

Fun with SAS® Date/Time Formats and Informats

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ABSTRACT

This paper was written as a tutorial for programmers new to SAS who encounter dates and times in a variety of formats. It was also written as a useful reminder to the more experienced SAS programmer on various ways to convert dates and times to SAS date/time values.

INTRODUCTION

This paper gives a general understanding of SAS date/time formats and informats, how to use them, and a variety of tips to use date/time variables.

WHAT ARE SAS DATE/TIME FORMATS?

THE SAS DATE FORMAT

For purposes of determining a SAS Date format SAS considers January 1, 1960 at midnight to be equal to zero. Dates after are positive, dates before are negative. SAS stores the date value as a number and SAS functions convert it. The date format simply changes the visual representation and does nothing to the underlying value.

January 1, 1960 = 0

January 2, 1960 = 1

December 19, 1989 = 10,945

January 1, 1950 = -3,652

THE SAS TIME FORMAT

Same concept as the SAS Date format - for each second the numeric representation of the SAS Time variable increases by one.

Midnight = 0

00:00:01 = 1

01:30:15 = 5,415

THE SAS DATETIME FORMAT

Similar to SAS Date and SAS time except now January 1, 1960 @ midnight = 0 and for each second the SAS Datetime increases by 1.

June 4, 2004 @ 20:10 = 1,370,376,600

TIP 1 – COMBINING SAS DATE AND TIME FORMATS

To combine two variables - a date and time that are in SAS Date and SAS Time format:

You can convert the date to time for determine a SAS Datetime value by multiplying the date by 24 hours, 60 minutes and 60 seconds.

Use the following code:

```
format vardt date9. vartm time8. vardttm datetime16.;
vardt = "20JUL96"d ;
vartm = "23:59:59"t;
vardttm = (vardt * 24 * 60 * 60) + vartm ;
```

This will give you the output: 20JUL96:23:59:59

TIP 2 – CONVERTING CHARACTER DATE/TIMES TO SAS DATETIME

Converting a date and time stored in a character variable, but like a SAS Date and SAS Time. To convert to a SAS Datetime format use the following code:

```
format vardt $20. vartm $10. vardttm datetime16.;
vardt = "20JUL96" ;
vartm = "23:59:59";
vardttm = (vardt * 24 * 60 * 60) + vartm ;

vardttm = input(compress(vardt)||':'||compress(vartm), datetime16.);
```

This will give you the output 20JUL96:23:59:59

TIP 3 – ANOTHER WAY TO COMBINE SAS DATE AND TIME FORMATS

Here's another way to convert a SAS Date and SAS Time to a SAS Datetime. Similar to Tip 1 it will do output the same thing without having to remembering to multiply the SAS Date by 86,400 (or 60 * 60 *24).

```
format vardt date9. vartm time8. vardttm datetime16.;
vardt = "20JUL96"d ;
vartm = "23:59:59"t;

vardttm = input(put(vardt, date7.)||':'||put(vartm, time8.), datetime16.);
```

This will give you the output 20JUL96:23:59:59

TIP 4 – THE POWER OF THE ANYDT INFORMAT

ANYDT is a new informat with SAS version 9 it can convert a character date, time, or datetime value without needing to know what SAS informat to use. It will automatically read in the variable and use DATE, DATETIME, DDMMYY, JULIAN, MMDDYY, MONYY, TIME or YYQ informats to convert the character variable to SAS Date, SAS Time or SAS Datetime.

To convert to a date use ANYDTEw.

To convert to a time use ANYDTMEw.

To convert to a datetime use ANYDTMw.

```
format vardt $20. var tm $10. newdt date9 newtm time5.;  
  
vardt = "20JUL96" ;  
var tm = "23:59:59";  
newdt = input(vardt, anydte.);  
newtm = input(var tm, anydtme.);
```

TIP 5 – CONVERTING FROM A MICROSOFT DATE/TIME TO A SAS DATE/TIME

Unlike SAS which uses January 1, 1960 as their base date Microsoft uses January 1, 1900, and unlike SAS which uses midnight as their base for 0 and then increases by 1 for each second Microsoft uses a fraction. If you ever get the numeric date/time in an XPT file where someone converted a Microsoft file to XPT you can use the following formulas:

```
sasdate = microsoftdate - 21916;  
sastime = microsofttime * 24 * 60 * 60;
```

You can then use any of the above tips to convert to a SAS Datetime value.

TIP 6 – THE ISO8601 DATETIME FORMAT

If you work in the clinical, pharmaceutical and manufacturing world SAS version 9 now has created the CDISC required datetime format ISO8601 which will convert a SAS date, time or datetime variable to ISO8601 format. ISO is an abbreviation for the International Organization for Standardization.

```
format isodate isotime $20. isodatetime $30.  
vardt = "20JUL96"d ;  
var tm = "23:59:59"t;  
vardtm = "20JUL96:23:59:59"dt  
  
isodate = put(vardt, is8601da.);  
isotime = put(var tm, is8601tm.);  
isodatetime = put(vardtm, is8601dt.);
```

Using the above previous tips you can also determine ISO8601 Datetime as follows:

```
isodatetime = put((vardt * 24 * 60 * 60) + var tm, is8601dt.);
```

This will generate the output – 1996-07-20T23:59:59

This isn't very exciting to most SAS users, but for of us in the Pharmaceutical industry this is big stuff.

TIP 7 – ANOTHER VERSION SAS FORMAT

SAS has also come out with another useful format in version 9. As an example you can take the format MMDDYYw. SAS now offers the following:

MMDDYY+ (works for many other date formats)

where + equals

MMDDYYB	(blanks)	09 15 07
MMDDYYC	(colons)	09:15:07
MMDDYYD	(dashes)	09-15-07
MMDDYYN	(nothing)	091507
MMDDYYP	(periods)	09.15.07
MMDDYYs	(slash)	09/15/07

CONCLUSION

The more you play with dates and times in SAS the more tricks you will find to manipulate the data to the form you want.

In addition to many formats and informats there are also many useful functions that can be used to do similar things. SAS is coming out with more and more functions that do similar things to the above tips. For example the new function DHMS will also generate a SAS Datetime from a SAS Date and SAS Time.

```
vardttm = dhms(vardt, 0, 0, vartm);
```

REFERENCES

Professional SAS Programmer's Pocket Reference by Rick Aster

SAS Language by SAS Institute by SAS Institute, Inc.

SAS Functions by Example by Ron Cody

CONTACT INFORMATION

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