

# MAX<sup>3</sup>

Enhanced Dynamic Burn-in of  
Digital Signal Processors,  
Microprocessors and Memories



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Setting the Standards for Tomorrow



As semiconductor processes move to .25 microns and below, standard burn-in systems no longer support the needs of IC manufacturers. The MAX3 solves this problem by offering 100% monitored bias and dynamic signal voltages as low as 0.7V.

## KEEPING PACE WITH TOMORROW

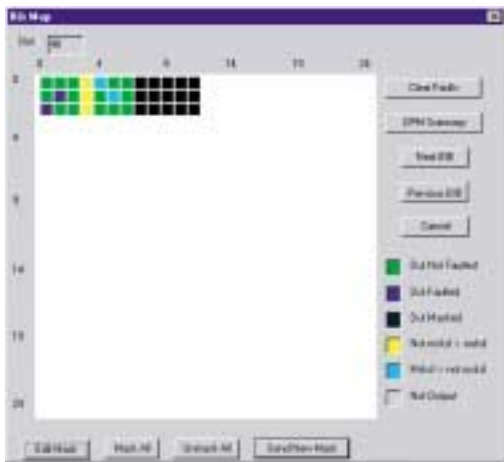
As semiconductor manufacturers continue to decrease line widths to incorporate more and more functions on a single chip, the current burn-in equipment in use today is fast showing its age. Designed and built to yesterday's specifications, these systems are not capable of meeting many of today's IC applications, much less tomorrow's. Therefore, the need for a new generation of test equipment that can keep pace with the new and emerging process technologies has reached a critical level.

The MAX3 Dynamic Burn-in System is designed to move beyond the limitations of today's burn-in systems. As with all of our equipment, we designed the MAX3 to allow future upgrades by building a system with a high degree of modularity, allowing capabilities to be added to address future applications. This means that when you purchase our newest burn-in station, you are assured that you won't need to replace it anytime soon.

Some of the features available in the system are:

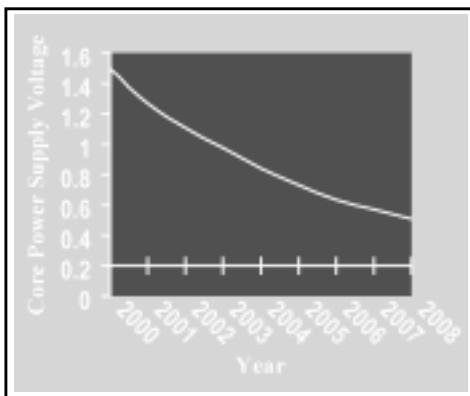
- Stimulus voltages as low as 0.7V
- Functional testing of devices during burn-in
- Testing with patterns for JTAG and BIST
- Vectors as deep as 2M for normal test operations
- Vectors as large as 24M for boundary scan applications
- 96 independent I/O channels
- Easy programming of standard memory patterns with addressing up to 4G
- Configurable with up to 32 independent pattern zones each to burn-in multiple device types simultaneously

Together, these features create a new system that can be used to burn-in the new types of memory devices such as Double Data-Rate DRAM, Rambus DRAM and SLDRAM, plus multifunction devices such as digital signal processors, microprocessors and systems-on-a-chip.



## OUTPUT MONITORING

Output Monitoring (or monitored burn-in) is the next logical step for increasing productivity. Output Monitoring identifies passing and failing devices during the burn-in process. It eliminates faulty parts from the testing process earlier and gives a greater production cost effectiveness. Output Monitoring also guarantees that the device is actually getting the proper inputs and receiving the specified burn-in to achieve the targeted reliability.



Projected IC Core Power Supply Voltage vs. Year  
(source: *The National Technology Roadmap for Semiconductors: 1999 Edition*)

## LOW-VOLTAGE HIGH-CURRENT CAPABILITY

Aehr Test's latest MAX3 dynamic burn-in system is capable of burn-in voltages as low as 0.7VDC and has the capacity to supply current as high as 51A per slot. This combination allows the MAX3 system to offer state-of-the-art low voltage capability with the highest device capacity of any burn-in system on the market today.

## 96 I/O CHANNELS

The MAX3 is capable of driving up to 96 independent I/O channels. In the standard configuration, the system supplies 96 digital channels. It can also be configured to supply 94 digital channels and two analog signal channels.

The larger number of channels compared to most systems enables users to provide higher fault coverage for burn-in of high pin-count devices. It also allows channels to be allocated to testing device outputs, especially for devices using JTAG or BIST. This makes the MAX3 system ideal for burning-in products such as microprocessors and

systems-on-a-chip as well as for memory devices.

## LARGE PATTERN VECTORS

We designed the MAX3 to accommodate pattern vectors up to 2 Meg deep across all 96 I/O channels for standard burn-in applications and 24 Meg deep for up to four channels for boundary scan applications. These pattern depths offer great flexibility and allow users to create complex patterns for logic devices such as digital signal processors, microprocessors and systems-on-a-chip. These patterns can be loaded quickly and efficiently with the MAX3's high speed parallel bus.

## STATE-OF-THE-ART PATTERN GENERATORS AND DRIVERS

Aehr Test Pattern Generators and Driver boards have long been known in the burn-in and test industry for maintaining high standards of performance.

MAX3 pattern generators give you the flexibility to program complex patterns and vector streams for multiple device types. The system includes signal drive for input channels and expected data for output channels. The system also allows you to install up to 32 Pattern Generator boards in individual zones to allow the testing of multiple device types simultaneously. Furthermore, the MAX3 Pattern Generator is capable of exercising the latest memory devices.

The MAX3 driver boards utilize the latest driver design and offer the best combination of low voltage range, high frequency capability and high current delivery of any driver board available. Our drivers also allow you to separate driver voltages into two groups, so that clock and address signals may be programmed at different voltage levels.

## THREE SEPARATE BIAS VOLTAGES PER DEVICE

The MAX3 includes three separate power supplies, two positive and one that can be either negative or positive depending on your specifications. Three power supplies means three separate voltage levels available at any one time across the zone and different zones may be programmed to different voltage setting. Pull-up

and Vcc voltages may be separated for a more stable burn-in environment.

All three power supplies can be programmed for different voltage levels at each individual burn-in step, with programmable sequencing and sequencing delays to power up devices smoothly to prevent device latch-up or damage.

## **WINDOWS NT-BASED OPERATION AND PROGRAMMING**

The MAX3 system uses the Microsoft Windows NT operating system. Known for its powerful architecture and easy learning curve, the Windows NT system reduces the training required to operate the system and at the same time offers a reliable platform for the system.

Multiple MAX3 systems are connected together on a Windows NT network through a central server. The server uses the Microsoft SQL relational database to protect the data while facilitating easy data entry and burn-in result retrieval. The database offers central control over the programs being run on all systems on the network.

## **LOT CONTROL AND DEVICE PROTECTION**

Our MAX3 system offers a number of ways to monitor and protect the lots as they are burned in. First, the system includes the BIB Lockout safety feature. The programmer may specify particular Burn-in Boards for specific burn-in programs. When Burn-in Boards other than those specified are installed in the system, the operator is warned of an improper burn-in board match and the system prevents the program from starting.

Second, device inputs are continuously monitored. When erroneous input data is detected, the faulted burn-in board slot is shut down while burn-in continues elsewhere in the zone and the system.

Third, the system keeps track of all good run time accumulated on the burn-in boards installed in the system. Good time occurs when all stimuli are at their programmed values (temperature, bias, stimulus voltages) and no faults are detected. When all the burn-in boards complete their programmed burn-in time, the burn-in lot is reported to be complete.

## **TEST RESULT REPORTING**

The MAX3 output monitoring capability generates a pass/fail map of all devices on all BIBs in the system. This information is reported in a variety of ways:

- A real-time display of test results from any BIB, showing whether each device on the BIB is passing or failing the current test
- A bin map at the end of each run, giving a summary of the run results for each BIB. This bin map can then be automatically sent to a sorting BIB unloader.
- Detailed reports of failures at each test step of the run. These reports can be used to develop a detailed reliability profile of the devices burned in.

## **ATS, MAX BURN-IN BOARD COMPATIBLE**

While the MAX3 burn-in system is state-of-the-art, we have protected our users' current investments in burn-in boards. The system can be configured to use the MAX2, MAX-64000 and ATS-12000 series burn-in boards, and burn-in programs written for the older systems can be transferred to the MAX3 easily.

## **SEMI S2-93 COMPLIANT**

The MAX3 system is designed to meet the SEMI-S2-93 Safety Standard, resulting in increased productivity through better safety systems.

## **COMPLETE BURN-IN SOLUTION**

The MAX3 system offers a complete solution. Aehr Test can supply you with systems configured to meet your specifications. This includes burn-in boards that can be tuned for particular devices to ensure that you get the best system with optimum performance characteristics.



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