

## Merry Christmas

As we close out 2013 and begin 2014, our thoughts turn to what we are thankful for and how we should improve. Personally, I'm thankful for my family, my health and the opportunity I have to contribute to making people's lives better. Making people's lives better is a key component of our culture at Burton Industries. We provide a workplace that helps our employees grow professionally. And, we also try to provide manufacturing partnerships that help our customers improve their products and achieve their business goals.

Our culture embraces a servant mentality that puts helping others at the top of our list of business goals. We aren't the fastest growing contract manufacturer in the world, but we do have some of the longest customer relationships because partnerships that help our customers grow, help grow our business as well. We are thankful for the opportunity to contribute to making each of our customers more competitive in their respective markets. Can we do a better job of helping you achieve your goals? Feel free to let me know.

As we enter this holiday season and thoughts turn to faith, fellowship and family, I'd like to wish you and your family a Merry Christmas and very Happy and Healthy New Year. The Burton Industries team and I look forward to serving you even better in 2014.

**Gary Burnett, Sr.**  
CEO



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### CUSTOM SOLUTIONS

For 35 years, Burton Industries, Inc. has had a long tradition of providing customized manufacturing solutions to OEMs in the medical, industrial, motor control, specialized consumer, security, building controls, defense and professional tool markets. We specialize in high mix, variable demand projects and support the full product lifecycle from product development through end market support services.

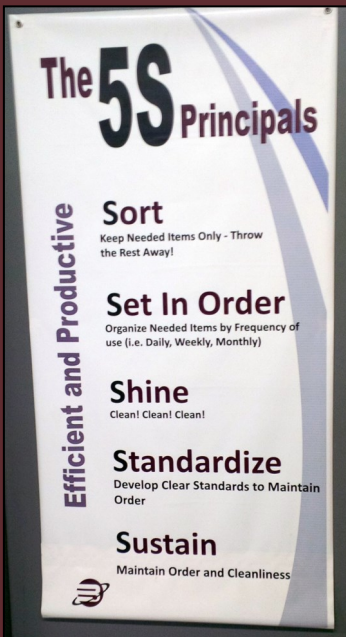
### QUALITY RESULTS

We've built our business by listening to customer needs and efficiently supporting high mix, variable demand projects. Our manufacturing strategy includes:

- Extraordinary communication with customers
- Teaming with suppliers
- Optimizing test
- Eliminating hidden cost drivers.

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# Burton Industries Leans Out The Production Area

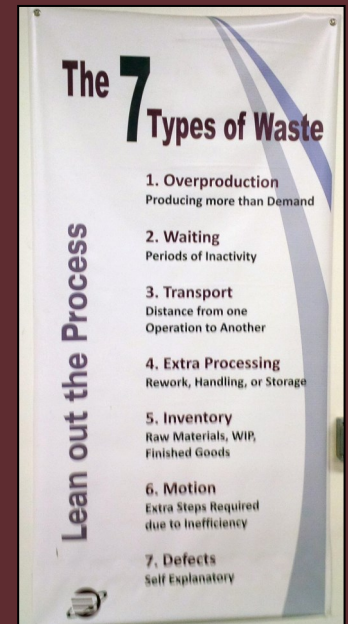


Lean manufacturing principles have been part of Burton Industries' manufacturing philosophy for a long time. While these principles were used in individual work cells, a holistic approach to rearranging the entire production area had not been taken.

That changed this summer when CEO Gary Burton rolled up his shirtsleeves and got actively involved in re-configuring the area.

"The people on our team have been busy doing their jobs. I decided to spend some time doing some of the grunt work in rearranging the area and it caught on from there," said Gary Burnett, Sr.

The production area now features point of use stocking, more complete implementation of 5S principles, upgraded ESD coating on the factory floor and a more efficient overall production flow.



A technician on second shift programs an SMT placement machine. Point of use stocking and 5S principles are now integrated throughout the production area.



Team training on Lean principles is reinforced through the use of visible reminders such as these 5S and 7 Types of Waste banners, which are prominently displayed on the production floor.

## A Checklist for Improving Product Design

By Jeff Ocker

There is a saying that what costs \$10 to fix in design, costs \$100 in production and \$1000 out in the field. Good designs are more cost efficient to produce, have less defects in manufacturing and are generally more reliable in the field. What common design mistakes should you avoid in your next product development effort? Here are some of the top issues we see:

**Issue 1: Lack of Proper Protection on I/O (Inputs/Outputs).** Most devices need to take input signals and output a signal to other devices out in the field. These are generally connected via hard wiring. This hard wiring can be

susceptible to external electrical noise or power surges due to other devices or lighting strikes and electrostatic discharge (ESD). When this happens, it is very possible for this unwanted noise to be induced onto the wiring going back into your system. Sometimes minor, but sometimes major damage can occur making the product malfunction. To prevent this, it is vital to design protection circuits that shunt the unwanted energy to ground.

**Issue 2: Lack of Proper Power Conditioning.** For any electrical product, it is important that the incoming power is conditioned to accommodate fluctuations in power, brown out conditions,

missing AC cycle and power outages. There are a number of ways to accomplish this. Many active ICs have some power conditioning built in and some even have the ability to monitor the power. Otherwise, utilizing simple resistors, capacitors and inductors in various topologies accomplishes sufficient power conditioning for most designs.

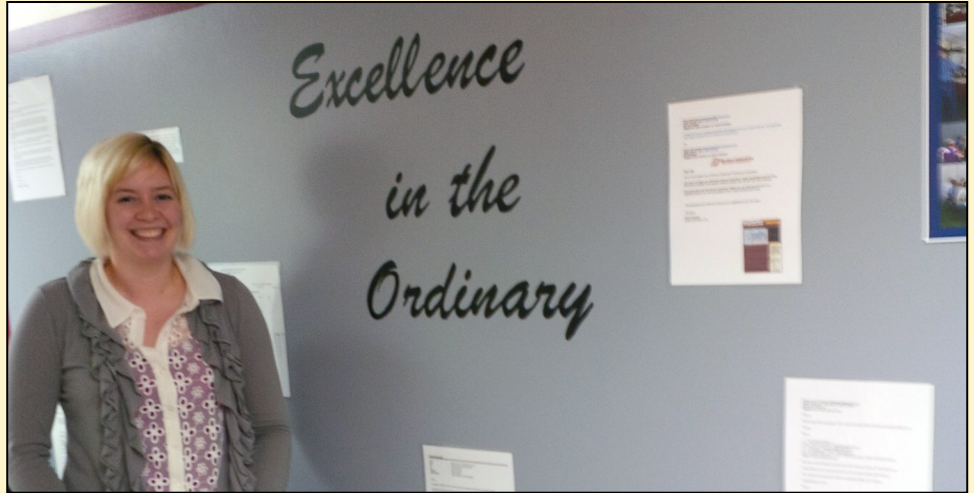
**Issue 3: Design for Manufacturability (DFM) Guidelines Ignored.** As I always say, you only design a product once, but you build it many, many times. Following good guidelines not

*(Continued on page 3)*

# New Bulletin Board Connects Employees and Customers

Burton Industries is working to find ways to drive better understanding on the impact of actions by employees on customer results. A new Excellence in the Ordinary bulletin board features customer communications on the results achieved.

Program Manager Meaghan Wallner has been working with customers to collect the material. Employees can browse the board and see how their efforts have helped customers achieve their goals.



Program Manager Meaghan Wallner helped create the new bulletin board.

## Product Design

*(Continued from page 2)*

only controls cost, but also ensures good quality. Follow proper spacing when routing traces, placing vias/pads, and placing components. Maintaining minimum distances to stay within "standard" capabilities for both fabrication and assembly results in good quality at a lower cost.

**Issue 4: Design for Test (DFT) Guidelines Ignored.** Process control requires a mechanism to monitor the process. Electrical test can serve as that mechanism. Providing at least one testable-sized via for each net on your design is good practice. Test fixturing has become more of a commodity these days so the cost of fixtures has dropped significantly. Keep the test pad (which can be a via) at least 35 mils diameter size and minimum 75 mils diagonal spacing to adjacent test pads. Keep test pads minimum 75 mils from body of component and 25 mils from a component lead. Following these two design guidelines will allow for good test coverage utilizing a lesser cost fixture.

**Issue 5: Insufficient Filtering of Integrated Circuits (ICs).** Placing filter ca-

pacitors (aka bypass caps) onto each IC is required to provide enough localized potential energy to allow the IC to switch properly. The other function they serve is to filter out AC (or DC ripple) voltage as not to interfere with the function of the part. Not having bypass caps in place may cause the IC to switch states unintentionally.

**Issue 6: Insufficient Bulk Capacitance.** Bulk capacitance is required to maintain proper voltage levels throughout the entire board. Depending on board size, there may be multiple sets of bulk capacitors used. Because the power source or power supply may not be able to provide sufficient power to all parts of the board, the bulk capacitors help provide the additional energy as needed. In other words, they help load level the supply(s).

**Issue 7: Insufficient Protection for Uncontrolled Incoming Power Loss.** Linear regulator protection is required to account for uncontrolled incoming power loss. When this occurs with insufficient protection, the current will want to go through the regulator in the wrong direction, possibly damaging the component. Ideally, a diode should be provided to shunt the current around the regulator instead of through it.

**Issue 8: Failure to Utilize PCB Design Good Practices.** Most products sold into market need to comply with certain agency standards, i.e. U.L., FCC, CSA, CE, etc. In order to pass many of these standards, employing sound EMC (electromagnetic compatibility) practices is key. The compatibility part of EMC means that a design cannot emit any electromagnetic interference nor be effected from induced electromagnetic interference. Following the practices mentioned previously will all help with ensuring the product complies with EMC requirements. Additionally, if you remember what was taught in basic circuits class, current (I) flowing through a wire will create an electric field. As a result the more wires carrying current, the more fields are produced. And a trace on a board is really nothing more than a wire. So keeping all wires as short as possible with the least amount of resistance reduces the magnitude of the electric field(s). These can be mitigated by providing sufficient power and ground planes which ultimately reduces ground loops. And one more thing to remember, a loop of wire with current traveling through it is really an antenna! This is not good for passing EMC testing.



## Burton Industries Salutes Its Veterans!

We at Burton Industries pause during this holiday season to honor all who are now serving or have served honorably in the military. The sacrifice that they have made to be away from their families while protecting us at home is beyond words. Many Burton staffers have proudly shared stories about themselves or their own family members in the military. We salute them and extend our best wishes for a safe and happy holiday season! We know that we have missed some people and extend our gratitude to them, as well!

**Luke Fulcomer**, I.T. Pro, served in the U. S. Army from Oct 2005 to 2008 as a 59D-C9 Generator and power systems repair for Patriot missile systems. He was stationed at Ft. Riley, KS as part of the 1St Infantry, 1st Sustainment Brigade, Charlie Company.

**Leah Rogers**, Director of New Business Development, proudly shares with us that her son, **Peter Messerschmidt** was in the U.S. Navy from 1991 – 1999 and was based in Norfolk, VA aboard the USS Guam LPH9. He sailed multiple missions including Operation Desert Shield in the Persian Gulf. He then was stationed at the Naval Air Station in Brunswick, MA.

Leah also shares that her daughter, **Allison Rogers Thiel** served in the U.S. Army National Guard from 2001 – 2011. She was in the 32nd Infantry

Brigade and was deployed to Camp Taji Iraq with 1157th Transportation Company from 2006 – 2007.

Also of note from Leah: her dad served in the U.S. Coast Guard and in -laws (mother and father in-law) in the U.S. Army during WWII, two brothers in the U.S. Navy (one who served two tours in Vietnam), and two nephews in the U.S. Navy.

**Jim Wishall**, Sales Engineer, shares that his son, U. S. Air Force Airman First Class **Mark Wishall**, is currently in training at Altus Air Force Base in Altus, OK. Mark will ultimately be stationed at Elmendorf AFB in Anchorage, AK in the 517th Airlift Squadron as a Loadmaster on C17 cargo jets. The 517th was part of the recent joint effort to provide aid to the survivors of the Super Typhoon Haiyan in the Philippines.

**John Berto**, Inspector, served in the U.S. Army from 1980-83.

**Justin Brownell**, Inspector, served in the U.S. Army from 2006-10 and for 11 months of 2007 he was in Iraq defending our way of life.

**Ryan Abramson**, Assembler, began serving in the National Guard in 2008. He was based in Afghanistan from May 2012 through March 2013, and recently completed three weeks of leadership training.

## Annual Food Drive Begins

Amid busy schedules the Burton Industries' team is again having their annual food drive. We all realize the need in the community, especially at holiday times throughout the year.

A good number of people spend volunteer time in our communities to help their neighbors. Our food drive helps them achieve their goal. This fits with our business philosophy as well. Being a service organization, we are able to assist those who are working hard to achieve excellence in humanitarian efforts. Helping those who are less fortunate is an effort that we believe to be of great value. Over the years we have col-

lected cash and food donations, which in turn is matched by the company, providing thousands of dollars in assistance. We have been able to provide a great deal of assistance to the area food pantries who are reaching out to many in the area.

Not only do these funds help during this Christmas season, but also helps replenish a depleted food reserve as the need does not end after the holidays. Please check with your local food pantries to see if you may be of assistance in your area. "A little done by many . . ."

## Anniversaries

### **Christine Brees**

Human Resource Director  
*3 years on October 25th*

### **Becky Hoff**

Customer Service  
*1 year on September 10th*

### **Scott Hoff**

Mechanical Maintenance  
*1 year on September 10th*

### **Linda Freeman**

Manufacturing Associate  
*2 years on October 3rd*

### **Luke Fulcomer**

IT Specialist  
*2 years on October 3rd*

### **Sean Hooper**

Assistant Manufacturing Engineer  
*2 years on October 3rd*

### **Leah Rogers**

Director of Business Development  
*2 years on November 21st*

### **Robert Soderman**

Hand Solderer  
*2 years on October 3rd*

### **Ramona Thelen**

Hand Solderer  
*6 years on December 26th*

## Connections

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