

**EXTERNAL SPECIFICATION  
(User Perspective)**

**TITLE : Sysgen Controller Diagnostic External Specification**

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**Document Review Form**

Please make note and initial on this page all corrections and/or proposed amendments by page number and/or section number.

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Recommendations, Differences, Construction Errors, and comments:

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Typographical Errors:

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Attach additional sheet(s) as needed.

**SYSGEN CONTROLLER DIAGNOSTIC EXTERNAL SPECIFICATION**

**1. INTRODUCTION**

**1.1. Purpose**

This specification describes the procedure to follow when testing Sysgen Controllers using the diagnostic *sysgen* to insure functional boards for Sun Workstations.

**1.2. Applicable Documents**

- (1) Sysgen SC4000 Intelligent Tape Controller Product Specification, Doc. No. 4000-500-00, 7/21/83.
- (2) Sysgen SC4000 Intelligent Tape Controller Installation Procedure, Doc. No. 4000-530-00, 6/11/83.
- (3) Sun SCSI Programmers' Manual, W. M. Bradley, 7/20/83.

**2. SYSTEM OVERVIEW**

**2.1. General Description**

The Sysgen Controller Diagnostic, *sysgen*, was developed to test the SCSI tape controllers (PN:370-1011-01) before they are assembled into systems. The diagnostic exercises the board by talking over the SCSI bus to a known good 1/4" Streaming Cartridge Tape Drive using the functions provided by the controller.

**2.2. Features**

The performance of the Sysgen Controller is examined through the use of the following functions:

- (1) Test Unit Ready,
- (2) Rewind,
- (3) Space,
- (4) Read,
- (5) Write,
- (6) Write File Mark,
- (7) Request Sense.

**2.3. Required Configuration**

The following hardware is required for an Sysgen Controller Diagnostic Test Station:

- (1) a card cage (PN:340-0332).
- (2) power supply(s) (PN:300-0135-03) for the card cage, sysgen board, and 1/4" Streaming Cartridge Tape Drive.
- (3) a monitor (PN:540:1015-01), video board (PN:501-0059-01), and keyboard (PN:540-1014-01).
- (4) Sun-2 processor board (PN:501-1007-04).
- (5) a scsi host adapter board (PN:501-1006-01).
- (6) a low power memory board (PN:501-1013-01).
- (7) an ethernet board (PN:501-0243) for booting over the network.
- (8) a 1/4" Streaming Cartridge Tape Drive (Archive) (PN:370-0544-01).

- (9) a 1/4" cartridge tape (PN:370-0543-01).
- (10) cables: one from the scsi to the sysgen (PN:530-1054-01), one from the sysgen to the tape drive (PN:530-1024-01).
- (11) power cables: for the Sysgen and the Archive tape drive.

#### **2.4. Error Handling**

Errors are detected and displayed for evaluation.

#### **2.5. General Performance Characteristics**

The Sysgen Controller Diagnostic takes on the order of three minutes to execute.

#### **2.6. Planned Extensions**

*Sysgen* will be added to the menu diagnostic.

#### **2.7. Limitations**

The following opcodes/commands are not tested:

- (1) 0x09/Set disk block size.
- (2) 0x18/Copy to (from) disk from (to) tape.
- (3) 0x19/Erase tape cartridge.

### **3. SYSGEN CONTROLLER DIAGNOSTIC SPECIFICATION**

#### **3.1. User Interface**

The steps listed below should be followed when testing the Sysgen controller:

- (1) Connect the Sysgen controller to the SCSI host adapter in the test station using the 50 pin SCSI bus cable from JH on the Sysgen to the SCSI interface connector on the host adapter (on the far left when the board is in the card cage).
- (2) Connect the tape drive to the Sysgen board from J1 on the Archive to the controller at JT using the 50 pin cable with the card edge connector at one end for the tape drive.
- (3) Insert the 1/4" cartridge tape into the tape drive.
- (4) Turn the test station power on.
- (5) Boot the test program, *sysgen*, to the test station from the manufacturing file server.
- (6) At this point the test operation begins with the Open command.

#### **3.2. Operation**

During operation, commands are sent to the Sysgen Controller according to the SCSI Interface Protocol in the following manner:

- (1) Wait for the busy signal in the Interface Control Register (ICR) to go away.
- (2) Assert select in the ICR.
- (3) Wait for the busy signal in the ICR.
- (4) Set the dma address and count.
- (5) Pass the Command Description Block, byte at a time.
- (6) Wait for a true interrupt request signal in the ICR indicating dma completion.

- (7) Read back status information, byte at a time.
- (8) Read the message byte (hopefully command complete!).
- (9) If a chk condition exists, read back sense information.

### **3.3. Diagnostic**

The diagnostic runs through the following sequence of commands to test the controller (the letter in parenthesis is displayed on the monitor as each command is executed):

#### **3.3.1. Open (O)**

An open consists of a test unit ready command followed by a rewind command.  
Possible errors are:

- (1) st: open failed!
- (2) st: not ready!
- (3) st: cannot rewind!
- (4) st: short transfer!

#### **3.3.2. Write (W)**

The following patterns are written out to the tape in a sequence of 10 blocks of 1024 bytes each.

- (1) 0x00000000
- (2) 0xffffffff
- (3) 0x55555555
- (4) 0xaaaaaaaa
- (5) 0xa5a5a5a5
- (6) 0xf00f00f
- (7) 0xdb6db6
- (8) 0xec6dec6d
- (9) 0x12345678
- (10) 0x98765432

Possible errors are:

- (1) st: write failed!
- (2) st: write protected!
- (3) st: short transfer!

#### **3.3.3. Close (C)**

A close consists of a write file mark if the last command was a write, and a rewind command.

#### **3.3.4. Open (O)**

An open consists of a test unit ready command followed by a rewind command.  
Possible errors are:

- (1) st: open failed!
- (2) st: not ready!
- (3) st: cannot rewind!

- (4) st: short transfer!

### **3.3.5. Read (R)**

The patterns written out are read back in sequence and the buffers checked against the data patterns to insure correctness. The checking is the reason the streaming tape speed is not maintained. Reads are attempted until the end of file mark is reached.

Possible errors:

- (1) st: read failed!
- (2) st: data readback error!
- (3) st: short transfer!

### **3.3.6. Write (W)**

The following patterns are written out to the tape in a sequence of 10 blocks of 1024 bytes each.

- (1) 0x00000000
- (2) 0xffffffff
- (3) 0x55555555
- (4) 0xaaaaaaaa
- (5) 0xa5a5a5a5
- (6) 0xf00f00f
- (7) 0xdb6db6
- (8) 0xec6dec6d
- (9) 0x12345678
- (10) 0x98765432

Possible errors are:

- (1) st: write failed!
- (2) st: write protected!
- (3) st: short transfer!

### **3.3.7. Close (C)**

A close consists of a write file mark if the last command was a write, and a rewind command.

### **3.3.8. Open (O)**

An open consists of a test unit ready command followed by a rewind command.

Possible errors are:

- (1) st: open failed!
- (2) st: not ready!
- (3) st: cannot rewind!
- (4) st: short transfer!

### **3.3.9. Space (S)**

The space command will skip over a specified number of file marks, in this case one file mark. Possible errors:

- (1) st: cannot skip file!

### **3.3.10. Read (R)**

The patterns written out are read back in sequence and the buffers checked against the data patterns to insure correctness. The checking is the reason the streaming tape speed is not maintained. Reads are attempted until the end of file mark is reached.

Possible errors:

- (1) st: read failed!
- (2) st: data readback error!
- (3) st: short transfer!

### **3.3.11. Close (C)**

A close consists of a write file mark if the last command was a write, and a rewind command.

## **3.4. Error Handling**

If any of the following errors occur the Sysgen Controller has failed and should be rejected:

- (1) st: open failed!
- (2) st: write failed!
- (3) st: write protected!
- (4) st: read failed!
- (5) st: data readback error!
- (6) st: cannot skip file!
- (7) st: not ready!
- (8) st: cannot rewind!
- (9) st: sense error!
- (10) st: short transfer!

If at any time an error occurs, the Sysgen Controller has failed the test and should be returned to the vendor.

During operation of the test the following line is displayed:

OW0123456789COR0123456789W0123456789COSR0123456789C

At the end of the test, if no errors have occurred, the following message will appear:

NO ERRORS - PASS!