

# Sorting Non-Date Values in Date Fields During Year 2000 Remediation



BY JOHN REDA

**ONE** of the most important concepts in Year 2000 remediation is century windowing, and mainframe sort packages are making full use of this simple yet powerful technique. SyncSort's CENTWIN parameter allows sort users to define exactly which two-digit years should be collated as part of the 20th century and which as part of the 21st century. For example, CENTWIN=1950 creates a century window in which the two-digit years 50 through 99 are sorted as 1950 through 1999, and the two-digit years 00 through 49 are sorted as 2000 through 2049.

Century windowing is a very efficient and cost-effective solution — if the data in a two-digit year field is actually a year. Unfortunately, programmers have sometimes used non-date values such as all X'99' or X'FF' in date fields to signal conditions such as end of file, or they have records where values of all X'00' or X'40' appear in a header field at the beginning of a sorted report.

Two Y2K remediation techniques are available for handling non-date values that appear in date fields. The special date format Y2S can be used to handle common non-date values in character and zoned decimal date fields. A second, more flexible technique utilizes the CHANGE parameter, which is applied to input and output records through the INREC and OUTREC statements. This second technique can be used successfully for remediation in a wide variety of site-specific non-date value situations.

This article describes two recent enhancements to SyncSort MVS which provide remediation techniques for such non-date value situations: a special date format, Y2S, and the use of a CHANGE parameter in INREC and OUTREC statements.

## USING SPECIAL DATE FORMATS FOR Y2K REMEDIATION

Special date formats are an easy and elegant way to deal with common remediation problems. The special date format Y2S is designed to handle specific non-date values in two-byte character or zoned decimal fields which would normally contain year values. When a century window and Y2S sort or merge

fields are specified, SyncSort does not apply the century window to certain values but rather places the records with these values at the beginning or end of the collating sequence according to the following rules:

- ◆ Records containing two-byte year fields with binary zeros (X'00') or a blank (X'40') in the first byte of a Y2S field are placed before records with valid numeric year data if the records are sorted in ascending order or after if the records are sorted in descending order. For example, records with X'0000' will collate before X'F9F6' if ascending order is used and after if descending order is used.

Figure 1: Changing Non-Date Values to Bogus Dates

```
INREC  FIELDS=(1,3,CHANGE=(3,X'000000',X'50000C',
                          X'999999',X'49366C'),
          NOMATCH=(1,3),
          4,77)
```

Figure 2: Restoring Original Non-Date Values After Sorting

```
OUTREC FIELDS=(1,3,CHANGE=(3,X'50000C',X'000000',
                          X'49366C',X'999999'),
          NOMATCH=(1,3),
          4,77)
```

## An Overview of SyncSort's Year 2000 Enhancements

Beginning with Release 3.6 of SyncSort MVS, a number of enhancements have been added to facilitate Y2K remediation.

One enhancement is the century window, which is specified through the CENTWIN parameter, and several special Y2K data formats that are used in conjunction with the century window. These formats are Y2B (Binary Data), Y2C and Y2Z (Character or Zoned Decimal Data), Y2D and Y2P (Packed Decimal Data), Y2S (Character or Zoned Decimal Data with Invalid Data) and PD0 (Packed Decimal Non-Year Data). Two Y2K formats (Y2IP and Y2ID) can be used to expand packed decimal data to two-byte four-digit years while keeping the data in packed decimal format. Y2D and Y2P can be used to expand packed decimal data, but they force a translation of the field containing the year value into displayable character format. Additional enhancements allow the century window and Y2K data formats to be used in sorts invoked by COBOL and programs in other languages.

Two SyncSort extensions are currently available. The first is the ability to use century windowing on INCLUDE/OMIT statements. This allows record selection applications to be remediated without field expansion. Another feature is the extension of the CHANGE parameter to INREC and OUTREC statements, as described in this article.

For more information, visit their web site at [www.syncsort.com](http://www.syncsort.com).

- ◆ Records containing year fields with binary ones (X'FF') in the first byte of a Y2S field are placed after records with valid numeric year data for ascending order or before for descending order. For example, records with X'FFFF' will collate after X'F9F6' if ascending order is used and before if descending order is used.

Use of the Y2S format successfully remediates the majority of non-date value problems for our users.

### REMIEDIATION WITH THE CHANGE PARAMETER

For non-date value situations that cannot be remediated with the Y2S format, Syncsort

has devised a flexible technique that can be applied in a wide variety of situations. This technique involves changing the non-date values in date fields to values that force records containing these values to collate at the beginning or end of a file and then changing these values back to their original values after sorting is completed.

This date-manipulation technique is implemented through the CHANGE parameter, which was originally introduced in SyncSort MVS as a way of modifying values in output files. Syncsort extended this option specifically for Y2K remediation to record level processing on both input and output, that is, to the input and output record

reformatting statements INREC and OUTREC. A practical example is the best way to illustrate this technique.

In our example, a file contains a 3-byte packed decimal "yyddd" field that begins in position 1 and normally holds a Julian two-digit year and three-digit day value such as "98052C" (February 21, 1998). However, two records contain non-date values: one record's "yyddd" field contains "000000" to force it to collate as the first record in the file, and another record's "yyddd" field contains "999999," which forces it to collate as the last record in the file.

The key to the technique is to set a century window (in this case, we will arbitrarily choose 1950 to 2049), and then to choose bogus date values that will force the records to the beginning and end of the file. For example, January 0, 1950 (50000C) will force a record to the beginning of the sorted file before January 1, 1950, the first date in the century window. December 32, 2049 (49366C) will force a record to the end, after December 31, 2049, the last date in the window. With these two bogus dates, it's easy to write the appropriate sort statements for a "yyddd" field to make it collate properly in a single sort pass.

Three statements are needed, and I will discuss each one separately. The first statement sets up the century window:

```
SORT  FIELDS=(1,1,Y2D,A,2,2,PD,A),CENTWIN=1950
```

This statement sorts the first byte in the date field as unsigned packed decimal data in ascending order. Specifically, the first "1" specifies the position, the second "1" sets the length of the "yy" in the "yyddd" field, and "Y2D" tells the sort to apply the century window to this one-byte unsigned packed decimal field. "A" specifies ascending order. The rest of the field, the two-byte "ddd" part of the "yyddd" field, will be collated normally as packed decimal data in ascending order. The CENTWIN parameter sets the beginning of the century window at 1950.

The second statement changes the non-year values to the bogus dates that will collate in the correct place in the file. See Figure 1. In this statement, the value X'000000' will be changed to X'50000C' and the value X'999999' will be changed to X'49366C' on input. NOMATCH tells the sort to keep any values that have not been changed just as they are (literally, substitute the value for itself if it is not one of the two values

designated for change). The rest of the 80-byte record is left intact. Finally, as shown in Figure 2, the third statement reverses the change.

Now let's look at some sample data. The file on input would have the following "yydddss" values:

```
000000
98365C
01001C
99152C
00153C
00366C
98001C
999999
```

After INREC processing and sorting, the values will look like this:

```
50000C
98001C
98365C
99152C
00153C
00366C
01001C
49366C
```

The values at the end of processing (after OUTREC has been applied) are:

```
000000
98001C
98365C
99152C
00153C
00366C
01001C
999999
```

This technique can be applied when you know which non-date values are forcing records to collate at the beginning or end of a file. The alternative is to write an exit program which slows sorting considerably because each record is processed and then passed to the sort separately. Not only is using sort functionality easier but it also improves sort efficiency significantly.

### SUMMARY

An additional complication in remediating sort applications for the Year 2000 comes from the presence of non-year values in date fields. Most of these problems can be solved by using the special Y2K date format Y2S, which collates records with certain values to the beginning or end of a file automatically. For other, less common non-year value problems, you can use the CHANGE parameter on

SyncSort's INREC control statement to create bogus dates that will collate correctly. Then you can use the CHANGE parameter on the OUTREC control statement to restore the fields to their original values after sorting.

The special Y2K data format Y2S and the extension of the CHANGE parameter to the INREC and OUTREC control statements are just a few of the many features that Syncsort has added to SyncSort MVS to help its customers remediate their sort applications for the Year 2000. **ts**



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