CD-ROM Studio for iSeries

with CD-ROM Developer's Toolkit

User's Guide and Reference

Version 6.1

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Introduction

CD-ROM Studio for iSeries and *CD-ROM Developer's Toolkit* allow you to create native iSeries CD-ROM images for product distribution and system archiving purposes as an alternative to using tape.

This reference is intended to help you get started with the *CD-ROM Studio for iSeries* package you received from Centerfield Technology, Inc.

The information in this reference applies to *CD-ROM Studio for iSeries* Version 6.1. The information should only be applied to this version of the product.

Product Contents

The product you received from Centerfield Technology, Inc., contains the following items.

> ### *CD-ROM Studio for iSeries* and *CD-ROM Developer's Toolkit* installation CD-ROM
>
> The CD-ROM contains the software for both your iSeries and your Windows client workstation. Refer to *Product Installation* for instructions on installing the software.
>
> ### *User's Guide and Reference*
>
> This reference is intended to help you get started with the *CD-ROM Studio for iSeries* package you received from Centerfield Technology, Inc.
>
> ### *CD-ROM Studio for iSeries License Information*
>
> This is the license key assigned to your iSeries system.

CD-ROM Contents

Item	CD-ROM location
iSeries Product Installation	'\'
Windows client installation	'\'
Softcopy version of the documentation	'\DOC\'
Toolkit ASCII source files	'\SAMPLE\SOURCE\'
Toolkit sample installs	'\SAMPLE\INSTALL\'

Product Requirements

iSeries

- ✓ OS/400 V5R2 or later
- ✓ A tape drive available to be used during the CD-ROM packaging process. If creating CD-Installer format CD-ROM images, no tape drive is required.
- ✓ TCP/IP

Windows (minimum requirements)

- ✓ Windows 95/98/ME/NT/2000/XP/Vista
- ✓ 2x CD-ROM drive
- ✓ 80486 @ 66Mhz, 16 MB RAM
- ✓ 10 MB hard drive for product
- ✓ Additional hard drive space required to store CD-ROM image, 700 (or 650) MB per image
- ✓ TCP/IP

CD-Recordable drive

- ✓ 2x (or greater) write speed
- ✓ Software/hardware support for ISO-9660 Mode 1 format
- ✓ Software/hardware support for Windows

Product Installation

iSeries Installation

1) Before beginning the installation on the iSeries, check the following prerequisite conditions.

   ✓ This product requires V5R2 or later version of OS/400.

   ✓ This product uses TCP/IP to communicate between the iSeries and the personal computer. TCP/IP needs to be configured before the server will function. Before continuing, make sure your Windows client can *ping* the iSeries system. See one of the following IBM iSeries references for information on configuring TCP/IP—*TCP/IP Fastpath Setup*, SC41-3430-01, or *TCP/IP Configuration and Reference*, SC41-3420-04.

   ✓ The installation uses TCP/IP port number 9494 by default. If that port is in use, the installation will search for unused port numbers, starting at 9495, until one is found. To determine which one was chosen, use the following command:

   > WRKSRVTBLE SERVICE(*ALL)

   ✓ The product installs into a library named BSCCDROM10. *The installation process will rename this library to BSCCDROM1_ if it already exists.*

   ✓ The toolkit installs into the library BSCTOOLKIT. *The installation process will rename this library to BSCTOOLKI_ if it already exists.*

   ✓ The server requires an active subsystem for proper operation. Determine the subsystem you wish to use. It will be needed later in the installation process. *If this is an upgrade, the previous setting will be preserved.*

   ✓ Have the license key available for entry during the installation process. *If this is an upgrade, the license key will be preserved.*

2) Sign on to an interactive session with QSECOFR or a user profile that has *SECOFR user class. This user profile must have *IOSYSCFG, *JOBCTL, *SECADM, and *SAVSYS special authorities.

3) The system value QALWOBJRST must be set to *ALL. The system value QALWUSRDMN must be *ALL or contain the libraries BSCCDROM10 and BSCTOOLKIT.

You can verify and change both of these system values using the following command.

WRKSYSVAL SYSVAL(*ALL)

4) Place the CD-ROM containing the *CD-ROM Studio for iSeries* product into your primary CD-ROM drive and issue the following command.

LODRUN *OPT

5) When prompted, enter the *active* subsystem where you want the server to reside.

6) When prompted, enter the license password that was provided with your product.

Press Enter to continue the installation.

7) Installation is now complete. You are ready to start the server.

8) To start the server, ensure TCP/IP is active on your system. If it is not active, issue the following command using the "Start application servers" and "Start TCP/IP interfaces" options that are correct for your system.

STRTCP *YES*/*NO *YES*/*NO

9) Issue the following command to start the *CD-ROM Studio for iSeries* server.

BSCCDROM10/STRBSCSVR

10) Verify the server is active in the subsystem you specified. The job name will be BSCSERVER. The following command can be used to check for the active job.

WRKACTJOB

11) The server will have to be restarted every time the subsystem is ended or the system is IPLed. You may add this command to your system startup routine. However, the OS/400 command STRTCP must be issued and TCP must be completely started before the server will start.

12) You are now ready to begin the Windows client installation.

Windows Client Installation

1) Place the CD-ROM containing the *CD-ROM Studio for iSeries* product into your CD-ROM drive.

2) If installation does not start automatically, enter the following from the Start->Run... window:

    d:\SETUP.EXE   where *d* is the CD-ROM drive letter

3) Follow the online instructions to complete the installation.

4) You may now use *CD-ROM Studio for iSeries*.

5) Continue with the chapter called *Creating your first CD-ROM image files*.

Creating your first CD-ROM image files

You are now ready to create your first CD-ROM image files. The following paragraphs will walk you through a sample scenario to introduce the process of creating CD-ROM image files. It will also help you configure a connection to your iSeries system.

You may fast-path through this sample by completing the actions in **bold text**.

1) In this scenario, we are going to build a sample installation CD-ROM that can be installed using the LODRUN command.

Background for the scenario:

The product we will install is currently saved in the save file LODRUNS1 in library BSCTOOLKIT. This save file contains a library named LODRUNL1 that was saved with the SAVLIB CL command.

The save file LODRUNS2 (also in the BSCTOOLKIT library) contains the program QTEMP/QINSTAPP and other install programs. The QINSTAPP program will be called by LODRUN.

The source file with the entire source for this sample is BSCTOOLKIT/LODRUN1.

Note on example scenario:

Other methods of installation or save/restore can be used with CD-ROM. Even if you do not plan to use LODRUN with your CD-ROM, it is useful to go through this example to understand the basic method of CD-ROM creation.

2) **Start the *CD-ROM Studio for iSeries* Windows client by double clicking the icon in the *CD-ROM Studio for iSeries* program group.**

3) Once the client is started, it will automatically guide you through the process of creating an iSeries CD ROM image. This is done through the *CD-ROM Studio for iSeries* "wizard".

4) The first dialog lets you create a new CD-ROM profile or open an existing profile. **Choose *Create a new CD-ROM image profile*.**

5) The next dialog prompts for an iSeries system. This system is where the CD-ROM image will be created.

6) To configure a connection, **click on the *Configure Network Connection*** button.

7) **Type the name of the iSeries system**. **Press *Next***.

8) **Enter the IP address of the remote system**. If you have a name server or a name defined in your HOSTS table, you may use that name instead of the IP address.

9) **For the port enter 9494 (if this port was already used by another application when *CD-ROM Studio for iSeries* was installed, another port was chosen; to determine if another port was chosen use the WRKSRVTBLE command)**. **Press *Save***. Configuration is now complete.

10) Before continuing, make sure the server is started on the iSeries. If it is not started, use the BSCCDROM10/STRBSCSVR command to start the server.

11) **Select the system you configured** and **enter a user ID and password** that is authorized to the library BSCTOOLKIT and has authority to the system save and restore commands. **Press *Next***.

12) You should see a message in the lower (left side) status bar of the main *CD-ROM Studio for iSeries* window saying *Successfully connected to server*.

13) The next dialog lets you select the type of CD-ROM format you would like to create. You will be prompted appropriately for the selected type of CD-ROM format.

    Choose *Save/restore based install using CD-ROM* from the dialog for this scenario, since we are building an install CD to be used with the LODRUN command. **Press *Next***.

14) Now you must specify the source for the CD-ROM image. In this scenario, we are going to call a program on the iSeries that will save the product to be installed.

    Select *Call an iSeries program to save the data to tape*. **Press *Next***.

15) **Select the iSeries program** to create the CD-ROM contents. The program name is **CUTCD** in library **BSCTOOLKIT**. You can use the drop downs to select the program. **Press *Next***.

The program accepts one parameter as input, namely, the tape device to which the CD-ROM image will be saved.

To create a CD-ROM image, the objects must go through a tape save operation. This is required to prepare the objects so they can be successfully restored via normal restore CL commands on the iSeries. In this scenario, the SAVSAVFDTA command is used to save the application to tape.

16) **Select the iSeries tape device** you want to use while creating the CD-ROM image. **Make sure there is a tape in the drive** that can be initialized. The premastering process will initialize the tape when you create the CD-ROM image. **Press** *Next*.

17) **Enter the Windows directory** (folder) where you want to put the resulting CD-ROM image files. The image files placed in this directory can be written to a CD-Recordable device. **Press** *Next*.

18) **Press** *Next* when prompted to enter the CD-ROM volume label. It is not used in this scenario.

19) You are now ready to create the CD-ROM image files. The following things will happen while creating the image files.

✓ The server will prepare the tape and CD-ROM creation environment.
✓ The program you specified will be called to do an iSeries save operation to the tape device you specified.
✓ The CD-ROM image files will be created from the save data and transferred to the target directory you specified.

20) **Press** *Create Image*. This will create the native iSeries CD-ROM image files. You will see status messages during this phase. This may take a while.

21) You will get a message saying that *CD-ROM premastering is complete*. **Press** *OK* to close the message box. **Press** *Cancel* to close the create dialog.

22) A child window now contains information about the CD-ROM image files you created. **Maximize the child window if it is not fully visible.** You are now ready to create a CD-ROM using a CD-Recordable device.

23) The tape in the drive also contains the CD-ROM image. This tape is suitable to send to a CD-ROM duplication company that accepts iSeries tapes with CD-ROM images. This can be used as an alternative method to using a CD-Recordable device.

24) See the *Burning a CD-ROM* section of the chapter called *Windows Client* to create a CD-ROM.

iSeries CD-ROM Creation Process

When planning your CD-ROM distribution or archiving strategy, there are several components that need to be considered. This chapter will describe these components and give you the options. Once you have chosen your strategy, you can use *CD-ROM Studio for iSeries* and *CD-ROM Developer's Toolkit* to create your CD-ROM and CD-ROM installation program.

This chapter assumes you are already familiar with the overall process presented in the previous chapters and *Appendix 1—Understanding CD-ROM on the iSeries*.

Choosing the type of installation

You must choose the type of installation procedure you want for your CD-ROM. This choice determines how your install will restore the contents from the CD-ROM.

CD-Installer, save file based installation

The CD-Installer method lets you package one or more products or versions on a single CD-ROM.

The CD-Installer method requires that you package your product into one or more save files and for it to have a callable install program that initiates the installation.

If the following statements apply, you should use the CD-Installer save file based method for your CD-ROM based product installation.

- You are using save files as part of your installation process today.
- You want to ship multiple versions or multiple products on a single CD-ROM.
- You do not have a CD-ROM based install already that uses one of the other methods.

LODRUN based installation

The LODRUN command lets a user insert the CD-ROM or tape media in their system and simply enter the LODRUN CL command. The system then loads and runs your installation program (QINSTAPP). Your installation program can then restore your product from the CD-ROM or tape media, prompt the user for installation specific information, and do any other needed system configuration or object creation.

If you are not familiar with the LODRUN command, see the IBM iSeries system manual *CL Programming*, SC41-4721-00, for more information.

The LODRUN command lets you specify a path on the CD-ROM. This is useful if

- You want several versions of your product on the same CD-ROM.
- You want to organize your CD-ROM such that the iSeries install is not in the root directory.

If the following statements apply, you should use the LODRUN command for your CD-ROM based product installation.

- You are using LODRUN today for your tape installation
- You want or need an install method other than a simple RSTLIB or RSTOBJ command.
- You want to ship your product in a subdirectory on the CD-ROM, not in the root directory.
- You have multiple iSeries versions or product installation programs on a single CD-ROM.
- You are shipping multiple iSeries products on a single CD-ROM media.

SAVLICPGM method

The RSTLICPGM command lets you install your product as a licensed program.

If you are not familiar with the RSTLICPGM command, see the IBM iSeries system manual *System Manager Use*, SC41-3321-02, for more information.

This command does not support subdirectories on the CD-ROM. This means your product must reside in the root directory of the CD-ROM and the CD-ROM can only contain one installation, product, or version.

If you need to use the RSTLICPGM command and also need to use subdirectories on the CD-ROM or ship multiple product installs on a single CD-ROM, you should

- Put your RSTLICPGM product in save files.
- Ship the save files in subdirectories on the CD-ROM
- Use either the CD-Installer or LODRUN or RSTOBJ method to retrieve the save file from CD-ROM into QTEMP during install
- RSTLICPGM from the save file in QTEMP

If the following statements apply, you should use the RSTLICPGM command for your CD-ROM based product installation.

- You can ship your iSeries in the root directory and have a single product install on the CD-ROM
- You are using RSTLICPGM today for product installation from tape

Save/Restore

The save/restore method is simply using one of the restore commands to retrieve the CD-ROM contents.

This is the method of choice for system archiving or doing object save and restore operations.

If you are not familiar with the save and restore commands on the iSeries, see the IBM iSeries system manual *Backup and Recovery - Basic*, SC41-4304-01, for more information.

The following commonly used restore commands have full support for subdirectories on the CD-ROM.

- RST (Restore Object)
- RSTOBJ
- RSTLIB
- RSTDLO

If the following statements apply, you should use the save and restore method for your CD-ROM based product installation or system archiving.

- You are using the CD-ROM for system archiving purposes
- You are distributing a library or objects that simply need to be restored onto the target system.
- You have no need for the LODRUN or RSTLICPGM method.

LODRUN Based Installation

Before creating a LODRUN based installation program, you should be familiar with the LODRUN command on the iSeries. See the IBM iSeries system manual, *CL Programming*, SC41-4721-00, if you need more information.

LODRUN and CD-ROM

When you issue the LODRUN command on the iSeries and specify an optical device (CD-ROM drive), OS/400 will look for a CD-ROM image file named QTEMP in the path you specified on the CD-ROM.

The QTEMP image file must contain the program QINSTAPP that was saved from library QTEMP. It can also contain other iSeries objects saved from QTEMP as well.

Typical LODRUN creation scenario

This outlines the typical approach used to create a LODRUN based CD-ROM. The example is used throughout the steps to show one way it can be done.

1) Identify the save data you are going to place on CD-ROM. To help automate the process, it is a good idea to write a CL program that contains the save operations. Here is an example.

    PGM PARM(&DEV)

        DCL &DEV *CHAR 10

        SAVLIB LIB(PRODLIB) DEV(&DEV) LABEL(&DEV)
           DTACMP(*NO) COMPACT(*NO) /* Save product library */

        SAVOBJ OBJ(*ALL) LIB(SAMPLES) DEV(&DEV)
           LABEL(SAMPLES) DTACMP(*NO) COMPACT(*NO)
                              /* Save sample library */
    ENDPGM

2) Decide on the layout of the CD-ROM so you know the path to specify on the restore operations.

> For this example, we are going to place the CD-ROM image files in the root directory of the CD-ROM.

> /PRODLIB   /SAMPLES

3) Create the install program(s) QINSTAPP.

QINSTAPP

PGM PARM(&DEV)

    DCL &DEV *CHAR 10

    /* Make sure sample library exists */
    CRTLIB SAMPLES
    MONMSG(CPF0000) /* Ignore errors */

    /* Restore the product and samples from the root directory of the
        CD-ROM */
    /* No OPTFILE path is needed since the files are in the root of the
        CD-ROM and the image file names are the same as the libraries the
        data was saved from */
    RSTLIB LIB(PRODLIB) DEV(&DEV)
    RSTOBJ OBJ(*ALL) LIB(SAMPLES)

ENDPGM

4) Add logic to the packaging program to package the install program also.

```
PGM PARM(&DEV)

    DCL &DEV *CHAR 10

    SAVLIB LIB(PRODLIB) DEV(&DEV) LABEL(&DEV)
        DTACMP(*NO) COMPACT(*NO) /* Save product library */

    SAVOBJ OBJ(*ALL) LIB(SAMPLES) DEV(&DEV)
        LABEL(SAMPLES) DTACMP(*NO) COMPACT(*NO)
                                    /* Save sample library */

    CRTDUPOBJ OBJ(QINSTAPP) FROMLIB(MYLIB)
        OBJTYPE(*PGM) TOLIB(QTEMP) NEWOBJ(*OBJ)
                    /* Put install program into QTEMP */

    SAVOBJ OBJ(QINSTAPP) LIB(QTEMP) DEV(&DEV)
        DTACMP(*NO) COMPACT(*NO)
                    /* Save install program from QTEMP */
                    /* It must be save from QTEMP since that is
                        where the LODRUN commands expects it to
                        be restored from */

    ENDPGM
```

5) Compile the QINSTAPP program. Compile the packaging program.

6) Insert a tape into the iSeries tape drive. This is used during the CD-ROM creation process.

7) Use either the *CD-ROM Studio for iSeries* Windows client or iSeries commands to prepare the data for CD-ROM. Use the packaging program you created above to package the save data.

8) Create the CD-ROM using the CD-ROM layout decided upon in step 2. In our example, the CD-ROM layout will be as follows.

    /PRODLIB   /SAMPLES   /QTEMP

Additional scenarios

See the following samples found in Appendix 5 for more for more information on using LODRUN based CD-ROM installations.

Scenario 1. Simple LODRUN-QINSTAPP product installation from CD-ROM
Scenario 2. Dual media LODRUN-QINSTAPP product installation
Scenario 3. Dual media LODRUN-QINSTAPP product installation using save files

Licensed program products (SAVLICPGM)

With SAVLICPGM, you can save one or more products onto CD-ROM. If the products exceed 700 (or 650) MB, you will need to create separate CD-ROMs, each less than 700 (or 650) MB.

Typical SAVLICPGM creation scenario

1) Create a packaging program.

   PGM PARM(&DEV)

   DCL &DEV *CHAR 10

   SAVLICPGM LICPGM(5716PM1) DEV(&DEV) OPTION(*BASE)
   RLS(*ONLY) LNG(*PRIMARY) OBJTYPE(*ALL)
   /* Save product */

   ENDPGM

2) Compile the packaging program.

3) Insert a tape into the iSeries tape drive. This is used during the CD-ROM creation process.

4) Use either the *CD-ROM Studio for iSeries* Windows client or iSeries commands to prepare the data for CD-ROM. Use the packaging program you created above to package the save data.

5) Volume Id. The Volume ID is important for licensed program product CD-ROMs. Enter a Volume ID you would like to use on the CD-ROM. *CD-ROM Studio for iSeries* will append a 01 to the volume ID you specify to indicate that this is the first CD-ROM for this product.

6) Create the CD-ROM. It is recommended you use the *CD-ROM Studio for iSeries* Windows client for this step, as it will automatically create the correct directory structure for the CD-ROM layout. It will also report the Volume ID or Volume Label to use when creating the CD-ROM.

If you do not use the *CD-ROM Studio for iSeries* Windows client, the description on the CD-ROM images will specify the path into which you should place the file on the CD-ROM.

Additional Information

For more information about packaging your product with the use of SAVLICPGM, see the IBM publication *System Manager Use*, SC41-3321-02.

Save/Restore

To save information to CD-ROM using basic save commands, follow these steps.

1) On the iSeries, initialize a tape large enough to hold your save data.

2) Issue the command BSCCDROM10/STRCDP to begin the save process.

3) Save your information to tape using one or more save commands. If you have any library names that are 9-10 characters long, specify a shorter name on the LABEL() keyword of the save command.

   If you do more than one save operation from the same library, only the last save operation will be included on the CD-ROM. You can change the command default for the HNDDUP() keyword on command BSCCDROM10/RTVCDIMG to allow multiple saves from the same library.

4) Issue the command ENDCDP DEV(TAP0x) VOLUME('MYCDROM') CDSIZE(700) to complete the save process. (Use CDSIZE(650) for older CD-ROM disks. You can also use larger values for creating images for DVD-ROMs.)

5) On the PC, choose to create a save/restore based CD-ROM. Select to use an existing tape when prompted. Follow the additional prompts to complete the process.

Using the CD-Installer/Save files on CD-ROM

Using the CD-Installer and CD-Installer save format, you can distribute a save file based product install on CD-ROM.

It also has built-in support to assist with shipping multiple products and multiple versions on a single CD-ROM.

If you are not using the CD-Installer save file method for product distribution, this information does not apply.

The CD-Installer is also referred to as the CD-ROM Installation and Disc Manager in some documentation.

When the user enters LODRUN DEV(*OPT), the CD-Installer program is initiated. It scans the current CD-ROM to determine its contents. It then builds a list of products (one product or many) that can be installed on the current release of OS/400.

Once a product has been selected for installation, it creates save files in QTEMP that contain your product. It then restores your installation program into QTEMP and calls it to do the install.

CD-Installer Save File Installation

If you are using the save file based installation approach, you must create an installation program and a set of save files. This section gives you the guidelines to use when developing your installation.

1) Develop your installation to run out of library QTEMP. During installation, the CD-Installer will place your install program and associated save files into library QTEMP.

2) You can use any number of save files as part of your installation.

3) Do not use save files with any of the following names: CDLOAD, QTEMP, CDINDEX, CDBASE

4) Name your save files using 8 characters or less. Names with 9 or 10 characters are not supported.

5) Test your installation out of QTEMP manually before burning a CD-ROM.

6) You may name your install program with any name you want.

Packaging multiple products on a CD-ROM

With the CD-ROM Installation and Disk Manager, you can package multiple products or versions on a single CD-ROM.

To do this, you need to package each product individually as if it were the only product on the CD-ROM. When you burn the CD-ROM, you can then create a subdirectory for each product. The Installation and Disk Manager will automatically search the CD-ROM and find all of the products on the CD-ROM.

Additional Information

Sample 4.—CD-Installer save file installation.

CD-Installer runtime code

Two files, QTEMP and CDLOAD, must be shipped in the root directory of the CD-ROM as part of the CD-Installer. These files contain the CD-Installer executables and will be invoked automatically by the command LODRUN DEV(*OPT). When using the CD-Installer, this should be the documented method you provide your user's for installing from CD-ROM.

These files will be automatically created by the *CD-ROM Studio for iSeries* Windows client. They will be placed into the same directory as your product specific files. When creating the CD-ROM, move one copy of these files into the root directory of the CD-ROM.

If you have multiple products on a single CD-ROM, you may use the QTEMP and CDLOAD files produced by any of the products and discard the duplicate files.

These files are also available on the iSeries in library BSCCDROM10.

CD-Installer Base and Index files

Two other files are also produced which must be shipped in the same directory as your product save files: **CDBASE** and **CDINDEX**. These files contain information and data specific to a single version of your product. These files are used by the CD-Installer to identify and list the products currently on the CD-ROM and to convert the CD-ROM files into save files during the installation process.

Save files

The save files that are part of your product will be saved as CD-ROM files with the same name. Place all of these files in the same directory as the CDINDEX and CDBASE files.

CD-Installer CD layout map

The map of a CD-ROM using the save file CD-Installer with two separate products might look like the following:

Path	Contents
/ *(root)*	QTEMP, CDLOAD
/PROD1/	CDINDEX, CDBASE, your files, …
/PROD2/	CDINDEX, CDBASE, your files, …

Mixed format CD-ROMs

You can use the CD-Installer on the same CD-ROM containing save/restore format based data.

The QTEMP file in the root directory must be the one provided as part of the *CD-ROM Studio for iSeries* package.

Naming conventions

Your product installation cannot have any save files with the following names.

QTEMP, CDLOAD, CDINDEX, CDBASE

Your save files must have 8 characters or less in their name. Save files with names of 9 or 10 characters in the name are not supported.
The installation program used to install from the save files cannot be named QINSTAPP. Any other iSeries program name is allowed.

Multi-volume CD-ROMs (Advanced Edition)

> **Note:** *Advanced Edition* is an additional cost option of *CD-ROM Studio for iSeries*. Contact a Centerfield Technology, Inc., sales representative for more information.

Many modern applications have become larger than will fit on a single CD-ROM (ISO-9660 Mode 1), which can hold only 700 (or 650) MB of data. In addition, the iSeries does not include support for spanning multiple CD-ROMs, as it does for tapes. *CD-ROM Studio for iSeries—Advanced Edition* includes the **Span Multiple CDs (SPANCDS)** command, which will help you divide large applications into image files that span multiple CD-ROMs. Without **SPANCDS**, this process is tedious, difficult to manage, and prone to error.

Manual process	Using SPANCDS
✋ Identify libraries	✋ Identify libraries
⌛ Determine object sizes in each library	
⌛ Organize objects by size to fit on CD-ROMs—probably different each time ① Be sure to arrange them to be restored correctly	
⌛ Save each set of objects ① Be sure to use 8-character labels for long library names ① Be sure to use unique labels	✋ Run **SPANCDS**
⌛ Create/modify QINSTAPP	
⌛ Create/modify installation program	
⌛ Save QINSTAPP	
⌛ Save installation program and supporting objects	
✋ Retrieve image files using Windows client	✋ Retrieve image files using Windows client
✋ Burn CD-ROMs	✋ Burn CD-ROMs

> **Note:** The **Save object for CD-ROM (SAV650)** command, part of *CD-ROM Studio for iSeries—Standard Edition*, provides a rudimentary method for splitting a library into CD-ROM size files. See *Appendix 5— Multi-volume CD-ROMs (Standard Edition)* for more information.

Note: This section assumes and builds upon a working knowledge of the *CD-ROM Studio for iSeries* commands and Windows client.

Span Multiple CD-ROMs (SPANCDS)

```
                Span Multiple CD-ROMs (SPANCDS)

 Type choices, press Enter.
                                                      Span Multiple CD-ROMs (SPANCDS)
 Libraries:                  LIB        _
   Save library . . . . . . . . .      >  _____      Type choices, press Enter.
   Restore library . . . . . . .       *SAVLIB
                       + for more values  _          Exit programs:            EXITPGM
 Device . . . . . . . . . . . . . DEV    TAP01          General pre-process program .         *NONE____
 Target release . . . . . . . . . TGTRLS *CURRENT         Library . . . . . . . . . .
 Intermediate output library . . OUTLIB  XCINTERMED     General post-process program          *NONE____
 CD-ROM volume ID prefix . . . . CDVOLID PRODUCT_CD       Library . . . . . . . . . .
 File ID prefix . . . . . . . . . FILEID  SAVE          Library pre-process program .         *NONE____
 CD-ROM size . . . . . . . . . . . CDSIZE 700             Library . . . . . . . . . .
                                                        Library post-process program         *NONE____
                                                          Library . . . . . . . . . .
                                                                                                   _____

                                                                                                   Bottom
 F3=Exit   F4=Prompt   F5=Refresh   F10=Additional parameters   F3=Exit    F4=Prompt   F5=Refresh   F10=Additional parameters   F12=Cancel
 F13=How to use this display      F24=More keys                 F13=How to use this display       F24=More keys
```

The **Span Multiple CD-ROMs (SPANCDS)** command facilitates the process of saving a large distribution for installation using multiple CD-ROM image files. In its simplest form, it is only necessary to specify the list of libraries to be saved **(LIB)**.

SPANCDS LIB(LIB1 LIB2)

As **SPANCDS** is running, the libraries are processed in the order specified in the **Library (LIB)** parameter. Each library is checked for size. If the contents of the library, plus the library object itself, will fit in the space remaining on the current CD-ROM, the entire library is saved. If the library and its contents are too large for the space left on the current CD-ROM, its contents are partitioned into sets of objects that will fit in the remaining space and on successive CD-ROMs. This process continues until all objects in the library are saved.

The output of **SPANCDS** includes:

- ✓ a set of tape or save files
- ✓ an output file from the save operations
- ✓ a CD-ROM layout file
- ✓ programs & a service program to restore the saved libraries
- ✓ display file used during recovery (in the event of restore problems)
- ✓ source for the main install program

The **Load and Run (LODRUN)** command, using a CD-ROM set that is created from these image files, will restore the specified libraries without modification.

Restrictions

1. No single object can be larger than *CD-ROM size* bytes.

2. This command should not be run in a program that is called from the *CD-ROM Studio for iSeries* Windows client.

3. Complete libraries only can be specified. At this time there is no provision for selecting or omitting individual objects in a library.

4. The system on which objects are restored must be at V5R2M0 or greater. This is because the installation objects that come with *CD-ROM Studio for iSeries—Advanced Edition* were created at target release V5R2M0.

Libraries (LIB)

Specifies a list of a maximum of 100 libraries to be saved.

This is a required parameter.

Save library

Specifies the name of a library to be saved. It must exist at the time the command is run.

Restore library

Specifies whether the library contents are restored to the same library in which they were saved, or to a different library.

The possible values are:

*SAVLIB

The library contents are restored to the same library in which they were saved.

library-name

Specify the name of the library where the saved library contents are restored.

Device (DEV)

Specifies the name of the device used for the save operation. The device name must already be known on the system by a device description.

This is a required parameter.

The possible values are:

TAP01

The save operation is done using tape device **TAP01**. The tape is suitable for use with the **Create CD Image from Tape (RTVCDIMG)** command, or with the **Multiple CD-ROMs from tape** method of the *CD-ROM Studio for iSeries—Advanced Edition* Windows client, using an existing tape.

Note: The **Start CD-ROM Premastering Mode (STRCDP)** and **End CD-ROM Premastering Mode (STRCDP)** commands are run by **SPANCDS** when a tape device is used.

*SAVF

The save operation is done using save files in the **intermediate output library**. The save files are suitable for use with the **Create CD Image from Save File (CRTCDIMG)** command, or with the **Multiple CD-ROMs from save files** method of the *CD-ROM Studio for iSeries—Advanced Edition* Windows client.

An advantage of using save files is that a tape device is not required. A disadvantage is that more disk space is needed than when using a tape device.

tape-device-name

Specify the name of the tape device used for the save operation.

Target release (TGTRLS)

Specifies the release of the operating system on which you intend to restore and use the object.

Note: Service program **XCINSTALL**, which is used by the generated **INSTALL** program, was created at target release V5R2M0. Therefore, you will not be able to use the generated program on a system with a release of OS/400 earlier than V5R2M0. Contact Centerfield Technology, Inc., support for assistance.

The possible values are:

*CURRENT

The object is to be restored to, and used on, the release of the operating system currently running on your system. The object can also be restored to a system with any subsequent release of the operating system installed.

*PRV

The object is to be restored to the previous release with modification level 0 of the operating system. The object can also be restored to a system with any subsequent release of the operating system installed.

target-release

>> Specify the release in the format **VxRxMx**. The object can be restored to a system with the specified release or with any subsequent release of the operating system installed.
>>
>> Valid values depend on the current version, release, and modification level, and they change with each new release. Press F4 to see a list of valid target release values.

Intermediate output library (OUTLIB)

> Specifies the intermediate output library for the deliverables. It must not be in the list of libraries to be saved, nor be the current library for the user who executes the command. The default is **XCINTERMED**.
>
> If the library does not exist, it will be created. If it does exist, it will be cleared. An inquiry message is sent to make sure that the library should be cleared.

CD-ROM volume ID prefix (CDVOLID)

> Specifies the prefix used to generate CD-ROM volume IDs. The prefix can be up to 14 characters long. The default is **PRODUCT_CD_**. A 2-digit sequence number is appended to the ID for each new volume. The first character must be alphabetic. The remaining characters can be alphanumeric or an underscore.

File ID prefix (FILEID)

> Specifies the prefix used to generate image file names. The prefix can be up to 4 characters long. The default is **SAVE**. A 4-digit sequence number is appended to the prefix to generate the tape label or save file name for each save operation.

CD-ROM size (CDSIZE)

> This is the maximum space on a CD-ROM, in millions of bytes (not megabytes). Typical values are 700 and 650, but it could be higher (up to 4700) for installations that use DVDs.
>
> The possible values are:
>
> **700**
>> The maximum space on each CD-ROM is 700,000,000 bytes.
>
> **cd-rom-size**
>> The maximum space on each CD-ROM is **cd-rom-size** million bytes.

Exit programs (EXITPGM)

Specifies qualified names of up to 4 programs that the installation program will call. The programs and any objects they use directly will be packaged with program **INSTALL**, file **XCCDLAYOUT**, service program **XCINSTALL**, and display file **RECOVER**.

The exit points are:

General pre-processing   Before any libraries are processed
General post-processing   After all libraries have been processed
Library pre-processing   Before each library is processed for the first time
Library post-processing   After each library is processed for the last time

The possible values are:

<u>*NONE</u>
      The exit point is not used.

program-name
      Specify the name and library of the program.

The only possible library value is:

library-name
      Specify the name of the library where the program is located.

All programs, and objects to which they refer, must exist at the time the command is run.

Typical SPANCDS scenario

This outlines the approach used to archive a set of libraries on 1 or more CD-ROMs. The tape drive is used to save the data. The resulting set can be used to restore the libraries on the same or another system.

1) Identify the libraries you want to put on CD-ROM. This example will use SAVLIB01 and SAVLIB02.

2) Insert a suitable tape into device TAP01.

3) Run the **Span Multiple CD-ROMs (SPANCDS)** command:

   SPANCDS (SAVLIB01 SAVLIB02)

4) Use the **Multiple CD-ROMs from tape** method of the *CD-ROM Studio for iSeries—Advanced Edition* Windows client to retrieve the image files to your PC.

5) Using the CD-ROM Layout report for reference, burn the CD-ROMs. Use the volume IDs listed in the report and put the image files on their respective CD-ROMs.

   If both SAVLIB01 and SAVLIB02 are 300 MB in size, there will be one CD-ROM.

CD-ROM volume ID	Image files	Library	Size
PRODUCT_CD_01	SAVE0001	SAVLIB01	300 MB
	SAVE0002	SAVLIB02	300 MB

   If both SAVLIB01 and SAVLIB02 are 600 MB in size, there will be two CD-ROMs.

CD-ROM volume ID	Image files	Library	Size
PRODUCT_CD_01	SAVE0001	SAVLIB01	600 MB
	SAVE0002	SAVLIB02	100 MB
PRODUCT_CD_02	SAVE0003	SAVLIB02	500 MB

Deliverables

The **Span Multiple CDs (SPANCDS)** command generates a number of objects on the iSeries system. These include the saved library data, 2 data files and reports, a source file, a QINSTAPP program, an installation program, a service program, and a display file. With the exception of data saved to tape, they are all located in the intermediate output library **(OUTLIB)**.

Save data

When a tape device is specified on the **Device (DEV)** parameter, the libraries specified in the **Library (LIB)** parameter are saved to a tape that is suitable for use with the **Create CD Image from Tape (RTVCDIMG)** command, or with the **Multiple CD-ROMs from tape** method of the *CD-ROM Studio for iSeries—Advanced Edition* Windows client, using an existing tape.

When save files are specified, the libraries are saved to save files that are suitable for use with the **Create CD Image from Save File (CRTCDIMG)** command, or with the **Multiple CD-ROMs from save files** method of the *CD-ROM Studio for iSeries—Advanced Edition* Windows client.

The file labels or save file names are constructed from the **File ID prefix (FILEID)** followed by a 4-digit sequence number.

Save data output file

The save operations output file, **XCSAVOUTF**, is the database file to which member-level information from the save operations is directed. A report is created from this file. This can be used by developers as they see fit, perhaps to ensure that everything was saved as intended. **SPANCDS** does not use it once it has finished.

CD-ROM layout file

The CD-ROM layout file, **XCCDLAYOUT**, specifies the CD-ROM volume IDs and the image files that should be placed on each. It is used during installation to check that certain system values are set appropriately. A report is created from this file that is useful when recording the CD-ROMs.

Source code and programs

A CLLE source file, **QCLSRC**, is created. There is only one member, for the module from which the program, **INSTALL**, is created.

Note: The generated source code can be modified by the customer. Centerfield Technology, Inc., does suggest, however, that it should be left as is. It is easier and more reliable to customize the process using the exit programs. See *Using Exit Programs* for details.

Program: INSTALL

This is the main installation program, restored and called by **QINSTAPP**. **INSTALL** performs the following actions:

✓ Calls the **CHECKAUTH** procedure
✓ Calls the general pre-processing exit program

✓ For each image file:
  ✓ Calls the library pre-processing exit program (only when first image file for the library)
    ✓ Checks whether to skip the library (exit program parameter)
  ✓ Calls the **CHECKCD** procedure
    ✓ Checks whether user cancelled installation
  ✓ Calls the **RESTORELIB** procedure
  ✓ Calls the library post-processing exit program (only when last image file for the library)

✓ Calls the general post-processing exit program

The program is created from this main module and uses procedures in the **XCINSTALL** service program (see below).

Program: QINSTAPP

This program is restored and called when **LODRUN** is executed.

Note: When save files are used, the image file **SAVFINSTAP**, installed as a part of *CD-ROM Studio for iSeries*, contains **QINSTAPP**. It is copied and renamed to **QTEMP** by the **Create CD Image from Save File (CRTCDIMG)** command. When tape is used, the program **TAPEINSTAP** is copied to **QTEMP** as **QINSTAPP** and saved to tape from there.

Other installation objects

Service program **XCINSTALL** and display file **RECOVER**, installed as a part of *CD-ROM Studio for iSeries—Advanced Edition*, are copied to the intermediate output library by **SPANCDS**.

Service program: XCINSTALL—Routines provided by Centerfield Technology, Inc.

This service program contains the routines called directly by the program **INSTALL**, as well as other supporting routines.

Procedure: CHECKAUTH—Check authority system values

This procedure checks the values of system values that affect installation:

- ✓ QALWUSRDMN (Allow user domain objects in libraries)
- ✓ QALWOBJRST (Allow object restore option)
- ✓ QUSEADPAUT (Use adopted authority)

Procedure: CHECKCD—Check that correct CD is mounted

This procedure checks whether the correct CD-ROM is loaded. If not, it prompts the user to load the next volume. The user can also skip to the next library or cancel the installation from here.

Note: If the installation is using image catalogs, the **Work with Catalog Entries (WRKIMGCLGE)** is run.

Procedure: DEC9TOCHAR—Convert 9-digit packed to 9-byte character

This procedure converts packed numeric values to left-adjusted, blank-padded character values, primarily for use in message data.

Procedure: GETMSGTXT—Get message and help text

This procedure gets message and second-level text during the recovery phase.

Procedure: RECOVER—Recover from objects not restored

This procedure is called when there are problems and/or security changes during the restore of a library. See *Installing the Distribution* for more information about this phase.

Procedure: RESTORELIB—Restore a library

This procedure restores the save data. If the save command was **SAVOBJ**, the restore library is created first. If save files were used, the image file is copied to **QTEMP** from the current volume. Then the appropriate restore command is run, based on which save command was used.

Procedure: RESTOREOBJ—Restore an object

This procedure is used during the recovery phase to restore an object that did not get restored.

Procedure: XCSETDLVRY—Set message queue delivery mode

This procedure sets the delivery mode of the workstation message queue. It sets the mode to *BREAK at the start and resets it at the end.

Display file: RECOVER—Recover from objects not restored

This display file is used during the recovery phase.

These objects are saved for use in a **LODRUN** installation.

Using Exit Programs

The general-purpose installation programs generated by **SPANCDS** will restore the specified libraries from a set of CD-ROMs using the **Load and Run (LODRUN)** command. Basic authority checks are made to insure successful installation, and the user is prompted to load or mount successive CD-ROM volumes.

However, you may have special considerations for your installations. Therefore, exit points have been provided that let you customize the installation.

Common considerations

Example shells for the exit programs can be found in source file **BSCTOOLKIT/SPANCDS**. They show which parameters must be passed, if any. They also demonstrate the minimum necessary error handling.

Errors must be handled by the exit program. If the error is severe enough to stop the installation, the exit program can send any CPF0000 escape message to the *PRV program queue, since the **INSTALL** program has a general monitor for those messages, as well as MCH0000 messages. **INSTALL** specifically monitors for CPF9898 after each exit program call, but other CPF0000 messages will have the same outcome.

The exit programs and the objects they use are packaged together in image file **QTEMP** (when tape was used) or **XCINST** (when save files were used). The **Display Program References (DSPPGMREF)** command is used to discover which objects are used. **Note:** These objects must reside in the same library as the respective exit program. Move or copy these objects to the respective library before running **SPANCDS**.

Caution: Only objects used by the exit programs themselves will be discovered. Therefore, ensure that programs or service programs do not use objects that are not referred to by the exit program.

At most 4 object types can be discovered by **SPANCDS**:

✓ *PGM
✓ *FILE (DSPF & PRTF only)
✓ *DTAARA
✓ *SRVPGM

In addition, not all program types will report all these object types:

- ✓ **C**   no information is provided for C-language programs except for ILE C-language programs (CLE)
- ✓ **CBLLE**   *FILE, *PGM, and *SRVPGM
- ✓ **CL**   *FILE, *PGM, and *DTAARA
- ✓ **CLE**   *SRVPGM
- ✓ **CLLE**   *FILE, *PGM, *DTAARA, and *SRVPGM
- ✓ **COBOL**   *FILE and *PGM (literal names on CALL command)
- ✓ **RPG**   *FILE, *DTAARA, and *PGM
- ✓ **RPGLE**   *FILE, *PGM, *DTAARA, and *SRVPGM

There are at least 2 ways to use other object types. The first might be to have the general exit program create the objects themselves. The other might be for the first library to contain the objects in question. Of course, this would not be able to help the general pre-processing exit program, or the library pre-processing exit program when called for the first library.

General pre-processing exit point

Use this exit point to perform one-time processing at the start of the installation. This could include authority checks, user validations, and other setup operations that apply to the entire installation.

No parameters are passed to this program. Send a CPF0000 escape message back to the *PRV program queue to halt the installation.

General post-processing exit point

Use this exit point to perform one-time processing at the end of the installation. This could include data conversions and cleanup operations.

No parameters are passed to this program. Send a CPF0000 escape message back to the *PRV program queue to halt the installation.

Library pre-processing exit point

Use this exit point to perform processing before restoring a library. It is also used to set whether to skip processing for a library, based, perhaps, on user input or local conditions. It is called before processing the first or only image file for the library.

Both the save library and restore library names are passed to the exit program, as well as a "skip this library" parameter, set to False ('0'). Set this parameter to True ('1') in order not to process the library. Send a CPF0000 escape message back to the *PRV program queue to halt the installation.

Library post-processing exit point

Use this exit point to perform processing after restoring a library. It is called after processing the last or only image file for the library.

Both the save library and restore library names are passed to the exit program. Send a CPF0000 escape message back to the *PRV program queue to halt the installation.

Using the Generated Image Files

You must first execute the **Span Multiple CDs (SPANCDS)** command on the iSeries in order to generate the save data and other output. You can then use the *CD-ROM Studio for iSeries—Advanced Edition* Windows client, or one of the *CD-ROM Studio for iSeries* commands, to create the image files.

Using the *CD-ROM Studio for iSeries—Advanced Edition* Windows Client with SPANCDS

The easiest way to bring the image files to your Windows PC for recording on CD-ROMs is to use one of the **Advanced Edition** methods in the Windows client. You will be prompted only for settings that you can change. Other settings that you see in the **Standard Edition** methods are preset and unchangeable for these methods. You will still see them in the client window and on the client reports.

When creating a new profile using one of the **Advanced Edition** methods, merely follow the wizard to create the image files on your Windows PC.

Tape

When you used a tape device to save the specified libraries, use the **Multiple CD-ROMs from tape** method. **Note:** Since the data was already saved by the **SPANCDS** command, you must use an existing tape.

Save files

When you used save files to save the specified libraries, use the **Multiple CD-ROMs from save files** method. The product description and installation program are given the hidden value, ***SPANCDS**.

Add the save files from the intermediate output library **(OUTLIB)**. Be sure to include **XCINST**, which contains the program, **INSTALL**, the CD-ROM layout file, **XCCDLAYOUT**, the service program **XCINSTALL**, the display file, **RECOVER**, and any exit programs and objects they will use.

You can also use dynamic selection. This specified program needs to add all the save files in the intermediate output library **(OUTLIB)** to the list of save files. It is not generated by the **Span Multiple CDs (SPANCDS)** command.

Using the *CD-ROM Studio for iSeries* commands with SPANCDS

You can use *CD-ROM Studio for iSeries* commands in order to create image files from the output of **SPANCDS**. The image files can then be

downloaded to a PC where they can be recorded to CD-ROMs or to ISO images on the hard drive.

Tape

When you used a tape device to save the specified libraries, use the **Create CD Image from Tape (RTVCDIMG)** command.

1. At the OS/400 command line, enter the command **RTVCDIMG** and press **F4**.

2. From the **Create CD Image from Tape** display, provide the following information and press **Enter**:

   ✓ Tape device (required)
   ✓ Target library (optional)

   Use the defaults for the remaining parameters.

Save files

When you used save files to save the specified libraries, use the **Create CD Image from Save File (CRTCDIMG)** command. Set both the **Product description (PRODDESC)** and the **Installation program (INSLIB)** parameters to the special value, ***SPANCDS**.

1. At the OS/400 command line, enter the command **CRTCDIMG** and press **F4**.

2. From the **Create CD Image from Save File** display, provide the following information and press **Enter**:

   ✓ Product description (must be set to the special value ***SPANCDS**)
   ✓ Save files (be sure to include **XCINST**)
   ✓ Installation program (must be set to the single value ***SPANCDS**)
   ✓ Target library (optional)

   Use the defaults for the remaining parameters. The release information cannot be set when **PRODDESC** and **INSPGM** are set to ***SPANCDS**.

Recording the Image Files

Developers must be sure to use the CD-ROM volume IDs as listed in the CD-ROM layout report. They must also put the image files on their respective CD-ROM volumes. This is most likely a manual process, so it

is important to be careful, since the installation program depends on these being the same as they are in the CD-ROM layout file.

Starting with V5R2 of OS/400, support for virtual optical drives has been added to the iSeries. CD-ROM images are added to an image catalog directly from CD-ROMs or from ISO images stored in the IFS. The image catalog is then loaded to the virtual optical device.

CD Recording software usually has an option to create CD-ROM images on the hard drive. These images are suitable for use in image catalogs on the iSeries. **Note:** Be sure to use the standard ISO format for recording these images. Some software (Roxio, e.g.) has a proprietary format that cannot be used for this purpose.

Installing the Distribution

The **LODRUN** command is used to install the distribution. The **QINSTAPP** program, which is restored to **QTEMP,** restores the installation objects and calls the **INSTALL** program. The user is notified that the workstation message queue will be changed to *BREAK mode. Authority checks are performed, and, if no problems are found, installation continues. The CD-ROM layout file, **XCCDLAYOUT**, is used during authority checks.

Then the (optional) general pre-processing exit program is called, before any libraries are processed. If no problems are found, installation goes on to process each library in the order specified on the **SPANCDS** command.

For each library, the (optional) library pre-processing exit program is called. The parameters are the save library name, the restore library name, and a logical value that controls whether to skip the library. In the event that a library has been split into multiple image files, this exit program is called only the first time the library is being processed.

If no problems are found and the library should not be skipped, a check is performed to be sure that the correct CD-ROM volume is loaded. If not, the user is prompted for the correct volume, until either the correct volume is found or the user cancels the whole operation. If image catalogs are used, the **Work with Catalog Entries (WRKIMGCLGE)** is run.

NOTE: Beginning with V5R3M0 of i5/OS (OS/400), mounting the next CD-ROM volume will take place automatically, so long as the image catalog entries are in order, with no gaps in the image entry indexes. This is best accomplished by using ***AVAIL** for the **IMGCLGIDX** parameter on the **ADDIMGCLGE** command.

When the expected volume is found, the actual restore process begins. If the images are based on save files, the save file is copied to QTEMP. The restore library is created, if necessary, when objects were save, not the entire library. Then the appropriate save command is executed.

NOTE: Because restore errors and security changes can occur, there is a recovery procedure that is called at this time. It checks to see whether there are any problems and then brings up a display, where the user can take corrective action. See *Recovery phase* below for more information.

Other errors will cause the installation to end. It is possible to restart the installation where it left off, once the cause of the error has been corrected. See *Recovery phase* below for more information.

The (optional) library post-processing exit program is now called with the save library name and the restore library name as the parameters. In the event that a library has been split into multiple image files, this exit program is called only the last time the library has been processed.

Finally, the (optional) general post-processing exit program is called, after all libraries are processed. The workstation message queue is restored to its original delivery mode.

Recovery phase

After every restore command, the recovery procedure is called. If it finds any errors or security changes, it displays a list of the affected objects. The user can then take corrective action and/or proceed with the installation.

```
                    Recover From Objects Not Restored

    Save library: SAVLIB01     Volume: TAPE_SNGL_01        Restored:        13
 Restore library: RSTLIB01       File: TPS0001            Not restored:       2

   These objects were not restored or need additional action. Type 5 to see the
 entire message. Press F8 to see the job log. Press F9 for a command line. You
              may need to contact your vendor for assistance.
   Once errors are fixed, type 8 to restore objects. Press F10 to continue with
      this file. Press F11 to skip to the next file. Press F12 to cancel.

   5=Display message    8=Restore object


 Opt  Object      Type      Msg ID    Message
  _    STRSECANL   *PGM      CPF370B   VERNPGMR owns PGM STRSECANL in RSTLIB01.
  _    STRSECANLV  *PGM      CPF3761   Cannot use PGM STRSECANLV in RSTLIB01.
  _    XCCFGL      *FILE




 F8=Job log   F9=Command line   F10=Continue   F11=Skip file   F12=Cancel
```

✓ The header displays information about the file on the CD-ROM that is being processed, including the number of objects restored and not restored.

✓ The header then gives brief instructions for the various actions that the user can take.

✓ Then follows the list of objects that were not restored or that had security changes. The user can
   ▫ display message details, if any;
   ▫ restore an object that has not been restored.

✓ Colors distinguish the kinds of problem encountered.

- Red means the object was not restored and there is an error message. Corrective action should be taken.
- Yellow means the object was not restored but there is no error message. The object should be restored (option 8) after problems have been rectified.
- Turquoise means the object was restored but there is diagnostic information about it. It might be necessary to make adjustments in security, etc.
- Green means the object has been restored successfully using option 8.

✓ There are 2 options that can be applied to an object:
- **5=Display message** presents the message details:

```
                        Display message detail

     Save library: SAVLIB01    Volume: TAPE_SNGL_01
  Restore library: RSTLIB01      File: TPS0001

 Message: Cannot use PGM STRSECANLV in RSTLIB01.


 Second-level: Cause . . . . . :   PGM STRSECANLV is locked by another job, or a
nother save or restore operation is in progress for this object or for library R
STLIB01. Recovery  . . . :   Try the request again when PGM STRSECANLV is availa
ble.
```

```
 F12=Cancel
```

- **8=Restore object** attempts to restore the object, using the same parameters as the **INSTALL** program does.

✓ The **F8=Job log** and **F9=Command line** function keys provide the means to correct errors.

✓ The remaining function keys provide various ways to proceed:
- **F10=Continue** is used to continue where the installation left off. The library post-processing program will be called, if there is one.
- **F11=Skip file** is used to stop processing the file being processed and continue with the next file. The library post-processing program will **not** be called, if there is one.
- **F12=Cancel** is used to completely cancel the installation. The user can start again in the middle of the process by using the reentry capability of the **INSTALL** program.

In order to resume installation from the beginning using a physical CD-ROM drive, enter the following command:

```
CALL QTEMP/INSTALL (OPT01 '0' ' ')
```

In order to resume installation with file **SAVE0005** using a physical CD-ROM drive, enter the following command:

```
CALL QTEMP/INSTALL (OPT01 '0' 'SAVE0005')
```

In order to resume installation from the beginning using an image catalog, enter the following command:

```
CALL QTEMP/INSTALL (OPTVRT01 '1' ' ')
```

In order to resume installation with file **SAVE0005** using an image catalog, enter the following command:

```
CALL QTEMP/INSTALL (OPTVRT01 '1' 'SAVE0005')
```

NOTES: Use the device names on your system.

Be sure to load the CD-ROM volume that contains the file with which you want to begin. If you are using an image catalog, use the **Work with Image Catalog Entries** (**WRKIMGCLGE)** command to mount the correct volume.

Using iSeries image catalogs

Beginning with V5R2 of OS/400, IBM has added support for virtual optical drives. When installing IBM PTFs and licensed programs from a virtual drive, you only need to add all the CD-ROM images to an image catalog, and the installation can proceed without your involvement. With 3rd-party installations at V5R2, you need to mount each image manually. Fortunately, you can do this remotely—you do not need to be on-site to do this. Beginning with V5R3, **CHECKCD** will automatically mount each image, if the image catalog entries were added in order, with consecutive indexes that start at 1.

The installation program detects that the CD-ROM drive is a virtual optical device. After **CHECKCD** has prompted the user to load the next image file, it runs the **Work with Image Catalog Entries** (**WRKIMGCLGE)** command when it finds that the next image file is not on the currently mounted volume, or if image catalog entries are out of sequence.

Install your product from CD-ROM images in the integrated file system

You can provide ISO CD-ROM images that can be downloaded from your website. These images are a convenient way to install from a directory on your iSeries server. Alternatively, your customers can add images from multiple physical CDs to an image catalog.

The following options can be taken against images in an image catalog:

✓ **Unload:** This option lets you unload an optical image from the virtual optical device. Only images that have a status of **Loaded** can be unloaded.

✓ **Load:** This option lets you load an optical image into the virtual optical device. Images that have a status of **unloaded** or **mounted** can be loaded. The effect of loading a **mounted** optical image is to unmount it and leave it in **loaded** status.

✓ **Mount:** This option lets you mount an optical image into the virtual optical device and activate it. Only images that have a status of **loaded** can be mounted.

Create the optical device

Note: These commands are usually performed once.

3. At the OS/400 command line, enter the command **CRTDEVOPT** and press **F4**.

4. From the **Create Device Description (Optical)** display, provide the following information and press **Enter**:

   ✓ Device description (Provide a name for the new device description.)
   ✓ Resource name (*VRT)
   ✓ Device type(*RSRCNAME)

Create an image catalog

1. At the command line, enter the command **CRTIMGCLG** and press **F4**.

2. From the **Create Image Catalog** display, provide the following information and press **Enter**:

- ✓ Image catalog name
- ✓ Directory name

Add image catalog entries

1. At the command line, enter the command **WRKIMGCLGE** and press **F4**.

2. From the **Work with Catalog Entries** display, provide the following information and press **Enter**:

   - ✓ Image catalog name

3. From the **Work with Image Catalog Entries** display, select **Add** (option 1) to add an optical image to the image catalog and press **Enter**.

4. Continue adding the remaining optical images. Add the images in the order shown in the CD-ROM layout report.

Load the virtual optical device

1. At the command line, enter the command **LODIMGCLG** and press **F4**.

2. From the **Load or Unload Image Catalog** display, provide the following information and press **Enter**:

   - ✓ Image catalog name
   - ✓ Device name (the name of the virtual optical device)

   The first image catalog entry will be set to **mounted** and the rest will be in **loaded** status.

Start the installation

1. At the command line, enter the command **LODRUN** and press **F4**.

2. From the **Load and Run** display, provide the following information and press **Enter**:

   - ✓ Device name (the name of the virtual optical device)

3. Installation will begin. When installation asks for the next CD-ROM, follow the procedure outlined below.

Mount the next volume

1. At the command line of a second interactive session, enter the
   command **WRKIMGCLGE** and press **F4**.

2. From the **Work with Catalog Entries** display, provide the following
   information and press **Enter**:

   ✓ Image catalog name

3. From the **Work with Image Catalog Entries** display, take the
   following steps:

   ✓ Press **F11** to see the volume names
   ✓ **Load** (option 8) the mounted volume (might not be needed)
   ✓ **Mount** (option 6) the next volume

Recommendations

This section contains tips and suggestions that could help make your installation smoother.

1) Because the **INSTALL** program tries to restore over any objects that are already there, you might want to restore objects to an empty library on the target system, then copy objects into the actual product library. This will minimize several kinds of problems that you may encounter in the restore process.

2) Be very careful with regard to physical and logical file relationships. **SPANCDS** does not verify the order in which libraries are to be saved, with respect to logical files that reside in different libraries than their parent physical files.

3) Feel free to use the information in the *Installing the Distribution* section in your installation instructions, especially about the recovery phase and using image catalogs.

4) It is important to tell the final user, the person running the installation, to contact technical support before leaving an installation in an unfinished state.

5) Remember, the **INSTALL** program is essentially a "restore" engine. Its sole purpose is to restore saved data to a target system.

   Therefore, customization is in the hands of the exit programs. E.g., environmental checks are probably best done in the general pre-processing exit program, where you can check for object locks, take care of things like subsystem descriptions and other system objects, etc. You could also set flags to condition the subsequent processing of each library. The sky's the limit.

Automating the CD-ROM creation process

Creating an image packaging program for use with the *CD-ROM Studio for iSeries* Windows client

You can write a program on the iSeries to create the save data for the CD-ROM that is called by the Windows client.

This section does not apply when using the CD-Installer save file format.

The program will be passed a ten character device name is input. To create the necessary data, simply use the appropriate save command to save the objects you want to tape. You may do as many save operations as necessary.

The program can be written in any iSeries language. Your program can do any preparation necessary for packaging your product. The program can call additional programs as necessary.

Once the call to your program is complete, *CD-ROM Studio for iSeries* will read the save data from tape and create files for your product that can be placed on CD-ROM.

For a LODRUN-QINSTAPP installation, your program must save the program QINSTAPP from the library QTEMP.

Notes: 1) You cannot use the following API calls within your iSeries program. *CD-ROM Studio for iSeries* is already managing the CD-ROM save environment on the iSeries. The use of these API calls will cause either your program or *CD-ROM Studio for iSeries* to fail.

        QLPCDRST, QlpHandleCdState
        QLPCDINF, QlpGenCdPremasteringInfo

    2) Any save operations performed to tape will result in data that can be used to create CD-ROM image files.

Example

This example is a packaging program for a LODRUN based CD-ROM.

```
PGM PARM(&DEV)

    DCL &DEV *CHAR 10

    SAVLIB LIB(PRODLIB) DEV(&DEV) LABEL(&DEV)
        DTACMP(*NO) COMPACT(*NO) /* Save product library */

    SAVOBJ OBJ(*ALL) LIB(SAMPLES) DEV(&DEV)
        LABEL(SAMPLES) DTACMP(*NO) COMPACT(*NO)
                                    /* Save sample library */

    CRTDUPOBJ OBJ(QINSTAPP) FROMLIB(MYLIB) OBJTYPE(*PGM)
        TOLIB(QTEMP) NEWOBJ(*OBJ)
                        /* Put install program into QTEMP */

    SAVOBJ OBJ(QINSTAPP) LIB(QTEMP) DEV(&DEV) DTACMP(*NO)
        COMPACT(*NO)
                        /* Save install program from QTEMP */
                        /* It must be save from QTEMP since that is where
                            the LODRUN commands expects it to be
                            restored from */

ENDPGM
```

Using dynamic selection to pick save files

When creating a save file based CD-ROM, you can create a program to dynamically select the save files to include based on a value selected by the user when using the Windows client.

The following is an example program, which dynamically selects the save file specified by the user.

```
PGM        PARM(&VALUE)

        DCL       VAR(&VALUE) TYPE(*CHAR) LEN(10)

        BSCCDROM10/ADDCDF SAVF(DANLIB/&VALUE)

ENDPGM
```

iSeries Command Reference

iSeries Save Commands for CD-ROM

This information applies to the system save commands that you use for save and restore operations. See the IBM iSeries system manual *Backup and Recovery - Basic*, SC41-4304-01, for complete information on save/restore based and restore.

Note: To save objects onto CD-ROM, they must be converted to CD-ROM format using *CD-ROM Studio for iSeries*. If you do not use the *CD-ROM Studio for iSeries* Windows client or the STRCDP/ENDCDP commands provided as part of this product, the result of the save operation will not produce save data that is compatible with CD-ROM.

The following save/restore commands support CD-ROM.

SAVLIB/RSTLIB	Save/Restore library
SAVOBJ/RSTOBJ	Save/Restore object
SAVDLO/RSTDLO	Save/Restore document library object
SAV/RST	Save/Restore object

It is important to understand how these commands are used to create an iSeries CD-ROM image file. Before creating your program for *CD-ROM Studio for iSeries* or when using the save commands with the iSeries product commands, look at the example programs in this manual.

Most of the parameters on the save commands are the same for CD-ROM as they are for tape. The following parameters have special meaning for CD-ROM.

File label (LABEL)

> The LABEL keyword can be used to name the resulting CD-ROM image file. By default, the label will be the library you are saving.

> ISO-9660 requires the CD-ROM image file to be a maximum of 8 characters in length. You can use the LABEL keyword to specify a file name for libraries that are 9 or 10 characters long to adhere to the ISO-9660 standard as an alternative to renaming the file using the *CD-ROM Studio for iSeries* Windows client.

Data compression (DTACPR)/ Data compaction (COMPACT)

> CD-ROM on the iSeries does not support data compression and compaction options that can be specified for tape drives. Both of these keywords should be set to ***NO** when doing save operations for CD-ROM.

Restore Commands for CD-ROM

This information applies to the system restore commands that you use for save and restore operations. See the IBM iSeries system manual *Backup and Recovery - Basic*, SC41-4304-01, for complete information on save and restore.

It is important to understand how to restore from a CD-ROM before creating your installation program. The following save/restore commands support CD-ROM.

SAVLIB/RSTLIB	Save/Restore library
SAVOBJ/RRSTOBJ	Save/Restore object
SAVDLO/RSTDLO	Save/Restore document library object

Optical File (OPTFILE)

When restoring from CD-ROM using the restore commands that support CD-ROM, the parameter *Optical file* (OPTFILE) is valid.

The OPTFILE keyword needs to contain the path of the CD-ROM image file from which you are going to restore objects. If the library name is different from the image file name on the CD-ROM, the image file name must also be specified.

The following shows the valid values that can be used with the OPTFILE keyword.

Value	Description
OPTFILE('/') *default value*	Restore from an image file that matches the specified file label (LABEL) from the root path on the CD-ROM.
OPTFILE('/SUBDIR/')	Restore from an image file that matches the file label (LABEL) from the path /SUBDIR/ on the CD-ROM.
OPTFILE('/SUBDIR/FILE.;1')	Restore from the image file FILE located in the path /SUBDIR on the CD-ROM.

Restore Examples

In all of these examples, we have done a SAVLIB of QTEMP. We now want to restore the object from CD-ROM.

Root directory, image name same as library name

CD-ROM path\image: \QTEMP
Restore command: RSTLIB SAVLIB(QTEMP) DEV(*OPT)
Alternative 1: RSTLIB SAVLIB(QTEMP) DEV(*OPT) OPTFILE('/')
Alternative 2: RSTLIB SAVLIB(QTEMP) DEV(*OPT) OPTFILE('/QTEMP.;1')

Subdirectory, image name same as library name

CD-ROM path\image: \AS400\QTEMP
Restore command: RSTLIB SAVLIB(QTEMP) DEV(*OPT)
OPTFILE('/AS400/')
Alternative 1: RSTLIB SAVLIB(QTEMP) DEV(*OPT)
OPTFILE('/AS400/QTEMP.;1')

Subdirectory, image name different than library name

CD-ROM path\image: \AS400\QTEMPV37
Restore command: RSTLIB SAVLIB(QTEMP) DEV(*OPT)
OPTFILE('/AS400/QTEMPV37.;1')

Data preparation commands

For a save-restore based CD-ROM, the iSeries save data must be prepared in a special unformatted format that can be converted to ISO-9660.

You can use these commands to prepare a tape for CD-ROM and use the *CD-ROM Studio for iSeries* Windows client to create the actual ISO-9660 images.

Start CD-ROM Premastering Mode (STRCDP)

Prepares the current iSeries job for creating unformatted save/restore data. Once this command is issued, all subsequent SAVxxx operations will produce unformatted save/restore data when writing to tape.

End CD-ROM Premastering Mode (ENDCDP)

Ends the special premastering mode for SAVxxx operations. Once issued, SAVxxx operations will once again produce normal save data to tape on save operations.

If a SAVLICPGM save operation was performed, this command also adds additional information about the save operation to the end of the tape to be used while generating the CD-ROM ISO-9660 image.

Tape Device (DEV)

The tape device used for the save operations.

Volume Id (VOLUME)

The Volume Label you will use when creating the CD-ROM. This parameter is ignored except for SAVLICPGM.

CD-ROM Size (CDSIZE)

The maximum size in MB of the file labels on tape. A premastering API will end the operation if this size is exceeded. Note: Use a large value for preparing to put image files on DVD-ROM.

CD-ROM image creation commands

These commands take your prepared data and convert the data into a format that is ISO-9660 compliant.

Create CD Image from Tape (RTVCDIMG)

Converts unformatted tape data to ISO-9660 compliant CD-ROM images.

Device (DEV)

Device containing tape with prepared save data.

Target library (TGTLIB)

The library to place the ISO-9660 compliant CD-ROM image files.

Volume label (VOLUME)

The Volume Label you will use when creating the CD-ROM. This parameter is ignored except for SAVLICPGM.

Create CD Image from Save File (CRTCDIMG)

Converts save file data to Centerfield Technology CD-ROM Installation and Disk Manager compliant CD-ROM images.

Product description (PRODDESC)

A description to be displayed when displaying this set of save files.

Save files (SAVF)

The save files to be shipped as part of the product.

Installation program (INSPGM)

The installation program that restores the data from the save files.

Target library (TGTLIB)

The library to place the resulting CD-ROM image files.

Base release level (OSRELEASE)

The minimum release to allow the restore operation.

Only release (ONLYRLS)

Specifies whether this product should only be displayed when at the base release specified or at the base release and all future releases.

Add save file to CD-ROM (ADDCDF)

The ADDCDF command can be used within an iSeries program to dynamically register a save file to be included on a CD-ROM. This command can be issued multiple times within a program. If a save file with the same name is included multiple times, even if from different libraries, only the last save file with that name will be included on the CD-ROM.

Centerfield CD-ROM Server Commands

Start CD-ROM Server (STRBSCSVR)

This command starts the CD-ROM Server on the iSeries. It is required so that the Windows client can communicate with your iSeries system.

End CD-ROM Server (ENDBSCSVR)

This command ends the CD-ROM Server job on your iSeries system.

Windows Client

The following sections give you the information for creating an ISO-9660 compliant, iSeries compatible, CD-ROM image using the *CD-ROM Studio for iSeries* Windows client.

Using the CD-ROM image creation wizard

The quickest and easiest way to create a CD-ROM image is to use the image creation wizard. The menus can be used to change specific attributes, options, and content once you have created a basic CD-ROM image definition using the wizard.

Creating a new definition

The first step in creating the CD-ROM image is to define the image. The definition contains

- iSeries objects to be placed on the CD-ROM
- Options to use while creating the CD-ROM image

When you start the *CD-ROM Studio for iSeries* Windows client, a splash screen is displayed for a few seconds. Then it automatically prompts to create or open a CD-ROM definition
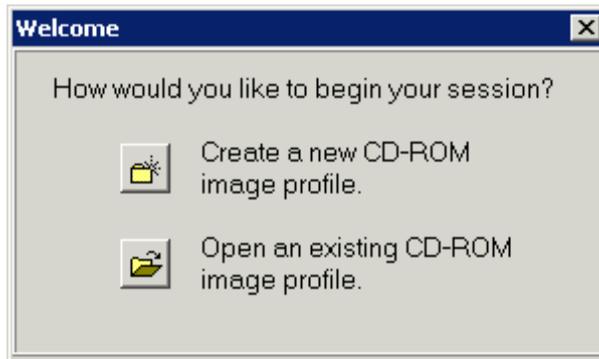
Opening an existing definition

To open an existing definition, either choose File->Open or use the folder button on the toolbar. This lets you reuse an existing CD-ROM definition after it has been defined once.

Open iSeries CD-ROM image profile

Look in: 📁 Builder

- 06-Product.CD4
- 07-LODRUN1.CD4
- 08-LODRUN2.CD4
- 09-LODRUN3.CD4
- 10-SAVFILE1.CD4
- 11-SYSPREP.CD4

File name:

Files of type: iSeries CD-ROM image profile

Open

Cancel
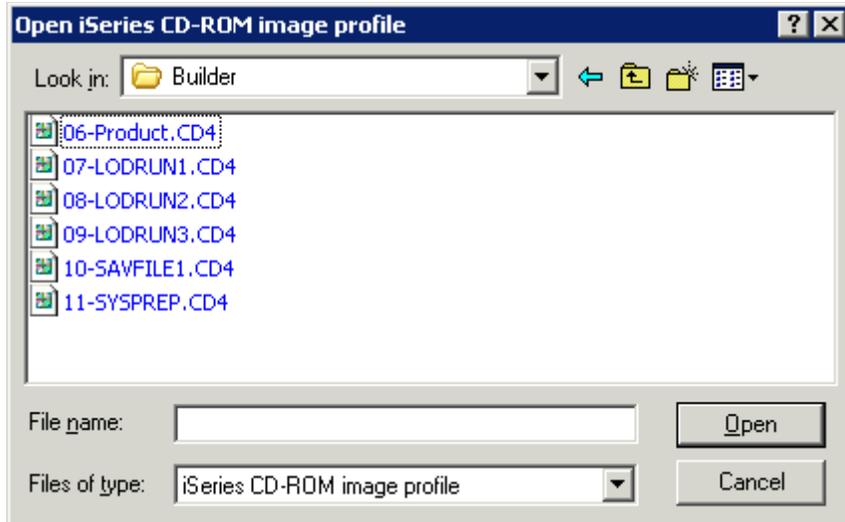
Selecting an iSeries system

Select the iSeries system that contains the libraries, objects, and programs you want to save onto CD-ROM.
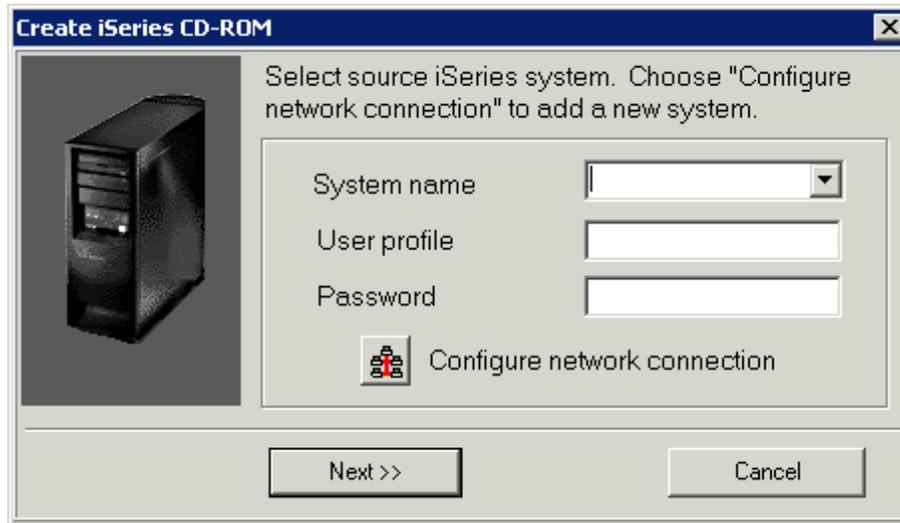
System Name

The name you gave the iSeries system during configuration.

User profile

The user profile for the selected iSeries system. The authority of this user profile will be used while creating the CD-ROM contents. Only objects that the user profile is allowed to access can be saved. The user profile used must have authority to use the system save and restore commands and attached tape device.

Password

The password for the user profile selected.

See *Creating your first CD-ROM image files* for information on configuring a connection.

Selecting the CD-ROM image type

CD-ROM Studio for iSeries creates CD-ROM images that work with iSeries save files or with save and restore commands and with the LODRUN and SAVLICPGM commands.

This dialog lets you choose the type of image you want to create. Based on the image type you select, intelligent prompting and processing will be done for that type of CD-ROM.
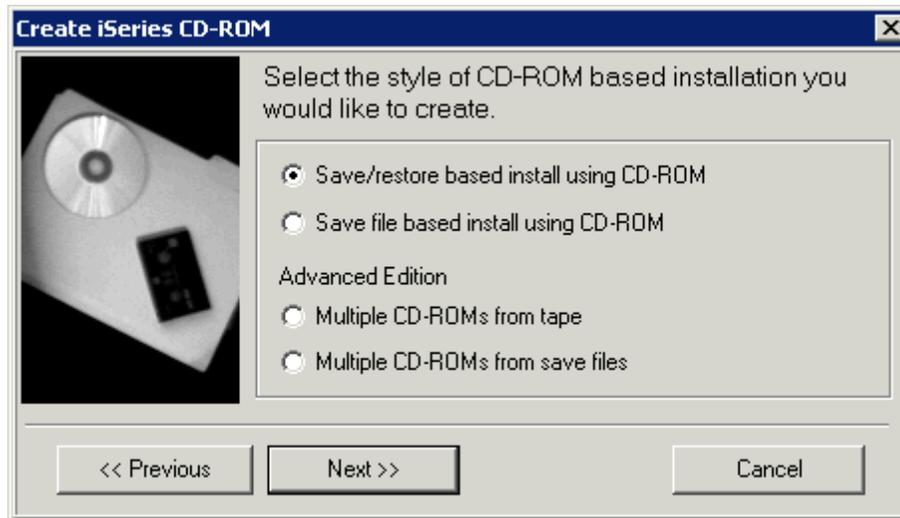
The following selections are allowed.

Save/restore based install using CD-ROM

This lets you create a CD-ROM using the native save and restore format. It is compatible with the restore commands, LODRUN, and RSTLICPGM.

Use this format for system archiving.

Save file based install using CD-ROM

This lets you create a CD-ROM install using save files. This method uses the CD-Installer provided as part of this package. See *Using the CD-Installer/Save files on CD-ROM* for more information.

Multiple CD-ROMs from tape

This *Advanced Edition* selection lets you create multiple CD-ROMs after running the SPANCDS command. The command LODRUN is used to restore the data. See *Multi-volume CD-ROMs (Advanced Edition)* for more information.

Multiple CD-ROMs from save files

This **Advanced Edition** selection lets you create multiple CD-ROMs after running the SPANCDS command. The command LODRUN is used to restore the data. See *Multi-volume CD-ROMs (Advanced Edition)* for more information.

Selecting the CD-ROM source data

When creating a CD-ROM using the native save/restore format, you must specify the source of the save data.
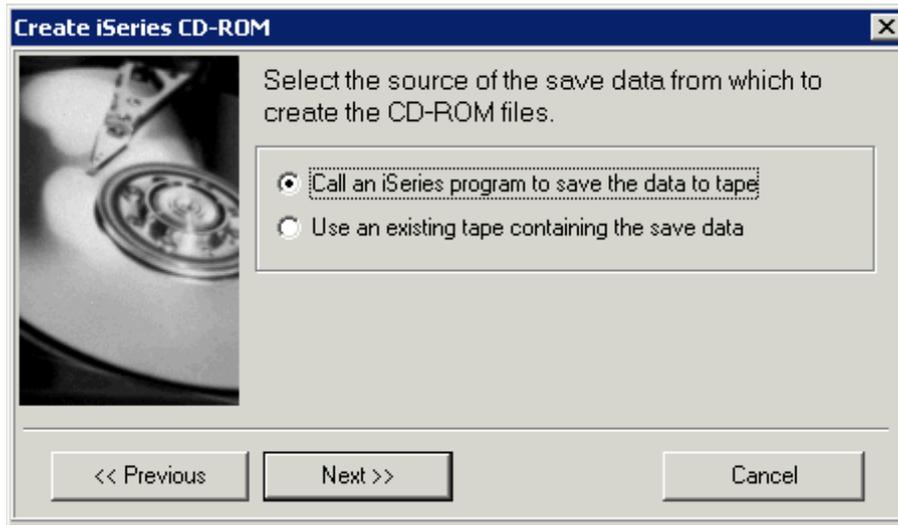
There are two ways to select the contents for the CD-ROM.

Call an iSeries program to save the data to tape

This lets you call a program on the iSeries. The program can use normal save commands to save the data to be included on the CD-ROM to tape.

Use an existing tape containing the CD-ROM contents

If you have an existing tape that contains the save data for creating the CD-ROM images, you can use that data as the source for a CD-ROM. The tape must contain data for CD-ROM creation. A normal save tape will not contain the correct data.

Saving objects using an iSeries program

When creating a CD-ROM using the native save/restore format, you must specify the program that creates the source save data.
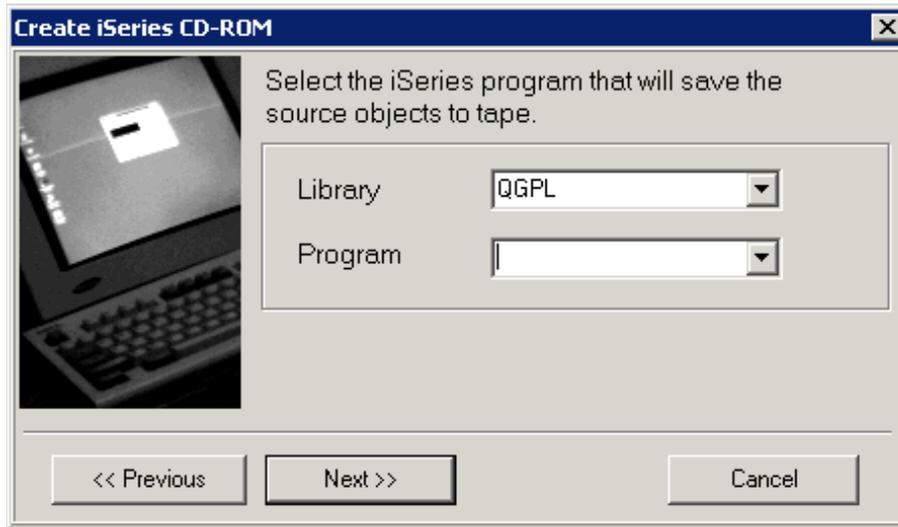
Select the iSeries program you have written to save the required objects to tape. See *Creating an image packaging program for use with the* CD-ROM Studio for iSeries *Windows client* for information on creating the program.

Library

The library name containing the program to call.

Program

The program to call. The program must follow the guidelines stated in *Creating an image packaging program for use with the* CD-ROM Studio for iSeries *Windows client*.

Note: This panel may not respond while creating the information for the drop down selection boxes. This is normal.

Tape device

When creating a CD-ROM using the native save/restore format, you must specify the tape drive to contain the save data.
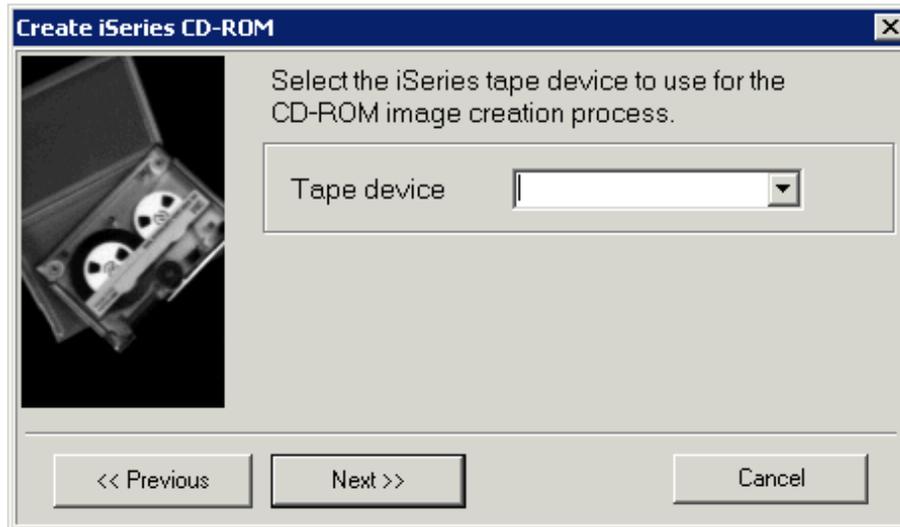
This is the tape drive to use while creating the CD-ROM contents. The raw save and restore data on tape is used to create the ISO-9660 CD-ROM files.

If you selected *Use an existing tape containing the CD-ROM contents* on the previous dialog, the CD-ROM image will be created from save data on the existing tape.

Otherwise, the tape will be used during the CD-ROM creation process. A tape large enough to hold the CD-ROM contents must be in the drive. The tape will be initialized as part of the premastering process.

Once complete, the tape will contain the save data to be converted to CD-ROM format. You can save this tape, send it to a duplication service if they prefer receiving iSeries save data on tape, or you can reuse the tape for other purposes.

Tape device

The tape device to use during the premastering process.

Product profile

When creating a CD-ROM using the save file format, you must provide details about the product that can be used during the installation process.
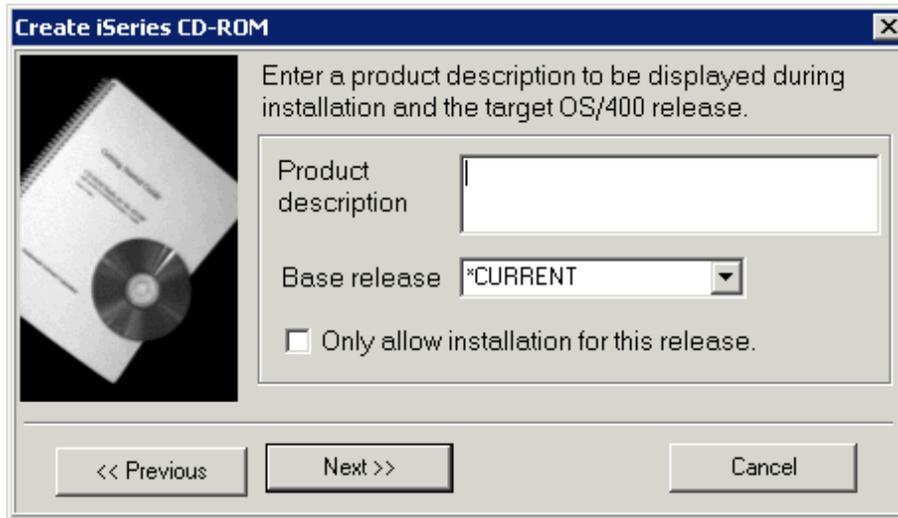
Enter the required product information.

Product description

This is the name of the product and an associated description. It can be up to 70 characters. The description is displayed by the CD-Installer during the iSeries installation. To translate this description into other languages, see *Appendix 3— NLS Support*.

Base release

This is the base OS/400 release supported by this product or version.

Only allow installation for this release

Check this option if you only want this product installed for the release specified. If you do not check this option, the product will be made available on any release of OS/400 that is newer than the base release specified.

Save file list

When creating a CD-ROM using the save file format, you must select the set of save files to be included as part of the product.
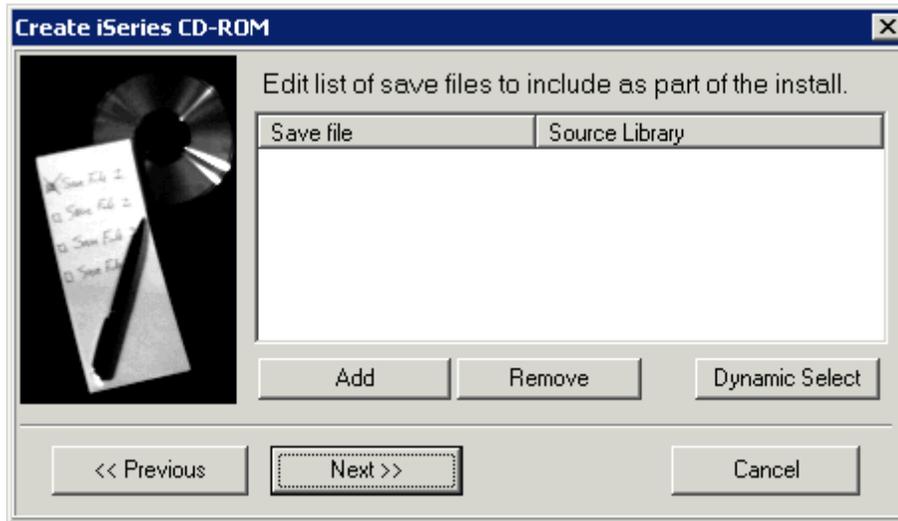
Add

Choose this to add save files to the product install.

Remove

This will remove the highlighted save file.

Dynamic Select

Choose to add save files dynamically at create time using a program that uses the ADDCDF command.

Select save files

When creating a CD-ROM using the save file format, you must the select the set of save files to be included as part of the product.
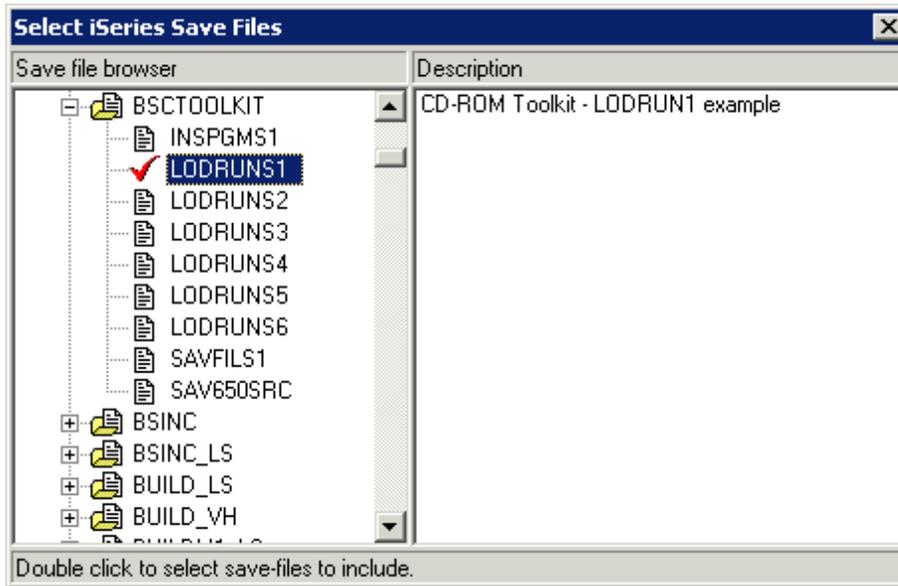
Click on the +/- symbol to expand or close the list of libraries and save files.

Double click on a save file to include it in the list.

A check mark ✓ indicates the file is selected.

Use the [X] to close the window once complete.

Installation program

When creating a CD-ROM using the save file format, you must specify the install program that will install the product. The install program and the save files will be in library QTEMP during the installation process.
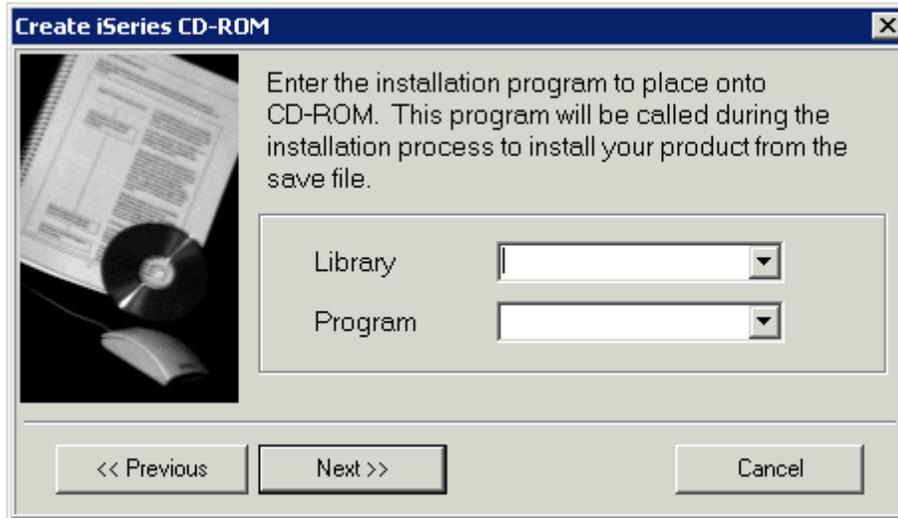
Select the iSeries program you have written to perform the product installation.

Library

The library name containing the program to call.

Program

The program to call. The program must follow the guidelines stated in *CD-Installer Save File Installation*.

Target directory

Enter target directory for the resulting CD-ROM images.

Path C:\ Browse

<< Previous   Next >>   Cancel
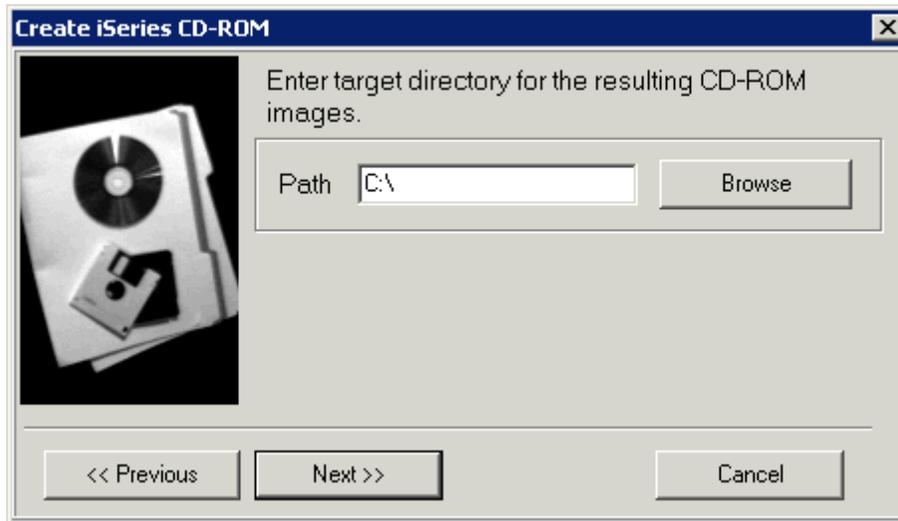
This specifies the target directory to place the created CD-ROM images. Any files with the same name as a newly created image file will be replaced.

Target Directory

The drive and path to place the CD-ROM image files. These files can then be placed onto a CD-ROM using a CD-Recordable drive connected to your PC using the software that came with the CD-Recordable drive.

If you are using the save file format, this directory will contain the following files in addition to a file for each save file you selected.

CDLOAD, QTEMP. These files must be placed in the root directory on the CD-ROM.

CDINDEX, CDBASE. These files must be placed in the same directory as save files produced as part of the product.

Create CD-ROM image
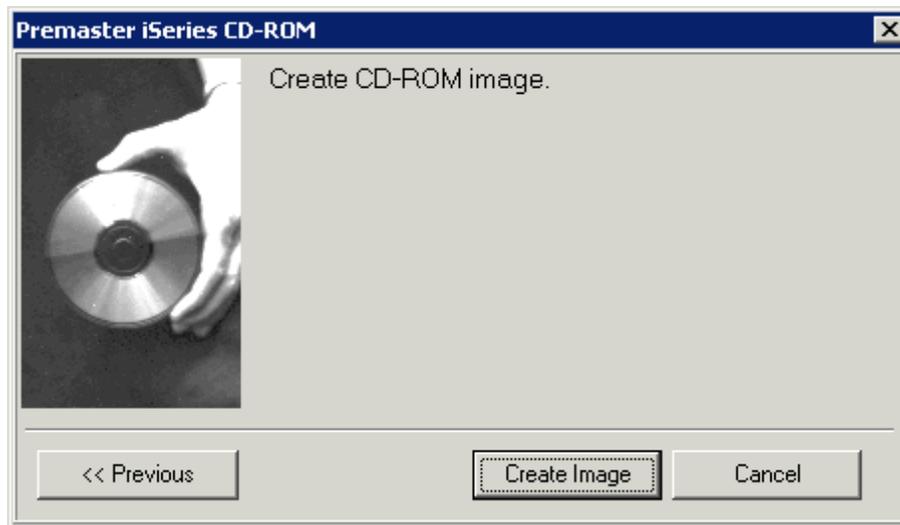
Press the Create Image button to create the CD-ROM image files.

You must have a tape in the tape drive that can be used during the pre-mastering process if using the save/restore format.

Appendix 1—Understanding CD-ROM on the iSeries

Base support

CD-ROM support on the iSeries is built around the ISO-9660 Mode 1 CD-ROM standard and either:

1) Save and restore support. *CD-ROM Studio for iSeries* lets you create CD-ROMs that take advantage of this support.

2) Integrated file system. You can write your application to access information stored on a CD-ROM through the QOPT directory structure

This support is built into OS/400 releases V3R6 and later.

CD-ROM Studio for iSeries uses your save/restore data to create CD-ROM data files that are compatible with the iSeries and ISO-9660.

There are two approaches you may use to do this.

1) Native iSeries save and restore compatible format.

   This format is the native iSeries format supported by OS/400. IBM uses this format for shipping the operating system and IBM software products.

   This format has the following advantages.

   - Works with LODRUN, RSTLICPGM, or native restore commands directly from CD-ROM

   This format has the following requirements.

   - Requires saving data to tape while creating CD-ROM.
   - End user must be aware of the directory layout of the CD-ROM during installation for LODRUN or save and restore.
   - For RSTLICPGM, only one version of the product can be shipped on the CD-ROM and the data must be in the root directory.

2) Save file format using the Centerfield Technology CD-Installer.

This format uses the CD-Installer format developed by Centerfield Technology, Inc. This format is intended for product distribution using save files shipped on CD-ROM.

This format is compliant with OS/400 release V3R6 and later.

This format has the following advantages.

- Does not require a tape during the CD-ROM creation process.
- Lets you develop and test your installation process using save files instead of burning a CD-ROM to test your installation process.
- Package multiple products and versions on the CD-ROM and the Centerfield Technology CD-Installer will automatically prompt the user for the products to install. The user does not have to worry about the CD-ROM directory structure and specify a special path during the installation procedure.

This format has the following requirements.

- CD-Installer files must be shipped on the CD-ROM to facilitate the automated install
- The total size of all files must be less than 700 (or 650) MB. If you have more than 700 (or 650) MB of data, you must use the save-restore format or one of the *Advanced Edition* options.

CD-ROM image files

CD-ROM Studio for iSeries refers to the saved iSeries objects that were saved for CD-ROM as CD-ROM image files. These image files follow the ISO-9660 standard and iSeries save/restore formats.

A quick look at the CD-ROM creation process

CD-ROM Studio for iSeries currently supports 2 types of CD-ROM formats. Both formats are ISO-9660 Mode 1 compliant.

1) Native iSeries save and restore compatible format.

This format is the native iSeries format supported by OS/400. IBM uses this format for shipping the operating system and IBM software products.

This format has the following advantages.

- Works with LODRUN, RSTLICPGM, or native restore commands directly from CD-ROM

This format has the following requirements.

- Requires saving data to tape while creating CD-ROM.
- End user must be aware of the directory layout of the CD-ROM during installation for LODRUN or save and restore.
- For RSTLICPGM, only one version of the product can be shipped on the CD-ROM. In addition, the data must be in the root directory.

2) CD-Installer save file format.

This format uses the CD-Installer format developed by Centerfield Technology, Inc. This format is intended for product distribution using save files shipped on CD-ROM.

This format has the following advantages.

- Does not require a tape during the CD-ROM creation process.
- Lets you develop and test your installation process using save files instead of burning a CD-ROM to test your installation process.
- Package multiple products and versions on the CD-ROM and the Centerfield Technology CD-Installer will automatically prompt the user for the products to install. The user does not have to worry about the CD-ROM directory structure and specify a special path during the installation procedure.

This format has the following requirements.

- Must ship special CD-Installer specific files on the CD-ROM
- The total of all saved save files and the CD-Installer files must be 700 (or 650) MB or less. If you have more than 700 (or 650) MB, this method is not an option.

Creating native save/restore format CD-ROMs

This section introduces the CD-ROM creation process for creating native iSeries save and restore compatible CD-ROMs.

Overview

iSeries libraries, objects, folders, and files.

You start with your existing iSeries objects and data.

Using **CD-ROM Studio for iSeries**, you can create CD-ROM image files that can be placed onto CD-ROM. The CD-ROM image files contain your saved iSeries data. The resulting CD-ROM can then be used in the iSeries drive and accessed using standard iSeries save and restore

CD-ROM image file creation. • ISO-9660 compatible • Save-restore compatible

CD-ROM images.

The output of the image file creation process is a set of CD-ROM image files that can be placed onto CD-ROM.

CD-ROM. • ISO-9660 format • Mode-1, 2048 byte sector

The CD-ROM can be created using a CD-Recordable device attached to your PC or Unix workstation

Or it can be created by a CD-ROM duplication service company that accepts CD-ROM images on tape.

Save-Restore, LODRUN, RSTLICPGM

Restore the objects from CD-ROM. Use the iSeries **CD-ROM Developer's Toolkit** to create your own automated install using LODRUN or RSTLICPGM.

Image file creation process

This shows the complete process *CD-ROM Studio for iSeries* uses to create CD-ROM image files. In some cases, only part of the process will be used when creating your CD-ROM.

Begin CD-ROM creation process.

CD-ROM Studio for iSeries manages the CD-ROM creation environment on the iSeries. It does all setup required in order to create CD-ROM compatible images.

Call program to put selected objects onto tape using save commands.

All of the contents for the CD-ROM must be first saved to tape. This is so the resulting CD-ROM is compatible with iSeries save and restore.

The save operations done during the CD-ROM image file creation process produces tape output that is not the same as the save operation would otherwise produce. A tape created using normal tape saves cannot be used in the CD-ROM creation process.

Instead of creating your own CD-ROMs, the resulting tape can be sent to a duplication service company that accepts iSeries CD-images on tape.

If the tape is not needed, it can be reused.

Retrieve data from tape and create CD-ROM image files.

CD-ROM Studio for iSeries retrieves the save data from tape and creates CD-ROM image files that are ISO-9660 and iSeries save and restore compatible.

Download CD-ROM images to client machine.

Once created, the CD-ROM image files are downloaded to the client machine where they can be put onto CD-ROM using a CD-Recordable device.

Creating CD-Installer format CD-ROMs

This section introduces the CD-ROM creation process for save file based product distribution using the Centerfield Technology, Inc., CD-Installer.

Overview

iSeries libraries, objects, folders, and files.

You start with your existing iSeries objects and data.

Using standard iSeries save files, package your product libraries and objects into save files.

- Save the data into one or more save files.
- Develop an installation program to install from the save files.

You also develop an installation program that installs your product from these save files.

CD-ROM Studio for iSeries, will create CD-ROM files from the save files. It will also create index and base installation files that allow the data to be restored from the CD-ROM during product installation.

Convert the save file data into CD-ROM files and create the CD-Installer base and index files.

This method does not require a tape.

CD-ROM.

The CD-ROM can be created using a CD-Recordable device attached to your PC or Unix workstation

- ISO-9660 format
- Mode 1, 2048 byte sector

The Centerfield Technology, Inc., CD-Installer must be placed in the root directory of the CD-ROM.

CD-Installer LODRUN interface

The installer is invoked using LODRUN and will list all products found on the CD-ROM allowing the user to choose which product to install.

Saving objects for CD-ROM

CD-ROM Studio for iSeries lets you save objects, libraries, document library objects, license programs, and install programs in an ISO-9660, iSeries compatible format.

To save objects onto CD-ROM, they must be converted to ISO-9660, iSeries save/restore compatible, CD-ROM image files. *CD-ROM Studio for iSeries* provides a Windows client and iSeries commands for creating the CD-ROM image files.

Windows client

This client does not require any working knowledge of the image creation process, besides needing a tape in your iSeries tape drive when creating native save/restore image files.

In some cases, you will need to do special processing as part of the save operation. In these cases, you can write an iSeries program that can be called by the Windows client. Within this program, you simply use any of the standard save commands that support CD-ROM to the tape device provided. *CD-ROM Studio for iSeries* takes care of creating the correct image file from that data.

To use the *CD-ROM Studio for iSeries* Windows client, see *Windows Client*.

iSeries commands

iSeries commands can also be used to create CD-ROM image files.

To use the iSeries commands, see *iSeries Command Reference*.

Understanding ISO-9660 naming

The ISO-9660 standard uses a DOS style 8.3 character naming convention, using the characters {A-Z, a-z, 0-9, _} for subdirectory and file names.

When creating your CD-ROM, you must keep this naming convention in mind.

Note: The naming convention applies to the CD-ROM image files. You can use standard iSeries naming for any iSeries object names, library names, etc.

Tape requirement

A tape is not required if you use the save file based CD-Installer method for product packaging.

To create native iSeries save and restore CD-ROMs, a tape drive is required to create an iSeries CD-ROM. *CD-ROM Studio for iSeries* uses the save data from the tape to create the CD-ROM image files. Without the tape, it is not possible to create a CD-ROM image file that is compatible with iSeries save and restore.

This tape can be saved and be used later to retrieve the save data (to recreate a CD-ROM for a particular release or version of your product), or it can be sent to your CD-ROM duplication service company, if they prefer using save data on tape for creating the CD-ROM.

If you do not need the tape after you have your CD-ROM images, you may reuse the tape for other save and restore operations by simply using the INZTAP CL command.

Appendix 2—Packaging Strategies

This section describes several different alternatives for software distribution and the advantages of each.

PC-iSeries on the same media

Since *CD-ROM Studio for iSeries* produces images that are ISO-9660 compliant, the CD-ROM can be placed in a PC CD-ROM drive and viewed. This lets you place PC and iSeries programs and data on the same CD. If you have a client/server application, this will allow you to ship a single media type to iSeries customers with RISC hardware.

Normally, PC applications are installed through a SETUP.EXE program in the root directory of the CD. If you so choose, the iSeries programs and data can be placed in the root directory without affecting the PC installation. In addition, the iSeries programs can be placed in a subdirectory on the CD to isolate them from the client code.

Handling multiple releases of OS/400

If your software product has dependencies on specific iSeries releases, you can use several different approaches to package your code on CD-ROMs. The simplest method is to package each iSeries release on a separate CD-ROM. This has the advantage that you can label each one and there will be no confusion about the CD-ROM contents. The disadvantage is that if the customer upgrades to a new release they may require a new CD-ROM to be shipped to them.

Another approach is to use a subdirectory naming convention to isolate release-specific code and ship all releases on the same CD-ROM. Your install programs can then automatically detect the installed version of the operating system and restore the appropriate version of the code on the customer's machine. For example, if your application supports V4R5 and V5R1, you could package your software in the following way:

- root directory contains all code not dependent on a specific release
- each release-dependent section of code is stored in a subdirectory. For example:
  - ◊ /V4R5/V4R5SAV.DAT for V4R5
  - ◊ /V5R1/V5R1SAV.DAT for V5R1
- QINSTAPP (if using the LODRUN install method) would be restored and invoked by the LODRUN command. The release would be determined and subsequent restores would use the associated subdirectory's save file.

The CD-Installer makes this easier when using the built-in release specific features.

Multiple products on the same CD-ROM

As with multiple releases, multiple products could be saved on a single CD-ROM. Your install program (e.g., LODRUN and QINSTAPP program) could list the products that can be installed and let the user choose which products to restore. This technique is used by IBM when doing a RSTLICPGM. If your product requires them, the key or password could be required to install the product successfully.

The CD-Installer is created to handle multiple products on a single CD-ROM. The CD-Installer scans the CD-ROM for available products. This lets you create the CD-ROM using the directory structure you choose for handling multiple products or versions but does not require the end customer to understand the CD-ROM layout.

Creating a tape from CD-ROM

If you have customers with a mixture of pre-RISC and RISC hardware, they will need a tape to install your product. If done with this scenario in mind, it is easy to create install tapes from the CD-ROM such that either you or your customers can create them.

The most straightforward approach is to restore the QINSTAPP program and an associated save file from the CD. Once restored, they can simply be saved back to the desired tape drive.

Renaming the iSeries CD-ROM image files

Save/restore based CD-ROM format

As long as your programs which restore objects from the CD-ROM are aware of the CD-ROM image file's new ISO-9660, 8.3 name (eight character name and 3 character extension such as **autoexec.bat**), you can rename the CD-ROM image produced by *CD-ROM Studio for iSeries* before copying them to the CD-ROM. In the case where you have a library or object with a name greater than ten characters, it must be renamed to conform to the maximum of 8.3 in the ISO format.

CD-Installer based CD-ROM format

You cannot rename the objects. This information is recorded in the CDINDEX file when the save file data was converted for the CD-ROM.

Burning a CD-ROM

To burn the CD-ROM image files you have created onto a CD-Recordable disk, you need a CD-Recordable device attached to your PC and a software package that supports the creation of ISO-9660 Mode 1 format CD-ROMs.

To create the CD-ROM, you simply need to add the CD-ROM image files created by *CD-ROM Studio for iSeries* to the CD-ROM. These files can be placed in the root directory or any subdirectory you choose.

The following chart gives you the information you will need when using your CD-Recordable software package.

Attribute	Value	
File system	ISO-9660	Joliet
Data sector format	Mode 1 or CD-ROM	
Data sector size	2048 bytes	
Disc type	Data	
# of tracks	1	
Track #	1	
Long file names	No	Not applicable
DOS extended file names	No	Not applicable
Volume label	Your choice	
Publisher Name	Your company	
Prepared by	Your company	
Rename files	Yes	
Directory structure	Your choice	
Recording speeds	2x or greater	

Note: We recommend the Joliet format if you want to put both iSeries and Windows installations on the same CD-ROM.

Note: The iSeries image files should be treated as data files when working with the CD-Recordable software. *They are not CD-ROM disc images*. They are iSeries save/restore images in a CD-ROM format.

Note: ISO-9660 Mode 2 with a single track also works with the iSeries. We have found that some PC based CD-ROM drives do not support ISO-9660 Mode 1. This can be used as an alternative. The iSeries does not support ISO-9660 Mode 2 extensions or multi-track or multi-session CD-ROMs.

Sending media to a duplication service

This section applies if you are using another company to mass-produce your CD-ROMs.

You can send your duplication service either:

- the CD-ROM you created using a CD-Recordable device attached to your PC or
- the tape with the CD-ROM image that was used while creating the CD-ROM image

The duplication service company can tell you their preferred format.

Appendix 3—NLS Support

There are no special NLS considerations when using CD-ROM as long as the ISO naming conventions are used.

However, since the CD-Installer displays text descriptions to the user, you may want to translate these text strings to other languages. The following section gives you information on adding multiple language support to the CD-ROM.

If you are not using the CD-Installer, save-file method for your CD-ROM, this information does not apply.

If you are not translating your installation into multiple languages, this information does not apply.

CD-Installer

The CD-Installer can support multiple languages. This section applies if you are going to translate your CD-Installer install package to multiple languages. It should be consulted *after* you have created your CD-ROM package in the base language.

To support multiple languages, create the CD-ROM using the base language. We recommend Upper Case English (ENP) since it works on every iSeries including DBCS machines.

During the installation process, the job language ID is used to pick the language to display. If no specific files for the language exist, the base language description is used.

Product descriptions

The CDINDEX file contains a text description for your product in the base language. You can add translated product descriptions by adding TEXT.xxx files (where xxx is the language ID) to the same subdirectory on the CD-ROM.

The TEXT.xxx file is a 75-byte text file with the following format.

5-byte character CCSID value followed by a 70-byte description string.

The following file (TEXT.ENU) contains a lower case English description (ASCII CCSID 437) padded with blanks to 70 characters.

00437Centerfield Technology, Inc. - Sample product description example!!

The file can be created with a simple text editor in either ASCII or EBCDIC. The CCSID should be the CCSID used to create the file. Make sure you choose a CCSID that is supported on all releases of OS/400 your product supports.

CD-Installer display file

The CD-Installer display file can be translated and repackaged as well. The source file CDDSPSRC in library BSCTOOLKIT contains the DDS. You can translate this file and rebuild the display file for each language you want to support. The program MAKECDDSP can be used to recompile the display file.

The program creates a file CDLOAD1 in library BSCCDROM10 by default. You can modify the program with the source provided. The CDLOAD1 file will contain the translated version of the display file. It should be added to the root directory of the CD-ROM with the following name – CDLOAD.xxx where xxx is the language.

You can retrieve the file from the iSeries using either Client Access or FTP.

Sample multi-language CD-ROM layout

Path	Contents
/ (root)	QTEMP CDLOAD CDLOAD.ENU CDLOAD.FRA CDLOAD.DEU CDLOAD.xxx (Other languages)
/PROD1/	CDINDEX CDBASE SAVF (Product save file) TEXT.ENU TEXT.FRA TEXT.DEU TEXT.xxx (Other languages)
/PROD2/	CDINDEX CDBASE SAVF (Product save file) TEXT.ENU TEXT.xxx (Other languages)

Appendix 4—Samples

This section has examples that illustrate the information in this manual. You can use these scenarios as a model for your own CD-ROM usage.

Common information

iSeries Source Files	In library BSCTOOLKIT.
CD-ROM Source	In the path \SOURCE on the *CD-ROM Studio for iSeries* product CD-ROM. The subdirectories on the CD-ROM have the iSeries source physical file name.
Save Files	Many of the examples have save files. The save files contain the product. These are packaged as part of the *CD-ROM Studio for iSeries* product.
Sample install	All of these examples are already built on the Centerfield Technology CD-ROM. You can run the example from the CD-ROM we provided with the command indicated for each scenario.

Scenario 1. Simple LODRUN-QINSTAPP product installation from CD-ROM

Description	In this example, we have a QINSTAPP installation program that prompts the user for an installation library and proceeds to install our product into that library.
	Our product was saved from a library named LODRUNL1.
Source file	LODRUN1
Source members	QINSTAPP—Main installation program
	INSLIBP—Installs the library into the library the user specified
	INSLIB—Command front end for INSLIBP
	CUTCD—Program to call from *CD-ROM Studio for iSeries* to create the source save data for the CD-ROM image
Save files	LODRUNS1, LODRUNS2
Sample install	LODRUN DEV(*OPT) DIR(SAMPLE/INSTALL/LODRUN1)

Source code

```
/****************************************************************************/
/*                                                                        */
/* QINSTAPP                                                               */
/*                                                                        */
/* LODRUN1 - Simple LODRUN installation program example                   */
/*                                                                        */
/* This program is automatically loaded by LODRUN during the installation */
/* process.  It restores and invokes INSLIB to do the product installation. */
/*                                                                        */
/****************************************************************************/

            PGM         PARM(&DEV)

            DCL         VAR(&DEV) TYPE(*CHAR) LEN(10) /* The device +
                          containing the installation media */

            /* Restore the command INSLIB and program INSLIBP from the */
            /* saved library QTEMP.  The saved library is located in   */
            /* the file '/SAMPLE/INSTALL/LODRUN1/QTEMP.'               */

            RSTOBJ      OBJ(INSLIB INSLIBP) SAVLIB(QTEMP) DEV(&DEV) +
                          OPTFILE('/SAMPLE/INSTALL/LODRUN1/QTEMP.;1')

            MONMSG      MSGID(CPF3780) EXEC(DO)
```

```
                /* Try name without the dot since some burners */
                /* do not write the file names with one         */

                RSTOBJ      OBJ(INSLIB INSLIBP) SAVLIB(QTEMP) DEV(&DEV) +
                              OPTFILE('/SAMPLE/INSTALL/LODRUN1/QTEMP')

              ENDDO

              /* Add QTEMP so we can find the command we just restored */

              ADDLIBLE QTEMP
              MONMSG      MSGID(CPF0000)

              /* Invoke the command prompting for the user for the target */
              /* library for the product                                  */

              INSLIB      ??LIB(LODRUNL1) DEV(&DEV)

              /* Handle any installation errors */
              MONMSG      MSGID(CPF0000) EXEC(DO)
              SNDPGMMSG   MSGID(CPF9898) MSGF(QCPFMSG) MSGDTA('An +
                            error or warning condition occurred +
                            during product installation') +
                            MSGTYPE(*ESCAPE)
              ENDDO

              ENDPGM
```

```
/***************************************************************************/
/*                                                                         */
/*  INSLIBP                                                                 */
/*                                                                         */
/*  LODRUN1 - Simple LODRUN installation program example                   */
/*                                                                         */
/*  This program does the actual product install from saved library LODRUNL1 */
/*  into the library the user specified.                                   */
/*                                                                         */
/***************************************************************************/

              PGM         PARM(&LIB &DEV)

              DCL         VAR(&LIB) TYPE(*CHAR) LEN(10) /* The target +
                            library */

              DCL         VAR(&DEV) TYPE(*CHAR) LEN(10) /* The device +
                            containing the installation media */

              /* Make sure target library exists */

              CRTLIB      LIB(&LIB) TYPE(*PROD)
              MONMSG      MSGID(CPF0000)

              /* Restore the product into the user library.    */
              /* The CD-ROM path is '/SAMPLE/INSTALL/LODRUN1/' */
              /* The CD-ROM image file is 'LODRUNL1'           */

              RSTOBJ      OBJ(*ALL) SAVLIB(LODRUNL1) DEV(&DEV) +
```

```
                              OBJTYPE(*ALL) VOL(*MOUNTED) MBROPT(*ALL) +
                              ALWOBJDIF(*ALL) RSTLIB(&LIB) +
                              OPTFILE('/SAMPLE/INSTALL/LODRUN1/LODRUNL1.;1')

            MONMSG        MSGID(CPF3780) EXEC(DO)

            /* Try name without the dot since some burners */
            /* do not write the file names with one        */

            RSTOBJ        OBJ(*ALL) SAVLIB(LODRUNL1) DEV(&DEV) +
                            OBJTYPE(*ALL) VOL(*MOUNTED) MBROPT(*ALL) +
                            ALWOBJDIF(*ALL) RSTLIB(&LIB) +
                            OPTFILE('/SAMPLE/INSTALL/LODRUN1/LODRUNL1')

            ENDDO

            ENDPGM
```

```
/****************************************************************************/
/*                                                                        */
/* INSLIB                                                                 */
/*                                                                        */
/* LODRUN1 - Simple LODRUN installation program example                   */
/*                                                                        */
/* This command is used by QINSTAPP to prompt for an installation library */
/* name.  This command calls program INSLIBP, which does the actual       */
/* installation.                                                          */
/*                                                                        */
/****************************************************************************/

            CMD           PROMPT('Product Installation')

            PARM          KWD(LIB) TYPE(*NAME) LEN(10) DFT(LODRUNL1) +
                            PROMPT('Product installation library')

            PARM          KWD(DEV) TYPE(*CHAR) LEN(10) DFT(*OPT) +
                            PROMPT('Installation device')
```

```
/****************************************************************************/
/*                                                                        */
/* CUTCD                                                                  */
/*                                                                        */
/* LODRUN1 - Simple LODRUN installation program example                   */
/*                                                                        */
/* NOTE: This program is intended to be called only by the CD-ROM Studio  */
/*       for iSeries Windows client, or in the proper sequence on         */
/*       the iSeries, as documented in the User's Guide and Reference     */
/*       manual that is part of this product.                             */
/*                                                                        */
/*       Using this program in any other way will not create save data    */
/*       suitable for creating a CD-ROM.                                  */
/*                                                                        */
/* This program can be called from the CD-ROM Studio for iSeries Windows  */
/* client, to create save data for this product installation example.     */
/*                                                                        */
```

```
/* The contents for the CD-ROM are currently saved in 2 save files.        */
/*                                                                         */
/*     LODRUNS1 - Contains the sample product library LODRUNL1.  This was  */
/*                saved using the SAVLIB command.                          */
/*                                                                         */
/*     LODRUNS2 - Contains the programs QINSTAPP, INSLIBP, and command     */
/*                INSLIB from library QTEMP.  This was saved using the      */
/*                SAVOBJ command.                                          */
/*                                                                         */
/***************************************************************************/

             PGM          PARM(&DEV)

             DCL          VAR(&DEV) TYPE(*CHAR) LEN(10) /* Tape device +
                            on which to save libraries and objects */

             /* Create save data for the library LODRUNL1 */
             /* by saving the save file data to tape      */

             /* Note:  You could also execute any other   */
             /* commands that save data to tape           */

             SAVSAVFDTA SAVF(BSCTOOLKIT/LODRUNS1) DEV(&DEV) +
                          VOL(*MOUNTED) SEQNBR(*END) ENDOPT(*LEAVE) +
                          CLEAR(*NONE)

             /* Create save data for the library QTEMP    */
             /* by saving the save file data to tape      */

             SAVSAVFDTA SAVF(BSCTOOLKIT/LODRUNS2) DEV(&DEV) +
                          VOL(*MOUNTED) SEQNBR(*END) ENDOPT(*LEAVE) +
                          CLEAR(*NONE)

             ENDPGM
```

Scenario 2. Dual media LODRUN-QINSTAPP product installation

Description	In this example, we have a QINSTAPP installation program that prompts the user for an installation library and proceeds to install our product into that library.
	This example supports both CD-ROM and tape media using the same installation program.
	Our product was saved from a library named LODRUNL2.
Source file	LODRUN2
Source members	QINSTAPP—Main installation program INSLIBP—Installs the library into the library the user specified INSLIB—Command front end for INSLIBP CUTCD—Program to call from *CD-ROM Studio for iSeries* to create the source save data for the CD-ROM image CUTTAPE—Program to call from iSeries command line to create the tape version of the product
Save files	LODRUNS3, LODRUNS4
Sample install	LODRUN DEV(*OPT) DIR(SAMPLE/INSTALL/LODRUN2)

Source code

```
/*****************************************************************************/
/*                                                                         */
/* QINSTAPP                                                                */
/*                                                                         */
/* LODRUN2 - Dual media installation program example                       */
/*                                                                         */
/* This program is automatically loaded by LODRUN during the installation  */
/* process.  It restores and invokes INSLIB to do the product installation.*/
/*                                                                         */
/* This version supports CD-ROM and tape.                                  */
/*                                                                         */
/*****************************************************************************/

            PGM          PARM(&DEV)

            DCL          VAR(&DEV) TYPE(*CHAR) LEN(10) /* The device +
                           containing the installation media */

            /* Determine media type.  Also, this rewinds  */
            /* the tape if it is a tape so we can restore */
```

```
                   /* the additional objects from QTEMP.        */

               QSYS/CHKTAP DEV(&DEV) VOL(*MOUNTED) SEQNBR(*NONE) +
                             LABEL(*NONE) CRTDATE(*NONE) ENDOPT(*REWIND)

/* CD-ROM installation specific code */

               /* Monitor for not a tape device message */

               MONMSG       MSGID(CPF6721) EXEC(DO)

               /* Clean up message so it doesn't scare */
               /* anyone by being in the joblog         */

               RCVMSG       MSGTYPE(*LAST) RMV(*YES)

               /* Restore the command INSLIB and program INSLIBP from the */
               /* saved library QTEMP.  The saved library is located in    */
               /* the file '/INSTALL/LODRUN1/QTEMP.'                        */

               RSTOBJ       OBJ(INSLIB INSLIBP) SAVLIB(QTEMP) DEV(&DEV) +
                             OPTFILE('/SAMPLE/INSTALL/LODRUN2/QTEMP.;1')

               MONMSG       MSGID(CPF3780) EXEC(DO)

               /* Try name without the dot since some burners */
               /* do not write the file names with one          */

               RSTOBJ       OBJ(INSLIB INSLIBP) SAVLIB(QTEMP) DEV(&DEV) +
                             OPTFILE('/SAMPLE/INSTALL/LODRUN2/QTEMP')

               ENDDO

               GOTO         CMDLBL(NOTAPE)

               ENDDO

/* Tape installation specific code */

               /* Restore the command INSLIB and program INSLIBP from the */
               /* saved library QTEMP.  The saved library is located in    */
               /* sequence one on the tape.                                */

               /* We leave the tape for performance reasons.              */

               RSTOBJ       OBJ(INSLIB INSLIBP) SAVLIB(QTEMP) DEV(&DEV) +
                             ENDOPT(*LEAVE)

/* Common installation specific code */
 NOTAPE:

               /* Add QTEMP so we can find the command we just restored */

               ADDLIBLE     LIB(QTEMP)
               MONMSG       MSGID(CPF0000)

               /* Invoke the command prompting for the user */
               /* for the target library for the product    */

               INSLIB       ??LIB(LODRUNL2) DEV(&DEV)
```

```
                 /* Handle any installation errors */
                 MONMSG     MSGID(CPF0000) EXEC(DO)
                 SNDPGMMSG  MSGID(CPF9898) MSGF(QCPFMSG) MSGDTA('An +
                              error or warning condition occurred +
                              during product installation') +
                              MSGTYPE(*ESCAPE)
                 ENDDO

                 ENDPGM
```

```
/*************************************************************************/
/*                                                                       */
/* INSLIBP                                                               */
/*                                                                       */
/* LODRUN2 - Dual media installation program example                     */
/*                                                                       */
/* This program does the actual product install from saved library LODRUNL2 */
/* into the library the user specified.                                  */
/*                                                                       */
/*************************************************************************/

              PGM         PARM(&LIB &DEV)

              DCL         VAR(&LIB) TYPE(*CHAR) LEN(10) /* The target +
                             library */

              DCL         VAR(&DEV) TYPE(*CHAR) LEN(10) /* The device +
                             containing the installation media */

              /* Make sure library exists */

              CRTLIB      LIB(&LIB) TYPE(*PROD)
              MONMSG      MSGID(CPF0000)

              /* Determine media type. */

              QSYS/CHKTAP DEV(&DEV) VOL(*MOUNTED) SEQNBR(*NONE) +
                             LABEL(*NONE) CRTDATE(*NONE) ENDOPT(*LEAVE)

/* CD-ROM installation specific code */

              /* Monitor for not a tape device message */

              MONMSG      MSGID(CPF6721) EXEC(DO)

              /* Clean up message so it doesn't scare */
              /* anyone by being in the joblog        */

              RCVMSG      MSGTYPE(*LAST) RMV(*YES)

              /* Restore the product into the user library. */
              /* The CD-ROM path is '/INSTALL/LODRUN2/'     */
              /* The CD-ROM image file is 'LODRUNL2'        */

              RSTOBJ      OBJ(*ALL) SAVLIB(LODRUNL2) DEV(&DEV) +
                             OBJTYPE(*ALL) VOL(*MOUNTED) MBROPT(*ALL) +
```

```
                                 ALWOBJDIF(*ALL) RSTLIB(&LIB) +
                                 OPTFILE('/SAMPLE/INSTALL/LODRUN2/LODRUNL2.;1')

              MONMSG      MSGID(CPF3780) EXEC(DO)

              /* Try name without the dot since some burners */
              /* do not write the file names with one        */

              RSTOBJ      OBJ(*ALL) SAVLIB(LODRUNL2) DEV(&DEV) +
                            OBJTYPE(*ALL) VOL(*MOUNTED) MBROPT(*ALL) +
                            ALWOBJDIF(*ALL) RSTLIB(&LIB) +
                            OPTFILE('/SAMPLE/INSTALL/LODRUN2/LODRUNL2')

              ENDDO

              GOTO        CMDLBL(EXIT)

              ENDDO

/* Tape installation specific code */

              /* Restore the product into the user library. */

              RSTOBJ      OBJ(*ALL) SAVLIB(LODRUNL2) DEV(&DEV) +
                            OBJTYPE(*ALL) VOL(*MOUNTED) MBROPT(*ALL) +
                            ALWOBJDIF(*ALL) RSTLIB(&LIB)

 EXIT:
              ENDPGM
```

```
   /****************************************************************************/
   /*                                                                       */
   /* INSLIB                                                                 */
   /*                                                                       */
   /* LODRUN2 - Dual media LODRUN installation program example              */
   /*                                                                       */
   /* This command is used to prompt for an installation library            */
   /* name by QINSTAPP.  This command calls program INSLIBP, which does the */
   /* actual installation.                                                  */
   /*                                                                       */
   /****************************************************************************/

              CMD         PROMPT('Product Installation')

              PARM        KWD(LIB) TYPE(*NAME) LEN(10) DFT(LODRUNL1) +
                            PROMPT('Product installation library')

              PARM        KWD(DEV) TYPE(*CHAR) LEN(10) DFT(*OPT) +
                            PROMPT('Installation device')
```

```
 /****************************************************************************/
  /*                                                                       */
  /* CUTCD                                                                  */
  /*                                                                       */
  /* LODRUN2 - Dual media LODRUN installation program example              */
```

```
          /*                                                             */
          /* NOTE: This program is intended to be called only by the CD-ROM Studio   */
          /*       for iSeries Windows client, or in the proper sequence on          */
          /*       the iSeries, as documented in the User's Guide and Reference      */
          /*       manual that is part of this product.                    */
          /*                                                             */
          /*       Using this program in any other way will not create save data     */
          /*       suitable for creating a CD-ROM.                         */
          /*                                                             */
          /* This program can be called from the CD-ROM Studio for iSeries Windows   */
          /* client, to create save data for this product installation example.      */
          /*                                                             */
          /* The contents for the CD-ROM are currently saved in 2 save files.        */
          /*                                                             */
          /*    LODRUNS3 - Contains the sample product library LODRUNL2.  This was    */
          /*               saved using the SAVLIB command.                  */
          /*                                                             */
          /*    LODRUNS4 - Contains the programs QINSTAPP, INSLIBP, and command       */
          /*               INSLIB from library QTEMP.  This was saved using the      */
          /*               SAVOBJ command.                                */
          /*                                                             */

/***************************************************************************/

              PGM          PARM(&DEV)

              DCL          VAR(&DEV) TYPE(*CHAR) LEN(10) /* Tape device +
                             to save libraries and objects onto */

              /* Create save data for the library LODRUNL2 */
              /* by saving the save file data to tape      */

              /* Note:  You could also execute any other   */
              /* commands that save data to tape           */

              SAVSAVFDTA SAVF(BSCTOOLKIT/LODRUNS3) DEV(&DEV) +
                             VOL(*MOUNTED) SEQNBR(*END) ENDOPT(*LEAVE) +
                             CLEAR(*NONE)

              /* Create save data for the library QTEMP */
              /* by saving the save file data to tape   */

              SAVSAVFDTA SAVF(BSCTOOLKIT/LODRUNS4) DEV(&DEV) +
                             VOL(*MOUNTED) SEQNBR(*END) ENDOPT(*LEAVE) +
                             CLEAR(*NONE)

              ENDPGM
```

```
   /***************************************************************************/
   /*                                                             */
   /* CUTTAPE                                                       */
   /*                                                             */
   /* LODRUN2 - Dual media LODRUN installation program example       */
   /*                                                             */
   /* This program can be called to create a installation tape.      */
   /*                                                             */
   /* The program requires the tape device as input.                */
```

```
/*                                                                      */
/* The contents for the tape are currently saved in 2 save files.       */
/*                                                                      */
/*    LODRUNS3 - Contains the sample product library LODRUNL2.  This was */
/*               saved using the SAVLIB command.                         */
/*                                                                      */
/*    LODRUNS4 - Contains the programs QINSTAPP, INSLIBP, and command    */
/*               INSLIB from library QTEMP.  This was saved using the     */
/*               SAVOBJ command.                                         */
/*                                                                      */
/**********************************************************************/

              PGM         PARM(&DEV)

              DCL         VAR(&DEV) TYPE(*CHAR) LEN(10) /* Tape device +
                            to create install tape */

              /* Initialize tape */

              INZTAP      DEV(&DEV) NEWVOL(AS400) CHECK(*NO) +
                            DENSITY(*CTGTYPE) ENDOPT(*REWIND) CLEAR(*NO)

              /* Save library QTEMP to tape by     */
              /* saving the save file data to tape */

              SAVSAVFDTA SAVF(BSCTOOLKIT/LODRUNS4) DEV(&DEV) +
                            VOL(*MOUNTED) SEQNBR(*END) ENDOPT(*LEAVE) +
                            CLEAR(*NONE)

              /* Add library LODRUNL2 to tape by    */
              /* saving the save file data to tape */

              SAVSAVFDTA SAVF(BSCTOOLKIT/LODRUNS3) DEV(&DEV) +
                            VOL(*MOUNTED) SEQNBR(*END) ENDOPT(*LEAVE) +
                            CLEAR(*NONE)

              ENDPGM
```

Scenario 3. Dual media LODRUN-QINSTAPP product installation using save files

Description	In this example, we have a QINSTAPP installation program that prompts the user for an installation library and proceeds to install our product into that library.
	This example supports both CD-ROM and tape media using the same installation program.
	This example uses save files for most of the install. This way, the media dependencies are isolated to QINSTAPP and do not affect the rest of the install.
	Our product was saved from a library named LODRUNL3.
Source file	LODRUN3
Source members	QINSTAPP—Main installation program INSLIBP—Installs the library into the library the user specified INSLIB—Command front end for INSLIBP CUTCD—Program to call from *CD-ROM Studio for iSeries* to create the source save data for the CD-ROM image CUTTAPE—Program to call from iSeries command line to create the tape version of the product
Save files	LODRUNS5, LODRUNS6
Sample install	LODRUN DEV(*OPT) DIR(SAMPLE/INSTALL/LODRUN3)

Source code

```
/**************************************************************************/
/*                                                                        */
/* QINSTAPP                                                               */
/*                                                                        */
/* LODRUN3 - Dual media installation program example using save files     */
/*                                                                        */
/* This program is automatically loaded by LODRUN during the installation */
/* process.  It restores and invokes INSLIB to do the product installation.*/
/*                                                                        */
/* This version supports CD-ROM and tape.                                 */
/*                                                                        */
/**************************************************************************/
```

```
              PGM          PARM(&DEV)

              DCL          VAR(&DEV) TYPE(*CHAR) LEN(10) /* The device +
                             containing the installation media */

              /* Determine media type.  It leaves  */
              /* the tape for performance reasons. */

              QSYS/CHKTAP DEV(&DEV) VOL(*MOUNTED) SEQNBR(*NONE) +
                             LABEL(*NONE) CRTDATE(*NONE) ENDOPT(*LEAVE)

/* CD-ROM installation specific code */

              /* Monitor for not a tape device message */

              MONMSG       MSGID(CPF6721) EXEC(DO)

              /* Clean up message so it doesn't scare */
              /* anyone by being in the joblog        */

              RCVMSG       MSGTYPE(*LAST) RMV(*YES)

              /* Restore the save file for the installation. */
              /* CD-ROM image path : /SAMPLE/INSTALL/LODRUN3 */
              /* CD-ROM image file : LODRUNS5                 */

              RSTOBJ       OBJ(LODRUNS5) SAVLIB(BSCTOOLKIT) DEV(&DEV) +
                             MBROPT(*ALL) ALWOBJDIF(*ALL) +
                             RSTLIB(QTEMP) +
                             OPTFILE('/SAMPLE/INSTALL/LODRUN3/LODRUNS5.;1')

              MONMSG       MSGID(CPF3780) EXEC(DO)

              /* Try name without the dot since some burners */
              /* do not write the file names with one         */

              RSTOBJ       OBJ(LODRUNS5) SAVLIB(BSCTOOLKIT) DEV(&DEV) +
                             MBROPT(*ALL) ALWOBJDIF(*ALL) +
                             RSTLIB(QTEMP) +
                             OPTFILE('/SAMPLE/INSTALL/LODRUN3/LODRUNS5')

              ENDDO

              GOTO         CMDLBL(NOTAPE)

              ENDDO

/* Tape installation specific code */

              /* Restore the save file for the installation. */

              RSTOBJ       OBJ(LODRUNS5) SAVLIB(BSCTOOLKIT) DEV(&DEV) +
                             VOL(*MOUNTED) LABEL(*SAVLIB) +
                             ENDOPT(*REWIND) MBROPT(*ALL) +
                             ALWOBJDIF(*ALL) RSTLIB(QTEMP)

/* Common installation specific code */
 NOTAPE:
              /* Add QTEMP so we can find the command we just restored */
```

```
            ADDLIBLE   LIB(QTEMP)
            MONMSG     MSGID(CPF0000)

            /* Restore install program from save file */

            RSTOBJ     OBJ(INSLIB INSLIBP) SAVLIB(LODRUNL3) +
                         DEV(*SAVF) SAVF(QTEMP/LODRUNS5) +
                         MBROPT(*ALL) ALWOBJDIF(*ALL) RSTLIB(QTEMP)

            /* Invoke the command prompting for the user */
            /* for the target library for the product    */

            INSLIB     ??LIB(LODRUNL3)

            /* Handle any installation errors */

            MONMSG     MSGID(CPF0000) EXEC(DO)
            SNDPGMMSG  MSGID(CPF9898) MSGF(QCPFMSG) MSGDTA('An +
                         error or warning condition occurred +
                         during product installation') +
                         MSGTYPE(*ESCAPE)
            ENDDO

            ENDPGM
```

```
/**************************************************************************/
/*                                                                      */
/*  INSLIBP                                                             */
/*                                                                      */
/*  LODRUN3 - Dual media installation program example using save files  */
/*                                                                      */
/*  This program does the actual product install from saved library     */
/*  LODRUNL3 into the library the user specified.                       */
/*                                                                      */
/**************************************************************************/

            PGM        PARM(&LIB)

            DCL        VAR(&LIB) TYPE(*CHAR) LEN(10) /* The target +
                         library */

            /* Ensure the library exists */
            CRTLIB     LIB(&LIB) TYPE(*PROD)
            MONMSG     MSGID(CPF0000)

            /* Restore the product into the user library. */

            RSTOBJ     OBJ(*ALL) SAVLIB(LODRUNL3) DEV(*SAVF) +
                         OBJTYPE(*ALL) SAVF(QTEMP/LODRUNS5) +
                         MBROPT(*ALL) ALWOBJDIF(*ALL) RSTLIB(&LIB)

            ENDPGM
```

```
/**************************************************************************/
/*                                                                      */
```

```
/* INSLIB                                                               */
/*                                                                      */
/* LODRUN3 - Dual media save file based install example                 */
/*                                                                      */
/* This command is used to prompt for an installation library           */
/* name by QINSTAPP.  This command calls program INSLIBP, which does the */
/* actual installation.                                                 */
/*                                                                      */
/************************************************************************/

              CMD         PROMPT('Product Installation')

              PARM        KWD(LIB) TYPE(*NAME) LEN(10) DFT(LODRUNL1) +
                            PROMPT('Product installation library')
```

```
/************************************************************************/
/*                                                                      */
/* CUTCD                                                                */
/*                                                                      */
/* LODRUN3 - Dual media LODRUN installation program example             */
/*          using save files.                                           */
/*                                                                      */
/* NOTE: This program is intended to be called only by the CD-ROM Studio */
/*       for iSeries Windows client, or in the proper sequence on       */
/*       the iSeries, as documented in the User's Guide and Reference   */
/*       manual that is part of this product.                           */
/*                                                                      */
/*       Using this program in any other way will not create save data  */
/*       suitable for creating a CD-ROM.                                */
/*                                                                      */
/* This program can be called from the CD-ROM Studio for iSeries Windows */
/* client, to create save data for this product installation example.   */
/*                                                                      */
/* The contents for the CD-ROM will be a save file and QINSTAPP in      */
/* library QTEMP.                                                       */
/*                                                                      */
/*    LODRUNS5 - Contains the sample product library LODRUNL3, program  */
/*               INSLIBP, and command INSLIB.                           */
/*                                                                      */
/*    LODRUNS6 - Contains the program QINSTAPP from library QTEMP.      */
/*                                                                      */
/************************************************************************/

              PGM         PARM(&DEV)

              DCL         VAR(&DEV) TYPE(*CHAR) LEN(10) /* Tape device +
                            to save libraries and objects onto */

              /* Create save data for the save file LODRUNS5 */
              /* by saving it to tape                        */

              /* Note:  You could also execute any other     */
              /* commands that save data to tape             */

              /* Notice how we use the label to control the name     */
              /* of the CD-ROM image file.  CD-ROM Studio uses this */
              /* label when creating the CD-ROM image.  ISO9660     */
```

```
                    /* states the name must follow the 8.3 naming      */
                    /* convention.  The library name BSCTOOLKIT would be */
                    /* too long and violate the naming convention.      */

            SAVOBJ      OBJ(LODRUNS5) LIB(BSCTOOLKIT) DEV(&DEV) +
                          VOL(*MOUNTED) SEQNBR(*END) +
                          LABEL(LODRUNS5) ENDOPT(*LEAVE) CLEAR(*NONE)

            /* Create save data for program QINSTAPP */
            /* by saving the save file data to tape  */

            SAVSAVFDTA SAVF(BSCTOOLKIT/LODRUNS6) DEV(&DEV) +
                          VOL(*MOUNTED) SEQNBR(*END) ENDOPT(*LEAVE) +
                          CLEAR(*NONE)

            ENDPGM
```

```
/***********************************************************************/
/*                                                                     */
/* CUTTAPE                                                             */
/*                                                                     */
/* LODRUN3 - Dual media LODRUN installation program example           */
/*           using save files.                                        */
/*                                                                     */
/* This program can be called to create an installation tape.         */
/*                                                                     */
/* The program requires the tape device as input.                     */
/*                                                                     */
/* The contents for the tape will be a save file and QINSTAPP in      */
/* library QTEMP.                                                      */
/*                                                                     */
/*    LODRUNS5 - Contains the sample product library LODRUNL3, program */
/*               INSLIBP, and command INSLIB.                          */
/*                                                                     */
/*    LODRUNS6 - Contains the program QINSTAPP from library QTEMP.     */
/*                                                                     */
/***********************************************************************/

            PGM         PARM(&DEV)

            DCL         VAR(&DEV) TYPE(*CHAR) LEN(10) /* Tape device +
                          to save CD-ROM image onto */

            /* Initialize tape */

            INZTAP      DEV(&DEV) NEWVOL(AS400) CHECK(*NO) +
                          DENSITY(*CTGTYPE) ENDOPT(*REWIND) CLEAR(*NO)

            /* Save program QTEMP/QINSTAPP to tape  */
            /* by saving the save file data to tape */

            SAVSAVFDTA SAVF(BSCTOOLKIT/LODRUNS6) DEV(&DEV) +
                          VOL(*MOUNTED) SEQNBR(*END) ENDOPT(*LEAVE) +
                          CLEAR(*NONE)

            /* Put the save file onto tape */
```

```
          SAVOBJ      OBJ(LODRUNS5) LIB(BSCTOOLKIT) DEV(&DEV) +
                        VOL(*MOUNTED) SEQNBR(*END) +
                        ENDOPT(*REWIND) CLEAR(*NONE)

          ENDPGM
```

Scenario 4. CD-Installer save file installation

Description	In this example, we packaged our product into save files and wrote an install program.
	This approach uses the CD-Installer as the CD-ROM method.
Source file	SAVFILE1
Source members	INSTALL—Main installation program INSLIBP—Installs the library into the library the user specified INSLIB—Command front end for INSLIBP
Save files	SAVFILS1—Contains the product library SAVLIB LIB(SAVFILE1)
	INSPGMS1—Contains INSLIBP and INSLIB objects used during install
Sample install	LODRUN DEV(*OPT) DIR(SAMPLE/INSTALL/SAVFILE1)

Source code

```
/**************************************************************************/
/*                                                                        */
/* INSTALL                                                                */
/*                                                                        */
/* SAVFILE1 - Save file based installation example                        */
/*                                                                        */
/* Initial install program for our product.  This program restores the    */
/* installation specific programs and calls those programs to do the      */
/* install.                                                               */
/*                                                                        */
/* The install programs are in save file QTEMP/INSPGMS1                    */
/*                                                                        */
/**************************************************************************/

          PGM

          ADDLIBLE   LIB(QTEMP)
          MONMSG     MSGID(CPF0000)

          RSTOBJ     OBJ(INSLIB INSLIBP) SAVLIB(SAVFILE1) +
                       DEV(*SAVF) SAVF(QTEMP/INSPGMS1) +
                       MBROPT(*ALL) ALWOBJDIF(*ALL) RSTLIB(QTEMP)

          ?INSLIB

          ENDPGM
```

```
/*****************************************************************************/
/*                                                                         */
/* INSLIBP                                                                 */
/*                                                                         */
/* SAVFILE1 - Save file based installation example                        */
/*                                                                         */
/* This program does the actual product install from saved library        */
/* SAVFILE1 into the library the user specified.                          */
/*                                                                         */
/* The library is saved in save file QTEMP/SAVFILS1                        */
/*                                                                         */
/*****************************************************************************/

            PGM           PARM(&LIB)

            DCL           VAR(&LIB) TYPE(*CHAR) LEN(10) /* The target +
                            library */

            /* Ensure the library exists */

            CRTLIB        LIB(&LIB) TYPE(*PROD)
            MONMSG        MSGID(CPF0000)

            /* Restore the product into the user library */

            RSTOBJ        OBJ(*ALL) SAVLIB(SAVFILE1) DEV(*SAVF) +
                            OBJTYPE(*ALL) SAVF(QTEMP/SAVFILS1) +
                            MBROPT(*ALL) ALWOBJDIF(*ALL) RSTLIB(&LIB)

            ENDPGM
```

```
/*****************************************************************************/
/*                                                                         */
/* INSLIB                                                                  */
/*                                                                         */
/* SAVFILE1 - Save file based installation example                        */
/*                                                                         */
/* This command is used to prompt for an installation library named       */
/* INSTALL.  This command calls program INSLIBP, which does the actual    */
/* installation.                                                          */
/*                                                                         */
/*****************************************************************************/

            CMD           PROMPT('Product Installation')

            PARM          KWD(LIB) TYPE(*NAME) LEN(10) DFT(SAVFILE1) +
                            PROMPT('Product installation library')
```

Scenario 5. CD-Installer save file installation with parameters

Description	In this example, we packaged our product into save files and wrote an install program that would receive a parameter from the CD Loader code with a list of save files in QTEMP.
	This approach uses the CD-Installer as the CD-ROM method.
Source file	SAVFILE2
Source members	INSTALL—Main installation program
Save files	None
Sample install	None

Source code

```
/****************************************************************************/
/*                                                                        */
/* INSTALL                                                                 */
/*                                                                        */
/* SAVFILE2 - Save file based installation example number 2               */
/*                                                                        */
/* Initial install program for our product.  This program restores the    */
/* installation specific objects (like programs and files) and            */
/* optionally calls more programs to continue the installation.           */
/*                                                                        */
/* Only source code is provided for this example (no save files).         */
/*                                                                        */
/* NOTE: This example demonstrates an alternative method to               */
/*       pass parameters to the program responsible for handling          */
/*       the save files that reside in QTEMP. This method has the         */
/*       advantage of allowing the installation program to                */
/*       dynamically determine the names of the save files rather         */
/*       than having to hardcode a known set of them.                     */
/*                                                                        */
/*       The parameter passed to this program is a structure that         */
/*       has a two byte binary number that indiates how many save         */
/*       files there are followed by 10 character save file names         */
/*       that have been put in QTEMP.                                     */
/*                                                                        */
/*                                                                        */
/****************************************************************************/

          PGM          PARM(&SAVFLST)

          DCL          VAR(&SAVFLST) TYPE(*CHAR) LEN(4000)
```

```
            DCL        VAR(&NUMSAVF) TYPE(*DEC) LEN(5)
            DCL        VAR(&SAVF) TYPE(*CHAR) LEN(10)
            DCL        VAR(&CHARPOS) TYPE(*DEC) LEN(5) VALUE(3)
            DCL        VAR(&NUMPROC) TYPE(*DEC) LEN(5) VALUE(0)

            ADDLIBLE   LIB(QTEMP)
            MONMSG     MSGID(CPF0000)

            /* Set the local counter to hold the number of */
            /* save files put in QTEMP by our invoker.     */

            CHGVAR     VAR(&NUMSAVF) VALUE(%BINARY(&SAVFLST 1 2))

 LOOP:
            /* Pull out the name of the save file in the list */

            CHGVAR     VAR(&SAVF) VALUE(%SUBSTRING(&SAVFLST +
                         &CHARPOS 10))

            /* Bump out position so the next time around we */
            /* get the next name in the list.              */

            CHGVAR     VAR(&CHARPOS) VALUE(&CHARPOS + 10)

            /* Process the current save file. In this example */
            /* we will restore some objects to QTEMP.         */

            RSTOBJ     OBJ(*ALL) SAVLIB(QTEMP) DEV(*SAVF) +
                         SAVF(QTEMP/&SAVF) MBROPT(*ALL) +
                         ALWOBJDIF(*ALL) RSTLIB(QTEMP)

            /* Bump the number of save files processed. */

            CHGVAR     VAR(&NUMPROC) VALUE(&NUMPROC + 1)

            /* If there are still save file names in    */
            /* the list, then go around the loop again. */

            IF         COND(&NUMPROC *LT &NUMSAVF) THEN(GOTO +
                         CMDLBL(LOOP))

            ENDPGM
```

Appendix 5—Multi-volume CD-ROMs (Standard Edition)

A single CD-ROM (ISO-9660 Mode 1) can hold 650 MB of data. The following section contains information for spanning CD-ROMs that can be accessed using save and restore commands.

Preparing the data

The first step is to prepare your save data for multiple CD-ROMs. You must break the save data into multiple chunks that are 650 MB or less. You can do this manually with multiple save operations or you can use the SAV650 command that is provided as part of the product.

The SAV650 command will take a library and do multiple save operations. Each save operation will contain the contents for a single CD-ROM. The save operations will use a tape label of SAV0000x where x is 1 for the first CD-ROM, 2 for the second CD-ROM, etc.

You can also save your data using standard iSeries save commands. Each save should contain 650 MB of data or less. You can use the LABEL keyword on the save command to identify each save operation.

Creating the CD-ROM image files

When creating the CD-ROM image files, you can let the *CD-ROM Studio for iSeries* Windows client automatically distribute the contents across multiple disks. However, in most cases it is best to manage the layout yourself.

Creating the CD-ROMs

When you create the actual CD-ROMs, place the appropriate file on each CD-ROM. You can use any CD-ROM label you want, but it is good idea to include which CD-ROM this is in the label. Example: CDROM01, CDROM02, etc.

Restoring from CD-ROM

Your installation program will need to restore the product from multiple CD-ROMs. A RST650 installation example is provided to give you a starting template and reference for restoring data saved onto multiple CD-ROMs with the SAV650 command.

Restrictions

The following methods do not support multi-volume CD-ROM sets.

- SAVLICPGM
- Save files and the CD-ROM Installation and Disk Manager

The SAV650 command package contains a set of source code and utilities to assist you when saving iSeries objects for CD-ROM. The tool will automatically break libraries into 650 MB chunks.

The command assumes no single object in the library is larger than 650 MB. It will not work with an object of 650 MB or larger.

Save 650 utilities

BSCCDROM10/	
SAV650	Command
SAV650	Program
RST650	Program

BSCTOOLKIT/	
SAV650	Source file
	SAV650 source
	SAV650CMD source
	RST650 source

SAV650 usage

To use SAV650 the command, simply type BSCCDROM10/SAV650 <F4>.

Library—This is the library you want to save for CD-ROM.

Object—This is the object or set of objects you would like to save. You can specify a single object, a generic object name such as A*, or *ALL to save all of the objects in the library.

Device—This is the device to which to save the object. It can be a tape device or *SAVF to save the objects to a save file to later be transferred to tape or added to CD-ROM using the save-file method.

Target release—Specify the target release.

Library—If you choose *SAVF, this is the library the save files are created in.

The output of the command is one or more SAVOBJ operations. The save operations will produce files with the names SAV00001, SAV00002 ... SAV0000n. Each file will be 650 MB or less.

RST650 usage

The source file BSCTOOLKIT/SAV650(RST650) gives you example source code for restoring objects saved with the SAV650 command. The sample includes the restore commands and examples of how to prompt for the correct CD-ROM in the set of CD-ROMs you produce.

Creating the CD-ROMs

6) Initialize tape.

7) BSCCDROM10/STRCDP—Start premastering

8) BSCCDROM10/SAV650—Save library

9) SAVOBJ QTEMP/QINSTAPP—Save your install program if you have one

10) BSCCDROM10/ENDCDP—End premastering

11) From the Windows client, choose *Save-restore based install using CD-ROM* followed by *Use an existing tape*. Choose to create the CD-ROM images. This will convert the save data on tape to the correct format and download to the PC.

12) Put each SAV0000x file on a separate CD-ROM. You can specify the CD-ROM sequence number in the CD-ROM label if you want. Add the QTEMP file to the first CD-ROM if you have an install program.

Modifying the source

The source file BSCTOOLKIT/SAV650 contains the source code for the SAV650 command. You can modify the base code to fit your environment better.

Assumptions/Restrictions

- No singe object in a library can be larger than 650 MB

Appendix 6—Technical Support

Centerfield Technology, Inc. is committed to providing our customers with support as problems or questions arise. All customers receive 90 days of free support. For those customers who choose to purchase extended support contracts, the following support options are available in one-year increments from the date of purchase. Support also includes minor enhancement releases and upgrades that might become necessary as OS/400 releases become available.

Contact Information

Internet

Web support pages are maintained at http://www.centerfieldtechnology.com. Updated documentation, how-to's, FAQs, and a list of known problems will become available as needed.

E-mail

To contact technical support by email, send email requests to *support@centerfieldtechnology.com*.

Fax

To contact technical support by fax, send your request to (507) 536-0474.

Phone

You can call (507) 287-8119 for technical support. Telephone support is available from 9:00 AM to 5:00 PM CST.

Support Checklist

Before contacting Centerfield Technology, Inc., concerning problems, please collect the following information and answer the associated questions. This will speed up the diagnosis of the problem.

Step 1: Clearly identify where you are having a problem. Some possibilities:
- ✓ Install of the iSeries code
- ✓ Install of the Windows client code
- ✓ Setting up TCP/IP communications
- ✓ Starting the iSeries servers

- ✓ During the actual CD image creation step
- ✓ When you are "burning" the CD image using the CD-ROM software from the vendor
- ✓ During a subsequent install using the CD

Step 2: Ensure the appropriate servers and subsystems are active on the iSeries:
- ✓ Issue a STRTCP command and verify you get a message saying TCP/IP is currently active.
- ✓ Issue WRKACTJOB command and look for a job with a name of BSCSERVER. If one does not exist issue, the following commands.
  - ADDLIBLE BSCCDROM10
  - STRBSCSVR
- ✓ If a job by the name of BSCSERVER does not exist look for a subsystem with routing data of 'BSCTCP' and a job queue entry which references a job queue with a name of BSCTCP in library BSCCDROM10. To find all subsystem descriptions and associated routing data do the following:
  - WRKSBSD *ALL/*ALL
  - Choose option 5 (Display)
  - Choose option 7 (Routing entries)
  - Choose option 6 (Job queue entries)
- ✓ Ensure the subsystem with the appropriate routing entry and job queue entry has been started. If you do not want that subsystem started, add the job queue entry and routing entry to the subsystem you want to use.
- ✓ Start the subsystem if it is not active (STRSBS).

Step 3: Document the message or symptom you are encountering:
- ✓ Failure message on the PC
- ✓ Failure message indicating an iSeries problem
- ✓ Hang condition

Step 4: Document the series of steps that occurred leading up to the failure:
- ✓ The type of CD-ROM being built (e.g. LODRUN or save/restore)
- ✓ User profile being used
- ✓ List of objects specified or the name of the program to call
- ✓ Name and type of tape device being used to create the image
- ✓ Path name on the PC to put the image

Step 5: Collect other pertinent information:
- ✓ Version of the software (available in Help->|About dialog)
- ✓ Amount of disk space on the drive specified to place the CD-ROM image
- ✓ The job log of the iSeries server job (the name of the job will be BSCCLIENT). To ensure a job log is produced, change the BSCTCP job description in the BSCCDROM10 library to log messages to the job log. To ensure a job log is produced issue the following command:

CHGJOBD JOBD(BSCCDROM10/BSCTCP) LOG(4 00 *SECLVL)

✓ The settings specified in the software used to burn the CD-ROM.