

# Practical Considerations for Minimizing Problems When Using Programmers and SST SuperFlash Memories



*Application Note*  
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## INTRODUCTION

The expected yield when writing or programming SST SuperFlash EEPROMs with a programmer is 100%. In practice, when using a device programmer, customers may experience less than 100% yields due to environmental and equipment maintenance issues.

Following the guidelines below will decrease the false failures and damaged devices during the programming operation.

## Programmer Considerations

The following programmer requirements should be met:

1. Power Supplies: a 50 to 100  $\mu\text{f}$  capacitor should be placed on each power supply. A 1 to 10  $\mu\text{f}$  capacitor should be placed on each socket for the DUT.
2. Absolute  $V_{DD}$  and  $V_{PP}$  (for the SST27SFxxx family) levels and spikes should fall within SST's specifications detailed in the data sheet.
3. Ground planes or parallel ground paths should be used to minimize inductance.
4. The programmer should be connected to AC power via an isolation transformer, e.g. Sola, Oneac.
5. The programmer should use SDP to write to the device (for the SST29xExxx families) at all times.
6. Multisite programmers should have a separate  $V_{SS}$  bus connection for each socket. Never use a series connection for  $V_{SS}$ .

## Environmental Conditions

The following environmental conditions should be maintained at the time of programming:

1. Temperature:  $25^{\circ}\text{C} \pm 3^{\circ}\text{C}$ , with transients less than  $3^{\circ}\text{C}$  per hour
2. Relative Humidity: 35% to 65%
3. Dust Content: less than  $1\text{mg}/\text{m}^3$
4. Mechanical Vibration: less than .2g from 5 Hz to 50 Hz, less than .5g from 50 Hz to 500 Hz

## AC Power Requirements

AC power should conform to the following:

1. Frequency: 50 or 60 Hz  $\pm .5\%$
2. Amplitude: 105 or 215 Vac  $\pm 5$  Vac
3. Ground Resistance: less than  $100\Omega$
4. Programmer should not be in the vicinity of large stepper or inductive start motors.

## Electrostatic Discharge (ESD) Protection

Proper ESD protection is essential to eliminate damage to semiconductor devices.

1. Antistatic flooring, work surfaces, and clothing
2. ESD ground independent of AC power ground
3. A ground stake should be used with 1 M $\Omega$  isolation between the ESD ground and the power ground.
4. Proper use of ground straps with appropriate connections
5. Use of antistatic paper or antistatic jackets for paper

## Shielding

1. Work area should be shielded from stray electromagnetic fields. For example, the programmer should be in a Faraday cage.
2. Operators should wear antistatic finger cots or gloves while handling devices.

## Maintenance and Calibration

Proper maintenance and calibration procedures should be followed to insure consistent programming results over time.

1. Programmers should be calibrated per the manufacturers recommendations at the recommended intervals.
2. Sockets should be replaced prior to the manufacturer's recommended limit for the number of insertions.
3. Work area should remain free of debris, dirt, and liquids.
4. Programmer and work surfaces should be cleaned at regular intervals.



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#### Summary

By following the above recommendations, the customer will experience consistent programmer yields at or near 100% due to a reduction in false programming failures and improperly programmed devices caused by programmer problems. The number of damaged devices caused by mishandling will be reduced or eliminated.