QUALSTAR® **Corporation**

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**APPLICATION
NOTE 004**

Subject:	Initial Release Date:	Revision Date:	Revision:
Using SCSI Tape Drives with Sun Workstations	**4/1/91**	**3/7/94**	**H**
	Models Affected: **1054, 1260S, 34XXS**		Page: **1 of 6**

1. Purpose and Scope

This application note provides the information necessary to allow the system integrator to interface the Qualstar 1054, 1260S, or 34XXS Series tape drive to Sun workstations running under SunOS Release 4.1.X system software. If you are using Release 4.2.X or a Solaris system, simply select the ***Kennedy*** inquiry string in the tape drive and disregard the rest of this application note. Instructions for doing this are given in the *Supplemental SCSI Drive Information* chapter of the appropriate Qualstar User's Guide.

A working knowledge of Sun workstations (hereafter referred to as *the system*) and of the SunOS Release 4.1.X operating system is assumed. For detailed information regarding the operation and use of Qualstar tape drives, refer to the User's Guide which came with the tape drive.

The information presented in this Application Note applies to all Sun workstations. Testing and verification was performed by Qualstar using a Model 3410S tape drive and a Sun SPARCstation2 running under SunOS 4.1.X.

2. Configuring the Tape Drive

Qualstar SCSI tape drives are nine-track, half-inch tape drives configured as SCSI sequential access devices and as such, are to be connected to the SCSI port of the system. Complete instructions for connecting and configuring the tape drive are given in the User's Guide which came with the tape drive. While connecting the tape drive, the following requirements must be met:

- The tape drive is shipped from the factory with internal terminators installed. If the tape drive is not physically located at the end of the SCSI cable, these terminators must be removed. If this is not done, improper system operation may result.

- Before attempting to connect the tape drive to the system, verify that the default drive configuration settings given in the *Supplemental SCSI Drive Information* chapter of the User's Guide are set in the tape drive. Failure to do so may result in improper operation.

3. Configuring the System

Before the system can communicate with the tape drive, two files in the kernel must be modified. This can be done using any convenient text editor. The files are located in */sys/scsi/targets*.

NOTE

Make a backup copy before modifying any file.

In the following procedure, the prompt for root login is represented by " **#** ". When editing the files, be sure to enter all spaces and to observe upper and lower case exactly as shown.

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1. Using a Text Editor, open the file */sys/scsi/targets/stdef.h* and search for the following text:

    ```
    #define ST_TYPE_QUALSTAR          0x24  /* Qualstar */
    ```

2. If the text is not found, locate the area which contains the following (or similar) define lines:

    ```
    #define ST_TYPE_CDC               0x20  /* CDC - (not tested) */

    #define ST_TYPE_FUJI              0x21  /* Fujitsu - (not tested) */

    #define ST_TYPE_KENNEDY                 0x22   /* Kennedy */

    #define ST_TYPE_HP                0x23  /* HP */
    ```

3. Add a define line as shown above for Qualstar, assigning a value of **0x24**. Enter the text exactly as it appears. If 0x24 is already assigned, pick an unused value between **0x20** and **0x28**. If all these values are taken, one of the existing define lines will have to be modified, deleted or commented out to make room for the Qualstar define line.

4. Save the changes to */sys/scsi/targets/stdef.h* and close the file.

5. Using the Text Editor, open the file */sys/scsi/targets/st_conf.c* and search for the following text:

    a. For 1054 drives -

    ```
    /* Qualstar 1054 SCSI 9-Track with 256K buffer */

    {
    "Qualstar 1054 1/2\ª reel", 10, "QUALSTAR10", ST_TYPE_QUALSTAR, 10240,
    (ST_REEL | ST_VARIABLE | ST_BSF | ST_BSR),
    300, 300,
    {0x00, 0x02, 0x06, 0x06},
    {0, 0, 0, 0}
    },
    ```

    b. For 1260S drives -

    ```
    /* Qualstar 1260S SCSI 9-Track with 256K buffer */

    {
    "Qualstar 1260S 1/2\" reel", 10, "QUALSTAR12", ST_TYPE_QUALSTAR, 10240,
    (ST_REEL | ST_VARIABLE | ST_BSF | ST_BSR),
    300, 300,
    {0x00, 0x02, 0x03, 0x03},
    {0, 0, 0, 0}
    },
    ```

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c. For 3402S and 3404S drives -

```
/* Qualstar 3402S/3404S SCSI 9-Track with 1MB buffer */

{
"Qualstar 3402S/3404S 1/2\" reel", 12, "QUALSTAR3402", ST_TYPE_QUALSTAR, 10240,
(ST_REEL | ST_VARIABLE | ST_BSF | ST_BSR),
300, 300,
{0x00, 0x02, 0x06, 0x06},
{0, 0, 0, 0}
},
```

d. For 3410S and 3412S drives -

```
/* Qualstar 3410S/3412S SCSI 9-Track with 1MB buffer */

{
"Qualstar 3410S/3412S 1/2\" reel", 10, "QUALSTAR 3", ST_TYPE_QUALSTAR, 10240,
(ST_REEL | ST_VARIABLE | ST_BSF | ST_BSR),
300, 300,
{0x00, 0x02, 0x06, 0x03},
{0, 0, 0, 0}
},
```

e. For 3416S and 3418S drives -

```
/* Qualstar 3416S/3418S SCSI 9-Track with 1MB buffer */

{
"Qualstar 3416S/3418S 1/2\" reel", 12, "QUALSTAR3416", ST_TYPE_QUALSTAR, 10240,
(ST_REEL | ST_VARIABLE | ST_BSF | ST_BSR),
300, 300,
{0x00, 0x02, 0x06, 0x03},
{0, 0, 0, 0}
},
```

6. If the above text is not found, insert it at the end of the following text:

```
/*
 * The drives below have not been qualified, and are
 * not supported by Sun Microsystems. However, many
 * customers have stated a strong desire for them,
 * so our best guess as to their capabilities is
 * included herein.
 */
```

7. Save the file and exit the Text Editor.

8. Verify which kernel module is being used by running *dmesg* (it may be something other than GENERIC_SMALL). Note that the screen text between the <angle brackets> identifies a directory name and will vary from system to system.

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```
                    # dmesg
                      .
                      .
                      .
                     <Date>
                     SunOS Release 4.1.1 (<KERNEL_NAME>) #1:<Date>
```

9. Recompile the kernel by entering the following commands at the # prompts. Substitute the directory name reported in the previous step in place of <KERNEL_NAME>, and do not enter the angle brackets:

```
              # cd /sys/sun4c/conf
              # /etc/config <KERNEL_NAME>
              # cd ../<KERNEL_NAME>
              # make
              # mv /vmunix /vmunix.old
              # mv vmunix /vmunix
              # halt
```

10. The system will prompt:

```
Type b (boot), c (continue), or n (new command mode)
```

11. Ensure that the tape drive is connected and powered up before continuing.

12. Enter **b** to reboot the system.

13. During the reboot, one of the following lines should appear (the model number will reflect the tape drive in use), indicating that /dev/rst1 is configured for the Qualstar tape drive:

```
              st1: <Qualstar 1054 1/2" reel>
              st1: <Qualstar 1260S 1/2" reel>
              st1: <Qualstar 3410S/3412S 1/2" reel>
              st1: <Qualstar 3402S/3404S 1/2" reel>
              st1: <Qualstar 3416S/3418S 1/2" reel>
```

NOTE

> The factory default setting for the SCSI Device ID is 5. If the SCSI Device ID of the tape drive were changed to 4, /dev/rst0 would be configured for the tape drive as follows (using a 3410S in this example):
>
> ```
>     st0: <Qualstar 3410S/3412S 1/2" reel>
> ```

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14. If one of the previous messages does not appear during boot-up, then verify SCSI device as follows:

    a. Enter the boot PROM monitor using L1A keys (upper left hand key = "Stop" plus "A").

    b. At the ">" prompt, enter **n**.

    c. At the "ok" prompt, enter **probe-scsi**.

    d. All installed SCSI devices will be displayed, including their SCSI ID numbers. After verifying the device and ID number, enter **old-mode**.

    e. At the ">" prompt, enter **c** to continue.

15. To verify activity on a SCSI device, change to directory */var/adm*, then enter **more messages**. A message line should exist similar to the syntax examples in Step 13, along with the current activity status.

    If an error is associated with any of the st1: devices, record the exact message for troubleshooting purposes.

The system is now configured to recognize the tape drive, and the following devices will access the tape drive as follows:

SCSI ID 4	SCSI ID 5	TAPE DENSITY (CPI)				
		1054	**1260S**	**3410**	**3402**	**3416**
/dev/rst0	*/dev/rst1*	—	—	—	—	—
/dev/rst8	*/dev/rst9*	1600	1600	1600	1600	1600
/dev/rst16	*/dev/rst17*	3200	6250	3200	3200	3200
/dev/rst24	*/dev/rst25*	3200	6250	6250	3200	6250

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4. Miscellaneous Notes

1. 34XX drives do not provide a write capability at 800 cpi, and if an 800 cpi tape is loaded, attempts to write on it will result in a write error. This is because the tape drive reports a File Protect status to the host whenever it is set for 800 cpi. (The FPT indicator on the tape drive front panel will be illuminated.) To write on the tape, either manually change the tape drive density using the Density switch, or load a tape which is recorded at something other than 800 cpi.

2. The native Sun driver does not support the tar command function arguments "r" and "u". The "r" argument writes files at the end of tape, and the "u" argument adds the named file to the tape if it is not already there, or if it has been modified since it was last put on tape. These operations can be slow and are intended only for seekable devices.