CASE STUDY

BIVAR

Simplifying Light's Journey Inside Complex Healthcare Diagnostic Systems

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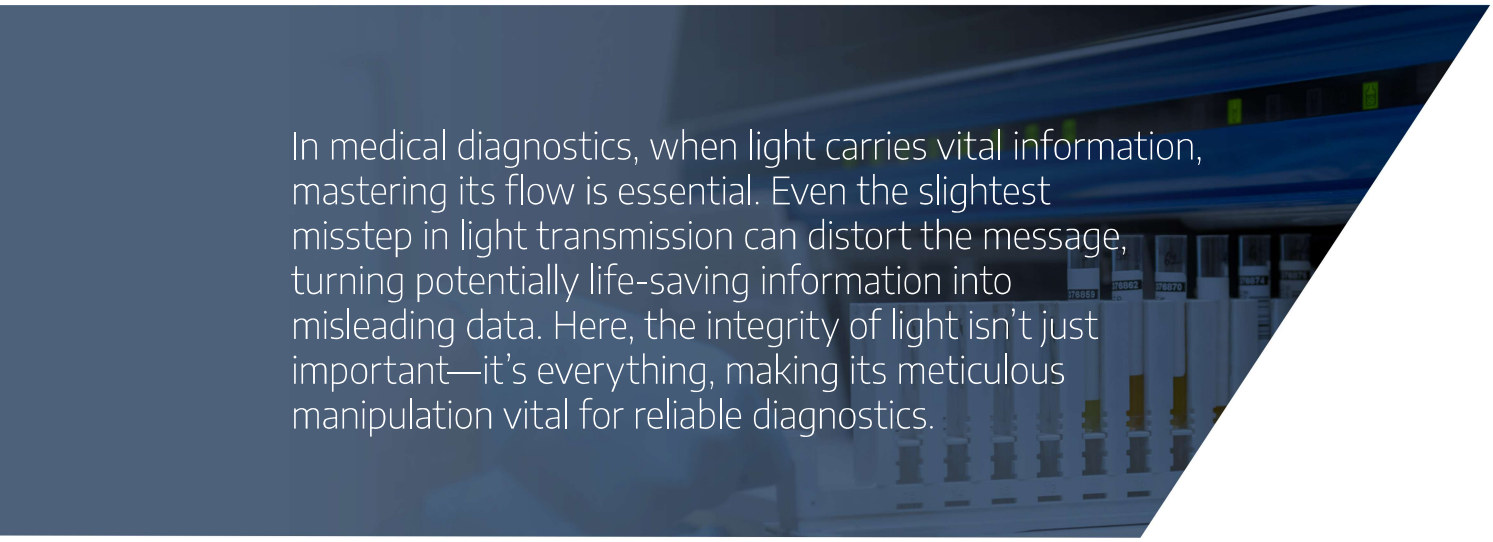
Project: Testing Equipment for a market leader in medical diagnostic devices



In medical diagnostics, when light carries vital information, mastering its flow is essential. Even the slightest misstep in light transmission can distort the message, turning potentially life-saving information into misleading data. Here, the integrity of light isn't just important—it's everything, making its meticulous manipulation vital for reliable diagnostics.

Medical devices are getting smaller, diagnostic equipment is evolving in complexity, and in some cases, diagnostic equipment is leaving the lab and heading into patients' homes. No matter where health tech is used, empowering care providers and patients with fast and accurate results is the name of the game. At Bivar, we're supporting the future of life-changing technologies with illumination solutions that enhance the functionality and reliability of medical and diagnostic devices.

See how our illumination expertise helped this healthcare technology innovator shine a brighter light on diagnostic workflows.

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The Challenge

Light doesn't always travel in a straight line. Inside sophisticated healthcare equipment, engineers need to thread light through complex pathways. When medical diagnostic data is carried as light, managing and manipulating how it moves is more vital than ever, as any deviation or loss in the light's integrity can lead to inaccurate readings. Here's how Bivar helped this expert in medical diagnostics navigate light through the inner workings of this state-of-the-art Diagnostic System.

How We Solved It

Complex Light Routing Expertise

This healthcare industry leader needed to send light from point A to point B—but the path involved many twists and turns. In this system, LED light travels a 90-degree path to a collimator meant to straighten light into parallel rays before entering light pipes feeding through a circular adapter. From there, multiple rigid light pipes perform a series of bends and diameter changes to effectively fan out into a rectangular array.

But the journey does not end there. After reaching the sample, light travels back towards a sensor through the light pipes as data. Here, the device analyzes wavelength and intensity of the returning light to produce a test result.

Enhancing light and data transmission for accurate test results: A two-part journey

- Maintain collimation of light emitted from LEDs, so it would travel in parallel rays without dispersing and maintain intensity over a distance.
- Design a system that could not only transmit this collimated light efficiently but also allow for the light to return for an accurate reading, without significant loss of integrity or efficiency.

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Sophisticated Testing and Simulation Processes

We optimized the light pipe curvatures, and entry and exit diameters through sophisticated testing and simulation processes. This comprehensive approach included expansive testing phases where we utilized 3D printing to experiment with different prototype adapters and light path geometries.

We also teamed our expertise with a full suite of simulation software for drafting the main concept and for light path optimization. The collaboration extended further as the client integrated our findings into their own internal testing platform.

Going Beyond the First Answer That 'Works'

Simulation software can only take you so far. Sometimes, the "best option" isn't feasible from a production or transportation perspective. Our team always keeps manufacturability front of mind, even from early prototyping. For this project, we also devised an inventive packaging solution, meticulously planned to fit a cost-effective number of units per box. We combined our practicality and ingenuity into a series of vacuum-formed trays that secured this light pipe solution for global transport.

> *"What sets us apart? Our first-hand variety of engineering experience. We don't just have one background but a range of engineering skills that best address today's technology requirements."*
>
> –Kurt Baron, Bivar Design Engineer

From the very start, we approach possible solutions with questions like 'is it easy to assemble?' and 'is there a cost-effective way to ship this in mass quantities to different regions across the world?' We don't come to you simply with an idea that works, but one that also fits into your overall business.

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Strength in Numbers

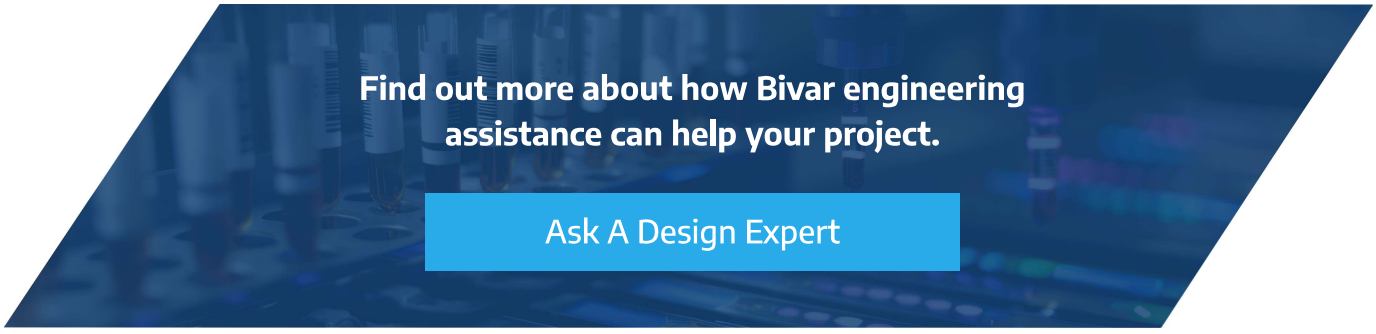
United in our efforts, we seamlessly integrate with your in-house engineering team, embodying the same level of dedication and pride that you would expect from your own staff. Our collective approach is driven by our all-in mentality, a philosophy underpinned by a distinctive structure that sets us apart: Bivar is fully ESOP employee-owned. “We’re all in this together,” explains Bivar Customer Experience Manager Shirley Mercado. “The work we put forth reflects our commitment and dedication to an exceptional customer experience.”

50+ Years of Global Partnerships

With over five decades of experience in the illumination sector, suppliers, manufacturers, and distribution partners have come to know our name as synonymous with diligence, expertise, and an unwavering commitment to service. Our reputation affords us unparalleled access to resources and supply chain agreements, empowering us to meet tight prototyping and production timelines.

Let’s Work Together to Illuminate Your Next Healthcare Design

When faced with a complex illumination challenge, you need a partner that understands all the details. At Bivar, we illuminate the path forward for creative engineering groups, empowering them to bring refined, high-quality products to the market with confidence.



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