

# Process Controls for Display Manufacturing

How to structure for flexibility

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## The Importance of Process Controls

In these tight economic times two events are occurring that make good process controls even more critical in any company. One economic event is the loss of resources due to restructuring and downsizing in many companies affecting both suppliers and customers. The other event is customers who are unable or uncomfortable providing any forecast, but will then issue purchase orders well within lead time.

To ensure you are ready to respond to these challenges, your display vendors should implement internal structures to support customer orders within these constraints. This ebook highlights how Planar has structured its process controls to meet these challenges.

## The Benefits of Centralization

### Seamless Interaction

Within Planar we have created a Central Operations Organization that reports directly to the Industrial Business Unit. This Central Operations group includes Supply Chain Commodity Managers and Buyers in both US and Taiwan, localized Supplier Quality Engineers (SQEs) based in US, Taiwan and Shanghai, and Logistics, Regulatory and Drafting located in US.

This centralized team allows seamless interaction and support to communicate internally and externally and provides reduced lead time to complete drawings, inform suppliers and coordinate deliveries to meet aggressive lead times.

### Close Coordination

With Supplier Quality Engineers (SQEs) located in the same offices as the Supply Chain there is close coordination in the search, selection, qualification and management of our suppliers. Each SQE maintains the relationships with our key suppliers via regular product audits, monthly review of yield and performance data and regular meetings inside the factory. The Taiwan office has regular meetings with the key suppliers who have their headquarters and Supply Chain in Taipei.

### Strong Working Relationships

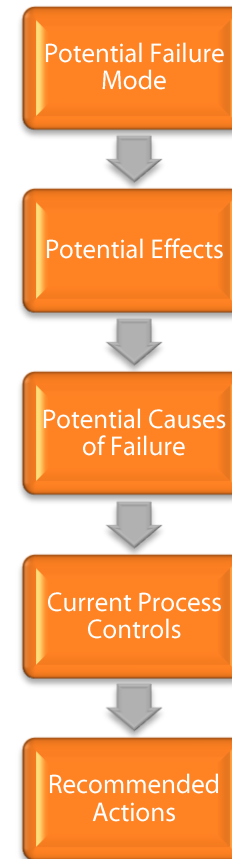
The purpose of these close partnerships is to ensure there are strong working relationships between Planar SQEs and Supply Chain and our supplier's factory, supply chain and quality teams so that issues are avoided or proactively addressed. This allows Planar to react quickly to long lead time issues, special shipping requirements and custom order changes.

# Process Potential Failure Mode Effect Analysis (PFMEA)

## Traditional Version of PFMEA

A requirement for our key suppliers is the implementation of Process Potential Failure Mode Effect Analysis (PFMEA) and Control Plans. We have implemented these same requirements for products we assemble and test within our own Beaverton factory.

For each PFMEA we follow the traditional steps of evaluating the Potential Failure Mode, Potential Effects, Potential Causes of Failure, Current Process Controls, Recommended Actions and score the risk priority level (RPN) for severity, occurrence and ability to detect. High scores for RPN require corrective actions and follow up. After the following build (PVT or MP), the team will meet again to review the results and make final updates to the PFMEA and the Work Instructions.



## PFMEA for Custom Products

### Custom Products Require an Adaptive Process

We are actively involved in many new product introductions at any point in time; many are based on similar display platforms, but usually with some new custom feature or technology. Conducting PFMEAs for every product, following the proscribed format is not realistic due to aggressive New Product Introduction (NPI) schedules and due to the quantity of NPIs in process at any one time.

As a result of our teams' experience, we have been able to revise the classic PFMEA method. This adaptation ensures a cross-functional team approach, while providing the PFMEA output in a shorter period of time. We will start the PFMEA right after the Pilot/PVT build, rather than at the proscribed initiation at feasibility stage. We use the draft work instructions and the yield data from the pilot build.

## PFMEA for Custom Products

### How to Adapt the Traditional Process

The team includes Manufacturing Engineer, Production Operators who built the pilot units, Supplier Quality Engineer, Supply Chain member and, if new technology, the Design Engineer. Using the Work Instruction, we will create a Risk Analysis for the product that includes each identified key process step. This Risk Analysis is created prior to the first meeting so that the review process can be effective. Edits are made during the review to reorder, add or delete any of the process steps.

This Risk Analysis will identify each process step as having a high, medium or low risk, as identified by the team. This identification of risk level is based on previous experience with this process step, yield data and new issues from the pilot build. Any step identified as high or medium risk will have a specific PFMEA created.

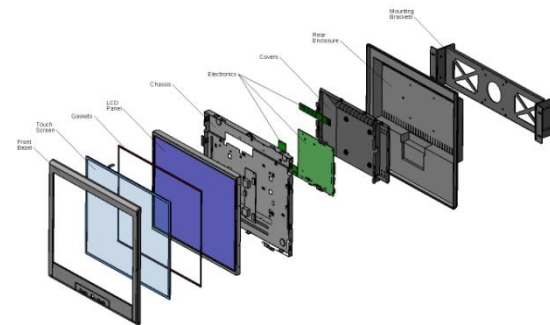
### Focus on the Risky Process Steps

The adaptive PFMEA will be created for major process steps rather than a PFMEA for each process step (example of major process steps: Assembly, Functional Test, Calibration) and it will include only the identified high or medium risk process steps. This method ensures that with limited time and resources we only focus on the key risk areas and avoid spending time discussing process steps that are not an issue.

## Conclusion

### Process Flexibility Matters

Process is essential to any manufacturing environment. A well defined and controlled process and an experienced team ensure the quality of the final product. When selecting a display vendor, it is important to understand each candidate's process controls for custom, as well as standard products. The ability to adapt to changing conditions and requirements can make a huge impact on the success of your program. Vendors like Planar Systems understand and have experience with providing process controls in situations that demand flexibility.



## About the Author



**Barbara Williams**

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Barbara Williams has 24 years of experience in quality assurance and supply chain at Planar including:

- Creating and managing Customer Service
- Managing production and RMA failure analysis and repair which included a closed loop feedback process for product improvement
- Project leader for the initial ISO registration
- Beaverton Site Quality Manager for eight years.

She recently returned from seven years working in Asia establishing Planar teams in Taiwan and Shanghai to manage product quality and nurture the relationships of our off-shore suppliers. She is currently the Director of Central Operations, which supports all Planar Business Units by coordinating the Supply Chain, Logistics, Quality and Regulatory functions within Planar.

### Define Your Project Online

For an interactive guide to defining and selecting a rugged or custom display, visit [www.planarembdedded.com/guide-to-custom-lcd](http://www.planarembdedded.com/guide-to-custom-lcd).

This application will help you collect the answers you need for your project and will email you a summary of your project definition.

