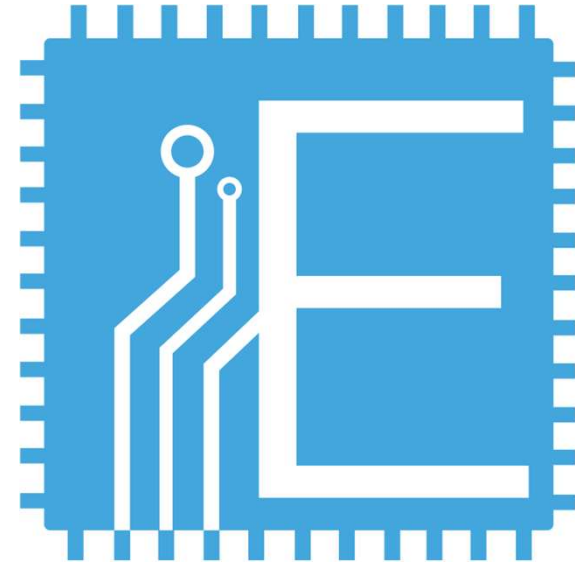
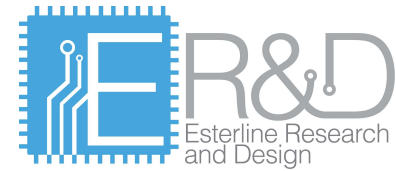


Esterline R&D

Research & Design



Esterline Research and Design



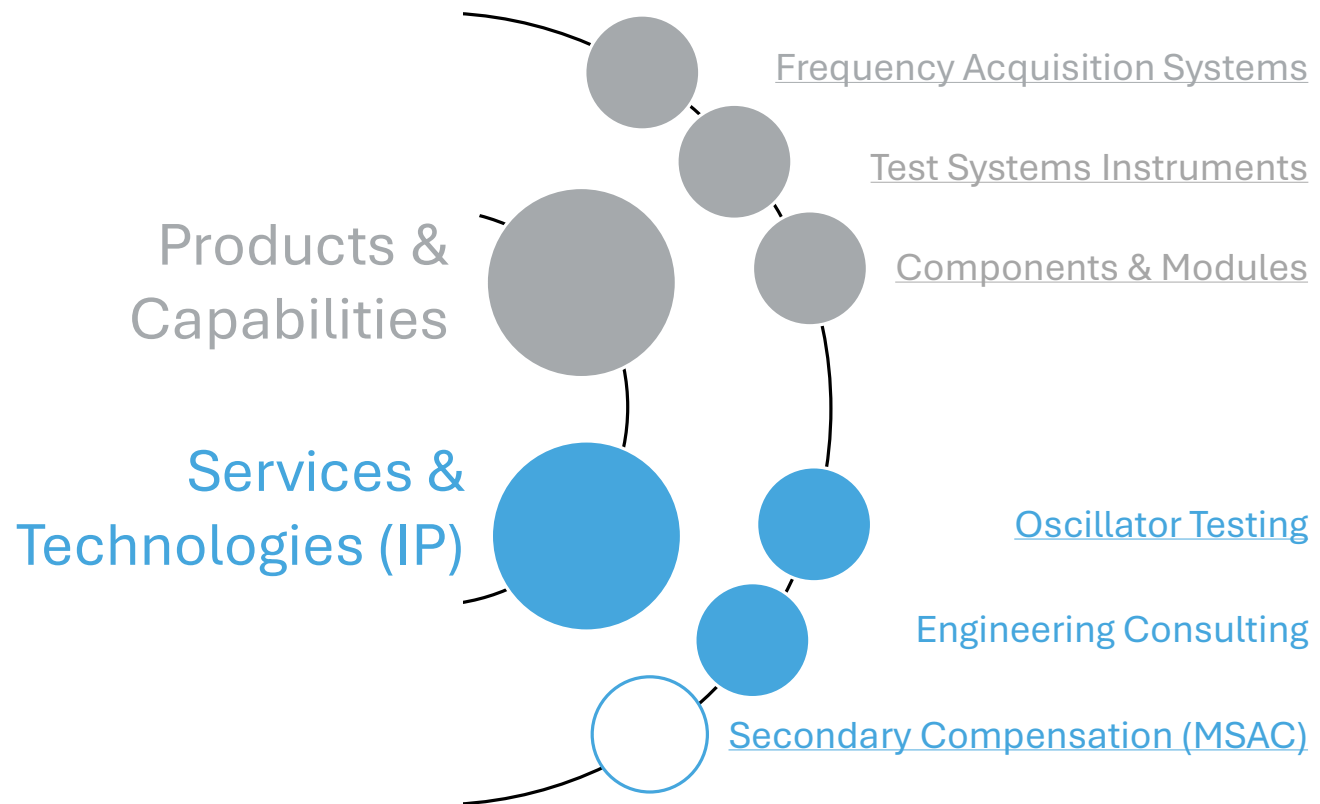
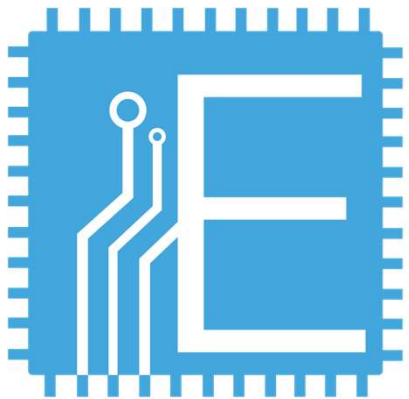
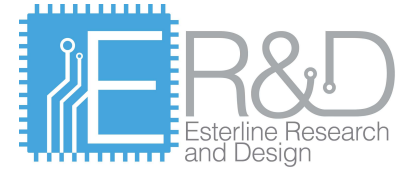
A specialized electrical engineering design firm focused on frequency control solutions.

- Extensive expertise in designing and testing high-precision crystal oscillators for military and commercial applications.

A team with over 175 years of combined experience in all aspects of oscillator design and testing.

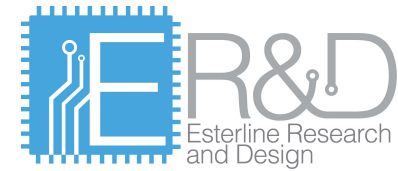
- Dedicated to advancing embedded time bases through innovative design, manufacturing, and testing.
- Known for delivering robust, high-quality, and reliable solutions to complex engineering challenges.

Products, Services & Technologies



PORTFOLIO OVERVIEW

Services & Technologies (IP)

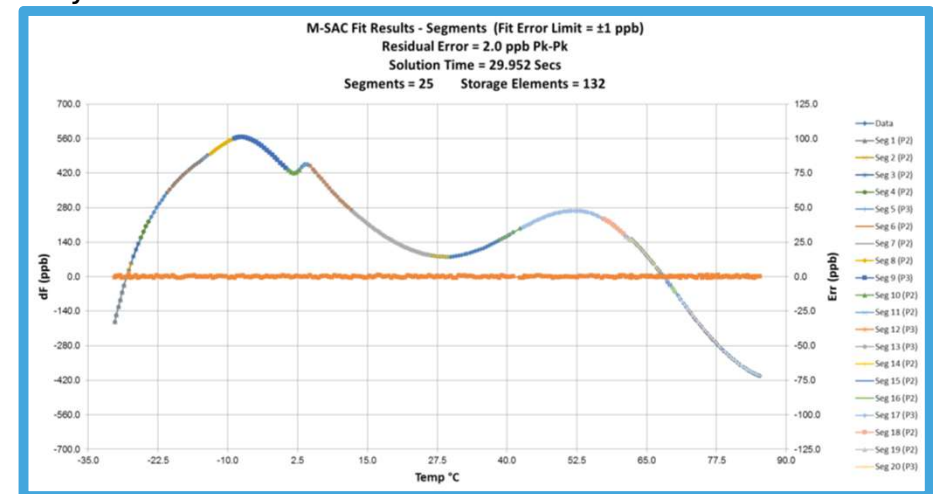


- **SECONDARY COMPENSATION (MSAC)**

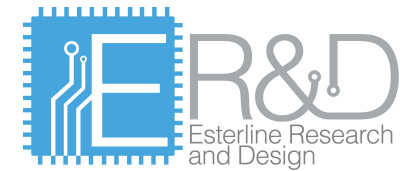
- Multi-dimensional Segmented Array Compensation (M-SAC)
- Unmatched Compensation Results
 - Improves performance down to Thermal Hysteresis of oscillator
 - Reduces Residual Error down to noise floor (In single direction)
- Layered compensation
 - Fitting of multiple environmental effects simultaneously

- **Reference Designs**

- LGT 100 / 300 / 500 / 501:
- LGH 100/ 300 / 1000 / 3000:
- SCH 100/ 300 / 1000 / 3000:

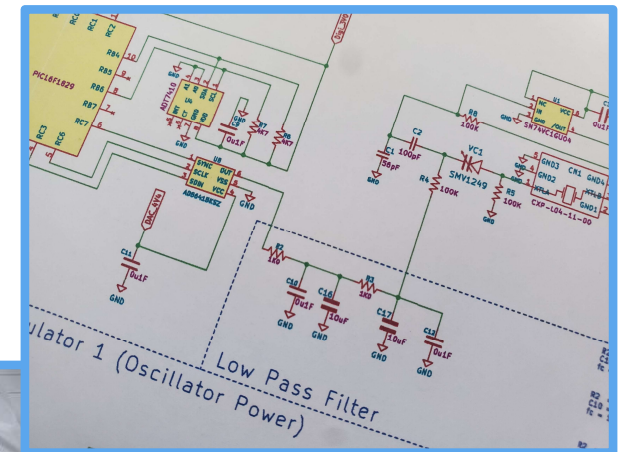


Services & Technologies (IP)



- ENGINEERING CONSULTING

- Frequency Control / Extensive oscillator experience
- Test and Automation
- RF circuit design / PCB layout
- Ceramic Substrate / Package design
- Microcontroller / Processor applications
- General Programming and Coding

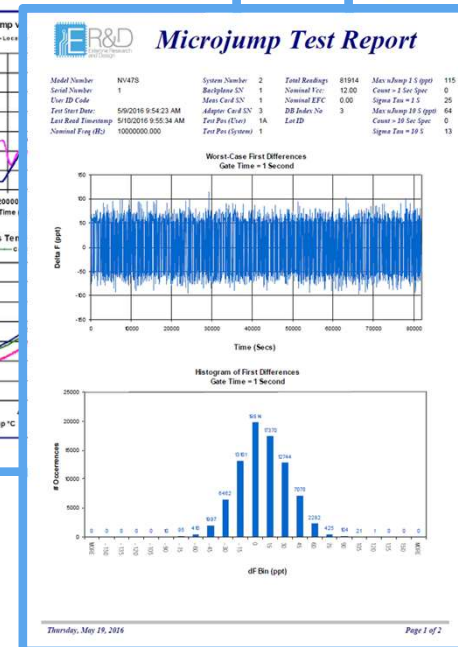
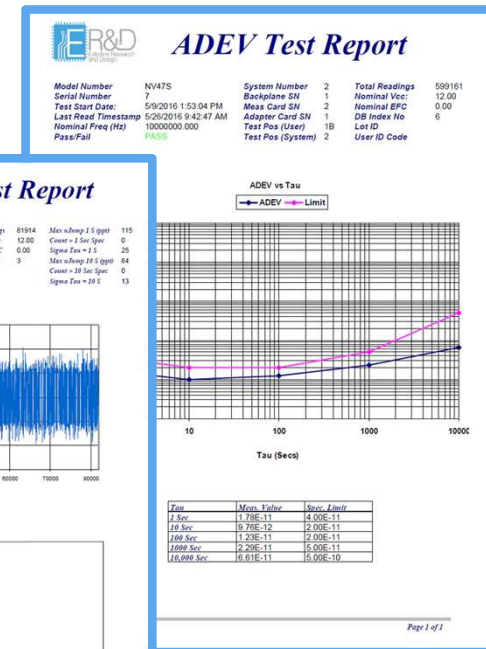
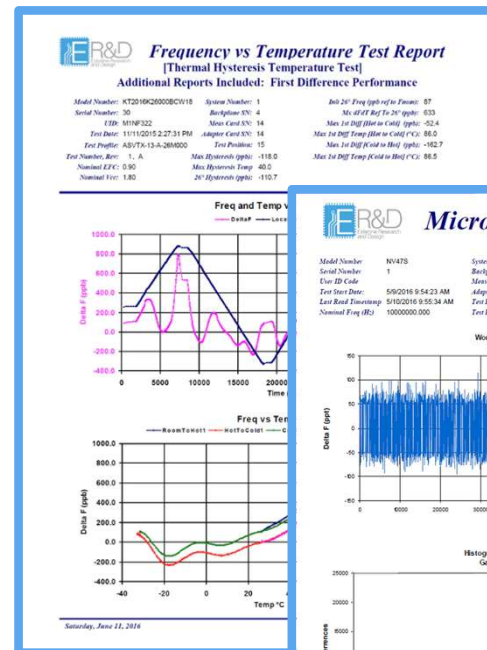


Services & Technologies (IP)



- **OSCILLATOR TESTING SERVICES** (INDEPENDENT CHARACTERIZATION & VERIFICATION OF PERFORMANCE, WITH A FORMAL FINAL REPORT)

- Temperature stability
- Aging
- Retrace
- Allan deviation/variance
- Phase noise (static and under vibration)
- Shock and Vibration
- Activity Dips
- Micro-jumps



Products & Capabilities



- **COMPONENT & MODULES** (EMBEDDABLE)

- **Embeddable Signal Source**

- [FRM100](#): Freq Reference Module

- **Freq Dividers & Multiplier**

- [FD100](#): RF Frequency Divider Module - Divide by 2, 4
- [FD200](#): RF Frequency Divider Module - Divide by 8, 16, 32, 64
- [FM200](#): RF Frequency Multiplier Module - Multiply by 2
- [FM300](#): RF Frequency Multiplier Module - Multiply by 3

- **Mixers/Down Converters**

- [DFM100](#): Difference Freq Module

- **Distribution Amplifier**

- [DA100](#): Fixed Frequency Sine Wave Out
- [DA200](#): Low Noise Fixed Frequency Sinewave Out
- [DA300](#): CMOS up to 100MHz
- [DA400](#): CMOS up to 200MHz
- [DA500](#): Broadband In/Broadband Out (AM to 500MHz)

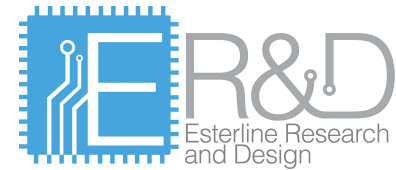
- **Timing Module**

- [LGT900](#): 1pps Disciplined - Ultra Low G-Sensitivity TCXO



[Links to: EsterlineResearch.com](http://Links.to:EsterlineResearch.com)

Products & Capabilities



- **TEST SYSTEM INSTRUMENT** (STANDALONE RACK MOUNT EQUIPMENT):

- **Frequency Counter**

- [FMS32](#): Simultaneous Acquisition - Zero-Dead-Time - 32-channel counter



- **Signal Source**

- [DFS100](#): Low-Noise, Ultra-Low-ADEV, 200MHz Bandwidth Synthesizer



- **Voltage Source**

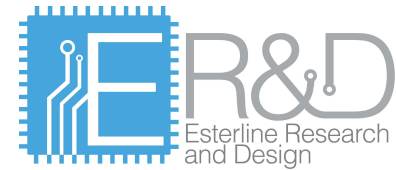
- [PVG100](#): Programmable Voltage Generator (6 Channels)
- [SPS200](#): High-Current, Fixed-Voltage, Dual DC Power Supply

- **Control Module**

- [RCM100](#): Relay Control Module Switch



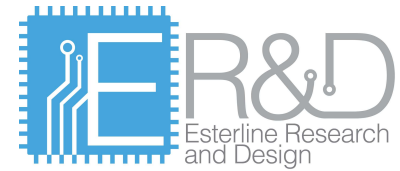
Products & Capabilities



- **FREQUENCY ACQUISITION SYSTEMS** (STANDALONE TEST EQUIPMENT):
 - **OCXO - Frequency Test Systems**
 - [FAS100](#) : OCXO Aging and Room-Temperature ADEV System (Cabled system)
 - [FAS200](#): OCXO Aging and Room-Temperature ADEV System (Back-plane system)
 - [FAS2000-TC](#): OCXO Full-Temperature Test System (Back-plane System)
 - **XO, VCXO & TCXO - Frequency Test Systems**
 - [FAS300-H](#): XO/VCXO/TCXO Burn-In Aging System
 - [FAS1000-TC](#): TCXO Full-Temperature Test System



Our Competitive Edge



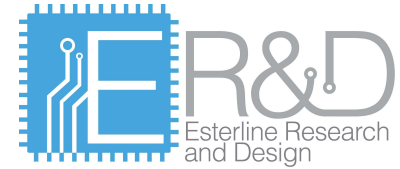
What We Do:

- Transform complex engineering challenges into actionable, high-performance solutions.

How We Stand Out:

- Precision You Can Rely On, Solutions You Can Trust.
- Innovating Precision, Solving Challenges.
- At Esterline R&D, we don't just build products—we build trust.
- Precision Frequency – Infinite Possibilities.

Delivering Unmatched Value



Expertise:

Decades of industry-leading experience, offering deep knowledge in frequency control, analog & digital electronics, and advanced compensation systems.



Scalability:

From embeddable modules to full test systems, our solutions grow with our clients' needs.



Customization:

Modular and custom-built solutions tailored to unique engineering challenges.



Integrity:

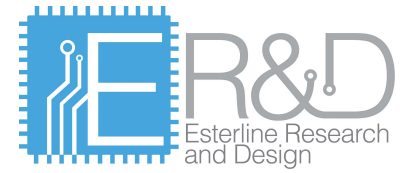
Transparent processes with rigorously tested and validated solutions.



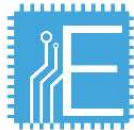
Innovation:

Proprietary MSAC technology providing breakthrough compensation solutions.

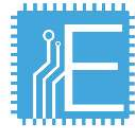
Other Presentations



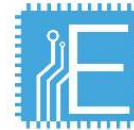
Esterline R&D
Components & Modules



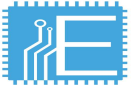
Esterline R&D
Test System Instruments



Esterline R&D
Frequency Acquisition Systems



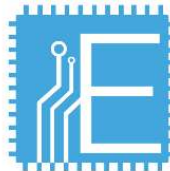
Esterline R&D
Services & Technologies (IP)



Engineering Consulting
Services & Technologies (IP)

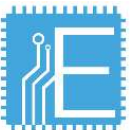
Engineering Consulting

Esterline R&D
Research & Design



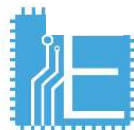
Portfolio Overview

Esterline R&D
Factory Overview



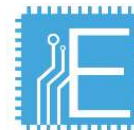
Millerstown, PA

Esterline R&D
Services, Capabilities & Technology



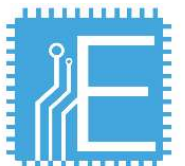
Secondary Compensation
MSAC

Esterline R&D
Services & Technologies (IP)



Oscillator Testing

Esterline R&D
Programs & Applications



Esterline R&D

Research & Design

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