



## Using New Features in CDR DICOM 3.5 Software

Schick Technologies, Inc.  
30-00 47<sup>th</sup> Avenue  
Long Island City, NY 11101

(718) 937-5765  
(718) 937-5962 (fax)



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# 1. New Features in CDR DICOM 3.5 Software

## 1.1. Introduction

Version 3.5 software provides several new features and improvements designed to maximize your productivity when using CDR. Changes that are most likely to be of interest to you are listed below and described in detail in this document.

- Image Compression
- PerfectShot™
- Direct Database Access
- Universal Integrator™

## 1.2. For More Information

Refer to the Contents page and follow the page references for more detailed information on each of these topics.

For general information on installing CDR software, please refer to the “CDR DICOM Quick Start Guide” or check our website at [www.schicktech.com](http://www.schicktech.com) for the latest versions of our product documentation.

## 2. Image Compression

### 2.1. What Does It Do?

Compressing X-ray images offers several benefits, including increased efficiency in the use of space allocated for storing images, and improved portability and electronic mailability. The following compression formats are supported in this version of CDR DICOM: High Quality, Medium Quality, and Low Quality.

### 2.2. How Do These JPEG Compression Formats Differ?

The compression types in CDR are based on the JPEG and JPEG2000 algorithms adopted by the DICOM 3.0 standard. JPEG2000 is a recent standard that uses wavelet compression, which allows no or minimal reduction in image information.

Comparing the different compression formats, they can be described as follows:

- **High Quality**, which uses JPEG 2000 Lossless, has no loss of data and it is possible to reconstruct the original image without error. This format typically will compress a grayscale image with approximately a 2:1 ratio.
- **Medium Quality**, which uses JPEG 2000 Near Lossless, has some loss of data, but the differences are not discernible visually. This option, which is comparable to LEAD PQ 1 in CDR 2.6, provides a compression ratio up to 5:1 with no perceptible loss of image quality.
- **Low Quality**, which uses the standard JPEG algorithm, has a higher loss of data, and differences may be discernible visually (20:1 compression).

### 2.3. Should I Compress My Images?

Choosing a compression format is a personal choice based on several factors that are unique to your practice. The number of patients you examine, the kind of radiographic images you take, the reports you prepare, and the media you use to store images, all contribute to the question of which type of image compression, if any, is suitable for you.

Lossless compression provides the smallest compression ratio and the highest level of image integrity. Users seeking small to moderate improvements in the number of images that can be stored in their archives may wish to consider lossless or near lossless formats. In cases where the storage space is a principal concern, and the slight reduction in image quality is acceptable, lossy compression may be appropriate.



## 2.4. I'm Upgrading from CDR 2.6. What Compression Type should I Choose?

From the following table you can see that the compression formats available in CDR 2.6 have been expanded for CDR DICOM. We have introduced new support for JPEG2000 lossless compression (High Quality) and we have replaced the optimal lossy compression (Lead PQ1) by an optimal, near lossless JPEG2000 format (Medium Quality).

Table 1. Comparing Formats Supported in CDR 2.6 and CDR DICOM

CDR 2.6		CDR DICOM	
Image Type	Compression	Image Type	Compression
Uncompressed	—	Uncompressed	—
—	—	High Quality	2:1
Lead PQ1	5:1	Medium Quality	5:1
JPEG	17:1	Low Quality	20:1

Because of its design, JPEG2000 provides high compression with image quality superior to all existing encoding techniques. JPEG2000 is supported officially by the ISO and DICOM standards, in both its lossless and lossy variations.

If you already maintain an image database of compressed images, refer to the previous table when upgrading from CDR 2.6 to CDR DICOM, or when converting uncompressed DICOM images to a compressed format.

## 2.5. Where Can I Select JPEG Compression?

Compression settings can be selected in several different modules of CDR DICOM: Data Conversion Utility, Data Administration Utility, and Client. Procedures for choosing compression in each module is described in the following sections.

### 2.5.1. Choosing Compression in the Data Conversion Utility

When selected in the Data Conversion Utility, compression is applied during the conversion of images from CDR's previous proprietary file format (found in CDR version 2.6 or earlier) to DICOM. A complete discussion of image conversion for CDR 2.6 users can be found in our document entitled, "Strategies for Converting CDR Images to DICOM." This document is shipped with the CDR User Guide and can be downloaded from our website as well.

Although you may already have experience with the conversion process, we recommend that you refer to conversion strategies document before starting.

Perform the following steps to choose compression in the Data Conversion Utility.

1. Start Conversion Utility.
2. Set Image Source Location.
3. Set Database Path (under Database Settings from Tools menu)
4. Select uncompressed or compressed image format from the selections available: Uncompressed, High Quality, Medium Quality, or Low Quality.
5. Click **Convert**.
6. Open Data Administration Utility to confirm that the utility applied your selection correctly.

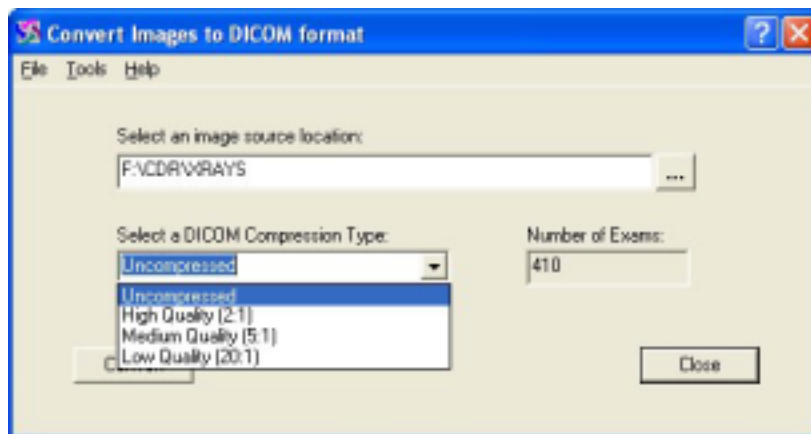


Figure 1. Selecting a Compression Type in the Conversion Utility

### 2.5.2. Choosing Compression in the Data Administration Utility

When selected in the Data Administration Utility, compression is applied to images that you select. This permits you to be more flexible as to which images you want to compress, allowing other radiographs to remain in their original uncompressed format.

Perform the following steps to choose compression in the Data Administration Utility.

1. Start the CDR Data Administration Utility. Browse to one or more patients, studies, or images in the right pane and select (highlight) them.
2. Click **File > Dicom Compress** and select one of the JPEG compression types listed when the dialog box is displayed.
3. Click **Compress**. A progress meter is displayed as the images are compressed.
4. When compression is complete, review the information in the right pane of the Data Administration Utility. Under the Compressed column, you should see the images you selected indicated by the compression format you chose. You may also notice that the adjacent column, File Size (kb), shows the current (compressed) size of each image.



Figure 2. Selecting a Compression Type in the Data Administration Utility

### 2.5.3. Choosing Compression in CDR Client

Compression formats selected in CDR Client apply to the current CDR session; specifically, new images that are to be acquired. The compression format remains the default for current and subsequent CDR sessions until you change it.

If you choose to save your images uncompressed, you can choose to apply compression at a later time using the Data Administration Utility.

1. Start CDR Client.
2. Click **System > Options**.
3. Click on the General tab. Under Default Image Compression, select one of the JPEG compression types listed when the dialog box is displayed.
4. Click **OK**.

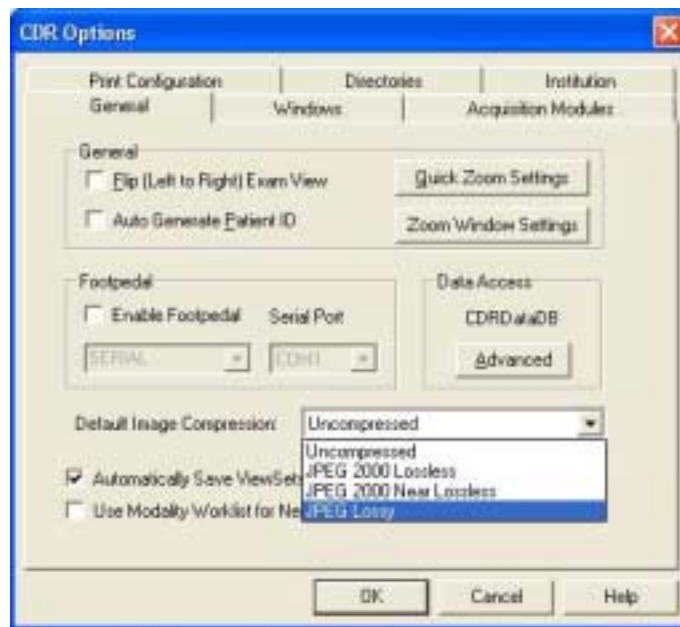


Figure 3. Selecting a Compression Type in CDR Client

## 3. PerfectShot

### 3.1. What Does It Do?

PerfectShot is designed to help you get the best images from your CDR Sensors every time you use them. Even if the image is slightly underexposed or overexposed, PerfectShot will adjust it automatically before displaying it. This benefits both you and your patient as there is need to retake the X-ray or expose your patient to additional radiation.

PerfectShot does more than just help improve the quality of the images you take; it also applies a subtle image filter that can make changes in tooth density much easier to see. Such changes, as you know, can be detected radiographically and are useful in determining the presence of caries.

As with other enhancements available in CDR DICOM software, the choice to enable it remains optional. If you are interested in seeing how this feature will work for you, proceed to the following section for information on turning on this setting.

### 3.2. Where Can I Find It?

PerfectShot must be enabled before an image is acquired. To enable this option, click **System > Options** at the CDR Exam Window. Click on the Acquisition Modules tab, and then double-click on X-ray to display the acquisition options for this module (or click once on X-ray and then on the **Properties** button). If the PerfectShot checkbox is empty, clicking on it will add a checkmark and enable the option. To disable PerfectShot, click on the checkbox again to clear the checkmark.

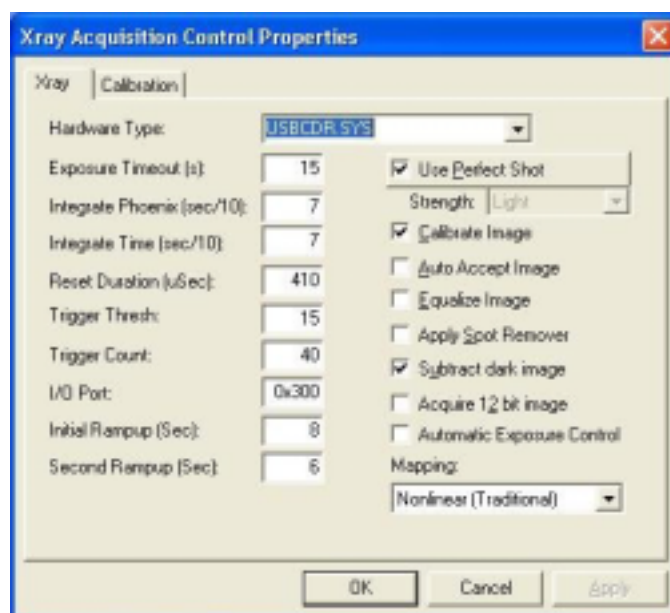


Figure 4. Selecting the PerfectShot Option

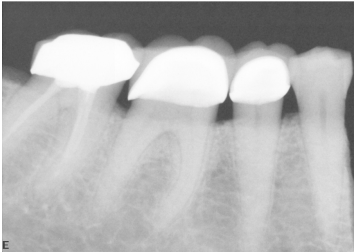
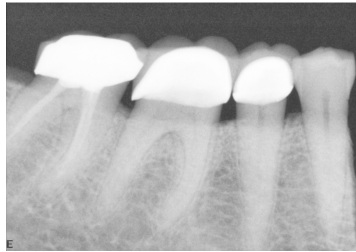

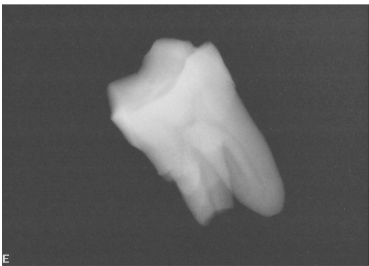
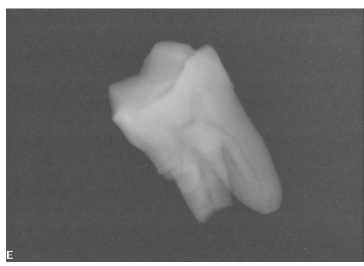
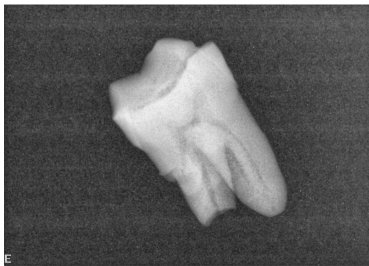
### 3.3. How are Revealer and PerfectShot Different?

Now that PerfectShot has been added to CDR DICOM's toolbox of image enhancements, it is important to mention how it compares to a similar feature: Revealer. First, although they both enhance radiographic images, PerfectShot is enabled before taking an X-ray and cannot be undone; Revealer is applied after the image is exposed. Second, the process used by each tool to enhance the image is significantly different.

Using Revealer, each pixel is processed equally, allowing more visual information to be captured and displayed. For the same reason, however, there is additional noise in the image as even small differences between pixels are enhanced.

PerfectShot provides a more subtle result by automatically adjusting image contrast. It enhances an image in a "one-shot" approach, creating opportunities for caries detection that would otherwise require the use of several different enhancement tools.

Table 2. Comparing Exposures and Enhancements

Normal Exposure	Normal Exposure (with PerfectShot)	Normal Exposure (with Medium Revealer)
		
		

## 4. Direct Database Access

### 4.1. Introduction

In CDR DICOM version 3.5, direct database access is installed by default for multi-user customers. This option will automatically import the data from your existing Access database and install the Microsoft Data Engine (MSDE). For more information about MSDE, refer to Microsoft's website, [www.microsoft.com](http://www.microsoft.com), type "MSDE" in the Search box, and follow the Product Information links.

Users choosing the single-user (standalone) version of CDR DICOM version of 3.5 are not affected by this change.

Although it is no longer the default installation, the DICOM server is still available as an alternative to direct database access.

### 4.2. Benefits of Direct Database Access

There are several benefits to direct database access, but we feel that one in particular will be important to you. With direct database access, you can use the Data Administration Utility to access and edit patient information. Fields such as Patient First and Last Name, ID Number, and Birthdate are available for editing. This capability, which was available only on servers in the multi-user version of CDR DICOM 3.0, is also available on clients as well. (This capability was always available in the single-user version.)

### 4.3. Advantages of MSDE

MSDE is built on client / server architecture, meaning it was developed with a networking environment in mind. Unlike Jet-type database engines, like Access, which are file-based servers, MSDE is a better performer in small workgroup environments because it processes the queries itself, without having to pull data across networks from other clients. Running as a service, MSDE serves as the source for patient and image data, assuming a processing and performance burden that would otherwise be placed on the clients.

### 4.4. Limitations of MSDE

MSDE installs Microsoft SQL Server, which is a license-free but limited version of Microsoft's SQL Server 7 product. There are several restrictions associated with the MSDE-installed version; particularly, that database tables (meaning the data inside the tables, **not the images**) are limited to 2GB.

## 4.5. Backing Up Data and Images

### 4.5.1. Data Backups

One of the ways in which database programs like Access and SQL Server differ is their requirements for effective data backups. Archiving data for an Access database is simply backing up a single file. For SQL Server databases, it is necessary to back up the data files and the transaction logs. SQL Server's capacity to log transactions is one of the important ways it differs from an Access database, and also the reason these files should be included in any file storage and recovery strategy.

Every change made to the SQL Server database is written to the transaction log. This accounts for the resilience of these databases, particularly when problems occur. For example, if an update to the database fails, the changes can be retrieved from the transaction log and either applied again or removed.

The CDR DICOM setup program sets the location of the program files, data files, and transaction logs for SQL Server. A typical location for these files would be:

```
C:\Program Files\Microsoft SQL Server\MSSQL$CDRDICOM\Data
```

Inside the Data folder would be the master data files (\*.mdf) and the transaction logs (\*.ldf), including those for the CDR DICOM database:

```
CDRDATA.MDF
```

```
CDRDATA_LOG.LDF
```

SQL Server provides several strategies for backing up data. Some strategies are easier to implement; other strategies provide faster recovery from failures. Choosing the strategy that provides the best recovery solution for your practice is an important decision that should be provided by a networking professional.

**IMPORTANT!** Remember to stop the SQL Server service before backing up files or use SQL Server's built-in backup procedures.

### 4.5.2. Image Backups

The images that you acquire with CDR DICOM are stored either locally or on a server, inside a folder you selected when the software was installed. A path such as "C:\Images" is typical for single-user installations, for example, but any valid path can be used. Regardless of where your particular images are stored, following a reliable archiving strategy for backing them up is strongly recommended.

By backing up your "Images" folder, you also back up the CDRData.mdb file located in the same location. CDRData.mdb is the database file containing patient, study, series, and other information about your images. It describes the structure of your CDR image database, so in the event that the file becomes corrupted, restoring a recent back-up may help resolve the problem.



## 5. Universal Integrator

### 5.1. What Does It Do?

Universal Integrator is a new software tool in CDR DICOM that understands how to bridge patients from a practice management program like PracticeWorks®, Dentrrix®, SoftDent® and many others to CDR DICOM. With Universal Integrator, the cumbersome and time-consuming practice of manually starting one application, finding a specific patient, and then opening that same patient in a second application, is automated by a single click of the mouse.


### 5.2. How Do I Install It?

When you insert the CDR DICOM 3.5 disk into your CD drive, a navigation program (CD browser) starts, consisting of a few informative windows. One of these windows introduces Universal Integrator and points to additional information about this new feature. If you wish to install this program, click on the “Install Universal Integrator” button. The Universal Integrator setup program will start automatically, ask you to identify the practice management software you use, and configure the tool appropriately.

Installing Universal Integrator in a multi-user environment requires a few additional steps. You will need just one Universal Integrator registration number, which is used when you install the product on your server.

1. Install Universal Integrator on a single workstation in the network (typically the server) and share the folder where it was installed. To do this in Windows XP (the steps in other operating systems would differ), right-click the Universal Integrator folder and click on Sharing and Security. If prompted, click “Just enable file sharing” and then click **OK**. At the Properties dialog box, check the “Share this folder on the network” box and enter a Share name.
2. Access the shared folder and run the setup installation (UniversalIntegrator.exe) from that location. To do this, click **Start > My Computer > My Network Places**. Locate the shared folder, open it, and start the Universal Integrator setup program.
3. When you are prompted with the message, “Do you want Universal Integrator started automatically when Windows is started,” click **Yes**. Repeat steps 2 –3 for each client workstation.

### 5.3. How Do I Use It?

Universal Integrator application is started by clicking on the  icon in the system tray with your left mouse button. Universal Integrator searches for any patients that you may have open in your practice management program and then starts CDR DICOM (if not currently active) and supplies it with that same information.

## 5.4. Additional Note for CDR DICOM Users

Some users of Universal Integrator may need additional information regarding the way this tool interacts with a practice management program. If you have installed CDR DICOM for the first time, meaning you did not have an existing CDRData Access or SQL database previously, this information does not apply to you.

If you have CDR DICOM installed already and would like to use Universal Integrator with your practice management program, you should read the following information: it may be helpful when you are working with this new utility.

When creating a new exam in CDR, Universal Integrator will retrieve information from the patient chart currently open and active in your practice management program. There are three separate items it will try to obtain (the same fields required by CDR DICOM): first name, last name, and patient ID number. The first time you use Universal Integrator for a patient with previous exams, you will need to edit the patient ID number in the Data Administration utility to match the ID that Universal Integrator has assigned. This enables Universal Integrator to use the correct ID information in the current, and any subsequent, exam for this patient.

If you do not edit the ID information, CDR will save any images with the same patient name (but different ID) in your database. This means that you will have an additional record for this patient. When you open the patient list you will see the same patient listed twice, each with a different ID number. If this happens, we recommend that you merge these records, using the Data Administration Utility.