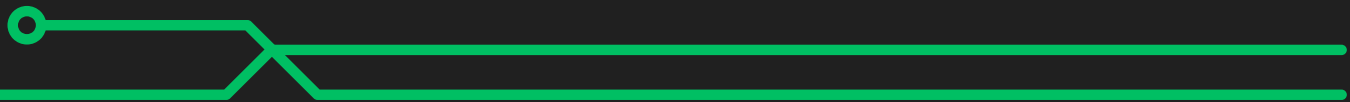


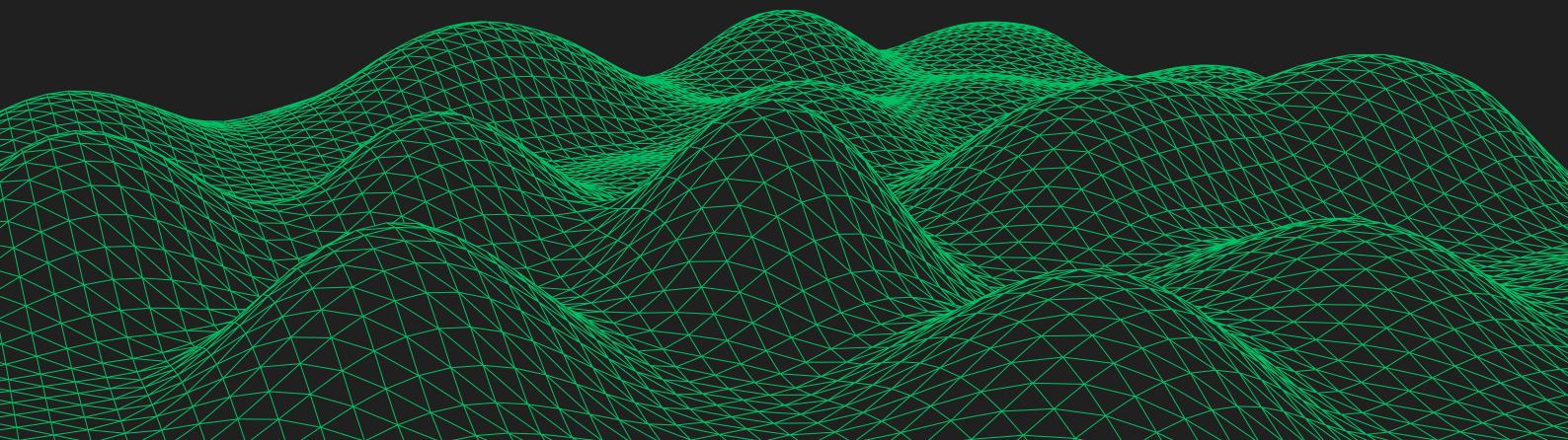


EMI DETECTOR | STATIC FIELD | GROUNDING



THE COMPLETE ESD MONITORING SYSTEM

DESIGNED AND DEVELOPED BY:



ABOUT BONZER GROUP PTE LTD

At Bonzer Group, we are a trusted engineering solutions provider, delivering high-precision manufacturing, automation, and monitoring systems across multiple industries. Our expertise spans fixtures, toolings, semi-automated machinery, and electronic component repair, allowing us to develop tailored solutions for the semiconductor, aerospace, electronics, and advanced manufacturing sectors.

With years of experience in designing, fabricating, and implementing custom-engineered solutions, we have successfully built automation systems, precision machining components, and real-time monitoring technologies that enhance operational efficiency and reliability. From high-tech semiconductor production lines to aerospace maintenance facilities, our solutions are built to meet the most demanding industrial requirements.

A prime example of our innovation is ESDNova, a groundbreaking all-in-one ESD monitoring system that measures three critical electrostatic discharge parameters simultaneously - a first in the industry. With AI-driven analytics, ESDNova enables real-time detection, prevention, and compliance with ESD control standards, making it an essential solution for semiconductor manufacturers and high-tech production environments.

Beyond ESD monitoring, we specialize in cloud-based and local control solutions, real-time data monitoring systems, and custom-built precision equipment for industrial automation. Whether it's ensuring quality control in semiconductor fabrication or optimizing machine performance in high-tech industries, we provide robust, scalable solutions that drive efficiency and reliability.

At Bonzer Group, quality and innovation are at the core of everything we do. We are ISO 9001:2015 certified, ensuring that our engineering processes meet the highest industry standards. Our mission is to help businesses enhance productivity, reduce risks, and optimize operations through cutting-edge engineering and technology.

Let us help you build the future of precision engineering.

Website: www.bonzer.com.sg

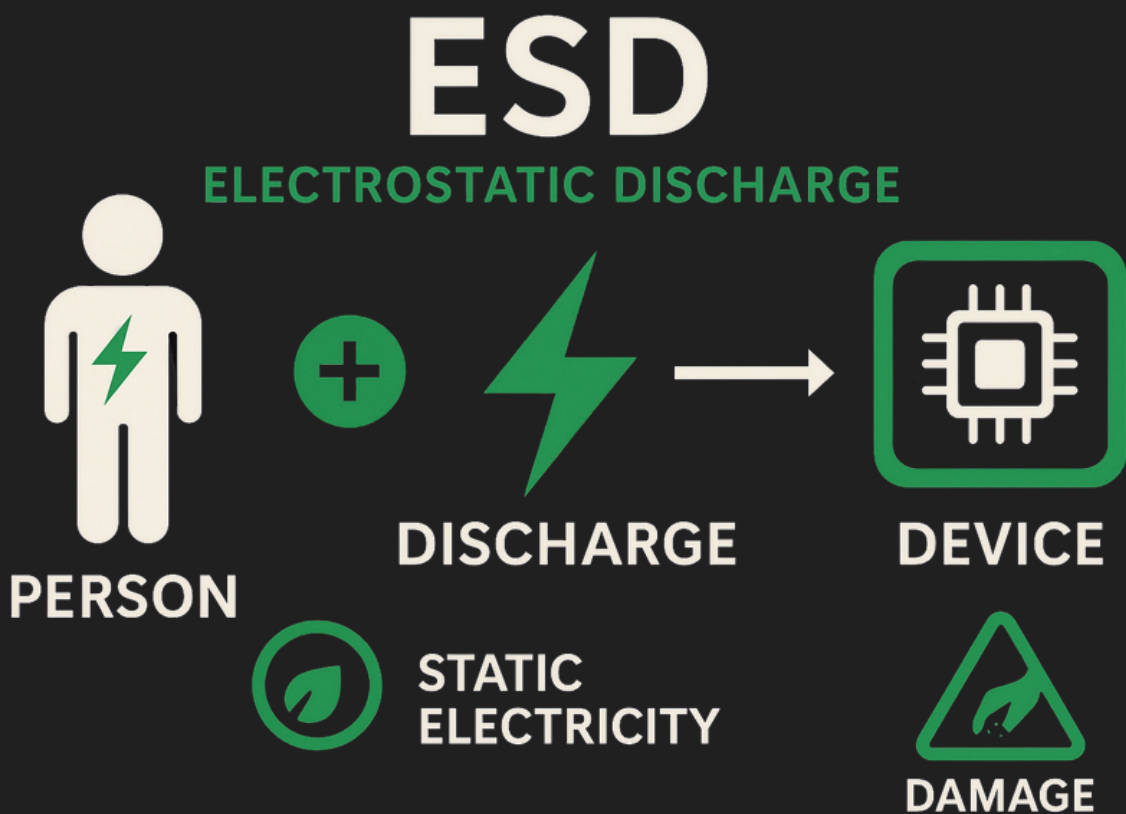
Email: contact@bonzer.com.sg



1. UNDERSTANDING ESD (ELECTROSTATIC DISCHARGE)

What is ESD?

ESD stands for Electrostatic Discharge, a phenomenon where a sudden flow of electricity occurs between two electrically charged objects. This discharge can happen due to contact, an electrical short, or dielectric breakdown, and it often results from the buildup of static electricity.



WHY IS ESD A PROBLEM?

Damage to Sensitive Components:

- Modern electronics, especially semiconductors, are highly sensitive to electrical surges caused by ESD.
- ESD can cause immediate catastrophic failure or latent defects, significantly reducing product reliability.

Manufacturing Disruptions:

- ESD events can lead to unexpected production stoppages, increased rework, and higher defect rates.

Financial Losses:

- ESD-related damages cost the semiconductor industry over **\$5 billion** annually, with cascading effects across the electronics sector exceeding **\$30 billion**.

The Need for Control

- As semiconductor geometries shrink, devices become even more vulnerable to ESD damage.
- Regulatory standards like ANSI/ESD S20.20 mandate robust ESD controls to protect high-value products and maintain operational efficiency.

WHY ESD IS A PROBLEM



Due to product failure, the semiconductor industry loses billions of dollars in revenue each year.

2. WHY ESDNOVA IS REVOLUTIONARY

What is ESDNova?

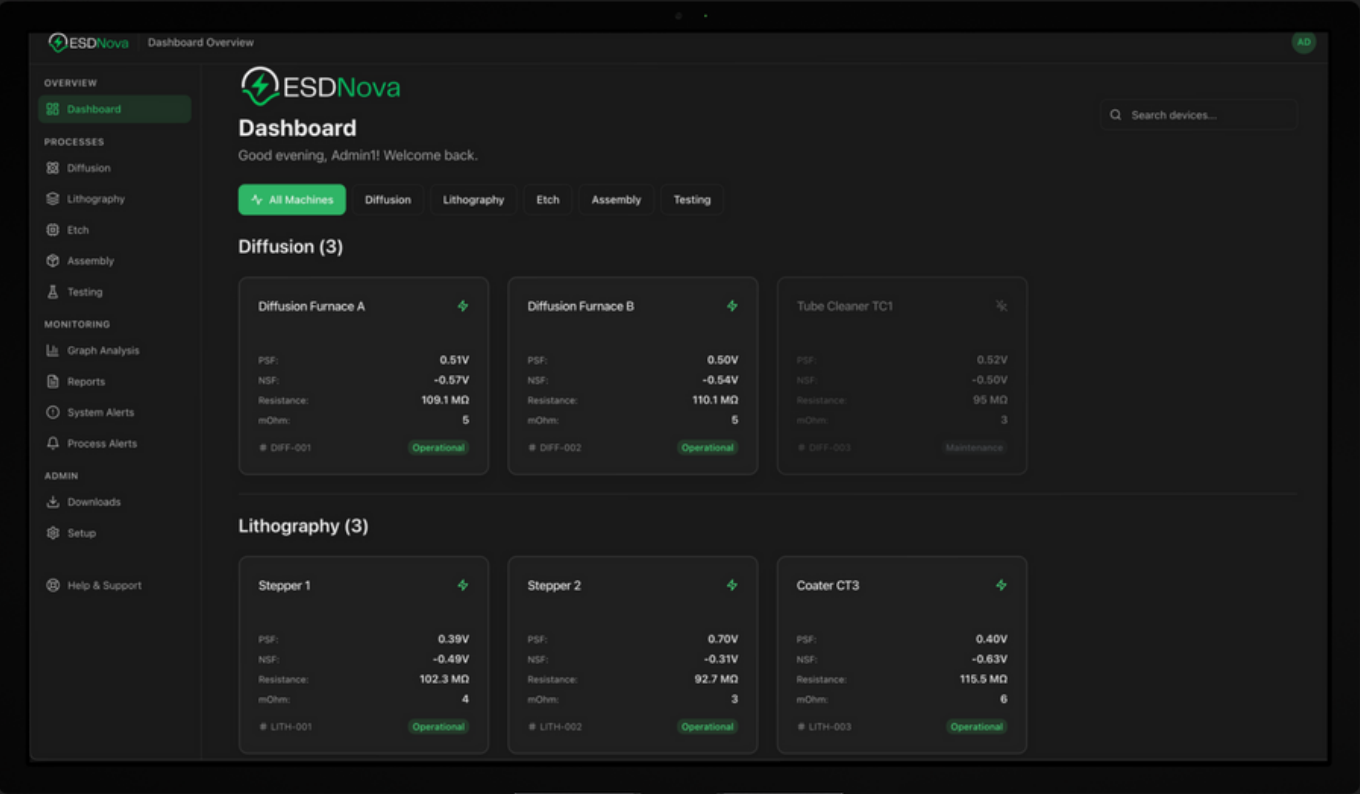
ESDNova is a state-of-the-art ESD (Electrostatic Discharge) monitoring system designed to safeguard high-tech manufacturing environments. It continuously monitors and measures critical ESD risks, including:

ESD EMI Events: Detecting and tracking electromagnetic interference caused by ESD.

Static Voltage Fields: Providing real-time measurements to monitor changes and risks.

Grounding and Ionizer Performance: Ensuring system stability and minimizing static imbalances.

The system integrates AI analytics, real-time data insights, and seamless connectivity (Ethernet/Wi-Fi) to deliver actionable intelligence. Its flexibility and compliance with industry standards (ANSI/ESD S20.20) make it indispensable for semiconductor and electronics industries, preventing costly failures and improving process efficiency.



Key Features of ESDNova

- **Detects ESD EMI Events:** Identifies and measures electromagnetic interference events caused by ESD.
- **Event Counts and Timestamps:** Tracks the number of ESD events and provides precise timestamps for analysis.
- **Real-Time Static Voltage Measurement:** Continuously measures changes in static voltage fields.
- **High Sensitivity:** Optimised for applications requiring precision at shorter distances.
- **Ionizer Risk Assessment:** Monitors static field changes to evaluate ionizer performance.
- **Flexible Output:** Integrates with all major facility monitoring systems (FMS).
- **Customisable Parameters:** Adjustable thresholds via hardware or firmware (Admin access) for tailored monitoring.
- **Connectivity:** Supports Ethernet and WiFi output, providing seamless data access.

One-of-a-Kind Solution

The ESDNova Monitor System is unmatched in its ability to deliver a comprehensive, real-time monitoring solution for ESD risks. Unlike conventional ESD monitors that focus on single parameters, the ESDNova integrates:

- **Multi-Parameter Monitoring:** Simultaneously tracks ESD EMI events, static voltage fields, and grounding/ionizer performance.
- **Real-Time Insights:** Provides actionable data instantly, ensuring proactive risk mitigation.
- **AI-Enhanced Analytics:** Leverages machine learning to detect trends and optimize process controls, a feature rarely seen in ESD systems.

Game-Changing Features

- **Seamless Integration:** Connects effortlessly to Facility Monitoring Systems (FMS) via Ethernet/Wi-Fi.
- **Customisability:** Fully adjustable thresholds and parameters cater to unique manufacturing needs.
- **Data-Driven Control:** Offers event counts and timestamping, allowing manufacturers to pinpoint risks and trends like never before.

Standards Compliance

- Meets ANSI/ESD S20.20 requirements, ensuring alignment with industry best practices.
- Aligns with recommendations from ESD TR20.20 for continuous monitoring.

3. THE AI ADVANTAGE

Proactive Risk Management

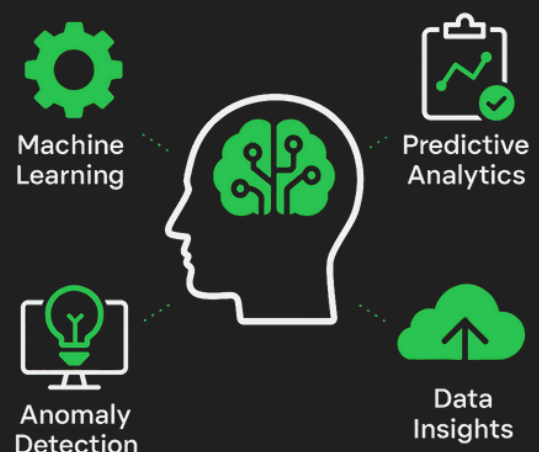
- **AI-Driven Insights:** The system leverages cutting-edge machine learning algorithms to detect anomalies, analyze trends, and predict potential ESD events before they occur. This proactive approach significantly reduces the risk of downtime and operational disruptions.
- **Predictive Maintenance:** By identifying early warning signs of equipment wear, the ESDNova prevents unexpected failures and enhances the longevity of critical tools, saving time and money.
- **Real-Time Alerts:** Operators are immediately notified of potential risks, ensuring swift intervention and minimal impact on manufacturing workflows.

Enhanced Efficiency and Optimisation

- **Self-Learning Technology:** The ESDNova's AI continuously evolves by analyzing historical data and patterns, improving its detection accuracy and adaptability over time.
- **Automation:** The system automates routine monitoring processes, reducing the need for manual checks and enabling operators to focus on higher-value tasks.
- **Process Optimisation:** Data insights generated by ESDNova allow manufacturers to fine-tune their processes, enhancing product quality and minimising waste.

Actionable Data for Strategic Decisions

- **Comprehensive Reporting:** ESDNova compiles detailed event logs, providing valuable data for compliance audits and long-term strategy development.
- **Trend Analysis:** Identifies recurring issues and suggests targeted improvements to minimize future risks.
- **Integration-Ready:** Its compatibility with major Facility Monitoring Systems (FMS) ensures seamless integration into existing infrastructure, making it easy to adopt and scale across multiple production lines.



4. ESDNova VS OTHER COMPANIES

ESDNova is a revolutionary ESD monitoring system that surpasses competitors with its advanced features and innovative technology. It offers comprehensive measurement of three key parameters, AI-driven predictive analytics, real-time monitoring with customisable alerts, a user-friendly interface, and seamless integration with existing systems. These advantages make ESDNova the ultimate choice for superior ESD monitoring.

Refer to the comparison table below to see how ESDNova stands out against other systems.

	Measures Multiple Parameters (All-in-One)	AI Integration for Predictive Analytics	Real-Time Monitoring	User-Friendly Interface	Cloud Connectivity	Customizable Alerts	Integration with Existing Systems
ESDNova	Yes	Yes (Advanced Level)	Yes	Yes	Yes	Yes	Yes
Desco Industries	No	No	Yes	Moderate	No	Limited	Limited
SCS (3M)	Partial	No	Yes	Moderate	No	Limited	Limited
Bondline Electronics	No	No	Yes	Basic	No	No	No
GIGABYTE Neo	Partial (Integrated with Access Control)	No	Yes	Advanced	No	No	No
RDL Technologies	Partial	No	Yes	Moderate	Yes	Limited	Limited

5. MARKET OPPORTUNITY

Addressable Market

- **Semiconductor Industry:**
 - Market size: \$720 billion (2024), growing at a CAGR of 12%.
 - Increasing sensitivity of advanced nodes (e.g., 5nm and below) makes ESD monitoring a critical need.
- **Electronics Manufacturing:**
 - Demand for high-reliability components in IoT, automotive, and consumer electronics drives the need for ESD-safe environments.

Growth Drivers

- **Shrinking Geometries:** Advanced chip designs require enhanced ESD controls to prevent failures.
- **Regulatory Pressures:** Compliance with ANSI/ESD S20.20 and other global standards is becoming mandatory.
- **Automation and AI Adoption:** The integration of AI in process controls is transforming manufacturing practices.

Unparalleled Value Proposition

- ESDNova stands out as the only solution offering a comprehensive, AI-powered approach to ESD risk management.
- Its unique ability to combine multi-parameter monitoring, real-time analytics, predictive maintenance, and scalable integration ensures a distinct competitive edge.

6. How ESDNova WILL TRANSFORM THE SEMICONDUCTOR INDUSTRY

ESDNova is a game-changer for managing electrostatic discharge (ESD) in semiconductor manufacturing.

Here's how it helps:

Proactive ESD Prevention: Real-time detection minimizes ESD-related damages, reducing rework costs and protecting high-value components.

Predictive Maintenance: AI-driven analytics predict ESD risks and equipment failures, allowing timely maintenance and preventing costly downtime.

Improved Product Reliability: Advanced nodes like 5nm are highly sensitive to ESD. The ESDNova enhances safety and yield, ensuring high-quality output.

Operational Efficiency: Automating ESD monitoring and integrating with Facility Monitoring Systems (FMS) streamlines operations and reduces manual workload.

Actionable Insights: Real-time data enables trend analysis, root cause identification, and continuous process improvement.

Regulatory Compliance: Simplifies adherence to standards like ANSI/ESD S20.20, reducing compliance risks.

Adaptability: Customisable and highly sensitive, it's ideal for cutting-edge manufacturing environments.

ESDNova is not just an ESD monitoring tool—it is a comprehensive solution for predictive risk management, operational efficiency, and long-term reliability. By integrating advanced analytics and predictive maintenance, the ESDNova enables semiconductor manufacturers to stay ahead of industry challenges, reduce costs, and drive continuous improvement in a rapidly evolving market.

7. SINGAPORE'S SEMICONDUCTOR ADVANTAGE: HOW ESDNOVA FITS IN

Singapore's emergence as a semiconductor hub, bolstered by Micron's groundbreaking HBM manufacturing facility, sets the stage for advanced solutions like ESDNova to play a pivotal role.

Future-Ready Manufacturing:

Micron's HBM assembly process demands the utmost precision and protection from ESD risks. The ESDNova safeguards these cutting-edge operations, ensuring high yields and consistent quality.

Boosting Global Competitiveness:

Singapore's investment in complex manufacturing processes highlights its commitment to innovation. ESDNova further elevates this position by providing industry-leading ESD protection and AI-driven insights.

Attracting More Investments:

Robust infrastructure, including advanced monitoring systems like the ESDNova, reassures global semiconductor companies that Singapore can support their complex needs, driving further investments.

Regulatory Excellence:

ESDNova aligns with international standards (ANSI/ESD S20.20), helping Singapore-based manufacturers achieve and maintain global compliance, which is essential for long-term competitiveness.

This synergy between Singapore's ambitions and ESDNova's capabilities creates a win-win scenario, ensuring the nation remains at the forefront of semiconductor innovation while minimizing production risks.

Join us in revolutionizing ESD monitoring and protecting the future of high-tech manufacturing.

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DESIGNED AND DEVELOPED BY:

