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TIBPAL Programmability

Texas Instruments PAL devices are thoroughly screened to give the highest practical programming yields. Several programs are ongoing to enhance the programming quality of these devices.

- Specific tests within the production test programs are designed to verify the integrity of the programming array over temperature. This ensures a proper blank device. As each device is not programmed, individual devices within a given lot may not successfully program.
- Statistical process control is used to monitor several key parameters related to programmability within the Texas Instruments' wafer fabrication area. Feedback from programming samples is used to adjust the screening levels as needed to provide desirable results.

Occasionally an individual device will not program correctly. When this occurs, it is requested that the unit and supporting paperwork be returned so the unit may be replaced. Due to the nature of programming defects, failure analysis of such devices is not normally performed.

When programmability problems occur with an entire lot, the root cause can usually be traced to the use of an improper programming code. The software for some programming systems does not prompt the user for the P-code. Instead, the user is prompted for manufacturer and device type. In some cases there is no provision made by the software to differentiate between the military and commercial device types. The military versions of TIBPAL devices are manufactured with a different die than the commercial versions. If the wrong version of the part number is selected when programming the device, an incorrect algorithm may be used and the device could be destroyed. Please consult the Texas Instruments PLD Programming Reference Guide for detailed programming information.

A special case exists with the military version of the TIBPAL16L8-15 (J, W, and FK packages) and the TIBPAL16R4-15 (J, W, and FK packages). When programming the TIBPAL16L8-15 using datecode 9903A or later, select from either TI Military/16L8-12 or TI/16L8-10 on Manufacturer/Device menu listing in the programming system. When programming the TIBPAL16R4-15 for datecode 9616A or later, select from either TI Military/16R4-12 or TI/16R4-10 on Manufacturer/Device menu listing in the programming system.

In some cases, devices are damaged by electrical overstress that may result in an apparent programming failure. While most instances of electrical overstress is caused by the use of incorrect programming codes, it can also be caused by reverse socket insertion or a significantly out-of-calibration programming system. If additional automated electrical testing of devices is performed by the end customer prior to programming, an evaluation of the test system is recommended. This evaluation should include the test limits and set up conditions, test system calibration, and the possibility of test system electrical transients, ground noise, and ground bounce. Reverse socket insertion during automated testing could also damage a device.

For additional information on this topic or any other inquiries, please contact the Texas Instruments Product Information Center at <http://support.www.ti.com> or (972) 644-5580.