



CyFlex® Scientific Linux DVD v.31 Installation Procedure

Version 7

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Developed by Transportation Laboratories

Version History

Version	Date	Revision Description
1	3/1/2019	Initial publication
2	6/18/2019	Removed content about SRR version from installation CD Revisions per OLY instructions
3	6/23/2019	Changed all CyberMetrix references to SGS Removed VNC steps from <i>Section 3.1 Quick Reference Steps on page 5</i> and from <i>Section 3.2 Detailed Steps on page 7</i> . Added step to confirm identification of the test cell in <i>Section 3.5 Configuring General Settings on page 19</i> Removed note describing latest SRR kernel module version in <i>Section 4.2 System-config Utility on page 40</i>
4	10/29/2020	Added instruction step to install the NVIDIA kernel module RPMs in <i>Section 3.8.1 Configuring the NVIDIA Graphics Adapter on page 30</i> Retrofit document to new template Revised applicable section titles to active tone Created <i>Section 3.3 Examples of Hard Disk Partitions on page 16</i> from existing content. Added <i>Section 3.8.3 Configuring the RocketPort PCI Express Card on page 33</i>
5	1/18/2021	Added <i>Section 4.3 Installing the Network Driver for the AIMB-786 i9700e Motherboard on page 44</i> .
6	5/11/2022	Updated hypertext link reference to cyflex.com Release Info in <i>Section 2 Installation Requirements on page 3</i>
7	3/20/2024	Rebrand to TRP Laboratories

Document Conventions

This document uses the following typographic and syntax conventions.

- Commands, command options, file names or any user-entered input appear in Courier type. Variables appear in Courier italic type.
Example: Select the `cmdapp-relVersion-buildVersion.zip` file....
- User interface elements, such as field names, button names, menus, menu commands, and items in clickable dropdown lists, appear in Arial bold type.
Example: **Type:** Click **Select Type** to display drop-down menu options.
- Cross-references are designated in Arial italics.
Example: Refer to *Figure 1...*
- Click intra-document cross-references and page references to display the stated destination.



Example: Refer to *Section 1 Overview on page 1*

The clickable cross-references in the preceding example are *1*, *Overview*, and on page *1*.

CyFlex Documentation

CyFlex documentation is available at <https://cyflex.com/>. View **Help & Docs** topics or use the **Search** facility to find topics of interest.

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1 Overview

1.1 Document Purpose

This document describes how to install the Scientific Linux (SL) Operating System version 6.9 via DVD on a test cell computer in preparation for installing CyFlex.

1.2 Installation Software and Document Versions

Using the most recent version of the SL installation software is recommended.

ⓘ Important:

Other versions of the software may have steps different from those described in this document.

The version of the installation is identified in the image filename. For example: `cyflex-sl69d31.iso`.

If using an earlier version of the SL installation, contact TRP Laboratories for assistance.

1.3 Finding Installation Support

1.3.1 File to Install Scientific Linux and CyFlex

The installation file is available as follows:

- On the installation DVD (SL LiveDVD) or USB flash drive

ⓘ Note:

Although USB and USB2 are industry standards, there are variations between USB flash drives and not all work with all computers. If your SL flash drive fails to run the installation, contact TRP Laboratories for the DVD.

1.3.2 Installation Support Documents

This procedure is available as follows:

- With the installation DVD (SL LiveDVD) or USB flash drive

1.4 CyFlex

1.4.1 General Information

CyFlex is a suite of software applications used for testing various products and their components, in research and development environments, and in production.

1.4.2 CyFlex Documents

CyFlex documentation is available at <https://cyflex.com/>. View **Help & Docs** topics or use the Search facility to find topics of interest.

1.5 Scientific Linux

Scientific Linux (SL) is a Linux distribution, and is a free and open source Operating System based on Red Hat Enterprise Linux. SL is not produced, maintained or supported by Red Hat.

2 Installation Requirements

CyFlex installation is separately documented. Navigate to <https://cyflex.com/index.php/category/release-info/>, select **Read More** for the release of interest, and then select the link for that release's **Installation and Updates Procedure**.

2.1 System Requirements

Minimum recommended requirements for installing SL, for use with CyFlex version 6.2.15 or newer:

- Test cell computer with a Quad Core processor
- 240 GB hard disk drive
- 8 GB RAM
- DVD drive

If the system is equipped with an optional MTL or NVIDIA graphics card, upgrading to the following hardware is recommended:

- Test cell computer with a Core i7 processor
- Advantech i7 ISA PCA-6028G2 board

Note:

Reserving an IRQ for the MTL card is not necessary when using this board.

2.2 Preparing for Installation

Having the following media and information ready speeds the installation:

- Installation SL DVD (SL LiveDVD) or USB flash drive
- Test cell user account name (or the default user account)
- Hostname
- Network Time Protocol (NTP) server name
- Public IP address
- Private IP address
- VNC the installation media sets the default VNCPassword.
- If using an optional NVIDIA adapter – a copy of the video driver (NVIDA-Linux-x86-310.32.run) (STC)
- If upgrading to a new test cell or replacing a hard drive, a copy of the previous hard drive's files and/or directories (/specs, /cell, /data, and esvd_data).

Examples:

- Test cell user account name: tcXXX ("XXX" is the test cell number).
- Hostname:
nodeXXX where XXX are the last digits of the Public IP address
- Network Time Protocol (NTP) server name:
- Public IP address
- Private IP address

If the connected network utilizes a DHCP server, the information listed below is collected automatically. However, if the network is without DHCP, this information must be added “manually” for each computer and Network Interface Card (NIC):

- IP address
- Netmask
- Domain Name System (DNS) IP address

If connecting to network based I/O (e.g., Snap, Gantner), only a private IP address and netmask are needed to configure the NIC.

Typically, a network administrator can supply this information and the user can later finish configuring the computer's network connection using a network configuration utility. Refer to *Section 4 Configuring a Network Connection* on page 37.

Virtual Network Computing (VNC) is a type of remote control software that allows control of another computer or device over a network.

The Dynamic Host Configuration Protocol (DHCP) automates assignment of IP addresses to NICs connected to the network.

Netmasks usually refer to classes of IP addresses. They help define a range of IP addresses for use by an Internet Service Provider (ISP).

Private (or local) IP addresses are assigned to devices inside of a home or business. Devices with private IP addresses can communicate with other hardware within the same network that also have private IP addresses, but not directly with devices with public IP addresses. A router is required for private and public networks to exchange information.

3 Installing Scientific Linux

3.1 Quick Reference Steps

Table 1 lists quick reference steps for users already familiar with the installation procedure. Refer to Section 3.2 on page 7 for detailed steps.

Table 1: Quick Reference SL Installation Steps

Step	Description
1.	Start the test cell computer using the installation media.
2.	Configure the BIOS to “boot” from the installation media.
3.	Wait for the “startup” screen to appear.
4.	Select KDE as the default Linux window manager.
5.	Optional – view existing hard disk partitions.
6.	Launch the SL Installer.
7.	Choose the installation site.
8.	Create the test cell account.
9.	Set the automatic login option.
10.	Optional – partition the disk using CyFlex defaults.
11.	Optional – if using CyFlex defaults, choose whether to use the entire hard disk.
12.	Disable file system journaling.
13.	Optional – install a boot loader.
14.	Answer whether the network uses a DHCP server.
15.	Enter the hostname of the test cell.
16.	If not using the CyFlex defaults – choose a disk partitioning utility.
17.	If a prompt occurs after exiting GParted – discard any data on the hard disk(s).
18.	Choose the installation type (Create Custom Layout).
19.	Create hard disk partitions.
20.	Exit the SL Installer.
21.	Shutdown the computer and remove the SL installation media.

Table 2 lists quick reference steps to configure general settings after rebooting.

Table 2: General Setting Steps after Rebooting

Step	Description
1.	Start the computer.
2.	Set the date and time.
3.	Optional – synchronize the date and time with the network.
4.	Disable the kdump kernel crash option.
5.	Set KDE as the default Linux window manager.
6.	Configure group privileges for the user account. Skip to Step 10 if a non-STC facility.
7.	Optional – for STC, configure the mouse settings.
8.	Optional – for STC, change the desktop to Folder View.
9.	Optional – for STC, add Konsole to the desktop.
10.	Set up the network connection.
11.	Optional – configure the test cell to use the Cummins email system.
12.	Verify the Minicom utility is functioning.
13.	Optional – If not done in step 3, synchronize the test cell clock with the network server.

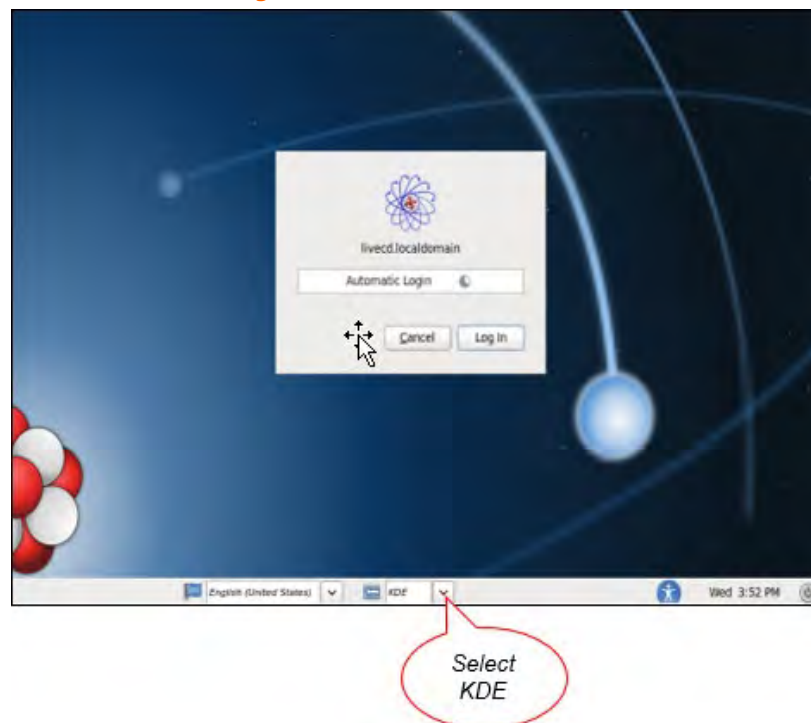
If the test cell includes any optional interface cards, refer to *Section 3.8 Configuring Optional Interface Cards* on page 30.

3.2 Detailed Steps

Execute the following steps to install Scientific Linux (SL):

1. Start the computer using the installation SL Live DVD or USB flash drive.
If during start-up a screen does not appear for selecting the boot device, configure the Basic Input/Output System (BIOS) to boot from the SL installation media:
 - a. Execute the following steps to enter the BIOS setup program:
 - Pressing a <key> or <keys> combination to enter the BIOS usually works depending on the computer manufacturer. Consult the documentation for the computer or motherboard or search online.
OR
 - Reboot the computer by pressing the computer reset button.
 - Press the <Delete> key.
 - b. Execute the following steps to change the settings:
 - Use the <arrow> keys to navigate to the Advanced BIOS Features.
 - Set the installation media boot order per the following example:
 - First boot device – CDROM
 - Second boot device – USBFDD
 - Third boot device – hard disk
 - c. Follow the prompts to save and exit the BIOS.
2. Wait for display of the startup screen; see *Figure 1*. This can take a few minutes.
3. Quickly select KDE from the window manager menu as in *Figure 1* before the automatic login completes.

Figure 1: KDE Selection



This action sets KDE as the default Linux window manager for the SL6 installation instead of Gnome. The default language setting is English, U.S.

Note:

If the screen closes before selecting KDE press **Ctrl+Alt+Del** and choose **Restart** and then repeat steps to this point.

4. Optionally execute the following steps to view the hard disk(s) for existing partitions:
 - a. Right-click and select **Konsole** to open a terminal window.
 - b. Enter the following to start the **GParted** disk partitioning utility:

```
$ gparted
```

Note:

The Gnome Partition Editor (**GParted Live**) is included on the SL Installation DVD or USB flash drive. Refer to *Section 6* on page 46.

fdisk is another option for viewing partitions.

- c. If the hard disk to be used for installing CyFlex is already partitioned, determine the following:
 - If any existing partition and/or data must be kept
 - Which partition to use for the installation

Important:

If installing to an existing partition, it will use the Scientific Linux OS. Another OS already on the partition will be incompatible.

5. Resume the installation. Single-click the **Install CyFlex to Hard Drive** icon on the desktop.

Note:

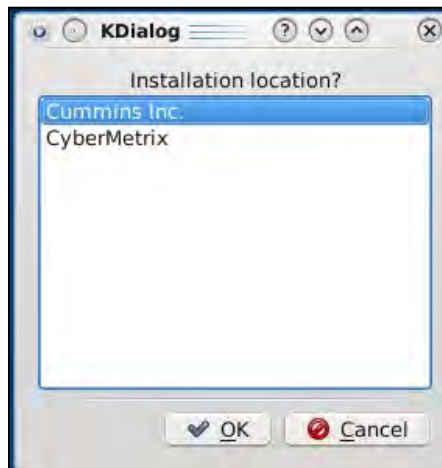
Single-click is the default mouse action to launch CyFlex and to open folders and files.

Figure 2: Desktop Folder



6. Select the **Installation Location** on the resulting window.

Figure 3: Installation Location



This selection sets up specifics particular to the site, such as the `rsync` server and Yum repository.

Click the **Cancel** button to exit the installation without making changes to the hard disk.

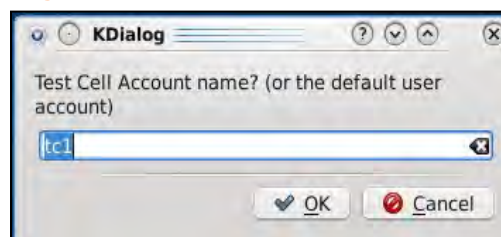
Notes:

`rsync` is a utility used to synchronize files and directories, for example, between a test cell computer and server.

Yum is an automated update program for maintaining systems using the Red Hat Package Manager (RPM). Yum works with software repositories (collections of packages), which can be accessed locally or over a network.

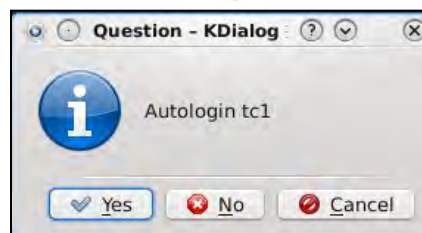
7. Enter the test cell account name on the resulting window. Do not enter `cyflexuser`, `tcp`, or `root`.

Figure 4: Test Cell Account Name



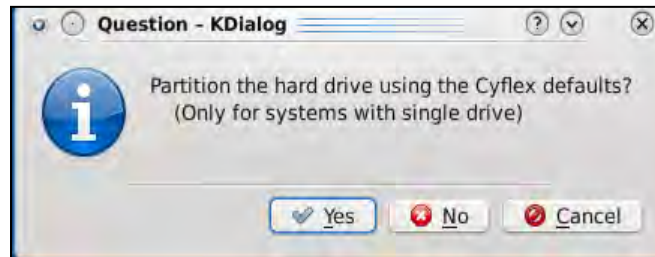
8. Select whether to automatically login the specified account when the computer is started.

Figure 5: Automatic Login Selection



9. If the machine has only one hard drive, select whether to use the CyFlex defaults for the partitions. The defaults are: /boot, /root, /home, and swap.

Figure 6: CyFlex Hard Drive Partition Options



Select **Yes**, **No**, or **Cancel**:

- Select **Yes** to partition the hard disk using the CyFlex defaults. This selection automatically installs a boot loader and disables file journaling.
 - Select **No** to setup partitions later. **No** is appropriate if the system has one or more of the following:
 - An existing partition(s) that must be kept
 - More than one hard disk
 - An optional MTL adapter, although the partitions can be modified later
10. If using CyFlex partitioning defaults, select whether to use all available hard disk space. Skip this step If not using the defaults.

Figure 7: Use All Available Hard Disk Space Option



Select **Yes**, **No**, or **Cancel**:

- Select **Yes** To use all disk space on the hard drive

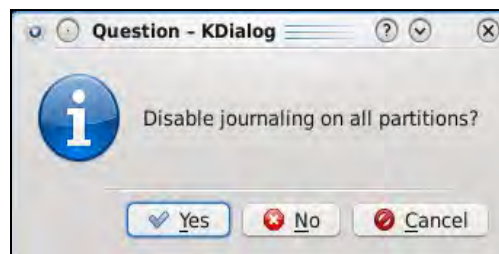
ⓘ Important:

This erases and reformats the entire hard disk.

- Select **No** to use minimum disk space for the installation.

11. File system journaling can interfere with CyFlex writing data. Select whether to disable file system journaling for all partitions. It is recommended to disable.

Figure 8: Disable File System Journaling Option



Select **Yes**, **No**, or **Cancel**:

- Select **Yes** to disable journaling (recommended).
- Select **No** to enable journaling.

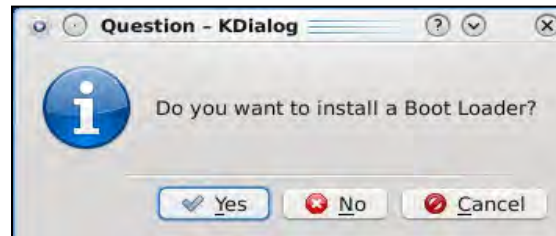
Notes:

Yes disables journaling on all ext 3 / 4 hard disk partitions.

In a journaling file system, changes are made to a “journal” before writing them to the main file system. In the event of a system crash or power failure however, these file systems are less likely to become corrupted, and are quicker to bring back online.

12. Select whether to install a Boot Loader.

Figure 9: Install Boot Loader Option



Select **Yes**, **No**, or **Cancel**:

- Select **Yes** for a reformatted hard disk.
- Select **No** if the hard disk already has a boot partition.
Use **GParted** to display the partition types.

Important:

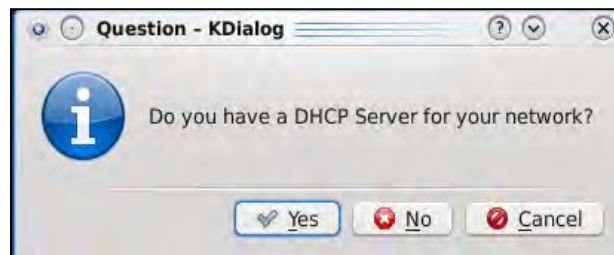
For machines with more than one hard disk, a boot partition is not needed on each disk, but only on the primary disk.

Note:

A boot loader program places the OS in memory. When the computer is restarted, the Basic Input/Output System (BIOS) performs some initial tests, then transfers control to the Master Boot Record (MBR) where the boot loader resides.

13. Respond whether a DHCP server exists on the network. If uncertain whether the network has a DHCP server, check with the network administrator or view the network configuration on a system already connected.

Figure 10: DHCP Server on Network



Select **Yes**, **No**, or **Cancel**:

- Select **Yes** If the network is connected to a DHCP server.
- Select **No** If the network is not connected to a DHCP server.

If the network does not have a DHCP server, configure the network connection after completing the installation.

The IP address, netmask and DNS for the computer are collected automatically if the connected network has a DHCP server.

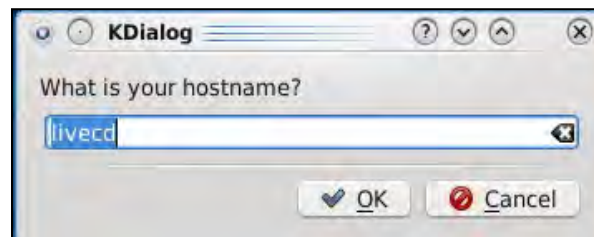
Note:

Up to four Ethernet devices may be enabled. Ethernet ports are enabled as follows:

- With DHCP: eth0
- Without DHCP: IP address (10.0.0.1, for example)

14. Enter the hostname of the test cell computer and then select **OK**.

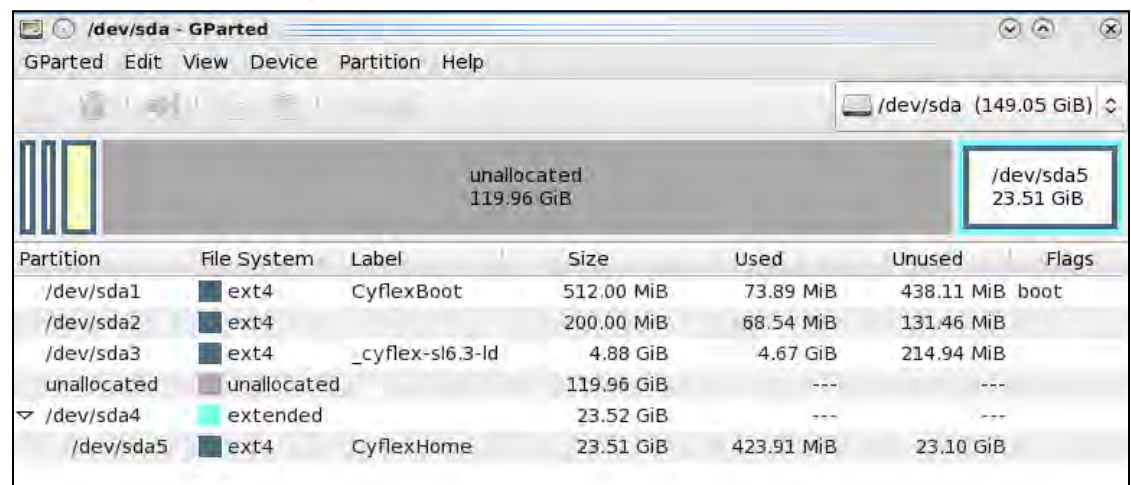
Figure 11: Test Cell Computer Hostname



15. The next displayed window is dependent on previously selected options:

- If CyFlex partition defaults was selected, the SL Installer begins copying to the hard disk. Proceed to step 20 on page 15.
- If an error message occurs, refer to *Section 3.4 Disk Space Error Message* on page 18.
- If CyFlex partition defaults was not selected, **GParted** is invoked.

Figure 12: GParted Window



Either:

- Partition the hard disk(s) using the **GParted** utility. Refer *Section 6 Gnome Partition Editor* on page 46.
OR
- Exit **GParted** and proceed to step 16 to use the Scientific Linux Installer (recommended).

16. If there is data on the hard disk(s), a prompt occurs after exiting **GParted**. Select **Yes Discard any data**.

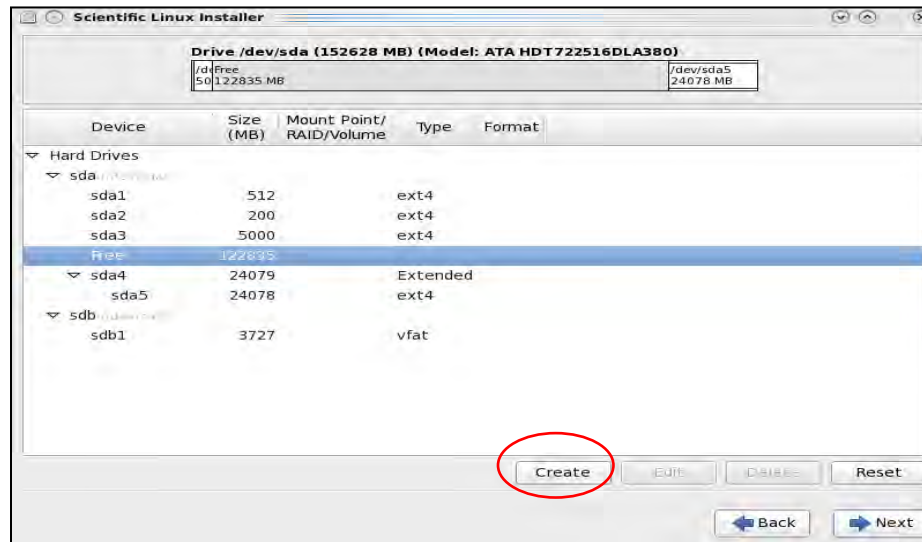
17. Select the installation type. Select **Create Custom Layout** and then select **Next** as in *Figure 13*.

Figure 13: Installation Type Selection



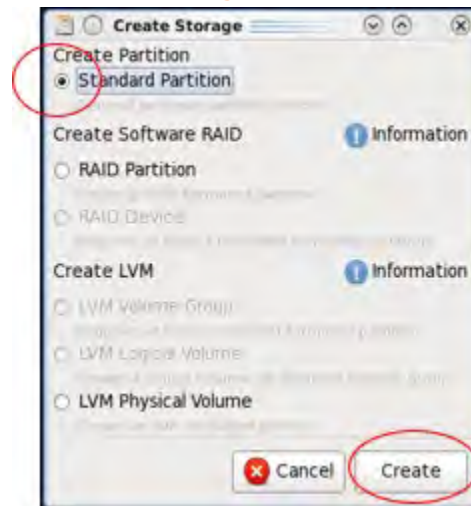
18. The resulting window shows the installed hard drives. The example in *Figure 14* shows hard drives **sda** and **sdb**. Existing partitions are **sda1**, **sda2**, **sda3**, etc.

Figure 14: Hard Drive Content Example



19. Configure the hard disk partitions:
- Select the **Free** disk space viewed below the hard drive you wish to partition. Refer to the example selection in *Figure 14*.
 - Select **Create** as in *Figure 14*.
 - Select **Standard Partition** on the resulting **Create Storage** window.

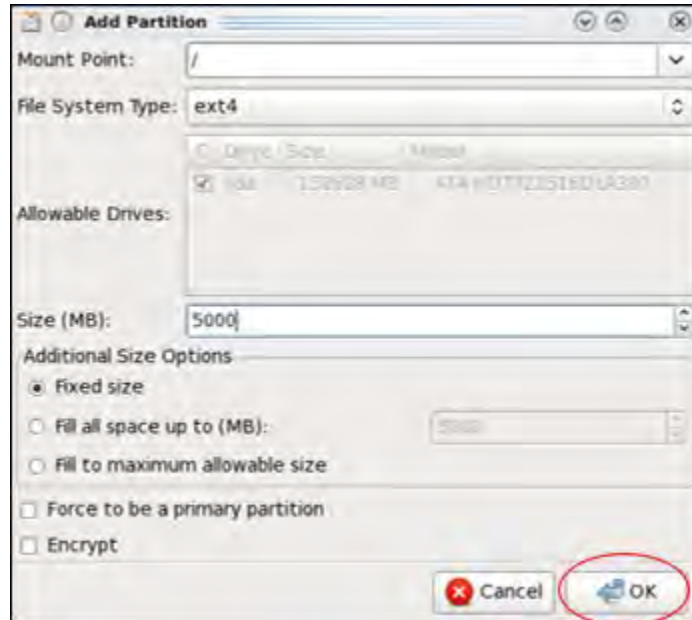
Figure 15: Create Storage Window



- Select **Create** as indicated in *Figure 15*.

- e. Complete the fields and options in the resulting **Add Partition** window. Refer to the example in *Figure 16* to set up each partition.

Figure 16: Add Partition Window Example



- f. Select **OK** when partition configuration is complete. The SL Installer main window is displayed with the configured hard drives and partitions.
 - g. Repeat steps a through f above to configure additional partitions.
 - h. After creating the final partition, click **Next** in the SL Installer main window (*Figure 13* on page 13). The SL Installer begins copying to the hard disk. Refer to *Section 3.3 Examples of Hard Disk Partitions* on page 16.
20. Exit the SL Installer after the installation is complete.

Figure 17: SL Installation Complete



21. Shutdown the computer and remove the SL installation DVD or USB flash drive.

3.3 Examples of Hard Disk Partitions

Example configurations appear in the tables below.

@Note:

The SL Installer requires boot and root partitions on a single hard drive, and a minimum of 5,000 MB for the root partition.

Table 3: Test Cell computer with One Hard Drive and Optional MTL Interface Card

Partition	Mount Point	File System	Size (MB)	Size Options	Contents
Boot (/dev/sda1)	/boot	ext4	250	Fixed	Kernel images and boot loader configuration
Home (/dev/sda2)	/home	ext4	20,000	Fixed	Users' home directories
Root (/dev/sda6)	/	ext4	-----	Maximum allowable	Root file system
DOS (/dev/sda3)	/dos/c	VFAT	4,000	None	FreeDOS
Swap (/dev/sda5)	-----	-----	-----	1 – 2 x physical memory	Used as virtual memory for performance

@Notes:

The DOS and home partitions must be primary partitions.
The swap partition size should be between one and two times the size of physical memory. For example, if the memory is 16 GB, allocate between 16,000 MB and 32,000 MB for the swap partition.

Table 4: Test Cell computer with One Hard Drive and Without Optional MTL Interface Card

Partition	Mount Point	File System	Size (MB)	Size Options	Contents
Boot	/boot	ext4	250	Fixed	Kernel images and boot loader configuration
Root	/	ext4	-----	Maximum allowable	Root file system
Home	/home	ext4	20,000	Fixed	Users' home directories
Temporary data	/tmp	ext4	20,000	Fixed	Temporary data files stored by applications

Partition	Mount Point	File System	Size (MB)	Size Options	Contents
Variable data	/var	ext4	20,000	Fixed	System logging files, spool directories and data (mail and printing, etc.)
Swap	-----	-----	-----	1 – 2 x physical memory	Used as virtual memory for performance

Table 5: Test Cell Computer with Two Hard Drives – First Hard Drive (SSD)

Partition	Mount Point	File System	Size (MB)	Size Options	Contents
Boot	/boot	ext4	250	Fixed	Kernel images and boot loader configuration
Root	/	ext4	-----	Maximum allowable	Root file system

Table 6: Test Cell Computer with Two Hard Drives – Second Hard Drive (HDD)

Partition	Mount Point	File System	Size (MB)	Size Options	Contents
Home	/home	ext4	20,000	Fixed	Users' home directories
Temporary data	/tmp	ext4	20,000	Fixed	Temporary data files stored by applications
Variable data	/var	ext4	20,000	Fixed	System logging files, spool directories and data (mail and printing, etc.)
Swap	-----	-----	-----	1 – 2 x physical memory	Used as virtual memory for performance
Shared data	/data	ext4	-----	Maximum allowable	Data shared between users and/or operating systems, for example

3.4 Disk Space Error Message

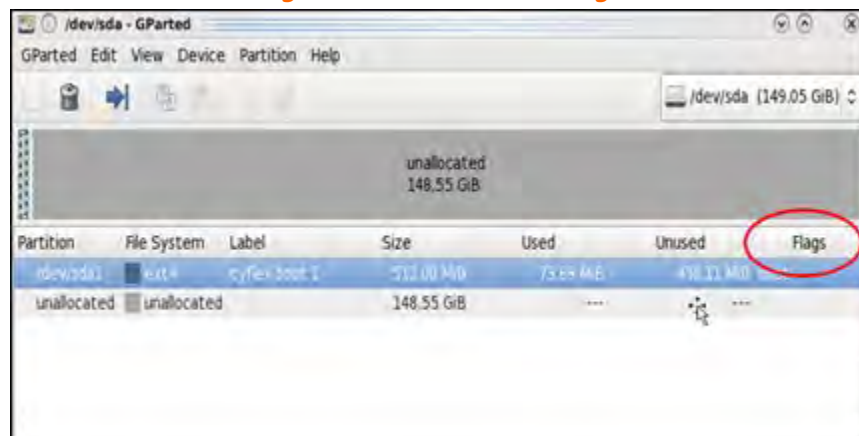
If while partitioning the hard disk(s) an error message states there is not enough unallocated disk space, the actual problem may be that the hard disk already has one of the following partitions:

- Boot
- Linux swap

Execute the following steps to view and resolve:

1. Open a terminal window and enter the following:
\$ gparted
2. Confirm there is enough unallocated disk space. The installation requires a minimum of 40 GB.
3. There can be only one boot partition on a hard disk. If an existing partition has a boot flag as in *Figure 18*, remove the flag:
 - a. Right-click on **Flags** in the **GParted** window as in *Figure 18*.

Figure 18: Check for Boot Flags



- b. Click **Manage Flags**.
- c. Deselect **boot** on the resulting **Manage Flags** window.

Figure 19: Manage Flags



- d. Save and Exit.

3.5 Configuring General Settings

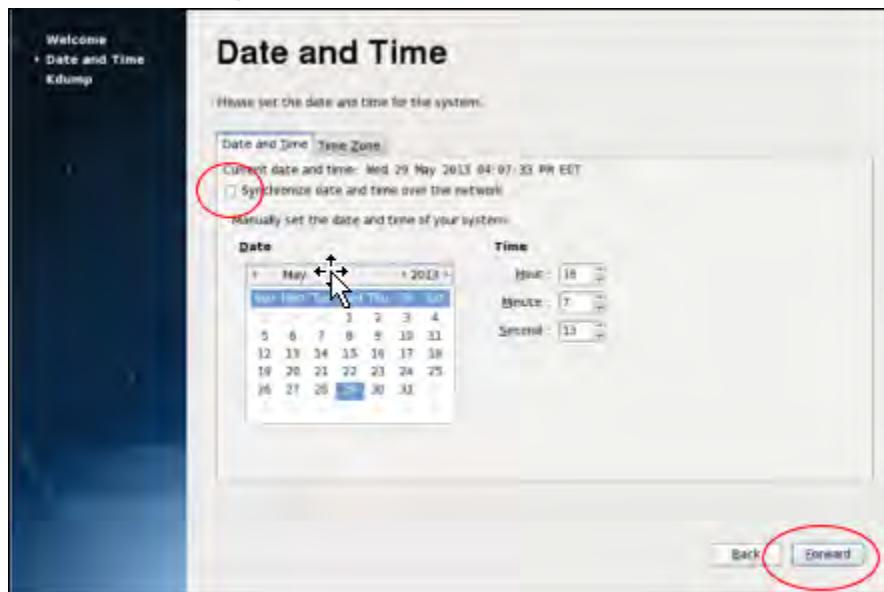
1. Confirm the SL installation media is removed and then start the computer.
2. Click **Forward** on the welcome screen as in *Figure 20*.

Figure 20: Welcome Screen



3. Ensure the **Date and Time** tab is selected and set the time zone to the local time zone on the resulting **Date and Time** window.

Figure 21: Date and Time Window



4. Select **Synchronize date and time over the network** and then click **Forward** as indicated in *Figure 21*.
5. Delete all listed NTP servers on the resulting window.

6. Add the NTP server for your Local Area Network (LAN).

Note:

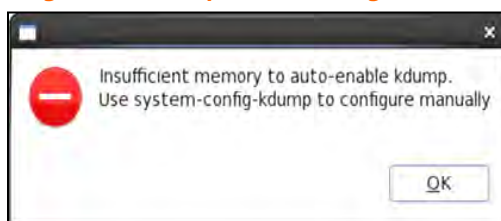
Entering the IP address instead of the server produces a prompt stating the entry is not a server. Click **Yes** to use the IP address.

7. Follow the resulting prompts to save the NTP server.

8. Select **Forward** on the **Date and Time** window.

If the following **Kdump** error message appears, disregard it. The next step disables **Kdump**.

Figure 22: kdump Error Message



9. Set the **Kdump** kernel option:
 - a. Deselect the **Enable kdump?** option as indicated in *Figure 23*.

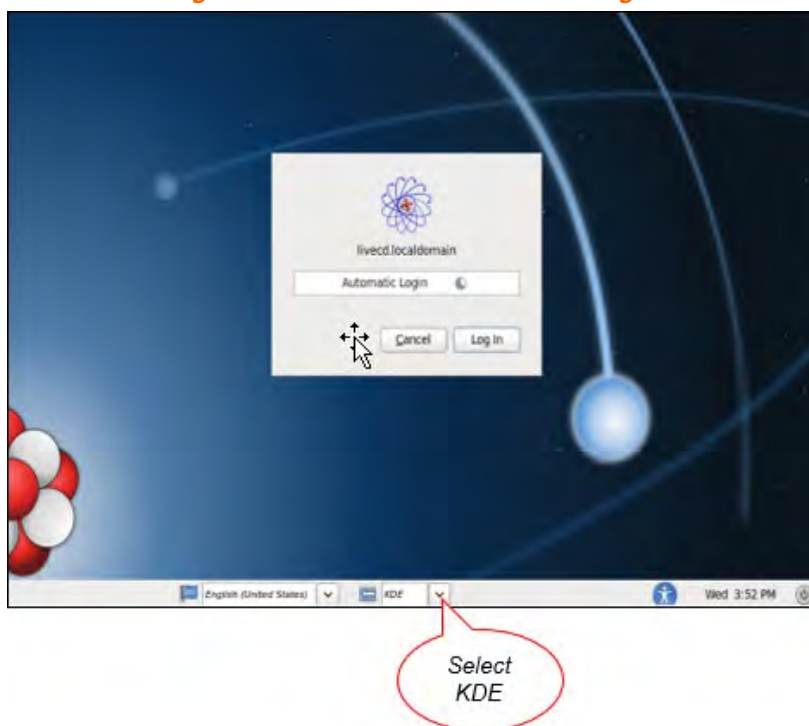
Figure 23: Kdump Options



- b. Select **Finish**.

- c. Follow the prompts to activate the new **Kdump** setting and then reboot the computer:
 - i. Select **Yes** to enable the setting.
 - ii. Select **OK** to restart the system.
10. Select a Linux window manager. Select **KDE** from the drop-down menu when the computer restarts and before the automatic login times-out.

Figure 24: KDE for Linux Window Manager



Note:

Automatic login for the user account was an option in a previous step. If this option was not chosen, start CyFlex from the application menu or the CyFlex icon on the desktop. A delay while CyFlex loads is normal. Start it only once.

11. Configure group privileges for the user account:
 - a. Open a shell window and replace `tcxxx` as in the following command with your test cell number:


```
$ su -c "/usr/local/bin/cyflex_mod_user tcxxx"
cyflex123
```
 - b. Use the K-menu to confirm the privileges are updated by logging out and back in. This enables **sudo**.

Note:

The K menu is equivalent to the Windows Start menu and is opened using the `<Alt> <F1>` keys.

Note:

Steps 12 through 14 apply exclusively to the test cell at the Seymour Technical Center (STC). Proceed to step 15 if not configuring at the STC.

12. If setting up a test cell at the Seymour Technical Center (STC), execute the following steps change the mouse settings. For other sites this step is optional and may be skipped.
 - a. Click the **Kickoff Application Launcher** in the bottom-left corner of the screen.
 - b. Select **System Settings**.
 - c. Click **Keyboard & Mouse**.
 - d. Select the **Mouse** option.
 - e. Choose the Double-click option for opening files and folders.
 - f. Click the **Apply** button in the bottom-right corner to save.
13. If setting up a test cell at STC, execute the following steps to change the desktop appearance from Desktop to Folder View. For other sites this step is optional.
 - a. Right-click the desktop and select **Desktop Settings**.
 - b. From the first drop-down menu, select **Folder View**.
 - c. Click the **Apply** button and then exit.
14. If configuring a test cell at STC, add **Konsole** to the desktop. For other sites this step is optional.
 - a. From the **Kickoff Application Launcher**, type `konsole` in the search box.
 - b. Right-click the **Konsole** icon and Select the **Add to Desktop** option.
15. Set up the network connection. Refer to *Section 4 Configuring a Network Connection* on page 37.
16. Execute the following steps if configuring the test cell to use the Cummins email system:
 - a. Enter the following to install the program for accessing email:

```
$ sudo yum install cyflex_cummins_mail
```

If an error message occurs stating "Couldn't resolve host," then:
 - i. Enter the following to open the hosts file:

```
$ sudo nedit /etc/hosts
```
 - ii. Verify the test cell hostname is "mapped" to its IP address.
 - iii. If the line for your host is not present, add it to the file.
 - iv. Save and exit the file.
 - v. Retry step a above to install the mail program.
 - b. Setup email and test it by emailing another user.

For questions about configuration, consult with the network administrator, another experienced user, or contact TRP Laboratories.
17. Verify the **Minicom** utility is functioning.

Note:

Minicom can be useful in troubleshooting, for example, to send commands to a serial

device that stops communicating with CyFlex.

Execute the following steps:

a. Enter:

```
$ sudo minicom -s
```

 **Note:**

If entering sudo does not work, try su.

If the **Minicom** screen does not appear:

i. Use **which** to locate the program and then execute it. Enter:

```
$ which minicom
```

ii. If **Minicom** is not on the machine, install it by entering the following:

```
$ sudo yum install minicom
```

b. Execute the following steps to set a valid serial port:

i. Enter the following:

```
$ minicom -s
```

ii. Follow the configuration screen instructions to set up the serial port.

An alternative method is to execute the following steps:

i. Create (or copy) a text file for **Minicom** to read.

ii. Include the following lines in the file per the example:

Example using serial port **ttyS0**:

```
# Machine-generated file - use <CNTL> + <A> +  
<Z> to change parameters  
menu 0 port /dev/ttyS0
```

 **Note:**

Enter the following to view serial ports for the machine:

```
$ dmesg | grep tty
```

iii. Save the file as: `/etc/minirc.dfl`.

18. Execute the following steps to synchronize the test cell system clock with the network server. Skip this step if you used the option to synchronize in step 4 on page 19.

a. Enter the following to install the Network Time Protocol (NTP) program on the test cell:

```
$ sudo yum install cyflex_ntp
```

b. Execute the following steps to identify the local NTP server's IP address and hostname:

i. At another test cell PC already set up, enter the following to identify the NTP server's IP address:

```
$ ntpstat
```


Example Output:

```
# The output should say "synchronized."  
synchronized to NTP server (149.20.54.20) at stratum 2  
time correct to within 30 ms  
polling server every 1024 s
```

- ii. Determine the hostname of the NTP server using its IP address per the following example:

```
$ nslookup 111.222.333.444
```
- iii. Note the server's IP address and hostname for the next steps.
- c. Execute the following steps to confirm the NTP configuration file identifies the correct NTP server:
 - i. At the test cell being set up, enter the following to open the NTP configuration file:

```
$ sudo nedit /etc/ntp.conf
```
 - ii. If a line in the file contains `ntp.ctg.cummins.com`, replace it with the NTP server's IP address or hostname per the following example:

```
server 111.222.333.444
```
 - iii. Save and exit the file.
- d. If the NTP configuration file required changes, enter the following to restart the NTP service:

```
$ sudo service ntpd restart
```
- e. Enter the following to verify that the date and time are synchronized over the network:

```
$ ntpstat
```

The output should state "synchronized" and list the NTP server IP address.

Note:

It can take as long as 20 minutes for the synchronization to occur when first connecting to the NTP server.

If the synchronization did not work, check the `ntpdate` file:

- i. Enter the following to open the file:

```
sudo nedit /etc/sysconfig/ntpdate
```
- ii. If these settings are not already correct in the file, modify the file accordingly:

```
SYNC_HWCLOCK=yes
```
- iii. Save the file and exit.
- iv. Enter the following commands:

```
$ sudo chkconfig ntpd on  
$ sudo chkconfig ntpdate on
```

- v. Enter the following if the `ntpd` file required changes:

```
$ sudo service ntpd restart
```
- f. Repeat step e on page 24 to verify that the date and time are synchronized. If they are not, consult your network administrator or contact TRP Laboratories.

3.6 Setting up the TSCS Utility

The Test Support Computer System (TSCS) utility is required if the test cell contains an optional MTL interface card. The TSCS utility tests whether an I/O device, such as an MTL adapter, is detected over the network.

Because the TSCS utility requires a DOS-compatible environment to operate, a hard drive on the computer must have a DOS partition. Refer to step 19 on page 14.

Refer to the following sub-sections to install FreeDOS and the TSCS utility on the DOS partition.

3.6.1 Creating the FreeDOS Installation CD

A FreeDOS installation (boot) CD is required to install FreeDOS. If your site does not supply this CD, make one.

Execute the following steps to create a boot CD:

1. For Cummins, go to the Cummins URL: Other sites: go to <http://www.ibiblio.org/pub/micro/pc-stuff/freedos/files/distributions/1.1/> and find the `fdllsrc.iso` file. An ISO file is an image of a disc.
2. Download the FreeDOS ISO image file to the hard disk.
3. Execute the following steps to burn the FreeDOS 1.1 ISO image to a writeable CD.
 - a. Open the K3b Linux utility.
 - b. Click the **Tools** drop-down and select **Burn CD Image** as in *Figure 25*.

Figure 25: K3b - Burn CD Image



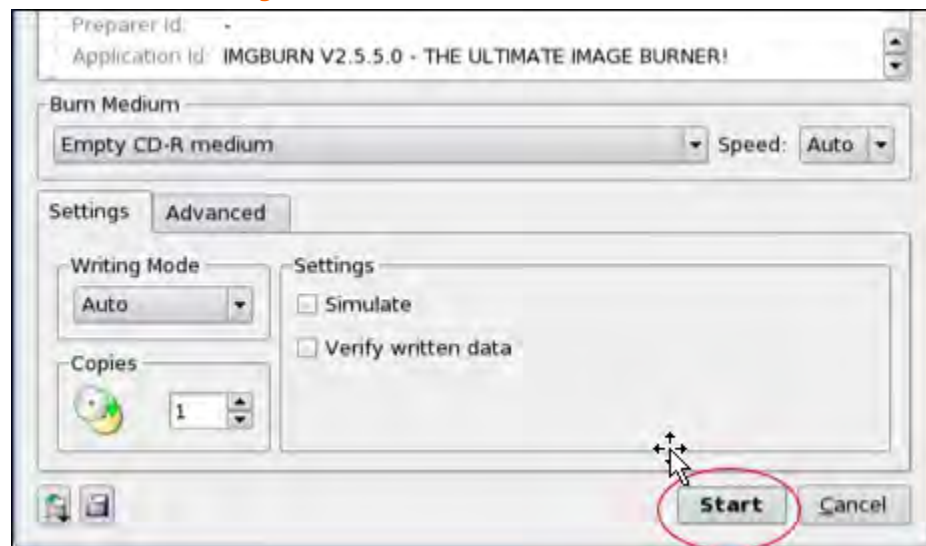
- c. The resulting window presents fields and drop-down menus for identifying the ISO file and burn media (CD) and for choosing options. Select appropriate options.

Figure 26: Burn CD Options



- d. Insert a blank CD.
- e. Click to **Start** the burn and follow subsequent prompts.

Figure 27: Start CD Burn



3.6.2 Installing FreeDOS

Execute the following steps to install FreeDOS 1.1 on the test cell:

1. View the hard disk to determine the DOS partition. Execute the following steps:

- a. Open a terminal shell window.
- b. Login as the root (substitute) user. Enter the following:

```
$ su
```

```
$ cyflex123
```

- c. Enter the following to display the partitions:

```
$ df
```

Note:

Alternate commands are `sudo fdisk -l` and `gparted`.

- d. Observe the file system of each partition. For DOS, this is normally FAT32 or VFAT.

If a DOS partition does not appear in the output, it was not created during the SL installation. Refer to step 19 on page 14.

2. Execute the following steps to add DOS to the boot list:

- a. Open the GRUB menu interface configuration file `grub.conf`. Enter the following:

```
$ cd /boot/grub/
```

```
$ nedit grub.conf
```

- b. Add the following lines to the end of the file:

```
title DOS
```

```
rootnoverify (hd0,2)
```

```
chainloader +1
```

```
boot
```

Important:

In the `rootnoverify` line above, make sure the DOS partition is identified correctly as indicated in the *Table 7*.

Table 7: DOS Partition Identifiers

Partition Name in Output	Partition Name in grub.conf File	Description
/dev/sda1	(hd0,0)	First primary partition on first hard disk
/dev/sda2	(hd0,1)	Second primary partition on first hard disk
/dev/sda3	(hd0,2)	Third primary partition on first hard disk
/dev/sdb1	(hd1,0)	First primary partition on second hard disk

Partition Name in Output	Partition Name in grub.conf File	Description
/dev/sdb2	(hd1, 1)	Second primary partition on second hard disk

- c. Save the file and exit.
3. Reboot to the DOS partition. Enter:
\$ reboot
4. After reboot, select **DOS**.
5. Wait for the message: **This is not a bootable disk...**
6. Insert the FreeDOS v1.1 CD and follow the prompts.

Some of the screens do not mention how to advance to the next screen. When this occurs and an installation progress bar does not appear press the <Enter> key to continue.

- a. Select **Install to hard disk**.
- b. Press **1** to start the installation.
- c. Select the language: **English (US)**.
- d. Select the C: drive. ("C:" should be the only drive displayed.)
- e. Select **1** to continue the installation.
- f. Select **1** to **Start installation of FreeDOS 1.1 Final**.
- g. Advance past the screens about licensing and additional installation disks.
- h. View (and change if preferred) the source and destination locations of the files:
 - Install from **E:\FREEDOS\PACKAGES/**.
 - Install to **C:\FDOS**.
- i. Use the arrow key and space bar to select the box next to **boot.** The boxes for **base** and **util** should already be checked. If not, select them also.

@Note:

Select all of the listed program and utility packages

- j. Proceed with the installation.
Subsequent screens list programs being installed and display progress. This takes several minutes.
- k. Select **SYSLNXX** to install the Syslinux boot loader.
- l. Advance past the screen asking for the next installation disk while leaving the CD in the drive.
A screen notification indicates when the FreeDOS installation completes successfully
- m. Select **1** to write FreeDOS code to the boot sector area to load the `kernel.sys` file.
- n. At the next screen, boot to DOS.

7. Remove the CD.
8. Edit the `fdconfig.sys` file:
 - a. Open the file. Enter:
`$ nedit fdconfig.sys`
 - b. Change `MENUDEFAULT` from 1, 5 to 3, 5.
9. Reboot to Linux:
 - a. Enter:
`C:\ reboot`
 - b. Select **Scientific Linux** on the resulting screen.

3.7 Running the TSCS Utility

Execute the following steps after FreeDOS is installed on the DOS partition:

1. Open a terminal window.
2. Login as `su`. Enter the following:
`$ su`
`$ cyflex123`
3. Connect to the network.
4. Mount the DOS partition. Enter the following commands:
`$ cd /mnt`
`$ mkdir tmp`
`$ mount /dev/sda3 /mnt/tmp`
`$ cd /mnt/tmp`
`$ cp -rv /mnt/TcNfs/wayne/tscs /mnt/tmp/`
5. Reboot to the DOS partition:
 - a. At the command line, enter:
`$ reboot`
 - b. Select **DOS** on the resulting screen.
6. Run the TSCS utility:
 - a. Start the `setup` file. Enter:
`C:\tscs\setup`
 - b. Select **Advanced User Mode** on the resulting screen.
 - c. Go online.
 - d. Confirm the MTL interface is recognized. Refer to *Section 3.8.4 Configuring the MTL Adapter on page 35*.
7. Reboot to Linux:
 - a. At the DOS prompt, enter:
`C:\ reboot`
 - b. Select **Scientific Linux** on the resulting screen.

8. Copy the `tscs.cfg` file from the DOS partition to the `/cell` directory. Enter the following commands:

```
$ su mount /dev/sda3 /mnt/tmp
$ cd /mnt/tmp/tscs
$ cp tscs.cfg /cell/tscs.cfg
```

3.8 Configuring Optional Interface Cards

This section describes steps for configuring optional interface cards are included below with the assumption hardware installation complies with the manufacturer's instructions.

3.8.1 Configuring the NVIDIA Graphics Adapter

ⓘ Important:

Before installing a graphics card other than NVIDIA, contact TRP Laboratories for approved graphics cards and drivers.

ⓘ Note:

If Linux does not disable the on-board video and its memory usage when the NVIDIA graphics adapter is set up, it may be necessary to disable the on-board video in the BIOS. Adjust settings so that memory ranges are not reserved for the on-board video.

Execute the following steps to configure a NVIDIA graphics adapter:

1. Confirm the network connection is set up to access the Internet.
2. Confirm the NVIDIA graphics card is enabled. Enter:

```
lspci | grep VGA
```

The output should indicate a VGA compatible controller. For example, NVIDIA Corporation GT218 [GeForce 8400 GS] (rev a2)/.

If the NVIDIA display is correctly operating, proceed to step 3 on page 31.

If the NVIDIA display does not correctly operate, execute the following steps to disable the graphics display built into the computer motherboard.

ⓘ Note:

BIOS varies between systems and may not all include the options mentioned below.

- a. Reboot the system.
- b. While the system is starting, press the <Delete> key to enter the BIOS.

ⓘ Note:

Navigate in the BIOS using the <arrow> keys and change settings using <Enter>.

- c. Select the **Chipset** tab.
- d. Choose the **North Bridge** option and then set the following:
 - **Initiate Graphic Adapter = [PEG/IGD]**
 - **PEG Force Gen1 = Enabled**

3. Login as root. Enter the following:

```
$ su
$ cyflex123
```

4. Install the Open-source Nvidia driver. Enter the following:

```
$ yum install kmod-nvidia-340xx nvidia-x11-drv-340xx -y
```

Note:

The `-y` specification will allow the yum to install the driver without prompting.

Contact TRP Laboratories for support if the installation fails.

5. Restart the system. Enter:

```
$ reboot
```

6. Login and verify the installation was successful. Enter the following command from a terminal:

```
$ cat /proc/driver/nvidia/version
```

The output should resemble the following to indicate successful installation:

```
NVRM version: NVIDIA UNIX x86 Kernel Module 340.106
```

7. Confirm the NVIDIA graphics card is enabled. Enter the following:

```
lspci | grep VGA
```

The output should indicate a VGA compatible controller. For example:

```
NVIDIA Corporation GT218 [GeForce 8400 GS] (rev a2)/.
```

3.8.2 Configuring the RocketPort Serial Ports Adapter

Execute the following steps to set up a RocketPort interface card:

1. Determine and note the number of RocketPort serial ports on the adapter. This information is needed for step 6.

2. Determine whether the RocketPort driver is installed. Enter the following:

```
$ rpm -qa | grep rocketport-linux
```

- o If the output shows the driver is already installed, skip to step 6 to edit the `rc.local` file.
- o If there is no output, proceed to the next step.

3. Determine the version of the installed kernel. Enter the following:

```
$ rpm -qa | grep kernel
```

The output displays the kernel version.

Note:

The `uname` command also allows viewing the installed kernel. Enter:

```
$ uname -r
```

Example output:

```
2.6.32-754.6.3.el6.i686
```

4. List versions of the RocketPort driver available for installation. Enter the following:

```
$ sudo yum list --showduplicates rocketport-linux
```

Example Output:

```
Available Packages
rocketport-linux.i686      3.16.0-1_2.6.32_220.el6
rocketport-linux.i686      3.16.0-1_2.6.32_754.17.1.el6
rocketport-linux.i686      3.16.0-1_2.6.32_754.6.3.el6
```
5. Install the RocketPort driver that is compatible with the kernel version. For example, if the kernel version is:

```
3.16.0-1_2.6.32_754.6.3.el6
```

The appropriate driver is:

```
rocketport-linux.i686 3.16.0-1_2.6.32_754.6.3.el6
```

Command for the given example:

```
$ sudo yum install rocketport-linux-*754.6*
```
6. Edit the `rc.local` file to enable the adapter and its serial ports. Enter the following:

```
$ sudo nedit /etc/rc.local
```

 - a. Scroll down to the end of the file.
 - b. After the last line, add the following:

```
for i in {S,R,RP}{0..7}; do
  if [ -c /dev/tty${i} ]; then
    chmod a+rw /dev/tty${i}
    case ${i:1} in
      S) ln -s /dev/tty${i} /dev/ser$(( ${i: -1} + 1 ));;
      R) ln -s /dev/tty${i} /dev/rckt$(( ${i: -1} + 1 ));;
      RP) ln -s /dev/tty${i} /dev/rckt$(( ${i: -1} + 1 ));;
    esac
  fi
done
```
 - c. Save the file and exit.
7. Reboot the system. Enter:

```
$ reboot
```
8. Check the `rc.local` file for errors. Enter:

```
$ sudo less /var/log/boot.log
```
9. Review the output for errors. Revert to step 6-b above if errors are detected.

3.8.3 Configuring the RocketPort PCI Express Card

Execute the following steps to set up a RocketPort PCI Express card:

1. Determine and note the number of RocketPort serial ports on the adapter. This information is needed for step 6.
2. Determine whether the RocketPort PCI Express card is installed. Enter the following:

```
$ rpm -qa | grep rp_infinity_express
```

 - o If the output shows the driver is already installed, skip to step 6 to edit the `rc.local` file.
 - o If there is no output, proceed to the next step.

3. Determine the version of the installed kernel. Enter the following:

```
$ rpm -qa | grep kernel
```

The output displays the kernel version.

@Note:

The `uname` command also allows viewing the installed kernel. Enter:

```
$ uname -r
```

Example output:

```
2.6.32-754.6.3.el6.i686
```

4. List versions of the RocketPort PCI Express card driver available for installation. Enter the following:

```
$ sudo yum list --showduplicates rp_infinity_express
```

Example Output:

Available Packages

```
rp_infinity_express 1.16.0-1_2.6.32_431.23.3.el6
```

```
rp_infinity_express 1.16.0-1_2.6.32_696.16.1.el6
```

```
rp_infinity_express 1.16.0-1_2.6.32_754.6.3.el6
```

5. Install the RocketPort PCI Express card driver that is compatible with the kernel version. For example, if the kernel version is:

```
3.16.0-1_2.6.32_754.6.3.el6
```

The appropriate driver is:

```
rocketport-linux.i686 3.16.0-1_2.6.32_754.6.3.el6
```

For a RocketPort PCI Express card, the driver is:

```
rp_infinity_express-1.16.0-1_2.6.32_754.6.3.el6
```

Command for the given example:

```
$ sudo yum install rocketport-linux-*754.6*
```


6. Edit the `rc.local` file to enable the adapter and its serial ports. Enter the following:

```
$ sudo nedit /etc/rc.local
```

- a. Scroll down to the end of the file.

- b. After the last line, add the following:

```
for i in {S,R,RP}{0..7}; do
    if [ -c /dev/tty${i} ]; then
        chmod a+rw /dev/tty${i}
        case ${i:~1} in
            S) ln -s /dev/tty${i} /dev/ser$(( ${i:~1} - 1 ) + 1 ) ;;
            R) ln -s /dev/tty${i} /dev/rckt$(( ${i:~1} - 1 ) + 1 ) ;;
            RP) ln -s /dev/tty${i} /dev/rckt$(( ${i:~1} - 1 ) + 1 ) ;;
        esac
    fi
done
```

- c. Save the file and exit.

7. Reboot the system. Enter:

```
$ reboot
```

8. Check the `rc.local` file for errors. Enter:

```
$ sudo less /var/log/boot.log
```

9. Review the output for errors. Revert to step 6-b above if errors are detected.

3.8.4 Configuring the MTL Adapter

Complete the tasks described in *Section 3.6 Setting up the TSCS Utility* on page 25 before configuring the MTL interface card.

Important:

Installing an Industry Standard Architecture (ISA) card such as an MTL adapter typically requires editing the BIOS to reserve an IRQ for the card. Otherwise, the BIOS will use the available IRQs for Peripheral Component Interconnect (PCI) cards. If installing an ISA card, and for the driver to operate properly, it is recommended to reserve IRQ5 in the BIOS setup. Refer to *Section 5 IRQ Conflicts* on page 45. For Advantech i7 computer boards however, there is no option for reserving interrupts.

Execute the following steps to configure the MTL interface card:

1. Open a terminal window and login as `su`. Enter:

```
$ su
```
2. Enter the following password:

```
$ cyflex123
```
3. Unless the system uses an Advantech i7 board, install the DOSEMU utility. Enter:

```
$ yum install dosemu
```

Note:

The MTL interface works with an Advantech i7 board, but DOSEMU does not.

4. View partitions on the drive using **GParted** or **fdisk**. Enter the following if using **GParted**:

```
$ gparted
```
5. If the hard disk was partitioned using the CyFlex defaults, configure the partitions again for a system with an optional MTL interface card. Refer to step 19 on page 14 and *Section 3.3 Examples of Hard Disk Partitions* on page 16.

Note:

Steps to enable booting from the DOS partition are described in *Section 3.6.2 Installing FreeDOS* on page 27

6. Install the kernel driver for the MTL interface. Execute the following steps:
 - a. Open the `rc.local` file. Enter:

```
$ nedit /etc/rc.d/rc.local
```
 - b. The next action depends on whether a dcc20 card or MTL card is installed.
 - If a dcc20 card is installed, scroll down to a line that says
uncomment these next 3 lines if you have a
dcc20 card. Delete the # comment-out symbol from each line listed below:

```
#cd /cyflex/bin/modules  
#/cyflex/bin/modules/tc_load  
#cd -
```

- If an MTL card is installed, uncomment the following lines:

```
#cd /cyflex/bin/modules  
#/cyflex/bin/modules/mtl_load  
#cd -
```
- c. If the following lines are commented, do not edit them. i.e., leave commented:

```
#cd /cyflex/bin/modules  
#/cyflex/bin/modules/ipc_load  
#cd -
```
- d. Save the file and exit.

3.8.5 Configuring a dynlink Card

Execute the following steps if a dynlink PCI card is installed in the computer:

1. Verify the card is recognized. Enter: `$ lspci | grep SBS`
 - The following output appears if the card is recognized:
`Bridge: SBS/Greenspring Modular I/O PCI-40A or cPCI-200 Quad IndustryPack carrier`
 - If the card is not recognized:
 - i. Turn off the computer.
 - ii. Ensure the card is fully inserted in the PCI slot.
 - iii. Power-on the computer.
 - iv. Repeat step 1 above.

Contact TRP Laboratories for support if the card is still not recognized.

2. When the card is verified as recognized, add the following line to the bottom of `/etc/rc.local`:

```
setpci -f -d 124b:0040 command=0017 latency_timer=40  
cache_line_size=08
```
3. Reboot the computer.

4 Configuring a Network Connection

4.1 NetworkManager

Configure a network connection for each NIC in the test cell that will be used to communicate over the network.

NetworkManager works for both wireless and wired connections. The system-config-network utility is an alternate method for setting up wired connections. Refer to *Section 4.2 System-config Utility* on page 40.

Important:

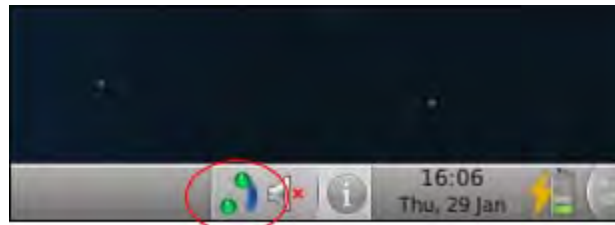
Configurations vary by customer site, and the setup goes faster if required information is on-hand. Refer to *Section 2.2 Preparing for Installation* on page 3.

One way to gather details for the connection is to view another test cell computer in the group, already connected and equipped with the same hardware. Or, check with a network administrator.

Execute the following steps to start NetworkManager:

1. Right-click the network connection icon in the desktop task bar as indicated in *Figure 28*.

Figure 28: Network Connection Icon



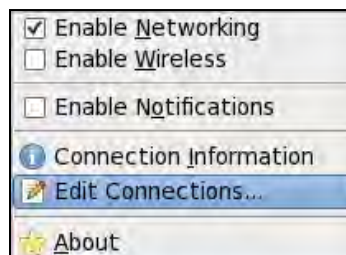
On some systems, the network connection icon does not appear. In this case:

- a. Open a terminal window.
 - b. Enter the following at the command line:

```
$ sudo service NetworkManager start
```

An icon (two screens) appears in the desktop task bar.
 - c. Right-click the icon.
2. Ensure that **Enable Networking** is checked on the resulting screen as in *Figure 29*.

Figure 29: Network Options



3. Select **Edit Connections** as in *Figure 29*.

4. Select the appropriate connection type tab.

Figure 30: Network Connections Tabs



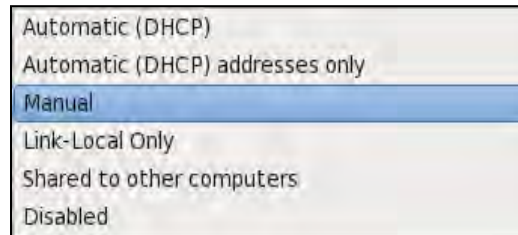
5. Select an Ethernet port connection to be configured. **System eth0** is selected in the example in *Figure 30*.
6. Select **Edit**; refer to *Figure 30*.
7. Select a tab for the standard or Internet Protocol version, e.g. **IPv4**, **IPv6**, etc.

Figure 31: Edit Connection Type



8. Select a method to populate the fields for the selected Ethernet port connection.
 - a. Select **Method** as indicated in *Figure 31* on page 38.
 - b. Select one of the displayed methods, e.g. **Manual**, **Automatic (DHCP)**, etc.

Figure 32: Port Connection Information Population Options



9. The **Editing** window is redisplayed with the selected standard or Internet Protocol version and selected field population method as in *Figure 33*.

Figure 33: Editing Window with Selected Options



Enter the following:

Addresses:

- a. Enter an IP **Address**:
 - i. Select the **Address** tab.
 - ii. Select **Add**.
 - iii. Enter the IP address.
- b. Enter a **Netmask address**:

- i. Select the **Netmask** tab.
 - ii. Select **Add**.
 - iii. Enter the netmask address.
- c. Enter a **Gateway** address:
 - i. Select the **Gateway** tab.
 - ii. Select **Add**.
 - iii. Enter the gateway address.
- d. **DNS servers:** Enter the DNS Server address(es). If adding more than one DNS server, separate addresses with a comma but no space.
- e. **Search domains:** Enter the domain(s). Separate multiple domains with a comma but no space.
- f. Checking the following option boxes is recommended (unless IPv4 is not used):
 - **Available to all users**
 - **Connect automatically**
 - **Require IPv4 addressing for this connection to complete**
- g. Click **Apply**.

4.1.1 Configuring Additional Ethernet Ports

Execute the following steps to configure additional Ethernet ports:

1. Perform the steps in *Section 4.1* on page 37 starting with selecting a port as described in step 5 on page 38.
2. Leave the **DNS servers** and **Search domains** fields blank.
3. Click **Apply** to save the changes and close.
4. Test the connection by “pinging” the hostname of another test cell known to be connected.

The output should state: `Reply from` and include the hostname’s IP address. If not, check the connection settings again.

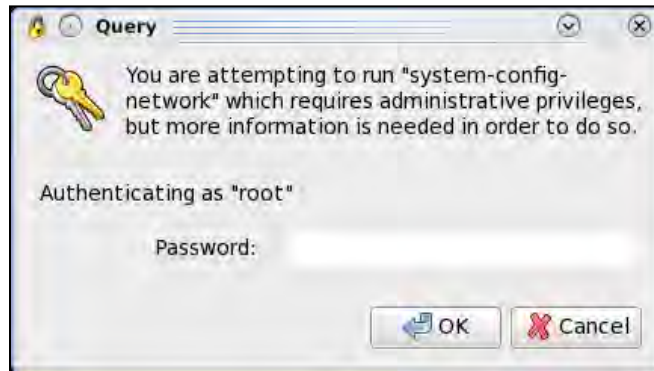
4.2 System-config Utility

The system-config-network utility is an alternate method for setting up wired connections to the network. NetworkManager works for both wireless and wired connections. Refer to *Section 4.1* on page 37.

Execute the following steps to run the system-config-network utility:

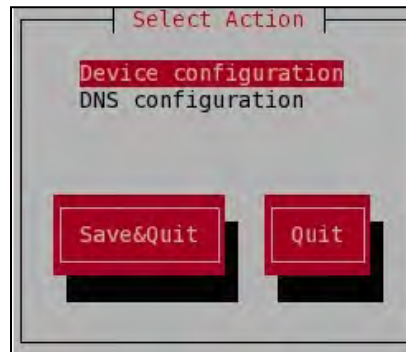
1. Open a terminal shell window and enter the following:
`$ system-config-network`
2. Enter `cyflex123` for the requested password on the resulting **Query** window and then select **OK**.

Figure 34: system-config-network utility Password



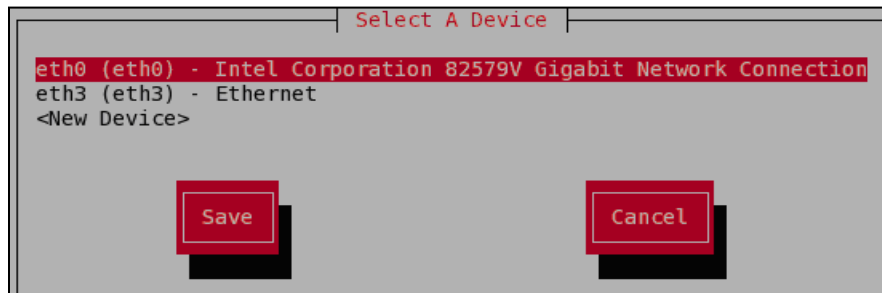
3. Select whether to configure a network device or DNS from the resulting **Select Action** window and then select **Save&Quit**.

Figure 35: Select Configuration Action



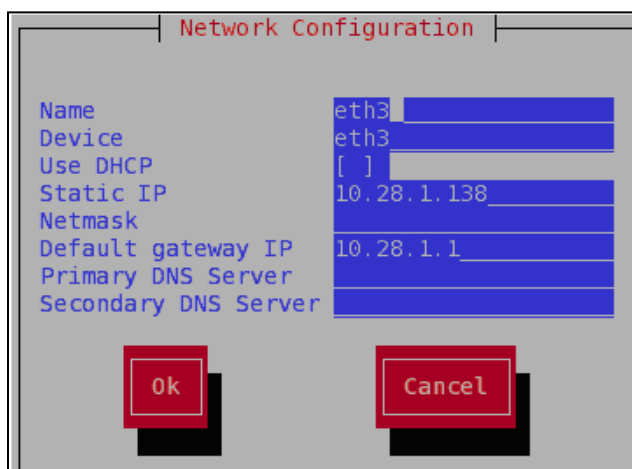
4. Select an Ethernet device on the resulting **Select a Device** window.

Figure 36: Select a Device



5. Complete the fields on the resulting **Network Configuration** window.

Figure 37: Network Configuration



The image shows a 'Network Configuration' dialog box with the following fields and values:

Field	Value
Name	eth3
Device	eth3
Use DHCP	[]
Static IP	10.28.1.138
Netmask	
Default gateway IP	10.28.1.1
Primary DNS Server	
Secondary DNS Server	

At the bottom of the dialog are two buttons: 'Ok' and 'Cancel'.

- Use the <arrow keys> to navigate between fields and control buttons.
- Select **OK** and press <Enter> to save the settings.

6. Configure another Ethernet device as needed:
 - a. Repeat the preceding steps starting with step 3 on page 41.
 - b. Complete the **Network Configuration** window fields. See *Figure 37*.
Example (STC):
Name: eth1
Device: eth1
Use DHCP: Delete the asterisk (*) using the <spacebar>.
Static IP (public IP address)
Netmask: 255.255.255.0
 - c. Select **OK** and press <Enter> to save the settings.
7. Set up the DNS:
 - a. Select **DNS configuration** on the **Select Action** window. Refer to *Figure 35* on page 41.
 - b. Complete the displayed fields.
 - **Name:** Confirm the test cell hostname is correct. If not, type the hostname.
 - **Primary DNS server:** Enter the primary DNS server IP address.
 - **Secondary DNS server:** Enter the secondary DNS server IP address.
 - **Tertiary DNS server:** Enter the tertiary DNS server IP address.
 - **DNS search path:** Enter the path string. Delimit paths with spaces.
 - c. Save the settings.
 - d. On the **Select Action** window, select **Save&Quit**.
8. Modify files to enable the network connections after restarting the system. Execute the following steps:
 - a. Open a shell window.
 - b. Login as the root user. Enter the following:

```
$ su
$ cyflex123
```
 - c. Change to the directory containing the files to be changed. Enter:

```
$ cd /etc/sysconfig/network-scripts
```
 - d. In each file below, change the line for ONBOOT" from No to Yes and save.

```
$ nedit ifcfg-eth0
$ nedit ifcfg-eth1
```

Note:

The filenames correspond to the devices in the steps above. In this case `eth0` and `eth1`.

- e. Exit the files.
- f. Restart the service network. Enter:

```
$ service network restart
```


Respond to the prompt for the root password.

4.3 Installing the Network Driver for the AIMB-786 i9700e Motherboard

If using the AIMB-786 motherboard with the i9700e processor, one of the onboard ethernet ports may require the driver to be manually installed. Installation of this driver is required to configure and use that ethernet port.

1. Determine whether the driver is installed. Run:

```
sudo lspci | grep I219-LM
```

If the following results:

```
00:1f.6 Ethernet controller: Intel Corporation Ethernet  
Connection (7) I219-LM (rev 10)
```

The driver must be installed.

2. To install the driver, run:

```
sudo yum install e1000e
```

Answer `y` when prompted whether to install.

3. Verify successful install. Run:

```
rpm -ql e1000e | grep ko
```

The following output indicates successful installation:

```
/lib/modules/2.6.32-  
754.6.3.el6.i686/updates/drivers/net/ethernet/intel/e1000e/  
e1000e.ko.new
```

Contact TRP Laboratories for support if the preceding output is not produced.

4. Run the following commands to initiate:

```
sudo dracut --force
```

```
sudo reboot
```

5. Once the computer has rebooted, run:

```
ifconfig -a
```

The ethernet port should be displayed and available. Configure the port using the `system-config-network` utility.

5 IRQ Conflicts

An interrupt request (or IRQ) is a hardware signal sent to the processor that temporarily stops a running program and allows a special program, an interrupt handler, to run instead. Interrupts handle events such as data from a modem, network, keyboard, or mouse.

5.1 Evidence of an IRQ Conflict

IRQ conflicts normally do not occur unless an ISA card is installed. IRQ conflicts between devices become apparent when one or more of these occur:

- Operating system does not recognize a PCI adapter
- Boot process does not complete
- Adapter driver does not install properly
- Adapter functions intermittently
- Adapter works for a while, then suddenly fails or locks up the system

5.2 Resolving an IRQ Conflict

Suggestions for fixing an IRQ conflict:

- Check with the system board manufacturer for:
 - A BIOS update. IRQ allocation is a primary responsibility of the BIOS.
 - Any required special drivers (Operating System specific)
- If the system board BIOS permits assigning an IRQ to an individual PCI slot, assign an unused IRQ to the PCI slot containing the PCI adapter.

6 Gnome Partition Editor

The Gnome Partition Editor (**GParted Live**) is included on the SL installation media (DVD or USB flash drive).

ⓘ Important:

The Gnome Partition Editor Web site contains complete instructions for creating and deleting partitions using the **GParted** utility. All of the features are described on the Web site:
<http://gparted.org/>

GParted has a graphical interface and allows the user to, among other actions:

- “Grow” or “shrink” the C: drive
- Create space for a new operating system(s)
- Manage partitions:
 - Select and view
 - Mount
 - Format
 - Create
 - Delete
 - Label
 - Move
 - Resize
 - Check
 - Copy and paste
- Attempt data rescue from lost partitions
- Manipulate file systems