James R. Johnson, Failure Analyst and optoelectronics experience:

Manufacturing experience began with serving Syquest to build the first removable disc drive [circa; 1988] but needed help in Failure Analysis to improve yields.

We produced the hub which had orbital requirements to within 0.003 held by center fingers that were spring loaded.

Customer's requirements for the five center fingers for interfacing with center spool had to be within 0.003" tolerance for co-orbital allowable repeatable run out.

The design and tooling was well done and Engineers and everyone did amazing work but the nuances of the 201 Stainless Steel from supplier and the process variation in handling before heat treating and machining all played a role in the end process.

Variation in oil, material hardness, camber and supplier batch control made it nearly impossible to manage.

My direct work defined the hardness variation first in the 201 Stainless Steel and camber in the supply spool and turned them to training.

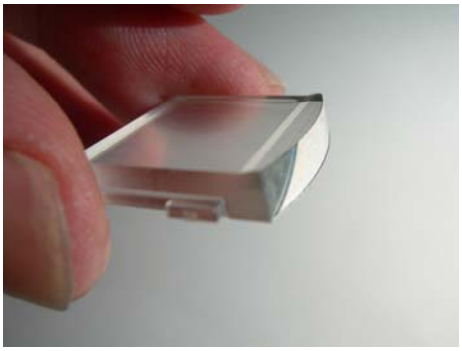
We even created color codes and hardness factors to help the machining processes who also suffered from the undefined hardness variation from our heat treating process.

We trained on handling and even taught handling people to identify, by color, more hardened pieces than others and batched them for machining. Goal reached as high as 1000 units an hour given the defined inspection and manufacturing processes maintaining the controls as needed for the customer's delivery to the military and government.

Recent experience with electro optics:

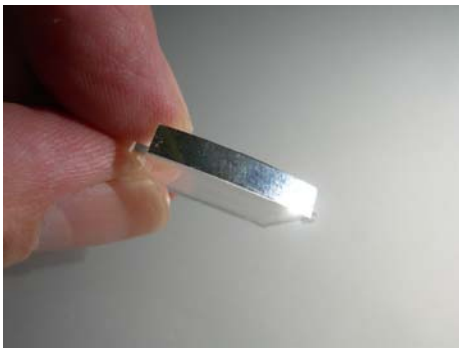
Working with Identix [see reference letter in resume] for their embedded finger print readers:

This is a highly precision Fresnel Lens on the flat surface with an angular parabolic mirror to compress and direct optical image thru a mm size channels to a CCD.



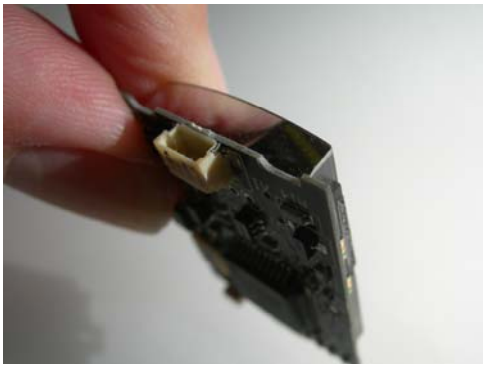
I over saw the design and tool building as well the inspection and test programs.

We included diffractive indices of each material that the image passed thru; clarity and occlusions being key inspection elements.

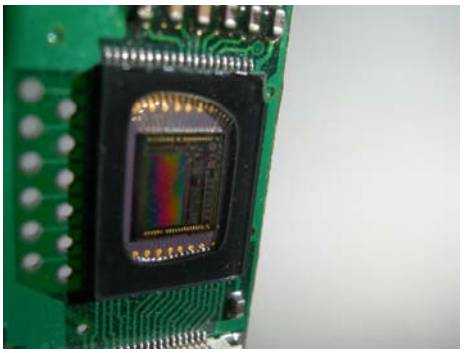


Using metalized chrome coating following ASTM & ASM specifications & is EPA requirements; suppliers placed and baked a chrome coating.

Adhesion, thickness and coverage being critical to function areas to control.

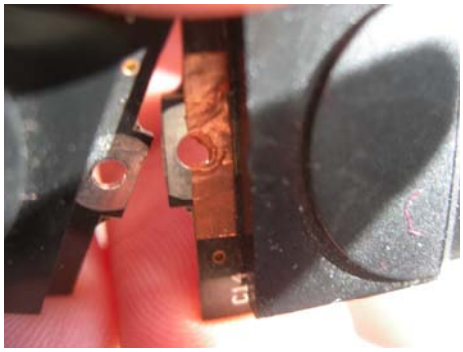


The final lens was hand assembled that fit with precision over the CCD where the optics and interface needed to be aligned. At the time, the pick and place process did not consider z (height) as a critical variation in PCB assembly; we set the standards in order to control "focal points."



A well executed process by suppliers and inspection fixtures and photo training.

In testing FCC/EMI it was discovered that grounding was not sufficient.



A quick fix copper strip served the mission on this first 10k unit run and an ECR was produced to closed the loop for an improved grounding contact design.

There were several issues that we all worked thru individually with corrective action as our records and design rules were implemented.

The end result:

Thin as a PCMCIA Card

Functional optics transported thru a series of processes to land perfectly over a targeted area at the CCD.

That met certification requirements

Next was to ensure all of the testing and certification was acquired [and placed on such a small label].

The need for in and out slide movement required flex cabling which was designed to slide like elevator cables; an excellent simple reliable idea by the engineers whom I worked with.

During reliability testing, it was discovered that PCB process could cause ware and tear or binding.

I ordered a windowed test slot during failed units [previously welded closed] to study test failures of the flex circuits and confirmed the "failure mode;" thus a PCB 610 requirement was refined and held as a critical to function inspection point; while the communication flow moved as flowingly as this mechanical design.

The technology moved quickly into a USB device and our design rules transferred over quickly to multiple applications.

The device had many nuances including fitting a square label in a round hole; meeting global delivery requirements.

Thankfully, the graphic artists was able to place the certifications without needing a magnifying glass.

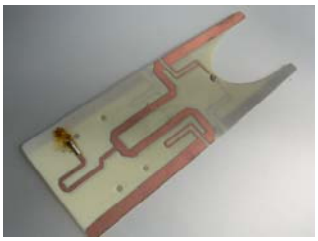
The use of metalized plastic offered a grounding effect for the expected electrostatic discharges. A beautiful and elegant solution to a small EMI generator.

Recent experience with electromagnetism:

My next position was with an antenna design to help the hard of hearing receive clearer communications.

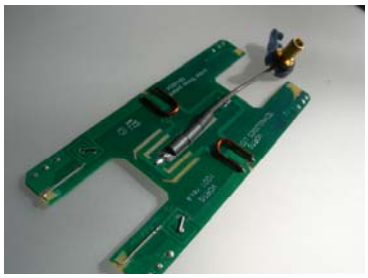
The antenna should be external to the electronics and may be embedded within the plastics of a hand set.. Using an external antenna and an interferometric array, the signal can be improved along with performance.

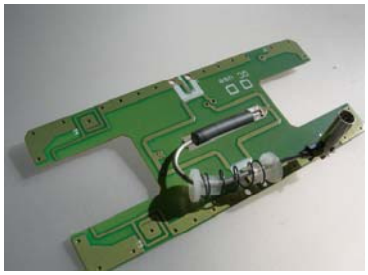
We commenced building an array antenna and I worked with several engineering firms across the country.



Thru trial and error we grew control over the variables and created a more effective device.

In electromagnetism, symmetry is key!





Embedding the technology followed rules of ergonomics and safety.

Hand held contoured and an excellent design firm placed the final touches on early design rules. Quickly and easily!

The design cycle goal was a 90 days for plastics and prototypes.

The means to reach this goal was a well documented program for the designers and tradesmen.

The goal was proven in the next application! 90 days

The result is a product that saves 30% energy from reduced head absorption and signal to noise rations unmatched in today's antenna world.

This design is now considered

"Green Technology."

NOTE:

Working with neon glass blowers one learns the relationship with gas, voltage is to the plasma's spectrum properties.

My first connection to photonics was working with B-52 Bombers' Star Tracker Systems which was a system beginning with a bubble at top of wings; with a prism seeking starts from latitude/longitude and angle with luminosity factors. The light was sent down to a rasp to be turned into signal.