical Specifications *

GENERAL	
technology	piezoresistive
measured quantity	three-axial force
number of taxels**	4 (2x2)
PCB type	flexible, designed for finger-mounted applications
DIMENSIONS	
bare taxel size	0.3x0.3 mm
taxel spacing	1.5 mm
size of total active area	3x3 mm
size of device	flexible layout, 1x60x80 mm when flat
SENSOR-ELEMENT CHARACTERISTICS	
bare sensor maximum load	3 mN
bare sensor sensitivity	4–6 mV/mN/V
maximum load with cover	<i>normal</i> : ±0.64 N; <i>shear</i> : ±0.25 N; (general load range is comparable to the one of light dexterous manipulation)
resolution	± 10 bit SNR
nonlinearity	±1%
accuracy	±5%
repeatability	±3%
long term instability under large load	approx. 1 bit lapse / min.
temperature dependence of offset	approx. 1 bit / °C
COVER	
cover type	elastic (Elastosil® RT–601)
Shore-A hardness of the cover	45

* parameters are measured on 16 bit output through MasterBoard 5.0D
 ** tactile pixel or tactile element



equivalent Young-modulus of elastic cover	2.4 MPa
cover thickness	0.5 mm (costumizable)
cover surface	hemispherical
receptive field size of taxels with elastic cover	0.8x0.8 mm
cross-sensitivity of neighboring taxels, resulting from the receptive field properties of the cover	<i>shear x: x neighbor 20%</i> <i>shear y: y neighbor 20%</i> <i>normal: x and y neighbors 30%</i>
viscoelasticity of the cover	<i>normal: exp. decay in <2 min.</i> <i>shear: none</i>
OUTPUT	
read-out electronics	Tactologic MasterBoard v5.0
output type	3-channel tactile image of 2x2 taxels
output resolution	8, 12 or 16 bit, depending on MasterBoard type
output noise	< 1 LSB
output scan rate	0–80 FPS
POWER	
voltage supply	USB powered through MasterBoard
current consumption	16 ± 5 mA sensor, 0-20 mA MUX
maximum power consumption	200 mW
SYSTEM LEVEL FEATURES	
connector type	USB, SPI, UART
read-out software	TactoSofT 2.2.
operating system	Windows XP, Vista
Minimal PC requirements	800 MHz processor, 40 MB hard disk space, 256 MB memory
MISCELLANEOUS	
warm-up time	2 minutes
operating temperature range	5 °C to 40 °C

Revision History

Version	Date	Comments, changes
1.0	2008.01.10.	First commercial version
1.1	2008.04.18.	Small updates in text, new images, more tech. spec.
1.2	2009.02.23.	Small changes, some parameters enhanced
5.0	2009.09.15.	– New sensor design with enhanced performance – Many parameters updated for use with MasterBoard v5.0

To Our Valued Customers

It is our intention to provide our valued customers with the best documentation possible to ensure successful use of your **Tactologic** tactile array. To this end, we will continue to improve our publications to better suit your needs. Our publications will be refined and enhanced as new volumes and updates are introduced.

If you have any questions or comments regarding this publication, please contact our company at info@tactologic.com. We welcome and appreciate your feedback!

Tactologic engineers are constantly working to improve the quality of our products. Specifications are therefore subject to change without notice. To obtain the most up-to-date version of this data sheet, please visit our website at <http://www.tactologic.com>. You can determine the version of this document from the heading on the first page.

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