

# Serializing CD Copies with ImageMaker

ImageMaker lets you serialize each CD copy you make with a unique identifying number or code, giving you or your customer a way to track and restrict the usage of a software product or service distributed on disc. This section explains how to use the serialization facility.

First of all, how does serialization work? What do you need to do to set it up?

A serial number is an identifier—either a number or some other string of characters—which is placed into the data on a CD to allow that disc to be validated or associated with a certain authorized user or buyer. The serial number can be any combination of characters (that is, each character in the serial number can have any of the 256 possible values of a byte of computer data); typically, though, it will simply be a number.

Since the serial number is embedded into the data on the CD, the end user (whoever creates the master disc to be produced) must plan ahead of time where that serial number will go and how it will be formatted and generated. Once these decisions have been made, there are three parts of the serialization process:

- 1** Before the ImageMaker master image for the serialized discs is created, the user must embed a **search string** in the data which will appear on the final production CDs. The search string is an arbitrary string of characters which is used in the next step below to determine where the actual serial numbers will be placed. It can go anywhere in the CD. The user simply places the search string in one of the files used to create the final CD which will be mastered.
- 2** After the search string is placed in the master data and an ImageMaker master image made from the master disc, that master image needs to be processed for serial number insertion before the CD production job is run. The utility program **SNMASTER** is used for this task. This utility requests information from the operator, including the search string and formatting information for the serial numbers. It then searches the master image for the search string, locates the insertion point for the serial number, and writes this information (including instructions on how to format the serial number) back into the master image dataset.
- 3** The master image is now ready to be used to make serialized copies. When it comes time to run the CD-R production job, the operator sets up the job in the usual way. Before running the job, there is an item which enables serialization, along with an additional dialog of serialization choices which the operator fills out before starting the job. When the job is started, production proceeds normally, with serialization done automatically for each disc in the job. (If the discs are verified after being written, serial numbers are skipped over to avoid false miscompare errors.)

## Limitations of Serialization

Only single-track ISO 9660 CDs (with 2,048-byte sectors) can be serialized.

## Standard and Customized Serialization Methods

ImageMaker MJ comes with a standard serialization method as part of the software. This method writes a numeric sequential serial number (e.g., 1001, 1002, 1003, ...) to each CD in a production job, starting from a given number supplied by the operator.

ImageMaker allows you to substitute your own serialization method by creating a customized software module (a DLL) and using it instead of the standard one which comes with the

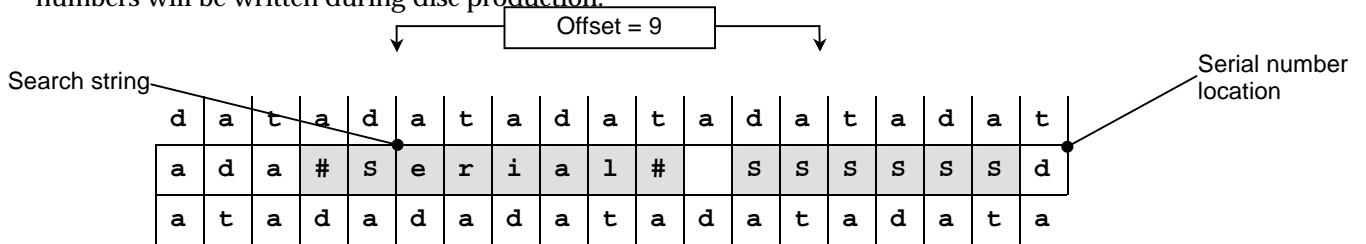
production system. This allows serial numbers to be created practically any way you choose, including reading pre-assigned serial numbers from a file and placing multiple serial numbers on each CD. (The **SNMASTER** utility supports multiple serial numbers per disc.)

For more information and technical literature about custom serialization, contact your sales representative or Microtech.

## Setting Up the Master for Serialization

The first step in serialization is deciding how the serial numbers will be embedded in the data on disc. This needs to be done both for the sake of the CD producer (so they know where to look for serial numbers on their customers' discs), and for the sake of ImageMaker, so it knows where to put the serial numbers on disc and how to format them.

Serial numbers can go anywhere on a CD; their location on the disc is a decision to be made by the programmers putting together the CD product. The link between the creator of the CD and ImageMaker is a serial number **search string**. The diagram below shows a small piece of the data on a CD where each square represents one byte (character) of data. In the middle of this data are two shaded areas. The first area is the search string; the second is the place where the actual serial numbers will be written during disc production.




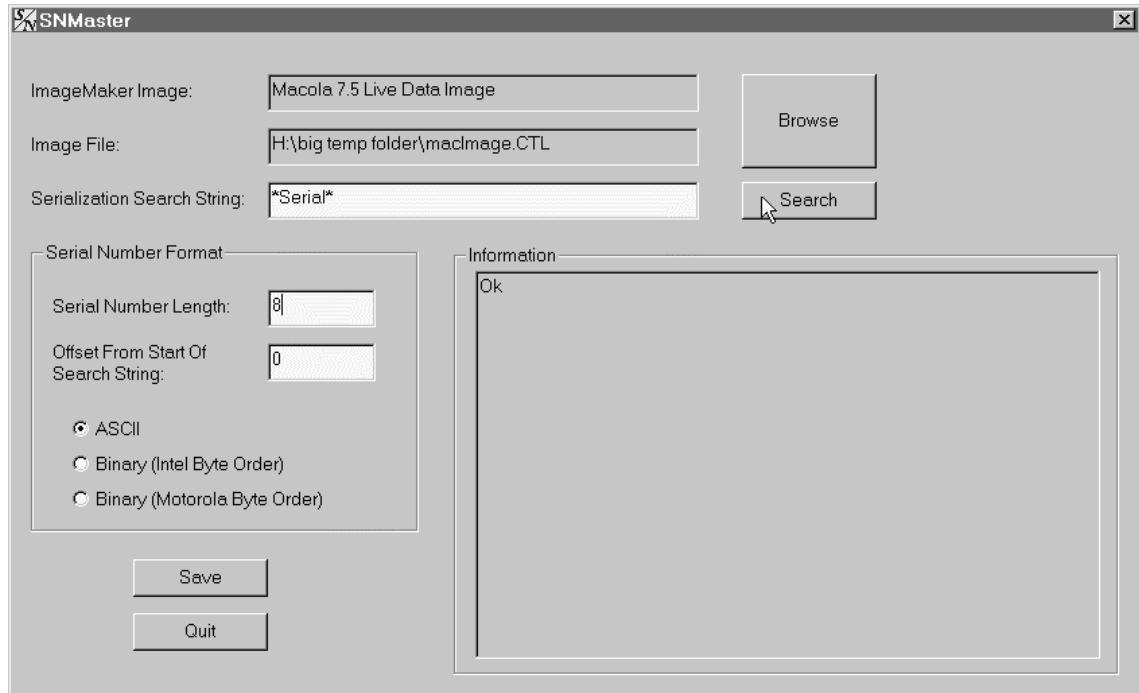
The search string can be any text (printable) characters. (It is **#Serial#** in this example.) You decide what this text will be. Since this string will later be used by an ImageMaker utility (**SNMASTER**) to locate the place in the image where the actual serial number is to be inserted, the designer of the CD must give this search string to whoever will process the master image before serialization. (You must make sure that this string will be unique across the entire CD, since **SNMASTER** searches the entire image.)

Likewise, the serial number itself can vary in length (up to a certain limit). The area where the serial numbers are to be inserted can contain any data in the original master CD, since these bytes will be overwritten by the actual serial numbers when the production job is run. Also notice in the example above that the serial number is *offset* from the search string by 9 characters. The serial number can be any (small) distance away from the beginning of the search string; if the offset is set to zero, it will overwrite all or part of the search string. The offset distance is selected when you run the **SNMASTER** utility (see below).

To summarize this step, the creator of the CD to be produced chooses the location of the serial number in the CD dataset by embedding a search string somewhere in the data (in one of the files which makes up the CD product), and leaves room for the actual serial numbers to be written to the CD.

## Using SNMASTER to Prepare Master Images for Serialization

After the master CD has been made, and an ImageMaker master image has been made from this disc, the SNMaster utility prepares the image for production with serial numbers. This utility is in the ImageMaker MJ folder. To run it, click the Windows NT  button at the lower left corner. In the list of programs which appears, move to the folder labeled **ImageMaker**. In this folder, select and click once on the item **SNMaster**. The utility's main dialog will appear as shown here below.



Here are the steps which need to be done to prepare an image for serialization:

- 1** Select the image, using the **Browse** button to open the file selection dialog. This is a standard Windows file selector. Only valid ImageMaker image files (of both the older **.CTL** and the newer **.MMD** variety) are shown in the browser. When you've located the file, click **OK** to open it.
- 2** Enter the serial number search string in the field provided, then click the **Search** button to find the string in the image. When the string is found, a message indicating this will appear in the **Information** box.
- 3** Select the serial number formatting options in the **Serial Number Format** group of controls:

**Serial Number Length:**

This selects the length, in bytes, of the serial number to be embedded. The usable range of lengths depends on the serial number format:

**For serial numbers in ASCII format**, the longest possible serial number is 10 digits (the highest possible value for a serial number being 4,294,967,295. If the serial number length is too small for the serial number value, the number will be truncated (excess digits cut off) from the left side. If the serial number length is longer than the value of the serial number, the number will be padded with spaces on the left side. ASCII serial numbers have any leading zeros suppressed; for example, a 4-character-long serial number with the value 2 will appear as **bbb2**, where **b** indicates a space.

**For serial numbers in binary format** (either Intel or Motorola format), the serial number can be from 1 to 4 bytes long. The maximum possible value of the serial number depends on the length:

LENGTH	MAXIMUM VALUE
1	255
2	65,535
3	16,777,215
4	4,294,967,295

If the serial number length is too small for the serial number value, the number will be truncated from the MSB (most significant byte) side of the number. If the serial number length is longer than the value of the serial number, the number will be padded with zeros on the MSB side.

**Offset from start of search string:**

Enter the distance, in characters (bytes) from the start of the search string to the place where the serial number is to be written. In the example given on page 3, the serial number location is offset 9 characters from the start of the search string.

To place the serial number directly over the search string (and overwrite all or part of the search string), set the offset to zero.

**Serial Number Format:**

This determines how the serial number will be written to the CD data during disc production:

**ASCII**

The serial number will be written as a string of ASCII numeric digits (0-9). Padding and truncation will occur as described above.

For the two binary format options, the following binary value (shown in hexadecimal) is used as an example to illustrate the byte ordering for each format (each box is one byte):

12	34	56	78
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**Binary (Intel Byte Order):**

The serial number will be written as a binary value. Intel byte ordering places the least-significant bytes first from left to right. The following diagram shows the Intel byte order for each size of serial number, using the sample value above:

SIZE	BYTE ORDERING
1	78
2	78 56
3	78 56 34
4	78 56 34 12

**Binary (Motorola Byte Order):**

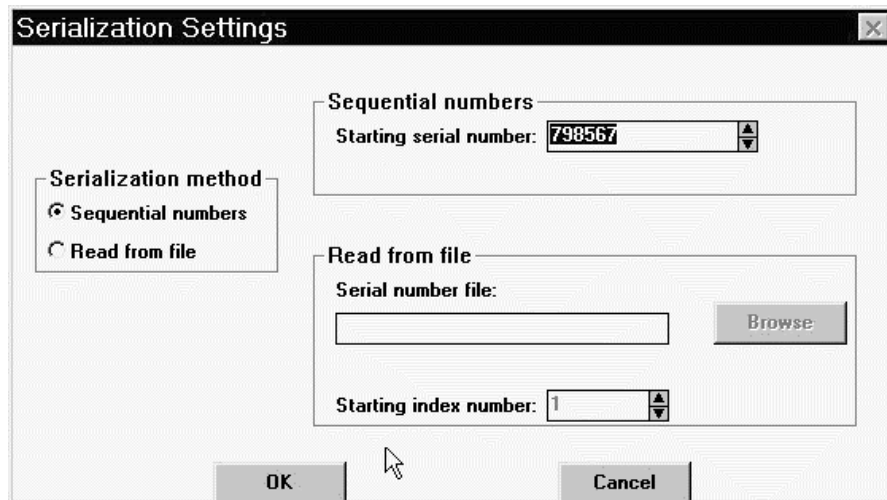
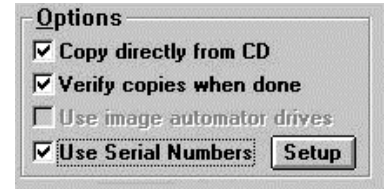
The serial number will be written as a binary value. Motorola byte ordering is simply from MSB (most-significant bit) to LSB (least-significant bit) from left to right. The following diagram shows the Motorola byte order for each size of serial number, using the sample value above:

SIZE	BYTE ORDERING
1	78
2	56 78
3	34 56 78
4	12 34 56 78

**4** After selecting the serial number formatting options, click the **save** button to write the serialization information to the ImageMaker image file. After the file has been updated, click **Quit** to close **SNMASTER**. If you change your mind and don't want to make any changes to the image after all, just click **Quit**.

## Running A Serialized CD-R Production Job

After the image has been prepared with **SNMASTER**, it's ready to use to make serialized CDs. Set up the production job as you normally would. (Instructions for running ImageMaker production jobs start on page **Error! Bookmark not defined.**) Before you click the **Start** button, check the **Use Serial Numbers** checkbox in the **Options** box, as shown to the right here. Then click the **Setup** button next to it to open the serialization settings dialog, shown below.



### **Serialization method:**

For standard serialization as described here, check the **Sequential numbers** item. (The other serialization method uses pre-constructed serial numbers placed in a file, and requires customized software to be used. For more information, you can request a technical document covering custom serialization from Microtech.)

### **Starting serial number:**

Enter the beginning serial number for the batch of discs to be made in this production job. The serial number is incremented by 1 for each disc made.

After setting the options and closing the dialog (click the **OK** button), start the job by clicking the **Start** button. CD-R disc production will proceed normally, with serialization of all discs in the job done automatically.

## Printing Serial Numbers on CDs

When you serialize CDs, you can print each disc's serial number on the disc as part of the print layout. Place the system variable **#serial\_number** in a text item in the layout where you want the serial number printed. (Turn to page **Error! Bookmark not defined.** for more information.) When you run the production job, each disc will be printed with its own serial number.

## Verifying Serialized Copies

You can verify serialized CD copies just as you can any other discs made with ImageMaker. You can either verify copies as they are made (by checking the **Verify copies when done** item in the **Options** box), or you can choose to verify copies in a separate batch operation. If you verify serialized copies as a separate operation, you must check the **Use Serial Numbers** option in the **Options** box before starting the job.

If you verify as a separate operation, you don't need to open the **Serialization Settings** dialog (as described above) as you do when setting up to make serialized copies. Since serial numbers are simply skipped over during verification, all the information needed for this operation is already contained in the ImageMaker image.

