

**EXTERNAL SPECIFICATION  
(User Perspective)**

**TITLE : Menu External Specification**

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## **1. INTRODUCTION**

### **1.1. Purpose**

This document describes the usage of the diagnostic *menu* and the tests in it. As tests are added to *menu*, this document will be updated.

### **1.2. Applicable Documents**

Sun 2 Processor Manuals (PN nnn-nnnn)  
Rasterop Chip Specification (PN nnn-nnnn)  
The Am9513 System Timing Controller Handbook (AMD PN 3402B-MMP)

### **1.3. Definitional Conventions**

The terms ropchip and timerchip will occasionally be used for the rasterop chip and Am9513 respectively.

#### **1.3.1. Notations**

The use of C notation for hexadecimal is used here, meaning *0znnnn* is *nnnn* in base 16. Operator input on menus will be in boxes.

#### **1.3.2. Terminology**

The term operator or user refers to you. The term booting refers to the loading of the program *menu* from the various media SUN supports. If you are unfamiliar with booting, refer the System Manager's manual.

## **2. SYSTEM OVERVIEW**

### **2.1. General Description**

The diagnostic *menu* is a menu oriented system with a number of tests and options selectable from the top level. The tests now under the menu are the rasterop chip test, and the user timer test.

### **2.2. Features**

*menu* allows the operator to test the rasterop chip once, or to let the timer test accumulate until told to stop. At the top level, you may either select the tests, or quit back to the monitor.

### **2.3. Required Configuration**

For the rasterop chip test:

A Sun 2 Processor with Raster op chip installed. (PN nnn-nnnn)  
At least 1MB of low power memory (PN nnn-nnnn)  
Some means of loading *menu* (ethernet, disk, tape, etc.)

For the user timer test:

A Sun 2 Processor with user timer modification installed. (PN nnn-nnnn Rev ?)  
At least 1MB of low power memory (PN nnn-nnnn)  
Some means of loading *menu* (ethernet, disk, tape, etc.)  
NO, repeat NO active DMA devices in the cardcage.

## 2.4. Error Handling

### 2.4.1. Rasterop

If the rasterop registers do not respond as planned, the contents are printed out. If the two rasterop memory tests do not produce the desired results, the value expected and observed are printed, and the test waits for operator input to continue.

### 2.4.2. User Timer

If the observed timing values exceed the limits given, the test stops with the bad values, and waits for operator input to continue.

## 2.5. General Performance Characteristics

The rasterop test takes about 1 sec to complete and return to the menu. The user timer test takes 200 milliseconds per pass, and waits or returns to the menu at the operators request.

## 2.6. Planned Extensions

Tests which do not require prom based operation or verification of memory will probably end up in *menu*.

## 2.7. Limitations

The verification of the rasterop chip is not exhaustive, and the user timer check is still subject to change.

## 3. Menu SPECIFICATION

### 3.1. User Interface

There are three levels at which the operator has input. At the top level of menu, some list of tests needs to be input. At the test level, some values may be required (or defaulted). During the test, the operator may have the ability to alter test actions, and or respond to error messages as they appear.

### 3.2. Input/Output

#### 3.2.1. Menu

When the menu starts executing, or you return to the top level, this menu will appear. The box indicates user input.

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Option Menu:

r - rasterop test  
t - user timer test  
q - leave the game

:  flags

### **3.3. Operation**

#### **3.3.1. Menu**

The operator must type the letters of the tests he wishes to run. For example, to run four rasterop test the operator should type 'rrrr'. To run two rasterop tests, then the timertest, 'rrt' should be input. To run the rasterop test, then the timer test, then quit, 'rtq' should be input.

#### **3.3.2. Rasterop test**

No input is required for this test until an error occurs.

#### **3.3.3. User Timer test**

When this test starts executing, it prints the following:

minimum clock [0x7944] : nnnn

maximum clock [0x7947] : nnnn

You may either enter a hexadecimal value for both of these, or press return to default them. Defaults have been chosen as the current best known limits. When you have done this, the test starts. As the test runs, you may stop output by pressing the space bar. To start output, press the space bar again. If you wish to stop the test and return to the menu, type a 'q'. As this test continues forever, you will have to do this eventually.

### **3.4. Error Handling**

#### **3.4.1. Rasterop test**

When an error is found on the memory rasterop cycles, the test stops and prints the values of the count, the observed data, and the expected data. If you type 'n', the test skips to the next portion of the test. If you type 'q', the test returns to the menu. Any other key will continue the current test.

#### **3.4.2. User Timer test**

If the timer value exceeds the input limits, the test prints

oops #n press any key

and waits for input. A space will print the next value and wait, a 'q' will return to the menu, any other key will continue the test.

### **3.5. Performance**

#### **3.5.1. Rasterop test**

The test first checks to see if the registers respond, then performs a copy rasterop of aligned 16-bit words. After this, it does an invert of the data it just copied. This test is very short and returns immediately to the menu.

#### **3.5.2. User timer test**

This test sets up timer 4 as a user timer, and timer 5 as a counter. It then toggles between user and supervisor mode on a 1 millisecond interval for 200 milliseconds.

Due to the time it spends getting back to user mode, the value is skewed towards supervisor mode (0x7946 instead of 0x7800). The values printed out are pass number, the real time the test took (uses the real time clock to find this), the values for counter 4, and the value for counter 5. For counter 4, we print the current value, the max and min, the avg and standard deviation. For counter 5, we only print the current value, as it should never be anything but 0xffff (we check this).

APPENDIX

4. APPENDIX SECTION

4.1. Sample output for rasterop test

ROP @ 0x9800  
source @ 0x80000  
dest @ 0xa0000  
start copy .. stop  
start invert .. stop

*returns to menu*

4.2. Sample output for user timer test

Question marks are don t cares.

pass 1 time 0.201 4(0x7946 max 0x7946 min 0x7945 avg 0x7946 dev 0) 5(0xefff)  
pass 2 time 0.201 4(0x7945 max 0x7946 min 0x7945 avg 0x7946 dev 0) 5(0xefff)  
pass 3 time 0.201 4(0x79aa max 0x79aa min 0x7945 avg 0x79?? dev ?) 5(0xefff)  
oops #1 press any key

*now waiting for operator input*

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