


# ESA-QCA0037T-C

		<b>IRRADIATION TEST PLAN NO:</b> RAD-IMP-IGG-001		Issue No: 2 Date: 13/5/98 Page: 1 of 4																																	
Component No.: ST PC CONSUMER		Component Designation: MULTIMEDIA PC, ST 486 PROCESSOR CORE, 66 MHZ		Irradiation Spec No.: N/A Issue:                      Rev:																																	
Specification Detail: ST Datasheet Issue: Preliminary		Acceptance Evaluation            x Element <input type="checkbox"/> Diffusion <input type="checkbox"/> Lot <input type="checkbox"/>		Electrical Meas. In-situ                x Remote <input type="checkbox"/>																																	
Manufacturer: STM Address: 3 Rue de Suisse Rennes Cedex 2 France		Test Facility: ERA Address: Leatherhead Surrey ENGLAND		Project/Programme  IMPACT Originator: IGG CT Name: Paul Rickwood																																	
Radiation Source COBALT 60		Sample Size: 4 Control Devices: 1		Exposure Single                X Multiple																																	
Annealing Test YES X    NO <input type="checkbox"/>		Radiation Level: 25 KRad (si)																																			
Single Exposure Dose [kRAD(Si)] Dose Rate [RAD(Si)/s] Exposure Time Not Applicable		Multiple Exposure: Irradiation Steps Dose [kRAD(Si)] Maximum Dose Rate [RAD(Si)/s] Minimum Exposure Time [s]		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;">1</td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> </tr> <tr> <td>25</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>12500</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>		1								25								2								12500							
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Bias Requirements:      During and after Exposure (for remote elec. measurements):      YES																																					
Bias Conditions:        The Electrical Bias circuit as per EVMINI 1.1 Evaluation kit.																																					
Shielding:                Shielding is required to protect Evaluation board.																																					
Irradiation Test Sequence																																					
<b>Test Step</b>	<b>Description</b>	<b>Requirements</b>																																			
1	Irradiation Test Samples	Quantity 5 devices shall be selected from the lot delivered to IGG.																																			
2	Serialisation	Serialisation - (if the devices are not serialised). Test units shall be serialised 1 to 4 and the control unit shall be 5.																																			
3	Initial Electrical Measurements (at IGG)	Per Table A herein on all 5 parts. (See Remarks 1, 2 and 3)																																			
4	Initial Electrical Measurements (at ERA)	Per Table A herein on all 5 parts. (See Remarks 1, 2 and 3).																																			



## Irradiation Test Sequence (Cont.)

Test Step	Description	Requirements
5	Set-up Test	Verify evaluation board supplies (In-situ) for each DUT.
6	Irradiation Exposure	Verify radiation dose rate and position in the chamber to achieve required dose. Verify and witness duration of exposure to achieve required dose.
7	Intermediate Electrical Measurement (at ERA)	Continuous Monitoring (see table A and Note 4)
8	Annealing	Annealing shall be at room temperature for 24 hours.
9	Post Annealing Electrical Measurements (at IGG)	Per Table A herein on all 5 parts. (See Remark 2 and 3)
10	Accelerated Aging	Aging shall be storage only at Tamb = +25 ±5°C for 168 hours.
11	Final Electrical Measurements (at IGG)	Per Table A herein on all 5 parts. (See Remark 2 and 3)
12	Total Dose Irradiation Test Report	ESA/SCC No. 22900.

## Remarks

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1. The initial electrical measurements performed at IGG (Test Step 3) shall be performed within 24 hours of the initial electrical measurements at ERA (Test Step 4).
2. All electrical testing shall be performed on the same set of equipment in order to achieve correlation of results both at IGG and ERA.
3. At test steps 3, 4, 9 and 11, the functionality of the parts shall be verified by running the CPU 24-hour Burn In Test Programme until the parts have achieved thermal equilibrium demonstrated by a stable supply current to the evaluation board. The supply currents to the evaluation board shall then be recorded.
4. The exposure shall be stopped for any device that exhibits functional failure, as defined by the CPU 24-hour Burn In Test Programme V.1.1 and the time to functional failure recorded and total dose calculated.



**TABLE A - ELECTRICAL MEASUREMENTS AT ROOM TEMPERATURE  $T_{amb} +25 \pm 5^{\circ}C$   
BEFORE, DURING AND ON COMPLETION OF IRRADIATION**

NO:	TEST
1	Monitor functionality by interface with the appropriate peripherals and run CPU 24-hour Burn In Test Programme V1.1 (See attached description)
2	Supply currents to the evaluation board to be measured and recorded at 5 minute intervals during irradiation. Prior to and on completion of radiation, supply currents to the evaluation board to be read and recorded.



# Appendix 1

## CPU 24-hour Burn In Test Programme V1.1 (Documentation)

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Ip

.June.21.1991.

Introduction  
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CPU24 is a "industrial grade" burn-in test program for use in testing the ability of system-boards to withstand heavier-than-normal operations in order to locate any possible manufacturing/engineering defects.

The testing involves all aspects of system-board resources, from CPU, FPU, BIOS ROM, system cache, RAM, and even video.

The program has been named CPU24.BAK so that you must read this file before using CPU24. As a result, you now have the obligation to read the following instructions, warning, notice and disclaimer. To setup CPU24 for its executable, enter the following at your DOS prompt:

COPY CPU24.BAK CPU24.EXE

Type CPU24 to run.

Proper implementation of month change has not yet been done. As a result, using CPU24 on the last day of a month may yield and improper end time.

This limitation will be addressed as soon as possible and registered users will certainly be the first to know (more on registration later).

Future revisions  
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- implementation of proper month change on the last day of month
- more involvement of video sub-system in testing
- implementation of floppy/hard drive testing, either integrated with or as a companion module, to CPU24
- user-selectable time frame for testing

Revision History  
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Cpu24.txt

- 1.10 - Released: June.21.1991
  - bug fix: v.1.00a tended to stop after 1 second before 10 hours due to
    - a misplaced data type
  - implemented full IEEE standard double precision floating point calculations
  - removed introductory text from executable
  - replaced 72-hour executable version with a batch file
  - implemented filling/moving of 32K memory blocks
- 1.00a - Released: June.01.1991
  - implementation of 24 hour time frame
  - addition of a 72-hour executable version for manufacturing use
  - minor equation alteration to prevent illegal values
- 1.00 - Released: February.14.1991
  - implementation of full double precision floating point calculation
  - first full-scale distribution
- 0.01 - Released: December.01.1990
  - beta version
  - minor bug fix
- 0.00 - Released: November.01.1990
  - beta version
  - initial release

WHAT CPU24 Is All About

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This program's purpose is simple and straight-forward: to burn-in system-boards and their components.

This program works on the premise that most computer system problems arise as a result of:

1. poor engineering design, or
2. manufacturing defects.

A minute number of problems may arise due to electrical problems from thunderstorms, or just plain electrical wear and tear. These latter are not considered problems as they occur as a fact of life. The first two, however, are unacceptable.

CPU24 performs tests in passes, each pass calculating 8 IEEE-compl

iant floating  
-point operations of a complex equation, with an additional 8 additional  
calculations, 4 to calculate timing and 4 to write the sums of the  
first 8  
calculations into a 32K memory block. Each 32K memory block is filled, then  
its data is flushed out and refilled again. As a result, this test will use  
all system-board resources: CPU, FPU, RAM, BIOS ROM, system cache, chipset  
modules and even video. This type of intensive testing will bring the system-  
board components to maximum operating temperature. Any engineering and/or  
manufacturing flaws will certainly show up during this exercise, usually by  
hanging the system or spontaneously resetting the system.

Some manufacturers install CPUs which are improperly rated (ie. 286-10 CPUs  
boosted to 12MHz, or 386-25 CPUs to 33MHz, by means of a faster crystal).

This test will almost always reveal the shaky reliability of such boards,  
causing them to hang/reboot about 60%-80% of the time. As a note, even if you  
have such a 'souped-up' system within the lucky 20%, I don't find it morally  
or ethically acceptable for retailers/manufacturers to sell such units. Hoping  
your 'souped-up' system-board falls within 20% is not a chance I'd risk.

From personal experience, I've notice two types of such 'souped-up' boards.

The first are the standard boosts with faster crystals. The boards usually  
have massive heat sinks on the CPUs and sometimes even chipsets to try  
cooling these components down. The second type are called 'Factory Pre-  
Sorted' CPUs. These essentially faster chips which fail the CPU manufacturer's  
(usually Intel, Harris, AMD or Siemens) stringent quality control tests but  
are still much better than the normal properly rated CPUs. Thus, in the vast  
majority of standard usage, these 'Factory Pre-Sorted' CPUs tend to not give  
many problems.

The most appropriate time to use this program would be right after

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you bring  
your brand-new machine home or to the office from the store, even  
before you  
take the time to pack away the boxes. Prepare a batch file to run  
CPU24 for 3  
days (72-hours). One such batch file is included, called CPU72.BA  
T.

Sure, you won't have use of your brand new system for 3 days, but  
I'm sure  
you'll agree that 3 days now would be better than 1 week in the sh  
op 6 months  
down the line!

If a system passes without a hitch, you can be darn sure it will k  
eep running.  
You should also examine if your case and power-supply provides ade  
quate air  
ventilation/circulation to cool your system. Overheating may caus  
e problems  
in the future. Again, it is better to catch the problems now, rat  
her than  
later. If you do find that your system hangs or reboots, especial  
ly if you  
run the test 3 or 4 times, you can be sure there is something wron  
g with the  
system. This test has been tested on a wide range of systems and  
on a  
system-board with good components, you can run this test for weeks  
on end  
without causing any crash.

After your initial test, you may give your system the occasional r  
un-through  
whenever you have the time to spare. However, when the final week  
of your  
warranty is approaching, run the test another 72-hours, just to ma  
ke sure  
you can get any potential problems fixed before warranty expires.  
Any system  
that runs for a year or more will continue to run.

This program can also be used to benchmark various configurations.  
CPU24  
depends on the configuration of the system-board in general in com  
pleting  
each pass it cycles through. Naturally, systems-boards with FPUs  
and system  
caches will certainly increase their ability to do more calculatio



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ns in a time frame. Please note that CPU24 is not designed for true benchmarking as no provisions have been implemented for actually assessing the fine differences between CPU types. CPU24 is designed to test the ability of a system-board to do heavy computational work over a long-than-average time period.

Most people interpret benchmarks improperly. Some people (retailers, manufacturers, and buyers alike) throw around Norton SI or Landmark CPU speed ratings left, right and center.

One very classic case is the use of the Landmark CPU Speed Test on the Intel 486 class system-boards. Some retailers enjoy quoting seemingly spectacular speed ratings with version 0.99 of the Landmark CPU Speed Test, with figures going up to 155MHz on 486-33MHz systems. I'd like to inform every one now that the version 0.99 Landmark does not have any provisions for CPUs as high as a 386-33, let alone the 486-33. The proper version of Landmark is version 2.00 which gives most 486-33 systems a speed of 115MHz. In fact, when you run version 0.99 on a 386-33, the speed bar wraps around the screen several times. On a 486-33, version 0.99 hangs, since its algorithms to calculate a speed rating is simply blown away by the 486-33's response. The 155MHz reported speed is simply the last figure version 0.99 prints out before it dies.

The same applies to Norton SI and a host of other such benchmark programs. Versions are very important and you must make sure a particular benchmark offers the correct results. A benchmark reported by Norton SI version 3 is not the same as a Norton SI version 4.5. The same holds true for CPU24.

A benchmark must be compared against two systems, each with only one factor different, whether it be CPU speed or video display type. When us

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ing CPU24 to benchmark CPUs, you should have two machines with the same configuration exactly (hard drive type, video type, RAM) except for the system-board and CPU itself.

WARNING: The testing performed will run your system-board to its maximum capacity. Although it has yet to occur, the high temperatures generated by your system-board during the tests may cause damage to improperly designed components. SYSTEM-BOARD COMPONENTS WHICH ARE OF ANY HALF-DECENT QUALITY AND PROPERLY DESIGNED FOR THEIR RATED OPERATION WILL NOT BE DAMAGED FROM THIS TEST. Many components will generate extreme heat which may cause severe burns if in contact with bare skin. Do not touch components during testing. (I found out the hard way and nursed a number of blisters for some days.) You are urged to read the instructions and disclaimer in the introduction to CPU24 before running either test programs.

IMPORTANT NOTICE: Peregrine Graphics Systems, as the manufacturer/producer of this program, offers no guarantees, explicit or implied, with regards to the fitness or usefulness of this program except for the following: this software, CPU24, has been written and fully tested on systems manufactured by:

Abax Communications Group

2091 Dufferin St. Toronto, Canada, M6E 3R3

(416) 658-3989, (416) 658-3992 FAX

CPU24 was designed primarily for burn-in testing and a method of quality control of Abax computer systems.

DISCLAIMER: Peregrine Graphics Systems shall not be responsible for any damages caused by the use, or misuse, of this software. No modifications

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of this  
software by any means is allowed.

If you like this program and find it of much use in maintaining the working operation of your computer, or find that it helped you locate a fault in your system, please send \$10 to register your copy. In addition to acknowledging the usefulness of this program, the registration fee entitles you to future versions and/or burn-in softwares produced by Peregrine Graphics Systems. If intend to use this program to burn-in systems which you will resell, you MUST register.

Send registration and/or comments to:

William Ip

Box 428, Station W

Toronto, Canada, M6M 5C1

I can also be reached on CompuServe at 70670,737, or Canada Remote Systems 798-7730 (2400 baud) or 798-7733 (14,400 USR dual).

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