# James R. Johnson, optoelectronics experience:

My position as Director of Engineering & Launch with Identix was the result of a Merger between Identix and an acquired "Russian" company specializing in Optics.

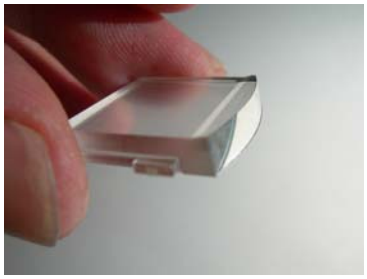
My roll was to integrate the corporate structure of the new company with the corporate structure of Identix.

Both companies could not certify their company to ISO 9000 or customer standards [Compaq and Toshiba] as their products were designed to be embedded finger print readers.

Working with the teams [see reference letter in resume] our work designed the first biometrics software and embedded finger print readers.

Image processing and Focal Plane Arrays create signal correction and calibration.

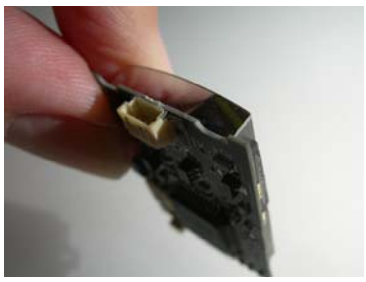
This is a highly precision Fresnel Lens on the flat surface has an angular parabolic mirror plated to compress and direct optical image thru mm size channels to CCD.



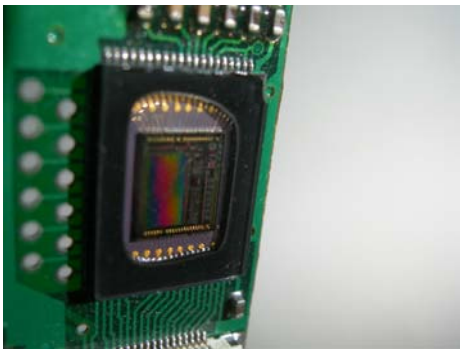
I over saw the design and tool building as well the inspection and test programs. We included diffractive indices of each material that the image passed thru; clarity and occlusions being key inspection elements.

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.



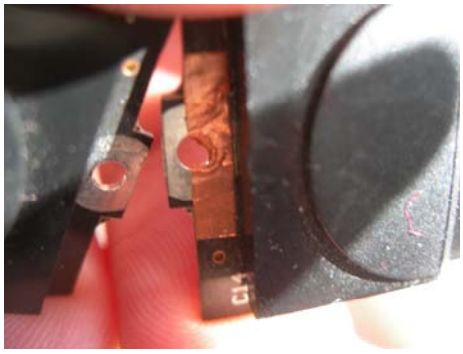
Final lens was hand assembled that fit with precision over the CCD where the optics and interface needed to be aligned. At the time, the pick and place process did not consider z (height) as a critical variation in PCB assembly; we set the standards in order to control "focal points" and helped the PCB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



The rainbow pattern, barely seen on the surface is the result of the Fresnel Lens placed on the surface. This is an amazing feat of micro angles curved, focused and reliable from a plastic part. A feat only a optical mold company could perform and a brilliant set of Russian Engineers in St. Petersburg could design. A well executed process by suppliers and inspection fixtures and photo training with optical recognition software as being the final inspection source for focus and occlusions.

In testing FCC/EMI [electric shock protection from static electricity], 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.



**PCM/CIA card was one iteration of our product launch.**


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 [placing your finger on the retractable lens] produced a reliable transported image thru a series of optical lens, mirrors, focal points and reflectors to land perfectly over a targeted area on the CCD [charged couple device] or optical imager.

**That met certification requirements**

International certification all that on one 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

We directed several durability and slide tests and discovered many obstructions that we worked thru on the PCB redesign to relocate components to an internal specification.

It was discovered that PCB process could cause ware and tear or binding.

Our machined "test" window slot provide a view into failure modes in order to study internal movement of the flex circuits and confirm the failure mode was cured.

Thus became the PCB 610 requirements from refined reliability testing to create CTF [critical to function] inspection points; while the communication flow moved flowingly between test, engineers and suppliers as a design for reliability process.

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.

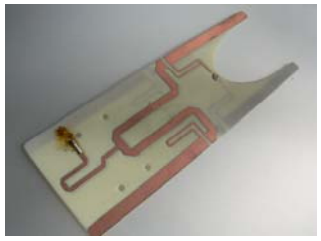
The use of metalized plastic offered a grounding effect for the expected electrostatic discharges.  A beautiful and elegant solution to a small EMI generator.

**Recent experience with electromagnetism:**

Moving from optical to electromagnetic design, our goal was to integrate antenna design for new hard of hearing 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 worked with several engineering professionals across

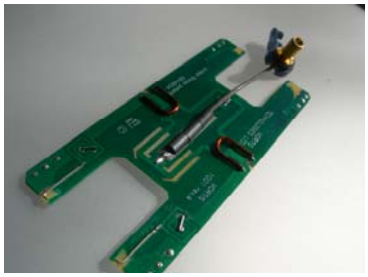


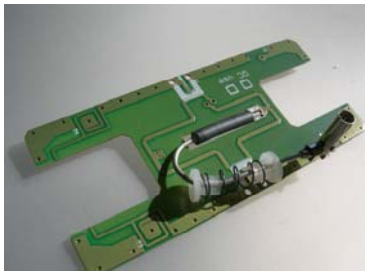
the country; both in market requirements specifications and design for manufacturing requirements.

The antenna designer did not have experience in cell phone integration at the time.

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

In electromagnetism, symmetry is key!





Once creating the Design Rules"

the embedding technology follows rules of ergonomics, safety and handling.

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 again.  Well done by an international team of suppliers.

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

This design is now considered

"Green Technology."




NOTE: The "see thru" plastics that reveals a "green" PCB was my idea off of one my child's toys that showed the curious "inside." It turned out to be an award winner [by my standards anyway].

We placed a magnifying lens in the opening in order to show the relationship between light bending and radio wave bending; same thing.

NOTE:

Working with neon glass blowers one learns the relationship with gas, voltage and 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;  that directed the light of a star by a prism  and turning it into a navigational aid that flew the airplane for days in the air.  Seeking stars for latitude/longitude by angle and luminosity was amazing technology in 1970 and was the for runner for several technologies today.