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Key Solutions in Electronics

LP4966

FSR Matrix Sensor 16 x 16

Description :

FSR MATRIX 16 × 16 is a high-performance force-sensitive resistor matrix control system designed for real-time pressure acquisition, processing, and visualization.

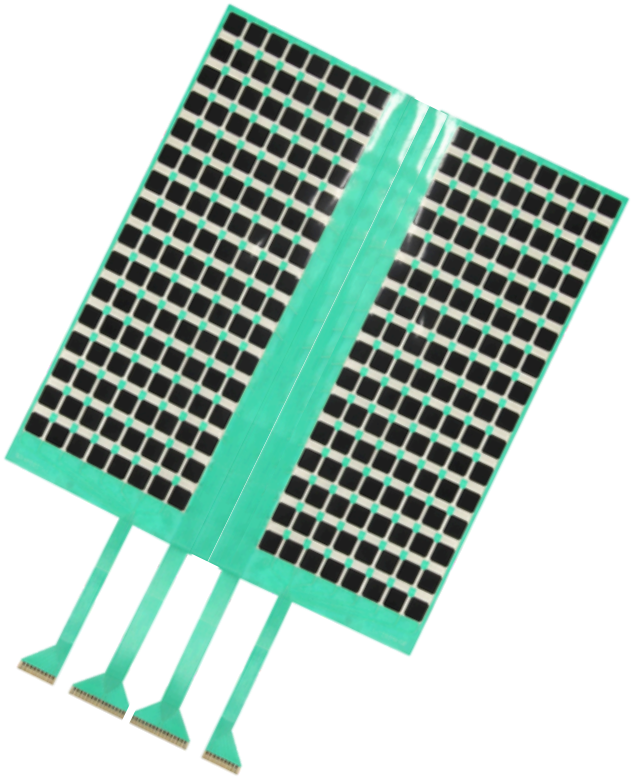
The system integrates an 16 × 16 FSR sensing grid (256 sensing nodes) with a dedicated embedded controller. It captures multi-point pressure data and converts analog resistive variations into stable digital output for analysis and reporting.

Built on a flexible PET substrate, the matrix provides fast response, wide force detection capability, and reliable long-term operation under repeated mechanical loading.

The integrated controller performs matrix scanning, signal conditioning, and digital filtering to ensure accurate and repeatable pressure measurement.

Key Features

- 16 × 16 FSR matrix configuration
- 256 independent sensing nodes
- Embedded matrix controller
- 12-bit ADC resolution (1–4095 levels)
- Real-time frame acquisition
- Live pressure heatmap visualization
- Integrated digital filtering
- Raw frame data logging
- Automated PDF report generation
- Single USB cable for power & communication
- Ultra-thin flexible matrix (0.5 mm)
- IP67 rated sensing surface
- >1 million actuation cycles



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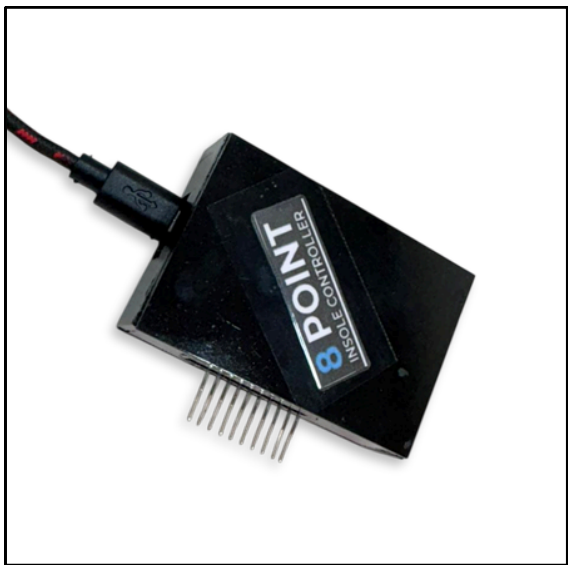
System Diagram



System Architecture

The system uses a row–column scanning architecture to sequentially acquire pressure data from all 256 sensing nodes.

The embedded controller performs:

- Matrix multiplexing
- Analog signal conditioning
- 12-bit ADC conversion
- Digital filtering
- Structured frame generation

Processed pressure frames are transmitted in real time to the desktop application via USB interface, where dynamic pressure distribution is displayed as a heatmap and stored for further analysis.

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Technical Specifications

Controller Specifications

Parameter	Specification
Controller Type	Custom Embedded FSR Matrix Controller
Matrix Size Supported	16 × 16
Total Sensing Channels	256 Nodes
ADC Resolution	12-bit
ADC Range	1 – 4,095
Data Acquisition	Row–Column Scanning
Frame Transmission	Real-time via USB
Signal Processing	Integrated Digital Filtering
Output Interface	Desktop Application
Data Logging	Raw Frame Storage + PDF Export
Power Requirement	5 V DC (via USB)
Communication	USB / Virtual COM

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FSR Matrix Sensor 8 x 16

Technical Specifications

FSR Matrix Specifications

Parameter	Specification
Sensor Type	Force-Sensitive Resistor (FSR) Matrix
Matrix Configuration	16 × 16 Grid
Total Active Sensing Points	256
Sensing Area (Single Sensor)	6 mm Diameter
Response Time	< 1 ms
Pressure Range	0 – 5 kg/cm² (0–71 PSI)
Resistance Range	0.98 – 1.2 MΩ
Conductive Material	Silver & Carbon
Substrate Material	Polyester (PET)
Dimensions	420 mm × 130 mm
Thickness	0.5 mm
Accuracy	±5%
Durability	>1 Million Cycles
IP Rating	IP67
Connector	2-Pin Male
Pin Spacing	2.5 mm
Country of Origin	India

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FSR Matrix Sensor 16 x 16

System Components

1. Controller

The embedded controller serves as the central processing unit of the system. It performs row–column scanning of both 16×16 matrices, executes signal conditioning and digital filtering, and transmits structured digital pressure frames to the desktop application in real time.

2. FSR Matrix

Two flexible 16×16 force-sensitive resistor matrices (256 sensing nodes each) capture independent spatial pressure distribution zones, enabling synchronized multi-area pressure analysis.

3. Power Supply

A single USB cable provides both 5 V DC power supply and real-time data communication between the controller and the desktop system.

Applications

- Industrial Surface Pressure Mapping
- Load Distribution Analysis
- Packaging & Cushioning Validation
- Lamination & Pressing Uniformity Testing
- Smart Floor & Presence Detection Systems
- Interactive Pressure-Sensitive Platforms
- Product Compression Testing
- Material Characterization & R&D