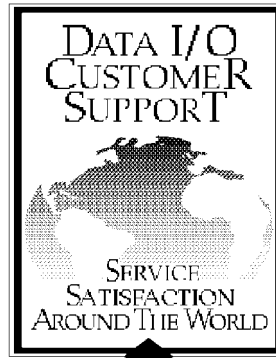




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Subject: Maximizing Programming Yields on the PP100

Model Affected: PP100

- 1.0 **PURPOSE:** To inform customers how too achieve maximum programming yields on The PP100.
- 2.0 **TOOLS REQUIRED:** Low-pressure air supply 20-30 PSI.
- 3.0 **PARTS REQUIRED:** NONE
- 4.0 **INSTRUCTIONS:** MAXIMIZING YIELD DURING PP100 SYSTEM OPERATION

It is our experience with our customers that occasional declines in system yields may occur during day to day operation of the PP100 Automated Programming System. The purpose of this bulletin is to help customers maximize their yields during production. While overall yield levels can vary depending on device manufacturer, any short term change in yields of more then 0.5% is generally cause for investigation of a local or immediate cause of variation. These changes in yield can be attributed to a number of causes, including the manufacturer parts and specific date/lot codes, sockets, system maintenance and system calibration.

Manufacture's Parts

Manufacture's parts can exhibit a number of variations that may affect yields in an automated system, such as the following:

Manufacturer's Parts Conditions That Can Cause Variances in Yield

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- **Mechanical variation in dimensions from different manufacturing lots or facilities can cause parts to not properly fit in the sockets or require recalibration of the system to be placed successfully.**
- **Presence of residual plastic on the edges of the parts (Flashing) can also cause parts to not rest properly in the sockets.**
- **Die changes (shrinks, process improvement for improved wafer yield, ect.) require new algorithms. Data I/O tracks these changes with vendors and highly recommends all customers to subscribe to our algorithm update program.**
- **Die processes do contain a certain degree of variability. Programming yields can sometimes vary on a normal die. Devices that are in the early part of their life cycle tend to have more fluctuations in yields as the semi-vendor's manufacturing process stabilizes.**
- **Multiple fabs often produce the same devices. Performance characteristics, including programming yield can vary from location to location.**
- **Lead oxide accumulating on the leads is also an issue for some devices. This can vary with age and the conditions with which the devices are stored.**
- **New devices vs. used devices – programming yields decreases with the number of programming cycles.**

Sockets

The programming sockets are perhaps the most important and also most vulnerable element of the system. They are subject to residue buildup, damage from devices mis-inserted (perhaps due to poor calibration of the placement system) , and general wear and tear. Sockets are generally rated by their manufacturer for 5000-10000 insertions per socket depending on the type, after which yields may drop off significantly.

Data I/O recommends that you number your PP100 adapters for each programmer so that you have a more accurate count of insertions on each socket. The reason is that not all sockets on the PP100 will have the same number of insertions.

Socket Conditions That Cause Varying Yields

- **Debris of any type can prevent sockets from closing completely. Sometimes the debris may not even be visible with the naked eye. Simple actuation may clear many debris. (Recommended cleaning, or blowing out with low pressure air 20-30 PSI is once per shift, more often in a dirty environment)**

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- **Small molded tabs between each of the contact fingers may become damaged, preventing one or more fingers from closing completely. This can cause intermittent failures.**
- **Clamping fingers are one piece, from the connector pin to the contact finger. If the connector pin is not seated in the molded base it will affect the contact point of the finger.**
- **Bent or distorted contact fingers can also cause intermittent failures.**

System Maintenance

System maintenance is critical to maintaining high yields. Periodic cleaning, adjustment and replacement of worn elements will ensure the best possible performance. These periodic procedures are outlined in the PP100 service manual and should be followed closely.

System Calibration

Careful system calibration is also critical to maintaining high yields. While not normally required during steady operation. Data I/O nonetheless recommends checking calibration of the system anytime yields fall to unacceptable levels.

Operator Error

Finally, there are a number of process errors that can result in reduced yield. While an automated approach can eliminate most human error during production, some of the following items are examples where errors in the system setup or maintenance programs can result in reduced yield:

Potential Human Errors in an Automated Environment

- **Using old algorithms even though the company has access to updated algorithms, because no formal internal process has been defined for updating algorithms. PP100 algorithms are updated weekly at <http://www.dataio.com/TechnicalUpdates.htm>**
- **Selecting the wrong part number in a job. (in effect using the wrong algorithm)**
- **Changing programming parameters (sector protection, security options, verify options, continuity testing, blank checking)**
- **Not measuring yields often enough, so that when yield rates drop slightly, it is not detected until a large number of devices have failed.**
- **Using the wrong datafile.**
- **Socket abuse (digging failed devices out with sharp instruments)**

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- **Changing to second source or third sources. (high quality parts tend to get higher yields than do the bargain basement varieties).**

Socket Maintenance

- **Blow out the sockets with a low-pressure air line to remove flashing and other debris.**
- **Check sockets for damage or wear.**
- **Replace sockets when required.**