VM/ESA Year 2000 Support - Technical Reference

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VM/ESA Development

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Note: IBM products identified as Year 2000 ready may require user intervention, such as the application of Program Temporary Fixes (PTFs) or Corrective Service Deliveries (CSDs) before the Year 2000 occurs, or for PCs, restarting the system after the Year 2000 occurs. See http://wwwyr2k.raleigh.ibm.com/yrpage2.html for more information.

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Introduction

This document contains technical information regarding VM/ESA's Year 2000 readiness and support for 4-digit years.

Year 2000 Ready Releases of VM/ESA

VM/ESA Version 2 Release 2.0 (V2R2.0), which was available in December 1996, is the first Year 2000 ready release of VM/ESA. VM/ESA V2R3.0, which was available in March 1998, and VM/ESA V2R4.0, which was available in July 1999, are also Year 2000 ready.

Along with the VM/ESA operating system, all functional options and features of Year 2000 ready releases of VM/ESA are Year 2000 ready, including:

- TCP/IP
- DFSMS/VM
- Shell and Utilities
- LANRES
- LFS/ESA
- CMS Utilities Feature
- ESA Migration Tool
- LE/370 1.8.0

Some of these may require PTFs to bring them to a Year 2000 ready level. Information regarding PTFs required for Year 2000 readiness may be found in the YR2000VM Preventive Service Planning (PSP) bucket, which is available through IBMLink or by contacting the IBM Support Center.

Licensed Products for VM/ESA also need to be evaluated for Year 2000 readiness. Although a particular release of a product may run on a Year 2000 ready release of VM/ESA, the product itself may not be Year 2000 ready as is; an upgrade to a new release or service level may be necessary. For Year 2000 readiness information about any product, visit the IBM Year 2000 Product Readiness Database at http://wwwyr2k.raleigh.ibm.com. PTF information for Licensed Products may be found in the YR2000VM PSP bucket described above.

In accordance with the IBM Year 2000 Maintenance/Service Statement (http://wwwyr2k.raleigh.ibm.com/service.html), software service for all Year 2000 ready releases of VM/ESA will remain available until at least January 31, 2001.

Releases of VM prior to VM/ESA V2R2.0 are not Year 2000 ready and have either been withdrawn from service or will be withdrawn from service before the end of 1999. See http://www.ibm.com/vm/techinfo/lpmigr/vmleos.html for details on VM end of service dates.

Why Do I Need VM/ESA's Year 2000 Release?

How Year 2000 Will Affect Non-Ready VM/ESA Systems

The following are examples of how VM systems which are not Year 2000-ready (releases prior to VM/ESA V2R2.0) will be affected by the Year 2000. This does not represent a comprehensive list of the items that were changed to make VM/ESA Year 2000 ready; in addition to fixing external symptoms, many internal changes were made to enable VM/ESA to function correctly with both 4-digit years and dates beyond 1999.

Control Program (CP)

There is no known loss of CP function caused by not migrating to a Year 2000-ready release of VM/ESA. However, application programs and other products which rely upon CP date functions might be affected if they require 4-digit-year output to execute correctly in the year 2000.

Conversational Monitor System (CMS)

- In the CMS file system, and shared file system, all dates are interpreted as **19xx**.
- The BEFORE and AFTER options of the FILELIST and LISTFILE commands do not work correctly for files that have a date of 2000 or beyond. For example, if you issue: `FILELIST * * A (BEFORE 01/01/99` then files with a year 2000 date would also be listed.
- FILELIST sorts by date by default and lists files from newest to oldest. Files with a year of 2000 or beyond are placed at the bottom of the list due to the sort acting on the 2-digit year.
- Application programs and other products which rely upon the CMS implementation of the OS TIME macro will not be compatible with MVS output beginning in the year 2000.
- After December 31, 1999, CMS OS Simulation will treat tapes with expiration dates of 99365 and 99366 as having expired. It is a common practice to specify these as ″never expire″ dates.

Group Control System (GCS)

There will be some loss of GCS function caused by not migrating to a Year 2000-ready release of VM/ESA.

- The GCS service aid command `QUERY MODDATE LAST` will not correctly provide a list of all GCS modules compiled on the most recent compilation date if the date of compilation is after 2000 and older GCS modules compiled before 2000 are also loaded.
- Application programs and other products which rely upon the GCS implementation of the OS TIME macro will not be compatible with MVS output beginning in the year 2000.

Enhancements to Make VM/ESA Year 2000 ready

In order for your VM/ESA system to be considered Year 2000 ready, all components of VM/ESA must be at Year 2000 ready levels. Enhancements to VM/ESA to make it Year 2000 ready include:

- Changes to the operating system (both CP and CMS) to correctly process 4-digit years and dates beyond 1999.
- 4-digit year input/output support for CP and CMS Application Programming Interfaces (APIs).

- Selected CP and CMS commands which accept and display dates now accept and display date formats which include 4-digit years.
- Capability to define system-wide and user default date formats. This provides flexibility for installations and/or users for all VM/ESA commands which support multiple date formats.
- Enhancements to support for changing the system time of day (TOD) clock. This makes it easier to change the date of a VM/ESA system at IPL time.

Changing the Date/Time of Your VM/ESA System

The date of your VM/ESA system may be changed by simply responding to the prompt ″Change TOD clock (Yes|No)″ at IPL time. The following example shows how to change the date/time on a Year 2000 ready VM/ESA V2R3.0 or later system:

```
NOW 12:30:37 EST WEDNESDAY 1999-01-06
Change TOD clock (Yes|No)
YES

Set date MM/DD/YY or MM/DD/YYYY or YYYY-MM-DD (valid years are 1942 through 2041)
01/06/2000

Set time HH:MM:SS
12:34:00
```

To check the date/time setting, issue the QUERY TIME command after the system IPLs:

```
q time full

TIME IS 12:36:40 EST THURSDAY 01/06/2000
CONNECT= 00:02:33 VIRTCPU= 000:00.94 TOTCPU= 000:01.27
```

VM/ESA V2R2.0 only accepts dates with 2-digit years in response to the ″Set date MM/DD/YY″ prompt. The example below illustrates how to set the year to 2000 on a Year 2000 ready VM/ESA V2R2.0 system:

```
NOW 12:52:48 EST WEDNESDAY 01/06/99
Change TOD clock (Yes|No)
YES

Set date MM/DD/YY
01/06/00

Set time HH:MM:SS
12:58:00
```

Again, QUERY TIME can be used to verify that the year has been set to 2000:

```
q time full

TIME IS 13:00:17 EST THURSDAY 01/06/2000
CONNECT= 00:02:14 VIRTCPU= 000:00.91 TOTCPU= 000:01.22
```

VM/ESA releases prior to V2R2.0 are not Year 2000 ready, and will not be supported beyond 1999. However, some releases may be IPLed for test purposes using the same procedure as the V2R2.0 example above. The fact that a non-ready release of VM IPLs with a system date in 2000 or later does not imply that it is Year 2000 ready.

Which Time Zone Do I Use When Changing the System Date/Time?

As shown in the examples above, the system date/time is specified in the currently defined (local) time zone. The time zone is displayed with the current time (in this case EST) prior to the first prompt, and is defined in the system configuration file as an offset from Coordinated Universal Time (UTC).

```
/*********************************************************************/
/*                        Timezone Definitions                       */
/*********************************************************************/

  Timezone_Definition EDT West 4.00.00
  Timezone_Definition EST West 5.00.00

/*-----------------------*
 * Time Zone Changes     *
 *-----------------------*/
  Timezone_Boundary    1998-04-05 02:00:00  to EDT
  Timezone_Boundary    1998-10-25 02:00:00  to EST
  Timezone_Boundary    1999-04-04 02:00:00  to EDT
  Timezone_Boundary    1999-10-31 02:00:00  to EST
```

The Timezone_Definition statements define EST as 5 hours west of UTC. The Timezone_Boundary statements tell VM/ESA what time zone to select at IPL time based on the current system date and time (if a date/time change crosses a defined time zone boundary, the time zone will change to match the boundary definition.)

Note: Timezone_Boundary statements are only used during IPL and do not affect the time zone for a running VM/ESA system. The time zone on a running system does not automatically change when a defined Timezone_Boundary is encountered. The CP SET TIMEZONE command may be used to change the time zone of a running system.

Which Clock is Changed When I Change the VM/ESA System Date/Time?

When you change the date/time of your VM/ESA system, the actual clock setting that is changed depends on the environment where your VM/ESA system is running:

- Native

  When running VM/ESA native on an S/390 processor, the processor's time of day (TOD) clock is changed. The processor's TOD clock value is adjusted from the local timezone to Coordinated Universal Time (UTC), which is offset zero.

- Running VM/ESA as a guest under VM

  When running VM/ESA as a guest under VM, the date/time setting for the virtual machine where the guest is running is changed by computing an offset from the processor's TOD clock which is unique to the virtual machine. This offset is added to the processor's TOD clock for all date/time functions issued by the VM/ESA guest. It is unique to the virtual machine and guest and appears to the guest as the "real" clock value.

- LPAR

  When running VM/ESA in an LPAR, the date/time setting for the partition where the VM/ESA system is running is changed. This is computed as an offset from the processor's TOD clock. The offset is added to the processor's TOD clock for all date/time functions. It is unique to the partition and appears to the VM/ESA system as the "real" clock value.

Year 2000 Testing with VM/ESA Guest Systems

Running Guests With Different Date/Time Settings

VM/ESA's guest capability can provide a Year 2000 test environment for any System/390 operating system. Guest operating systems may be run with a different system date/time than the host VM/ESA system. This enables testing of OS/390, MVS, TPF, VSE, and VM systems in various date environments. Multiple guest operating systems with different system dates may be run under the same host image without affecting each other or the host VM/ESA system.

The real system clock is never changed by a guest operating system. Clock requests by a guest operating system are intercepted by the virtual machine that the guest is running in, and are limited to that virtual machine. When a SET CLOCK (SCK) instruction is issued in a virtual machine, an offset from the real system clock is computed and stored in field VMDEPOCH in the descriptor control block (VMDBK) for that virtual machine. Similarly, when a STORE CLOCK (STCK) instruction is issued in a virtual machine, the time that is stored is computed by adding the offset in VMDEPOCH to the real system clock value.

To authorize a virtual machine where a guest operating system will be running to change its clock setting, include an OPTION TODENABLE statement in its directory entry. Then change the system date and time for the guest operating system. For more information about changing the system date for various System/390 operating systems, see ″Changing the System Date″ at http://www.software.ibm.com/year2000/changesysdate.html

The CP SET VTOD command, introduced in VM/ESA V2R3.0, may be used to change the TOD clock in a virtual machine. Changes made by SET VTOD are intended for guest operating systems only. SET VTOD does not allow a CMS user to run their virtual machine with a TOD setting that is different than the VM system TOD setting.

Using VM/ESA for Year 2000 Parallel Sysplex Testing

Beginning with VM/ESA V2R3.0, VM/ESA supports guest coupling simulation on the IBM 9672 Parallel Enterprise Servers Generation 3 and later and on the IBM Multiprise 2000 Servers (at the appropriate engineering change levels). VM/ESA Guest Coupling Simulation provides support for the simulation of one or more complete parallel sysplexes within a single VM/ESA system image. All guest operating systems coupled within a simulated sysplex can only be coupled (through simulated coupling links) to coupling facilities also running as guests of the same VM/ESA system.

VM/ESA's guest coupling simulation support may be used for Year 2000 testing of parallel sysplex environments. Multiple sysplexes with different dates/times may be simulated under the same VM host system. For more information on how to set up and use this facility, see ″VM/ESA Running Guest Operating Systems″ (SC24-5755).

Do I Have a Year 2000 Ready Level of VM/ESA?

Beginning with VM/ESA V2R2.0, CP, CMS, and GCS each include programming interfaces to indicate whether they are Year 2000 ready.

Since all components of VM/ESA must be at Year 2000 ready levels in order for a VM/ESA system to be considered Year 2000 ready, CMS and GCS only indicate that they are Year 2000 ready if they are running on a level of CP that is also Year 2000 ready.

CP

Bit 13 (X′0004000000000000′) in the bitmap provided by Diagnose x′00′ indicates whether CP is Year 2000 ready. This bit is turned on in all Year 2000 ready levels of CP.

Table 1. Year 2000 Readiness Bitmaps

Release	Year 2000 Ready?	Bitmap
V2R1.0	No	x′7FF8′
V2R2.0	Yes	x′7FFE′
V2R3.0	Yes	x′7FFF′
V2R4.0	Yes	x′7FFF8′

CMS

Programming interfaces in the table below may be used to determine whether CMS is Year 2000 ready:

Table 2. CMS Year 2000 Readiness Indicators

Programming Interface	Flag Name	Year 2000 Readiness Settings
DMSERP CSL Routine	YEAR2000_SUPPORT information name in General System Set	• ′1′ if ready (must be on CP which is also ready) • ′0′ if not ready
REXX CMSFLAG	YEAR2000 flag	• ′1′ if ready (must be on CP which is also ready) • ′0′ if not ready

GCS

Programming interfaces in the table below may be used to determine whether GCS is Year 2000 ready:

Table 3. GCS Year 2000 Readiness Indicators		
Programming Interface	**Flag Name**	**Year 2000 Readiness Settings**
FLS macro	FLS2000 bit in FLSFLG	• ′1′ if ready (must be on CP which is also ready) • ′0′ if not ready

Date Formats for CP and CMS Commands

New date formats with 4-digit years were introduced in VM/ESA V2R2.0. Date format operands for CP and CMS commands which provide date output were also introduced. One of these operands, SHOrtdate, represents the date formats that were displayed by earlier releases of VM/ESA.

The following are the date formats and date format operands:

Table 4. Date Format Definitions and Operands

Name (Abbreviation in CAPS)	Format
SHOrtdate	mm/dd/yy, mm/dd, or yy/mm/dd (same as earlier releases of VM/ESA)
FULldate	mm/dd/yyyy or yyyy/mm/dd
ISOdate	yyyy-mm-dd

Setting Default Date Formats

Default date formats may be set on a system-wide and user (virtual machine) basis for CP and CMS commands which provide date output. There are a variety of ways to set default date formats:

- The SYSTEM_DATEFORMAT system configuration file statement may be used to set the system-wide default date format when VM/ESA is IPLed.
- The SET DATEFORMAT and QUERY DATEFORMAT commands may be used to set the system default date format (Class B required) or a user's default date format (Class G), and to query them (Class G).
- The DATEFORMAT directory statement allows a user's default date format to be specified in the directory.

In addition to the date format operands, the following operands can be used to set default date formats:

Table 5. Default Date Format Operands

Name (Abbreviation in CAPS)	Used For	Result
SYSdefault	Setting user's default date format	User's default date format is set to system-wide default date format
VMDate	CMS DEFAULTS setting for • FILELIST • RDRLIST • NETDATA SEND • NETDATA RECEIVE	Set to user's (Virtual Machine's) default date format

SYSTEM_DATEFormat Statement

```
>>--SYSTEM_DATEFormat--.-SHOrtdate-.----------------------------------><
                       |-FULldate--|
                       '-ISOdate---'
```

Purpose

Use the SYSTEM_DATEFORMAT statement to set the system-wide default date format for commands that provide multiple date formats.

How to Specify

Include as many statements as needed; they are optional. You can place SYSTEM_DATEFORMAT statements anywhere in the system configuration file. If you specify more than one SYSTEM_DATEFORMAT statement, the last statement overrides any previous specifications.

Operands

SHOrtdate
specifies that dates in command responses be displayed in mm/dd/yy, mm/dd, or yy/mm/dd format, where mm is the month, dd is the day of the month, and yy is the 2-digit year.

FULldate
specifies that dates in command responses be displayed in mm/dd/yyyy or yyyy/mm/dd format, where mm is the month, dd is the day of the month, and yyyy is the 4-digit year.

ISOdate
specified that dates in command responses be displayed in yyyy-mm-dd format, where yyyy is the 4-digit year, mm is the month, and dd is the day of the month.

Usage Notes

1. If the SYSTEM_DATEFORMAT statement is not in the system configuration file, then the system-wide default date format is SHORTDATE.
2. The format of the dates, such as mm/dd/yy, mm/dd, and yy/mm/dd, are dependent upon the command or routine that displays or generates the date.

Examples

1. To define a default date format of mm/dd/yy, mm/dd, or yy/mm/dd, use the following SYSTEM_DATEFORMAT statement:

   ```
   SYSTEM_DATEFORMAT SHORTDATE
   ```

2. To define a default date format of mm/dd/yyyy or yyyy/mm/dd, use the following SYSTEM_DATEFORMAT statement:

   ```
   SYSTEM_DATEFORMAT FULLDATE
   ```

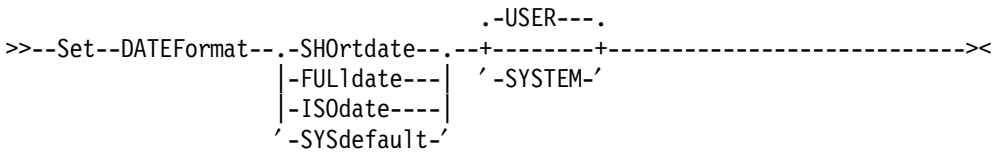
3. To define a default date format of yyyy-mm-dd, use the following SYSTEM_DATEFORMAT statement:

   ```
   SYSTEM_DATEFORMAT ISODATE
   ```

Migration Aids

Previous releases of VM did not let you set a default date format. Therefore, there are no macroinstructions in your HCPSYS or HCPRIO files that you need to migrate to a system configuration file.

SET DATEFormat Command



Authority

Privilege Class: B,G

Purpose

Use SET DATEFORMAT to set the default date format for commands which provide multiple date formats. Default date formats may be set for individual users or the entire system.

Operands

SHOrtdate
specifies that dates will be displayed in *mm/dd/yy*, *mm/dd*, or *yy/mm/dd* format, where *mm* is the month, *dd* is the day of the month, and *yy* is the 2-digit year.

FULldate
specifies that dates will be displayed in *mm/dd/yyyy* or *yyyy/mm/dd* format, where *mm* is the month, *dd* is the day of the month, and *yyyy* is the 4-digit year.

ISOdate
specifies that dates will be displayed in *yyyy-mm-dd format*, where *yyyy* is the 4-digit year, *mm* is the month, and *dd* is the day of the month.

SYSdefault
specifies that the default date format for this user will be set to the system-wide default.

USER
specifies that the default date format is being set for the user.

SYSTEM
specifies that the default date format is being set for the entire system.

Usage Notes

1. If SET DATEFORMAT is not specified for an individual user and there is no DATEFORMAT statement in the user's directory entry, the default date format for that user is the system-wide default.
2. SYSDEFAULT is not valid with SYSTEM.
3. SYSTEM is valid only for class B.
4. If the default date format for a user is set to (or defaults to) the system-wide default date format, and the system-wide default is changed, the user continues to see the old system-wide default as the user default until the user either logs off and logs back on or issues SET DATEFORMAT SYSDEFAULT to switch to the new system-wide default.

QUERY DATEFormat Command

```
                        .-USER---.
>>--Query--DATEFormat--+--------+-----------------------------------------><
                        '-SYSTEM-'
```

Authority

Privilege Class: G

Purpose

Use QUERY DATEFORMAT to display the current default date format for the system or an individual user.

Operands

USER
tells CP to display the default date format for this user.

SYSTEM
tells CP to display the default date format for the system.

Usage Notes

1. If your user default date format is set to (or defaults to) the system-wide default date format, and the system-wide default is changed, the response to QUERY DATEFORMAT USER will continue to indicate the old system-wide default as your user default until you either log off and log back on or issue the SET DATEFORMAT SYSDEFAULT command to switch to the new system-wide default.

Responses

If you issue `QUERY DATEFORMAT USER`, and your user default date format is set to SHORTDATE, FULLDATE, or ISODATE, you will get one of the following responses:

```
User Dateformat = SHORTDATE

User Dateformat = FULLDATE

User Dateformat = ISODATE

---------------
```

If you issue `QUERY DATEFORMAT USER`, and your user default date format is set to (or defaults to) the system-wide default, you will get one of the following responses:

```
User Dateformat = SHORTDATE (SYSDEFAULT)

User Dateformat = FULLDATE (SYSDEFAULT)

User Dateformat = ISODATE (SYSDEFAULT)

---------------
```

If you issue `QUERY DATEFORMAT SYSTEM`, you will get one of the following responses:

```
System Dateformat = SHORTDATE

System Dateformat = FULLDATE

System Dateformat = ISODATE
```

DATEFormat Directory Statement

Purpose

The DATEFORMAT statement specifies a user's default date format for commands that provide multiple date formats.

How to Specify

One DATEFORMAT statement is allowed in a user or profile entry. A DATEFORMAT statement in a user entry overrides a DATEFORMAT specification in a profile entry.

If you specify the DATEFORMAT statement, it must precede any device statements that you specify in a profile or user entry.

Operands

SHOrtdate
specifies that dates in command responses be displayed in mm/dd/yy, mm/dd, or yy/mm/dd format, where mm is the month, dd is the day of the month, and yy is the 2-digit year.

FULldate
specifies that dates in command responses be displayed in mm/dd/yyyy or yyyy/mm/dd format, where mm is the month, dd is the day of the month, and yyyy is the 4-digit year.

ISOdate
specifies that dates in command responses be displayed in yyyy-mm-dd format, where yyyy is the 4-digit year, mm is the month, and dd is the day of the month.

SYSdefault
specifies that the default date format for this user be set to the system-wide default. The system-wide default date format may be set in the system configuration file with the SYSTEM_DATEFORMAT statement, or with the CP SET DATEFORMAT command.

Usage Notes

1. The format of the dates, such as mm/dd/yy, mm/dd, and yy/mm/dd, are dependent upon the command or routine that displays or generates the date.
2. If you omit the DATEFORMAT statement when you code a user's directory entry, the default format for that user will be the system-wide default (SYSdefault). The user may change their default date format with the CP SET DATEFORMAT command.
3. If the user's default date format is set to SYSDEFAULT, the system-wide default date format that is in effect at logon time will be used until the user logs off or issues the SET DATEFORMAT command. If the system-wide default date format is changed, the user must logoff and log back on or issue the SET DATEFORMAT SYSDEFAULT command to switch to the new system-wide default

Examples

1. To specify the user's default date format as SHORTDATE, use the following DATEFORMAT statement in the user's directory entry:

   ```
   DATEFORMAT SHORTDATE
   ```

2. To specify the user's default date format as FULLDATE, use the following DATEFORMAT statement in the user's directory entry:

```
DATEFORMAT FULLDATE
```

3. To specify the user's default date format as ISODATE, use the following DATEFORMAT statement in the user's directory entry:

   ```
   DATEFORMAT ISODATE
   ```

4. To specify that the user's default date format should be the same as the system-wide default date format, use the following DATEFORMAT statement in the user's directory entry:

   ```
   DATEFORMAT SYSDEFAULT
   ```

DEFAULTS Command

The DEFAULTS SET command may be used to change the default date format for the following commands:

- FILELIST (V2R2.0 and later)
- RDRLIST (V2R2.0 and later)
- NETDATA SEND (V2R3.0 and later)
- NETDATA RECEIVE (V2R3.0 and later)

If VMDate is the CMS DEFAULTS setting for these commands, the user's (virtual machine's) current default date format is used when the command is issued. Otherwise, the CMS DEFAULTS setting overrides the user's default date format setting.

Date Formats for Individual Commands

Date formats may be specified on each CP and CMS command that provides dates as part of its output. When a date format is specified on a command, all default date format settings are overridden.

Compatibility

To maintain compatibility with releases of VM prior to V2R2.0, default date formats (system-wide and user) and the CMS DEFAULTS settings for the listed commands are initialized as indicated below. These settings cause date output from all commands to initially be in the same format as earlier releases of VM.

Table 6. Initial Date Format Settings

Type	**Date Format Default**
System-wide	SHOrtdate
User (Virtual Machine)	SYSdefault
CMS DEFAULTS for • FILELIST • RDRLIST • NETDATA SEND • NETDATA RECEIVE	VMDate

Application Programming Interfaces (APIs)

VM/ESA Application Programming Interfaces which accept date input and/or provide date output have been changed to support 4-digit years.

- CP Diagnose Codes
- CSL Routines
- Macros
- REXX
- CMS Pipelines
- EXEC2

CP Diagnose Codes

CP Diagnose codes have been changed as described below.

Diagnose x'00'

The bit map provided by Diagnose x'00' includes a bit to indicate Year 2000 readiness. This bit is on in all Year 2000 ready releases of VM/ESA.

The following are the bitmaps for the Year 2000 ready releases:

X'7FFE000000000000' for VM/ESA Version 2 Release 2.0

X'7FFF000000000000' for VM/ESA Version 2 Release 3.0

X'7FFF800000000000' for VM/ESA Version 2 Release 4.0

Bit 13 (X'0004000000000000') indicates whether Year 2000 support is present in CP.

Diagnose x'0C'

No changes have been made to Diagnose x'0C'. New Diagnose x'270' extends Diagnose x'0C' output to include dates with 4-digit years.

Diagnose x'14', x'D8'

The SFBLOK buffer returned by certain subcodes of these Diagnose codes includes a 1-byte century indicator at displacement x'8F'. This byte contains a hexadecimal representation of the century portion of the year (x'13'='19', x'14'='20', etc.).

The following subcodes of Diagnose x'14' and Diagnose x'D8' return a 370-format spool file block (SFBLOK) with the date in format *mm/dd/yy*:

- Diagnose x'14'
  - x'0004'
  - x'0008'
  - x'0FFE'
  - x'0FFF'
- Diagnose x'D8'
  - x'0000'

A 1-byte century indicator, at displacement x'8F', has been added to the SFBLOK returned by these subcodes. The byte contains a hexadecimal representation of the century portion of the year (x'13'='19', x'14'='20', etc.).

```
SFBLOK   DSECT ,       VM/SP 370 SPOOL FILE BLOCK
           .
           .
           .
SFBVAFP  EQU   X'10'   File created on VAFP type printer

SFBCENT  DS    1X      Hexadecimal representation of the
                       century portion of the year in SFBDATE
SFBSYSID DS    F       SYSTEM UNIQUE FILE-ID
           .
           .
           .
****     SFBLOK - 370 SPOOL FILE CONTROL
*                                .
*                                .
*                                .
*    +---------------------------+-------------+------+------+
*  88 |           SFBXAB          |   SFBXABL   |:FLG4A|:CENT |
*    +---------------------------+------+------+------+------+
*  90 |          SFBSYSID         |:FLAG5|      SFBOPCPY      |
*    +------+------+-------------+------+------+------+------+
*                                .
*                                .
*                                .
```

Diagnose x'84'

A new operation, DATEFMT, allows a user's default date format to be replaced in that user's CP object directory entry.

Table 7. DATEFMT Operation

DATEFMT	Replaces the user's default date format setting, to be effective at the next user logon. [SHOrtdate|FULldate|ISOdate|SYSdefault] **SHOrtdate|FULldate|ISOdate|SYSdefault** sets the virtual machine's default date format to the specified setting.

The following return codes have been added for the DATEFMT operation:

Decimal	Hex	Meaning
290	X'122'	An option is missing for the DATEFMT operation.
291	X'123'	An invalid option was specified for the DATEFMT operation.
292	X'124'	More than one option was specified for the DATEFMT operation.

Diagnose x′BC′

Fields containing the spool file date in 4-digit year format (*mm/dd/yyyy* and *yyyy-mm-dd*) have been added to the end of the data buffers returned by subcodes x′0000′ and x′0004′. The length of the data buffer which is returned by Diagnose x′BC′ is specified by the user.

The following illustrates the contents of the data buffers, including dates with 4-digit years, for each subcode of Diagnose x′BC′.

Subcode X′ 0000′

Depending on the specified buffer length, the user′s buffer contains as much of the following information as possible:

Character Length (in bytes)	Description
4	Spool file ID (EBCDIC)
8	File originator
1	Class
3	Type: RDR, PRT, PUN, CON
8	Number of records (EBCDIC)
3	Number of copies (EBCDIC)
12	File name
12	File type
8	Date: mm/dd/yy
8	Time
8	Distribution
4	Status -- ‘NONE’
8	FORM -- User forms
8	Destination
4	Flash name
3	Flash count (EBCDIC)
4	FCB -- Forms control buffer
4	CMOD -- Character modification
1	Character modification count (EBCDIC)
3	Load 3800 -- ‘ANY’ ‘BEG’ ‘NO ’
16	CHARS -- Character Arrangement Tables
8	SIZE -- Number of pages
8	SECLABEL - Security label of file.
10	Full year date: mm/dd/yyyy
10	ISO date: yyyy-mm-dd

Subcode X′ 0004′

Depending on the specified buffer length, the user′s buffer contains as much of the following information as possible. Note that CP returns character information, where appropriate, and binary format for numeric data.

Character Length (in bytes)	Description
1	Control block update level identifier
1	Maximum length of data available in doublewords
1	Spool file CLASS
1	*** RESERVED FOR IBM USE ***

Character Length (in bytes)	Description
1	Copy count
1	Page copy count
1	Flash count
1	Modify number
2	Spool file ID (in hexadecimal)
2	Logical Record length
4	Record count
4	Number of spool data blocks
4	*** RESERVED FOR IBM USE ****
4	Type: RDR, PRT, PUN, CONS
4	Spool file ID in EBCDIC
8	File owner
8	File originator
8	File name
8	File type
8	Date: mm/dd/yy
8	Time: hh-mm-ss
8	Distribution code
8	Destination value
8	User form name
8	Operator form name
4	FCB name
4	3800 Load CCWs: ′NO ′|′BEG ′|′ANY ′
4	Flash name
4	Modify name
16	Character set names
8	SECLABEL - Security label of file.
10	Full year date: mm/dd/yyyy
10	ISO date: yyyy-mm-dd

Diagnose x′270′

Diagnose code x′270′ was introduced in VM/ESA V2R2.0. It returns the same information as Diagnose x′0C′ with the addition of the date in 4-digit year (*mm/dd/yyyy* and *yyyy-mm-dd*) formats. The length of the output buffer is defined by the user in the Ry register. The default length is the same as Diagnose x′0C′.

Privilege Class: Any:

Use DIAGNOSE code X′270′ to cause CP to store the number of bytes of time information specified in the Ry register at the address specified in the Rx register. DIAGNOSE code X′270′ replaces DIAGNOSE code X′0C′ for new applications.

Entry Values:

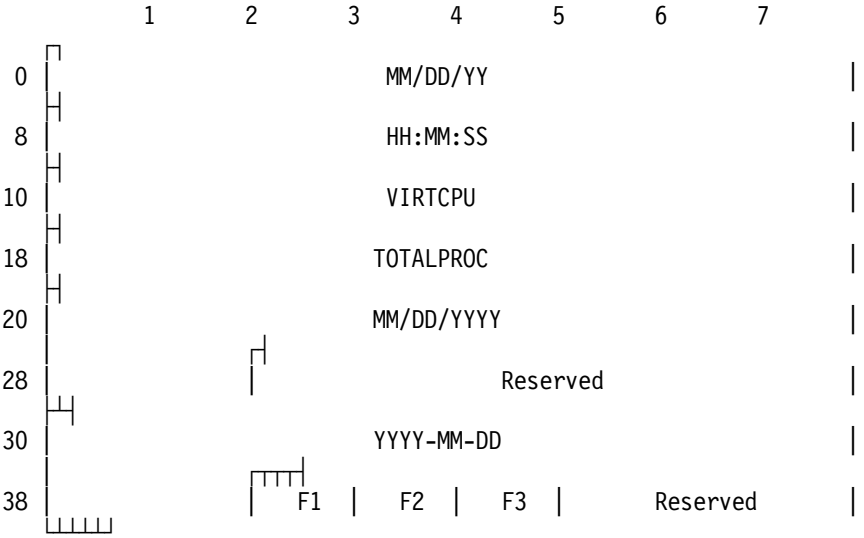
Rx Contains the address of an area where the time information is to be stored. The address must be in second-level storage (that is, in the storage that appears real to your virtual machine) and must be on a doubleword boundary.

Ax Is used only by XC virtual machines in access register mode. Ax contains the ALET for the address space containing the buffer where the time information is to be stored. When Rx is general register 0, Ax is not examined. The ALET is assumed to be X′00000000′, which indicates the host-primary address space.

Ry Contains the length of the buffer in bytes. If Ry is 0, the same output as the DIAGNOSE X′0C′ will be given. 48 bytes are necessary to contain the same output from the DIAGNOSE X′0C′ and the date in the full-year format. 64 bytes are needed to contain the same output from the DIAGNOSE X′0C′, the date in full-year format and the date in ISO format.

Exit Values: The output area contains the following information:

(Hex)



Byte definitions F1, F2, and F3 were added with APAR VM61788 in VM/ESA V2R2.0 and V2R3.0, and are included in the base of V2R4.0. The byte definitions for F1, F2, and F3 are as follows:

F1 Version of DIAGNOSE 270 (Currently 1)

F2 User′s default date format

F3 System default date format

The bit settings in F2 and F3 are as follows:

X′80′ SHORTdate format — mm/dd/yy

X′40′ FULLdate format — mm/dd/yyyy

X′20′ ISOdate format — yyyy-mm-dd

X′10′ Use the system-wide default setting (F2 only). If this bit is on, one of the other bits will be on also. The combination of these bits indicates the value of the system-wide default setting.

The first eight bytes (0 through 7) of the output area contain the date (*mm/dd/yy*) in EBCDIC. The next eight bytes (8 through 15) contain the time of day (*hh:mm:ss*) in EBCDIC. The next eight bytes, VIRTCPU (16 through 23), contain the virtual time consumed by the virtual CPU that issued the DIAGNOSE instruction. The next eight bytes, TOTALPROC (24 through 31), contain the total of the virtual time (VIRTCPU) and the simulation time spent on behalf of the virtual CPU that issued the DIAGNOSE instruction. Thus, TOTALPROC is always greater than or equal to VIRTCPU. The difference between them represents the time that CP has spent specifically on behalf of the virtual CPU. The next 10 bytes (32 through 41) contain the date in full year format (*mm/dd/yyyy*). The next 6 bytes (42 through 47) are reserved. The next 10 bytes (48 through 57) contain the date in ISO date format (*yyyy-mm-dd*). The next three bytes are three one-byte fields. The first byte is the version of the Diagnose 270. The second byte is the user′s default date format. The third byte is the system default date format. The last three bytes are reserved.

These values are also part of the response for the CP INDICATE USER command. Bytes 16 through 31 contain the virtual and total processor time used by the virtual machine that issued the DIAGNOSE instruction. VIRTCPU and TOTALPROC are doubleword, unsigned integers; the time is expressed in microseconds, not as TOD clock units.

Responses: These program exceptions can occur if DIAGNOSE X′270′ is given incorrect input data:

Problem Encountered	Cause
Specification exception	Any of the following: • The address contained in Rx is not on a doubleword boundary. • Ry is specified as any register except R0 and the user′s buffer length is less than or equal to 0. • The user′s buffer address is equal to zero. • There is an overlap of Rx and Ry, unless Rx and Ry are both specified as R0.
Privileged-operation exception	The virtual machine is in the problem state.
Access exception	An error occurred trying to store into the time-information area.

Callable Services Library (CSL) Routines

CMS File System CSL Routines

The CMS File System is comprised of minidisk, Shared File System (SFS), and Byte File System (BFS) files. Dates are a subset of the attributes maintained for all files. Applications can retrieve these dates by using Callable Services Library (CSL) routines. The date and time of the last update are supported for all three file systems. For SFS and BFS files, the date and time of creation of the file, the date of last reference, and the date and time of last change are maintained.

BFS file dates are actually stored as the number of seconds since 00:00:00 01/01/1970 Coordinated Universal Time but as output from the CSL routines, only 2-digit years are returned to remain compatible with the existing SFS and minidisk file date formats.

4-digit years may be entered as input and returned as output from CSL routines. This is accomplished through a new parameter that specifies which format the input or output date parameter is in (2-digit year versus 4-digit year).

For DMSGETDI and DMSEXIST, fields have been added to the end of their buffers which contain the date(s) with 4-digit years. DMSRDCAT has changes to its buffer but the buffer length remains the same.

Note: Previous releases of VM support input and output date parameters on these CSL routines in *yy/mm/dd* format. Formats supported by VM/ESA V2R2 are *yy/mm/dd* (SHORTDATE; same as previous releases), *yyyy/mm/dd* (FULLDATE) and *yyyy-mm-dd* (ISODATE).

4-digit year support in CMS File System CSLs has been implemented as follows:

1. For CSL routines that return the date along with other information in a buffer specified by the user, new field(s) will be added to the buffer for 4-digit year date(s).
2. For CSL routines that have an input or output parameter for a date and already have a keyword parameter (i.e. COMMIT/NOCOMMIT on DMSCLOSE), SHORTDATE, FULLDATE and ISODATE will be added as a new group to the keyword parameter. The date parameter will then reflect this format. To maintain compatibility with prior releases of VM, SHORTDATE will be the default.
3. For CSL routines that have an input or output parameter for a date and do not have an existing keyword parameter, a new keyword parameter will be added to the end of the parameter list that will signify the format of the date. The keywords will be SHORTDATE, FULLDATE and ISODATE. To maintain compatibility with prior releases of VM, SHORTDATE will be the default.

See the CMS Application Development Reference for more information on syntax and conventions for file I/O CSL routines.

The tables below list the CMS file system CSLs by category:

- CSL routines that provide the SHORTDATE, FULLDATE and ISODATE formats of the date(s) in a buffer specified by the user:

CSL routine	Description
DMSEXIST	Checks for the existence of a file, directory, or external object and retrieves information about the file, directory, or external object.
DMSGETDI	Reads directory records after a directory has been opened using Open Directory (DMSOPDIR).

CSL routine	Description
DMSRDCAT	Returns catalog information.

- CSL routines that will add new keywords to an existing keyword parameter to specify the format of the input or output date:

CSL routine	Description
DMSCLBLK	Closes files that have been opened previously using Open Blocks (DMSOPBLK).
DMSCLDBK	Closes files that have been opened previously using the Open Data Block routine (DMSOPDBK)
DMSCLOSE	Closes files that have been opened previously using the Open routine (DMSOPEN).
DMSCRDIR	Creates a directory once you have been enrolled as a user in an SFS file pool.
DMSCRFIL	Creates a new empty file in an SFS directory.
DMSCROB	Creates an external object in an SFS directory.
DMSEXIDI	Checks for the existence of a directory and retrieves directory-related information.
DMSEXIFI	Checks for the existence of a file and retrieves file-related information.
DMSOPBLK	Prepares a file for subsequent use by DMSRDBLK, DMSWRBLK, or DMSCLBLK.
DMSOPDBK	Prepares a file for data block I/O operations.
DMSOPEN	Prepares a file for subsequent reading or writing of data records.
DMSTRUNC	Deletes records from the end of an existing minidisk or SFS file.

- CSL routines that will have a new keyword parameter added to the end of the parameter list to specify the format of the input or output date:

CSL routine	Description
DMSENUSR	Enrolls one or more SFS users or one byte file system in a specified file pool.
DMSGETDA	Reads one directory record after a directory has been opened using Open Directory (DMSOPDIR) with an intent of SEARCHALL.
DMSGETDF	Reads one directory record after a directory has been opened using Open Directory (DMSOPDIR) with an intent of FILE.
DMSGETDS	Reads one directory record after a directory has been opened using Open Directory (DMSOPDIR) with an intent of SEARCHAUTH.
DMSGETDX	Reads one directory record containing extended file attributes after a directory has ben opened using Open Directory (DMSOPDIR) with an intent of FILEEXT.

DMSERP Changes for Year 2000

For CSL routine **DMSERP (Extract/Replace)**, information names have been added to the information sets which are related to date/time, and a new information name has been added to indicate the presence of Year 2000 support in the user's virtual machine.

In the **File Set** there are two information names related to date/time:

FILE_DATE_TIME which is rendered in the form YYMMDDHHMMSS hex(6), and
FILE_DATE_TIME_C which is rendered in the form YYMMDDHHMMSS char(12).

To indicate the century for these, new information name **FILE_DATE_CENTURY** has been added. This information name in an indicator that can not be replaced and can be used as a search argument. The extracted value indicates the time frame. A value of ′0′ means that the YY from the FILE_DATE_TIME or FILE_DATE_TIME_C lies in the time frame 01/01/1900-12/31/1999. A value of ′1′ means that the YY lies in the time frame 01/01/2000-12/31/2099.

Similarly, in the **Active File Set** there are two information names related to date/time:

ACT_FILE_DATE_TIME which is rendered as YYMMDDHHMMSS hex(6), and
ACT_FILE_DATE_TIME_C which is rendered as YYMMDDHHMMSS char(12).

To indicate the century for these new information name **ACT_FILE_DATE_CENTRY** has been added. Note: This is the correct spelling, as information names are limited to 20 characters.

In the **General System Set**, new information name called **YEAR2000_SUPPORT** has been added. It is an indicator that can not be replaced and it does not apply as a search argument. The extracted value indicates whether or not the user′s machine has support for the Year 2000 (both CP and CMS). A value of ′1′ indicates that Year 2000 support is present on the level of CP and CMS running in the user′s virtual machine. That is, APIs and commands which provide date input and output can provide 4 digit years. A value of ′0′ means that this support is not present. That is, APIs and commands which provide date input and output are restricted to 2 digit years.

DateTimeSubtract

CMS multitasking function **DateTimeSubtract** provides a comprehensive facility for the conversion and manipulation of date/time stamps. DateTimeSubtract was introduced in VM/ESA V2R2.0, and was enhanced in VM/ESA V2R3.0 to support additional date/time stamp formats. DateTimeSubtract is located in the VMMTLIB CSL. For more information, see the CMS Application Multitasking manual, or issue **HELP ROUTINE DATETIMS**.

DateTimeSubtract supports all the REXX DATE() formats except for **Century**, **Days**, **Month**, and **Weekday**. CP, CMS, CSL, Pipelines, and certain other selected formats are also supported.

The operations that can be performed with DateTimeSubtract include:

- Convert a time stamp from one format to another. For example, the European stamp **21/06/95**—which represents June 21, 1995—can be converted to the USA equivalent **06/21/95**. Formats supported include two-digit-year and four-digit-year character string formats and binary integer formats such as the output of the STORE CLOCK (STCK) instruction.
- Convert a time stamp from one time zone to another. For example, the Eastern Standard Time stamp **06/21/1995 15:30:00** can be converted to the Coordinated Universal Time stamp **06/21/1995 20:30:00**. Precision of up to one second is available for time zone offsets.
- Subtract time stamps of different formats and zones from each other and request the difference in another format and zone. For example, a time of day expressed as Eastern Standard Time in European format can be subtracted from a time of day expressed as Pacific Standard Time in USA format, and the result—an amount of time—can be requested in TOD clock units or a character string form.

DateTimeSubtract accepts a minuend stamp and a subtrahend stamp as inputs and produces a difference stamp as a result. The minuend is the first value in the subtraction expression, and the subtrahend is the value being subtracted. For example, in the expression **5-3=2**, **5** is the minuend, **3** is the subtrahend, and **2** is the difference.

An input stamp is expressed in DateTimeSubtract as follows:

Stamp text — The character string or binary buffer that contains the stamp.

Stamp length — An integer that indicates the length of the stamp in bytes.

Stamp format — An integer that indicates the format of the stamp (character string, binary, or other format).

Stamp bias — If the stamp represents a time-of-day, an integer that indicates the difference in seconds between the zone of the stamp and the UTC zone.

Stamp window type — If the stamp contains a two-digit year, an integer that indicates the type of window being used to provide information about the input year's century digits.

The window is a 100-year span to which the specified two-digit year belongs. For example, two-digit year **93** refers to the year 1993 if the window is [1970,2069], but it refers to the year 2093 if the window is [2000,2099]. DateTimeSubtract supports two kinds of windows:

- A *fixed window* always starts at the same year, no matter what the current year is at the moment of the call. This type of window is useful for manipuating dates known to reside at specific points in time.
- A *sliding window* slides forward in time as the current year moves forward. In other words, the distance between the current year and the beginning of the window is constant. For example, if the distance to the beginning of the window is fifty years and the current year is 1996, the sliding window is [1946,2045]. However, if the same distance is used in the year 2000, the window is [1950, 2049]. A sliding window is useful for manipulating dates known to be no more than a certain number of years old.

Stamp window position — If the stamp contains a two-digit year, an integer that indicates where the window begins. If a fixed window is being used, this is the first year of the window. If a sliding window is being used, this is the distance from the current year to the beginning of the window.

The difference stamp is expressed in DateTimeSubtract as follows:

Stamp buffer — The buffer into which DateTimeSubtract should place the difference stamp.

Stamp buffer size — An integer that specifies the size of the stamp buffer in bytes.

Stamp length — An output produced by DateTimeSubtract that indicates how many bytes of the stamp buffer were filled.

Stamp format — An integer that indicates the format in which DateTimeSubtract should express the difference stamp.

Stamp bias — An integer that indicates the zone in which DateTimeSubtract should express the difference stamp. This input is in seconds and expresses the difference between the desired zone and UTC.

Stamp window type — If the difference is requested in a two-digit-year format, an integer that indicates whether the result should be expressed using a fixed or sliding window. Knowing the type of window being used allows the caller to unambiguously interpret the result.

Stamp window position — If the difference is requested in a two-digit-year format, an integer that indicates the location of the window in which the caller expects the computed result to reside. If a fixed window is being used, this is the first year of the window. If a sliding window is being used, this is the distance from the current year to the beginning of the window.

Because format and zone conversions are just a special case of subtraction, separate zone conversion and format conversion functions are not provided. To accomplish a simple conversion, the caller specifies a relative-format subtrahend of zero, and DateTimeSubtract returns the converted stamp as the difference.

The following examples illustrate how to use DateTimeSubtract to perform various calculations and conversions.

Example 1

Problem: Convert **12/31/1995 09:00:00** in Eastern Standard Time (EST) to Pacific Standard Time (PST) and express the result in the same format.

Solution: The inputs and outputs to DateTimeSubtract are shown in Table 8.

Table 8. DateTimeSubtract Example 1. In this table, cell contents in ***this font*** are outputs; the rest are inputs.

	Minuend	**Subtrahend**	**Difference**
Stamp text	12/31/1995 09:00:00	0/00:00:00	***12/31/1995 06:00:00.000000***
Stamp buffer size	n/a	n/a	32
Stamp length	19	10	26
Stamp format	vm_tmr_format_usa	vm_tmr_format_met	vm_tmr_format_usa
Stamp bias	-18000	ignored	-28800
Stamp window type	ignored	ignored	ignored
Stamp window position	ignored	ignored	ignored

Example 2

Problem: Convert **12/31/1995 09:00:00** in Eastern Standard Time to the format supported by CMS Pipelines in Eastern Standard Time.

Solution: The inputs and outputs to DateTimeSubtract are shown in Table 9.

Table 9. DateTimeSubtract Example 2. In this table, cells contents in ***this font*** are outputs; the rest are inputs.

	Minuend	**Subtrahend**	**Difference**
Stamp text	12/31/1995 09:00:00	X′0000000000000000′	***19951231090000000000***
Stamp buffer size	n/a	n/a	32
Stamp length	19	8	***20***
Stamp format	vm_tmr_format_usa	vm_tmr_format_tod_relative	vm_tmr_format_pipe
Stamp bias	-18000	ignored	-18000
Stamp window type	ignored	ignored	ignored
Stamp window position	ignored	ignored	ignored

Example 3

Problem: Subtract three hours from the absolute TOD clock value X′0025613602932E00′ and express the result in Central Standard Time in the format supported by CMS Pipelines.

Solution: Note that the TOD clock value mentioned corresponds to January 1, 1995, midnight UTC. The inputs and outputs to DateTimeSubtract are shown in Table 10 on page 37.

Table 10. DateTimeSubtract Example 3. In this table, cell contents in ***this font*** are outputs; the rest are inputs.

	Minuend	**Subtrahend**	**Difference**
Stamp text	X′0025613602932E00′	0/03:00:00	***19941231150000000000***
Stamp buffer size	n/a	n/a	32
Stamp length	8	10	***20***
Stamp format	vm_tmr_format_tod_absolute	vm_tmr_format_met	vm_tmr_format_pipe
Stamp bias	ignored	ignored	-21600
Stamp window type	ignored	ignored	ignored
Stamp window position	ignored	ignored	ignored

Example 4

Problem: Convert **12/31/95 09:00:00** in Eastern Standard Time (EST) to Pacific Standard Time (PST) and express the result in ISO format.

Solution: Because the input has a two-digit year, a window must be used to precisely specify the date (that is, identify the century). In this example, a fixed window of [1900,1999] is used to assert that **12/31/95** means "12/31/1995." The inputs and outputs to DateTimeSubtract are shown in Table 11.

Table 11. DateTimeSubtract Example 4. In this table, cell contents in ***this font*** are outputs; the rest are inputs.

	Minuend	**Subtrahend**	**Difference**
Stamp text	12/31/95 09:00:00	0/00:00:00	***1995-12-31 06:00:00.000000***
Stamp buffer size	n/a	n/a	32
Stamp length	17	10	***26***
Stamp format	vm_tmr_format_usa_short	vm_tmr_format_met	vm_tmr_format_iso
Stamp bias	-18000	ignored	-28800
Stamp window type	vm_tmr_window_fixed	ignored	ignored
Stamp window position	1900	ignored	ignored

Example 5

Problem: Subtract three hours from **12/31/1995 09:00:00** Eastern Standard Time (EST) and express the result in Pacific Standard Time (PST) in USA two-digit format.

Solution: Because the output is requested in a format that uses a two-digit year, the caller must specify the window in which the result of the calculation is expected to reside. If the calculated difference falls within that window, DateTimeSubtract fills in the difference buffer and indicates success. If the difference falls outside the window, DateTimeSubtract indicates failure.

In this example, a sliding window of [-50,+49] is used; assume the call takes place in 1996. The inputs and outputs to DateTimeSubtract are shown in Table 12.

Table 12 (Page 1 of 2). DateTimeSubtract Example 5. In this table, cell contents in ***this font*** are outputs; the rest are inputs.

	Minuend	**Subtrahend**	**Difference**
Stamp text	12/31/1995 09:00:00	0/03:00:00	***12/31/95 03:00:00.000000***
Stamp buffer size	n/a	n/a	32
Stamp length	19	10	***24***
Stamp format	vm_tmr_format_usa	vm_tmr_format_met	vm_tmr_format_usa_short

Table 12 (Page 2 of 2). DateTimeSubtract Example 5. In this table, cell contents in ***this font*** are outputs; the rest are inputs.

	Minuend	**Subtrahend**	**Difference**
Stamp bias	-18000	ignored	-28800
Stamp window type	ignored	ignored	vm_tmr_window_sliding
Stamp window position	ignored	ignored	-50

Macros

DIRBUFF

The record map generated by this macroinstruction has been expanded to include the date formats with 4-digit years that are returned by a Get Directory request.

The following shows the new date fields:

```
&DNAME   DSECT
         .
         .
*
*      Get Directory record for FILE
*
         .
         .
DIRFUNQD DS    CL16           Unique Id
DIRFDAXD DS    XL4            Date (decimal yyyymmdd)
DIRFDAXC DS    CL10           Date (character yyyy/mm/dd)
DIRFDAXI DS    CL10           Date (character yyyy-mm-dd)
DIRFCEND DS    0F
DIRFLEN  EQU   *-&DNAME       Length of FILE record
DIRFR1L  EQU   DIRFLEN-(DIRFCEND-DIRFUNQD)         R1 Length
DIRFLV13 EQU   DIRFLEN-(DIRFCEND-DIRFDAXD)      cmslevel 13 len
*
*      Get Directory record for FILEEXT
*
         .
         .
DIREDFDS DS    CL24
DIREPAD  DS    CL50
DIREDEND DS    0F
         ORG   DIREPAD
DIREDAXD DS    XL4            Date (decimal yyyymmdd)
DIREDAXC DS    CL10           Date (character yyyy/mm/dd)
DIREDAXI DS    CL10           Date (character yyyy-mm-dd)
DIREDRXD DS    XL4            Date of Last Ref (dec yyyymmdd)
DIREDRXC DS    CL10           Date of Last Ref(char yyyy/mm/dd)
DIREDRXI DS    CL10           Date of Last Ref(char yyyy-mm-dd)
DIRECDXD DS    XL4            Creation Date (decimal yyyymmdd)
DIRECDXC DS    CL10           Creation Date (char yyyy/mm/dd)
DIRECDXI DS    CL10           Creation Date (char yyyy-mm-dd)
DIREDCXD DS    XL4            Date of Last Change(dec yyyymmdd)
DIREDCXC DS    CL10           Date of Last Chg(char yyyy/mm/dd)
DIREDCXI DS    CL10           Date of Last Chg(char yyyy-mm-dd)
         DS    CL3            Reserved
DIRECEND DS    0F
DIRELEN  EQU   *-&DNAME       Length of FILEEXT record
DIRER21L EQU   DIRELEN-(DIRECEND-DIREDFDS-11) Rel 2.1 Length
DIRELV13 EQU   DIRELEN-(DIRECEND-DIREDEND+1)  cmslvl 13 length
*
*     Get Directory record for SEARCHALL and SEARCHAUTH
*
         .
         .
DIRSNAME DS    CL153          Directory name
         DS    CL2            Reserved
DIRSDAXD DS    XL4            Date (decimal yyyymmdd)
DIRSDAXC DS    CL10           Date (character yyyy/mm/dd)
DIRSDAXI DS    CL10           Date (character yyyy-mm-dd)
DIRSCEND DS    0F
DIRSLEN  EQU   *-&DNAME       Length of SEARCH record
DIRSLV13 EQU   DIRSLEN-(DIRSCEND-DIRSDAXD+2)  cmslvl 13 length
         .
         .
```

EXSBUFF

The record map generated by this macroinstruction has been expanded to include the date formats with 4-digit years that are returned by an Exist request for a file or directory.

The following shows the new date fields:

```
         EXSBUFF
         .
         .
*
*      Exist record for FILE
*
         .
         .
         ORG   EXSFDLCD       DTOLC extended attributes
EXSFDTLC DS    CL24
EXSFDAXD DS    XL4            Date (decimal yyyymmdd)
EXSFDAXC DS    CL10           Date (character yyyy/mm/dd)
EXSFDAXI DS    CL10           Date (character yyyy-mm-dd)
EXSFDRXD DS    XL4            DoLR (decimal yyyymmdd)
EXSFDRXC DS    CL10           DoLR (character yyyy/mm/dd)
EXSFDRXI DS    CL10           DoLR (character yyyy-mm-dd)
EXSFCDXD DS    XL4            Creation Date (decimal yyyymmdd)
EXSFCDXC DS    CL10           Creation Date (char yyyy/mm/dd)
EXSFCDXI DS    CL10           Creation Date (char yyyy-mm-dd)
EXSFDCXD DS    XL4            DOLC (decimal yyyymmdd)
EXSFDCXC DS    CL10           DOLC (character yyyy/mm/dd)
EXSFDCXI DS    CL10           DOLC (character yyyy-mm-dd)
         ORG   EXSFDAXD       Date Extensions, added cmslvl 13
EXSF2000 DS    CL96               these are for year 2000
EXSFRES  DS    CL1            Reserved for future
EXSFCEND DS    OF
EXSFLEN  EQU   *-&DNAME              Length of FILE record
EXSFLV13 EQU   EXSFLEN-(EXSFCEND-EXSFDAXD-76)  cmslevel 13 length
         .
         .
*
*     Exist record for DIR
*
         .
         .
           ORG   EXSDCDTD       DTOC extended attributes
EXSDDTOC DS    CL24
EXSDDCXD DS    XL4            DOLC (decimal yyyymmdd)
EXSDDCXC DS    CL10           DOLC (character yyyy/mm/dd)
EXSDDCXI DS    CL10           DOLC (character yyyy-mm-dd)
EXSDCDXD DS    XL4            Creation Date (decimal yyyymmdd)
EXSDCDXC DS    CL10           Creation Date (char yyyy/mm/dd)
EXSDCDXI DS    CL10           Creation Date (char yyyy-mm-dd)
         ORG   EXSDDCXD       Date Extensions, added cmslvl 13
EXSD2000 DS    CL48           These are for Year 2000
EXSDRES  DS    CL6            Reserved for future
EXSDDEND DS    OF
EXSDLEN  EQU   *-&DNAME              Length of DIR record
EXSDLV13 EQU   EXSDLEN-(EXSDDEND-EXSDDCXD-52)  cmslevel 13 length
         .
         .
*
*     Exist record for DIR
*
         .
         .
           ORG   EXSDCDTD       DTOC extended attributes
EXSDDTOC DS    CL24
EXSDDCXD DS    XL4            DOLC (decimal yyyymmdd)
EXSDDCXC DS    CL10           DOLC (character yyyy/mm/dd)
EXSDDCXI DS    CL10           DOLC (character yyyy-mm-dd)
EXSDCDXD DS    XL4            Creation Date (decimal yyyymmdd)
EXSDCDXC DS    CL10           Creation Date (char yyyy/mm/dd)
EXSDCDXI DS    CL10           Creation Date (char yyyy-mm-dd)
         ORG   EXSDDCXD       Date Extensions, added cmslvl 13
EXSD2000 DS    CL48           These are for Year 2000
EXSDRES  DS    CL6            Reserved for future
EXSDDEND DS    OF
EXSDLEN  EQU   *-&DNAME              Length of DIR record
EXSDLV13 EQU   EXSDLEN-(EXSDDEND-EXSDDCXD-52)  cmslevel 13 length
         .
         .
```

FSSTATE

When the specified file exists, the address of a copy of its File Status Table (FST) information is pointed to by Register 1. Bit 4 (x′08′) of the FST Flag Byte (decimal displacement 31 in both the extended and standard forms) indicates the first 2 digits of the year the file was last written or updated. If this bit is off, the first 2 digits of the year are ′19′; if it is on, the first 2 digits of the year are ′20′.

FSTD

The DSECT for the FST control block returned by this macro has been updated to include the definition of the century indicator bit in the FST Flag Byte.

The following shows the definition of the century indicator bit in the FST:

```
         FSTD
FSTD     DSECT
         .
         .
         .
FSTFLAGS DS    1X -           F*2 - FST FLAG BYTE
*
*        FSTFLAGS DESCRIPTION
*
FSTRWDSK EQU   X′80′ -        READ/WRITE DISK
FSTRODSK EQU   X′00′ -        READ/ONLY DISK
FSTDSFS  EQU   X′10′ -        Shared File FST
FSTXRDSK EQU   X′40′ -        EXTENSION OF R/O DISK
FSTXWDSK EQU   X′C0′ -        EXTENSION OF R/W DISK
FSTEPL   EQU   X′20′ -        EXTENDED PLIST
FSTDIA   EQU   X′40′ -        ITEM AVAILABLE
FSTDRA   EQU   X′01′ -        PREVIOUS RECORD NULL
         SPACE 1
FSTCNTRY EQU   X′08′ -        Century for date last written
*                             (0=19, 1=20), corresponds to
*                             FSTYEARW, FSTADATI.
         .
         .
         .
```

TIME Macro (OS Simulation, GCS)

An indicator for the first 2 digits of the year has been added to the output for the simulated MVS TIME macro.

The values of the century indicator in the TIME macro output are as follows:

Hexadecimal value of C in 0CYYDDDF returned by TIME macro	Time frame
X′0′	01/01/1900-12/31/1999
X′1′	01/01/2000-12/31/2099
X′2′	01/01/2100-12/31/2199

CMS PIPELINES

The following CMS Pipelines stages commands were enhanced in VM/ESA V2R2.0 to accept new date format options SHORTDATE, FULLDATE, and ISODATE, and provide date output in the appropriate format:

AFTFST

The following are details of the changes to the AFTFST stage:

```
             .-SHOrtdate-.
>>--AFTFST--+-----------+-------------------------------------><
            |-FULldate--|
            |-ISOdate---|
            '-NOFORMAT--'
```

Operands

SHOrtdate
specifies that the format for the output date will be mm/dd/yy. This is the default.

FULldate
specifies that the format for the output date will be mm/dd/yyyy.

ISOdate
specifies that the format for the output date will be yyyy-mm-dd.

NOFORMAT
specifies that the list of open files is in the format returned by the FSSTATE macroinstruction. The status information provided for each file is 64 bytes in length. More information about the FSSTATE macroinstruction format can be found in the VM/ESA: CMS Application Development Reference for Assembler.

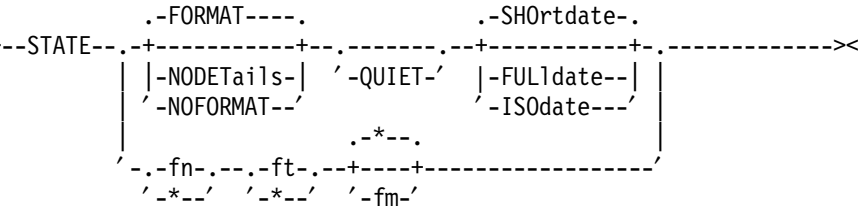
Example

In this example, assume that the files FILELOG TEST A and INPUT TEMP G are open. The following PIPE command lists the open files and displays the results at the terminal. Note that the FULLDATE option specification causes the output date to have a 4-digit year.

```
pipe aftfst ful | console
FILELOG  TEST     A1 V        105        181          2 10/02/1989  8:20:27
INPUT    TEMP     G1 V        104        216          2  6/16/1987 15:08:16
Ready;
```

STATE

The following are details of the changes to the STATE stage:



Operands

.
.
.

SHOrtdate
specifies that the format for the output date will be mm/dd/yy. This is the default.

FULldate
specifies that the format for the output date will be mm/dd/yyyy.

ISOdate
specifies that the format for the output date will be yyyy-mm-dd.

Examples

To show the file information for the file ABC FILE, enter:

```
pipe literal ABC FILE | state ISO | console
ABC      FILE     A1 F       4096         57        114  1996-08-15 11:05:09
Ready;
```

Because *fm* was not specified, the first mode in the search order that contains a file with the file name of ABC and file type of FILE is displayed. In this example, the file exists on the file mode A. Note that since the ISODATE option was specified, the date is displayed in ISO format with a 4-digit year.

The following return code is returned by STATE if the file does not exist on any accessed minidisk or directory:

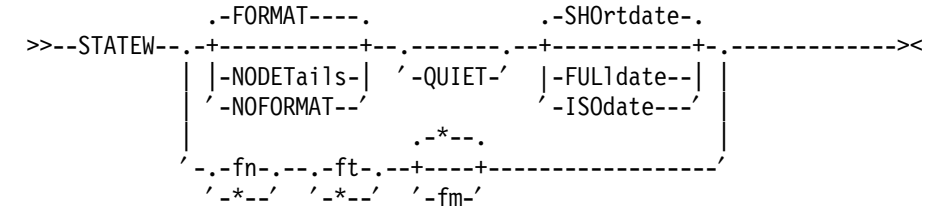
```
pipe state ABC FILE | console
Ready(00028);
```

The following PIPE command searches for a file that has a file type of NETID:

```
pipe literal * NETID * | state ful | console
SYSTEM   NETID    S2 F         80         25          1  8/15/1996 13:06:51
Ready;
```

STATEW

The following are details of the changes to the STATEW stage:



Operands

.
.
.

SHOrtdate
specifies that the format for the output date will be mm/dd/yy. This is the default.

FULldate
specifies that the format for the output date will be mm/dd/yyyy.

ISOdate
specifies that the format for the output date will be yyyy-mm-dd.

Examples

To show the file information for the writable file STATUS REPORT, enter:

```
pipe literal STATUS REPORT | statew iso | console
STATUS   REPORT   A1 F       4096         57        114  1996-08-15 11:05:29
Ready;
```

Because *fm* was not specified, the first mode that is writable in the search order that contained a file with the file name of STATUS and file type of REPORT is displayed. In this example, the file exists on the A-disk. Note that since the ISODATE option was specified, the date is displayed in ISO format with a 4-digit year.

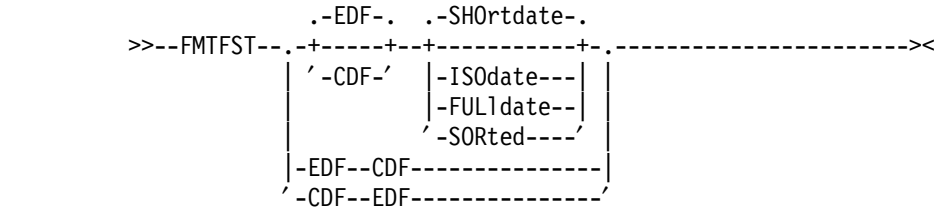
In this example, STATEW searches for two writable files; one (ABC) is specified by the operands of the STATEW stage command and the other (PROFILE) is specified by the primary input stream of the STATEW stage. The PIPE command and its results are shown below:

```
pipe literal ABC * *| literal PROFILE * D | statew ful | console
PROFILE  BUILD    D1 F         80         11          1 11/14/1989  9:42:55
ABC      FILE     A1 F         80         89          1  1/23/1991 12:27:27
Ready;
```

Note that the first file name written is the file specified by the operands of STATEW. This example assumes that the D disk is accessed as R/W.

FMTFST

The following are details of the changes to the FMTFST stage:



Operands

.
.
.

SHOrtdate
specifies that the format for the output date will be mm/dd/yy. This is the default.

FULldate
specifies that the format for the output date will be mm/dd/yyyy.

ISOdate
specifies that the format for the output date will be yyyy-mm-dd.

Examples

To format the records generated by the STATE NOFORMAT stage command, use the FMTFST stage command as in the following example:

```
pipe < LISTOF FILES | state noformat | fmtfst | console
```

LISTOF FILES (shown below) contains the file names. STATE NOFORMAT processes file information for the three files and FMTFST formats the status information. The resulting terminal output is also shown below.

FMTFST Stage Command Example: Input File Contents

```
===== * * * Top of File * * *
|...+....1....+....2....+....3....+....4....+....5....+....6....+....7...
===== LIZA     NAMES    A
===== PROCESS  NOTEBOOK A
===== ABC      FILE     A
===== * * * End of File * * *
```

FMTFST Stage Command Example: Command and Terminal Output

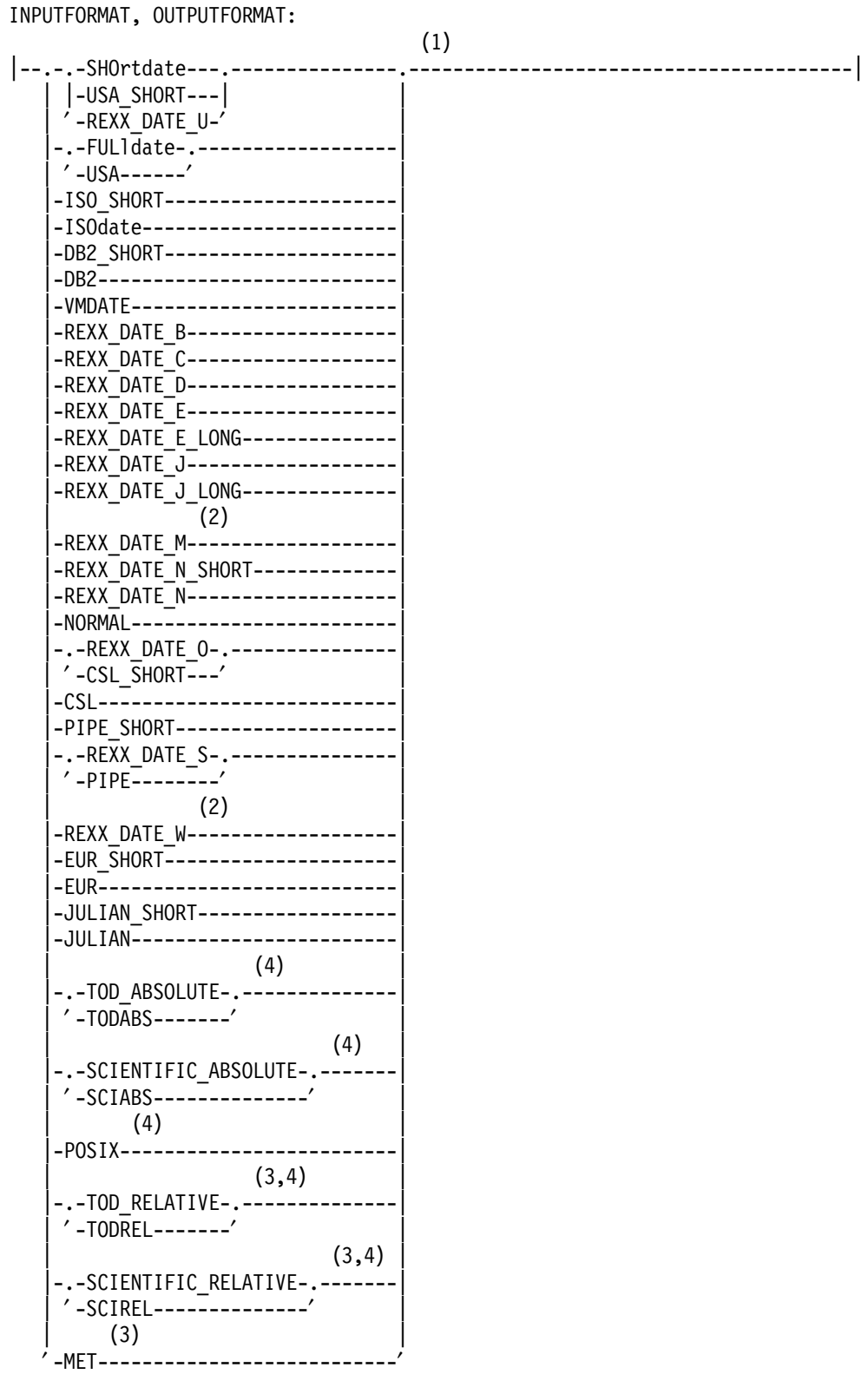
```
pipe < LISTOF FILES | state noformat | fmtfst | console
LIZA     NAMES    A0 V        199        318          6  7/23/91 10:42:10
PROCESS  NOTEBOOK A0 V         83      19288        406  7/24/91  9:10:28
ABC      FILE     A1 V         21          4          1  7/23/91 14:09:17
Ready;
```

FMTFST Stage Command Example: FULLDATE Format To have a formatted FST specify an output date of mm/dd/yyyy for the files in LISTOF FILES above, use the FMTFST stage command in the following example:

```
pipe < LISTOF FILES  | state noformat | fmtfst full | console
```

DATECONVERT

The DATECONVERT stage was introduced in VM/ESA V2R3.0, and enhanced in VM/ESA V2R4.0. It is used to convert date/timestamps to different formats or timezones, and to verify that a date/timestamp is valid.


INPUTFORMAT, OUTPUTFORMAT:
(1)
SHOrtdate
USA_SHORT
REXX_DATE_U
FULldate
USA
ISO_SHORT
ISOdate
DB2_SHORT
DB2
VMDATE
REXX_DATE_B
REXX_DATE_C
REXX_DATE_D
REXX_DATE_E
REXX_DATE_E_LONG
REXX_DATE_J
REXX_DATE_J_LONG
(2)
REXX_DATE_M
REXX_DATE_N_SHORT
REXX_DATE_N
NORMAL
REXX_DATE_O
CSL_SHORT
CSL
PIPE_SHORT
REXX_DATE_S
PIPE
(2)
REXX_DATE_W
EUR_SHORT
EUR
JULIAN_SHORT
JULIAN
(4)
TOD_ABSOLUTE
TODABS
(4)
SCIENTIFIC_ABSOLUTE
SCIABS
(4)
POSIX
(3,4)
TOD_RELATIVE
TODREL
(3,4)
SCIENTIFIC_RELATIVE
SCIREL
(3)
MET

```
NOTES:
(1)  The formats grouped together are synonyms for each other; they have the
     same format definition.  The REXX_DATE_x formats can also be specified

     as REXXx or Rx.  The x can be specified as B, C, D, E, E_LONG, J,

     J_LONG, M, N, N_SHORT, O, S, U or W.

(2)  This format is valid only for the Outputformat parameter.

(3)  This is a relative format; the rest of the formats are absolute.  You
     cannot convert between relative and absolute formats.

(4)  Time is an integral part of these formats; therefore, the TIMEOUT
     operand is ignored for these formats when they are used as an output
     format.
```

Purpose

Use the DATECONVERT stage to perform timestamp conversion and validation. You can use DATECONVERT to translate a specified location of an input timestamp in the record. DATECONVERT reads records from its primary input stream, takes the timestamp from the input range, and converts this timestamp from the input format to the output format. If the input field:

- Consists of a timestamp that is valid for its format, the timestamp will be converted into the specified format, and the updated record will be written to the primary output stream, if it exists.
- Does not consist of a valid timestamp in the particular input format, the record will be passed to the secondary output stream, if it exists.
- Consists of a timestamp that is valid for its input format, but it cannot be converted to the output format, the record will be passed to the secondary output stream, if it exists.

If there are errors and the secondary output stream does not exist, the pipeline will issue an error message and stop. If there is neither a primary nor a secondary output stream, then the pipeline will stop processing.

Parameters

Separator
Inputrange

WORDSEParator
WS

specifies the character that is used to separate words in the input records. For example, use the **WORDSEPARATOR** to specify that the dash (–) separates each word:

```
ws - w4
```

A blank is used as the default for **WORDSEPARATOR** (or **WS**)

FIELDSEparator
FS

specifies the character that is used to separate fields in the input records. For example, use the **FIELDSEPARATOR** to specify that the dollar sign ($) separates each field:

```
fieldsep $ f2
```

The default field separator character is X'05'.

char
hexchar
is the single character, *char*, or the two-character hexadecimal representation of a character, *hexchar*. Do not enclose the hexadecimal representation in quotation marks.

Use *char* or *hexchar* with the:

- **WORDSEPARATOR** (or **WS**) to specify the word separator character.
- **FIELDSEPARATOR** (or **FS**) to specify the field separator character.

BLANK
SPACE
specifies that a blank is used as the:

- Word separator character when specified with the **WORDSEPARATOR** (or **WS**) operand.
- Field separator character when specified with the **FIELDSEPARATOR** (or **FS**) operand.

Words
defines the location of the input data in a record for the delimited character strings (words). The **WORDSEPARATOR** (or **WS**) operand defines the character that delimits words. For example, use the **Word** to specify 3 words that are separated by a blank:

```
word 3
```

The operands WORD 3 specify the third word in the string as the input data for the stage.

A **Word** cannot be null. If a record begins with one or more delimiters, the first **Word** in that record begins in the position immediately following the delimiter or delimiters. Two or more consecutive delimiters are equivalent to having one delimiter which means that the next **Word** begins in the first position after the delimiters. For example, the first **Word** begins after the first delimiter, and the third **Word** begins after the two consecutive delimiters:

```
ws ? word 3
```

Fields
defines the location of the input data in a record for the delimited fields. The **FIELDSEPARATOR** (or **FS**) operand defines the character that delimits fields.

For example, the input data contains 3 fields separated by a dash (−):

```
fieldsep - f2
```

A field can be null. A record that begins with the delimiter has a null field as the first field. The 2 consecutive delimiters is considered a null field. For example, the types of null fields:

```
fs ? field 3
```

wnumberrange
fnumberrange
cnumberrange
defines a specified location of the input data as a range of word numbers, field numbers, or column numbers which is to be translated. The location is relative to the beginning or the end of the record. A negative number in the range shows that the range is relative to the end of the record; otherwise, the range is relative to the beginning of the record. If you do not specify a location, DATECONVERT uses the entire record. You can specify a location as:

location
-location
is a single column number, word number, or field number. *-location* is relative to the end of the record. The last location in the record is -1.

location1-*location2*
location1;*location2*
-*location1*;*location2*
location1;-*location2*
-*location1*;-*location2*
is a range of columns, words, or fields beginning with *location1* and ending with *location2*, inclusive. If you specify both locations relative to the beginning of the input record, (that is, you use *location1* and *location2*), *location2* must be numerically equal to or greater than *location1*. If you specify both locations relative to the end of the input record, (that is, you use -*location1* and -*location2*), *location2* must be numerically less than or equal to *location1*. For example, this specifies the last ten columns as the input location:

```
-10;-1
```

If you specified **Words**, this specifies the second-from-last as the input location:

```
words -2
```

If you specified **Fields**, this specifies the second-from-last as the input location:

```
fs ? fields -2
```

If you specify *location1*;-*location2* or if you specify -*location1*;*location2*, the position in the record defined by *location1* must occur before the position in the record defined by *location2*. For example, *location1* is positioned after *location2* in the record:

```
abcdefghijklmnopqrs | -8;6
```

For example, *location1* is positioned before *location2*:

```
abcdefghijklmnopqrs | -8;19
```

location1-*
location1;*
-*location1*;*
is a range of columns, words, or fields beginning with *location1* and ending with the last column, word, or field of the record, inclusive.

*-*location2*
*;*location2*
*;-*location2*
is a range of columns, words, or fields beginning with the first column, word, or field of the record and ending with *location2*, inclusive.

-
;
is a range of columns, words, or fields beginning with the first column, word, or field of the record and ending with the last column, word, or field of the record, inclusive.

location1.n
is a range of *n* columns, words, or fields beginning with *location1*. You can specify any number from 1 to 2^{31} -1 for *n*.

Inputformat
Outputformat

describe the absolute and relative formats of the input and output timestamps. The formats grouped together are synonyms.

WINDOW
specifies the sliding or fixed window to be used when converting from a two-digit year to a four-digit year. If you specify an input date that already contains a four-digit year, this parameter is ignored; specifying a sliding or fixed window will have no effect.

For more information, see Usage Note 15 on page 55.

signednumber
specifies a value to show the position of the sliding window. You can specify a positive number without a + (plus) sign, or a negative number with the - (minus) sign; for example 30, 50, -30, -50. The default is -50.

A sliding window is used by DATECONVERT when you have a two-digit input year to specify an additional numeric value from which DATECONVERT can deduce the century digits of the year. For example,

```
12/25/93
```

This value calculates the 100-year span in which the year will reside.

BASEYEAR *yearnumber*
specifies the value that shows the base year of the fixed window. This must be a positive number without a + (plus) sign.

TIMEOUT
specifies the time will be part of the output (added in VM/ESA V2R4.0)

Streams Used

Primary Input Stream: The DATECONVERT stage reads records from its primary input stream.

Primary Output Stream: If the primary output stream is connected, the stage writes the records with valid converted timestamps to its primary output stream If the input range specified is outside the range of the record, the record will be written as is to the primary output stream.

Secondary Output Stream: If the secondary output stream is connected, the stage writes the records that contain timestamps that are not valid to its secondary output stream. If it is not connected and one of the timestamps is not valid, the pipeline will issue an error message and stop processing.

Usage Notes

1. DATECONVERT does not delay the records.
2. If the DATECONVERT stage discovers that all of its output streams are not connected, the DATECONVERT stage ends.
3. DATECONVERT converts no more than one timestamp field per record.
4. Input data outside the input range is unchanged.
5. If the output timestamp has a different length than the input range the input data following the output timestamp is shifted right or left as necessary.

   For example, when a date in **ISODATE** format is converted to **SHORTDATE** format, the data to the right of the date is shifted two columns to the left.

```
pipe literal The date 1998-08-18 is next Tuesday
   |dateconv 10.10 iso short|cons
The date 08/18/98 is next Tuesday
Ready;
```

Likewise, when a date in **SHORTDATE** format is converted to **ISODATE** format, the data to the right of the date is shifted two columns to the right.

```
pipe literal The date 08/18/98 is next Tuesday
   |dateconv 10.8 short iso|cons
The date 1998-08-18 is next Tuesday
Ready;
```

6. For the character string formats, the input timestamp can be specified with leading zeroes omitted. For example, if you enter:

   ```
   4/2/1998
   ```

   DATECONVERT will assume the field is:

   ```
   04/02/0001998
   ```

   because the **USA** format has a maximum length of 13 for the date portion of the timestamp.

   Be careful when specifying input timestamps without leading zeroes. For example, if you specify the input timestamp of 12/31/01 with input format of **FULLDATE**, DATECONVERT will pad the zeroes to the left of each field. In this entry the *yyyyyyy* will be padded with 00 thus treating this timestamp as 12/31/0000001.

   However, on output DATECONVERT will produce the output timestamp containing the appropriate number of leading zeroes in each field except for the year field, which is not padded with zeroes. For example,

   ```
   04/02/1998     12/13/1
   ```

   There are some exceptions such as **REXX_DATE_N** and **REXX_DATE_N_SHORT** that do not accept leading zeroes on input or do not produce leading zeroes on output for their *dd* field.

7. Leap seconds are not accounted for in any of the calculations.

8. Conversions between absolute formats **TOD_ABSOLUTE**, **SCIENTIFIC_ABSOLUTE**, and **POSIX** and other absolute formats are based on the time zone of your system (as returned by DIAG x′00′). Specifically:

   - Conversions from date to date-time formats set the time portion of the output to midnight in your time zone.
   - Conversions from date-time to date formats return the date in your time zone.

9. Sometimes there is a loss of information when converting from one format to another less precise date format.

   - You cannot convert back to a date that was converted to **REXX_DATE_W** or **REXX_DATE_M**. For example,

     ```
     pipe literal 05/15/1997|dateconv full rw|cons
     Thursday
     Ready;

     pipe literal 05/15/1997|dateconv full rm|cons
     May
     Ready;
     ```

   - When you go from a date with a 4-digit year to a date with a 2-digit year, you cannot convert back to the correct date of a 4-digit year without specifying the correct window. For example,

```
pipe literal 01/01/1900|dateconv full short|cons|
     dateconv short full| cons
01/01/00
01/01/2000  <---- default window -50 is not correct;
            since 1900 is out of the range of 1947-2046.
Ready;
pipe literal 01/01/1900|dateconv full short|
     dateconv short full baseyear 1900|console
01/01/1900  <---- correct window is
            base year of 1900
Ready;
```

- You cannot convert back to a date that was converted to **REXX_DATE_C** or **REXX_DATE_D** if the input dates span a century or a year, respectively. For example,

```
pipe literal 01/01/2000|dateconv full rc|cons|
     dateconv rc full| cons
    1
01/01/1900              <---- Begins in year 1900.
Ready;
```

  But specifying BASEYEAR lets you specify the beginning of year 2000.

```
pipe literal 01/01/2000|dateconv full rc|cons|
     dateconv rc full baseyear 2000|console
    1
01/01/2000
Ready;
```

```
pipe literal 01/01/1900|dateconv full rd|cons|
     dateconv rd full| cons
  1
01/01/1997              <-----------current year is 1997.
Ready;
```

  But specifying BASEYEAR lets you specify the year of 1900.

```
pipe literal 01/01/1900|dateconv full rd|cons|
     dateconv rd full baseyear 1900|console
  1
01/01/1990
Ready;
```

- When you go from a doubleword format such as **TOD_ABSOLUTE, SCIENTIFIC_ABSOLUTE,** or **POSIX** to a date format that represents the date with month, day, and year, you will lose time information due to truncation to whole days. Here is an example of **TOD_ABSOLUTE** to **ISODATE** and back again:

```
pipe strliteral xFFFFCA5B17000000|dateconv todabs isodate|
     cons
2042-09-17
Ready;
pipe literal 2042-09-17|dateconv isodate todabs|
     specs 1.8 c2x 1|cons
FFFEBF85E8000000
Ready;
```

  An example of converting a date to **SCIENTIFIC_ABSOLUTE** shows the second word on conversion is always X′02932E00′ which is equivalent to NOON:

```
pipe literal 11/24/97|dateconv sho sciabs|
     specs 1-* c2x 1|cons
0025655802932E00
Ready;
```

To save the time information, specify the TIMEOUT operand.

```
pipe strliteral xFFFFCA5B17000000|dateconv todabs isodate timeout|
     cons
2042-09-17 19:53:47.370496
Ready;
pipe literal 2042-09-17 19:53:47.370496|dateconv isodate todabs|
     specs 1.8 c2x 1|cons
FFFFCA5B17000000
Ready;
```

However, even in this example, you may lose information because **TOD_ABSOLUTE** is more precise than **ISODATE**.

```
pipe strliteral xFFFFCA5B17123456|dateconv todabs isodate timeout|
     cons
2042-09-17 19:53:47.370787
Ready;
pipe literal 2042-09-17 19:53:47.370787|dateconv isodate todabs|
     specs 1.8 c2x 1|cons
FFFFCA5B17123000
Ready;
```

You should note that **TOD_ABSOLUTE** has a precision of 1/4096 microseconds, whereas **ISODATE** has a precision of 1 microsecond.

- When you go from a doubleword day format such as **TOD_RELATIVE or SCIENTIFIC_RELATIVE** to a day format that truncates to whole days, you will lose time information.

  For example,

```
pipe strliteral x7FFFFFFFFFFFFFFF|dateconv todrel met|
     cons
      26062
Ready;
pipe literal 26062|dateconv met todrel|specs 1-* c2x 1|
     cons
7FFF5FC2F4000000
Ready;
```

- When converting between the doubleword formats that include times you may find some discrepancies due to rounding of seconds or milliseconds.

10. You cannot convert between relative and absolute formats. Attempts to do this result in an error message and no dates will be converted. You can convert absolute to absolute, or relative to relative.

11. The only format capable of expressing a BC year is **SCIENTIFIC_ABSOLUTE.** An attempt to place a BC year in any other format results in a record that is not valid.

12. Date formats that contain a *yy* (2-digit year) using a window can achieve 4-digit years up to 31 Dec 9999, and 7-digit years up to 31 Dec 5873999. The lowest expressible date is 01 Jan 0001.

    For example, a 2-digit year of 01 with BASEYEAR 1 conversion to the lowest expressible 4-digit year of 0001:

```
pipe literal 01-01-01|dateconvert iso_short rn baseyear 1
     |console
 1 Jan 0001
```

13. The *Inputformat* range for conversion to **REXX_DATE_C**, **REXX_DATE_D**, and **REXX_DATE_M** are equivalent to the range for **ISODATE** which is 1-01-01 to 5873999-12-31 (*yyyyyyy-mm-dd*).

    The *Inputformat* range for conversion to **REXX_DATE_W** is equivalent to the range for **SCIENTIFIC_ABSOLUTE** which is X'00000000 00000000' (1 Jan BC 4713 12:00:00 UTC) to X'7FFFFFFF 02932DFF' (03 Jun AD 5874898 23:59:59:999 UTC).

14. Column alignment may not be preserved for formats that contain dates with varying length years. For example, if we have two input dates in the **FULLDATE** format (*mm/dd/yyyyyyy*) and convert them to the same output date format, you can see that the year field is not padded with leading zeroes.

```
pipe literal col1 08/01/0001 col3|literal col1 08/01/0011 col3|
   dateconv w2 fulldate fulldate|console
col1 08/01/11 col3
col1 08/01/1 col3
Ready;
```

15. Using a Window

    When you have two-digit years, DATECONVERT supports two different window techniques. These techniques let the caller who provides a two-digit input year to specify an additional numeric value from which DATECONVERT can deduce the century digits of the year. For example,

    ```
    12/25/93
    ```

    No matter whether you use a sliding-window or fixed-window technique, be careful to ensure that the 100-year window you are characterizing resides entirely with AD years. In other words, the beginning year of your 100-year interval must be greater than zero. Also, the beginning year must be less than or equal to 5873900. DATECONVERT will return an error if these conditions are not met. The two techniques are:

    - Fixed Window Technique

      In this technique, a given two-digit year is assumed to reside in the 100-year span [*number*,*number*+99], where integer *number*, called the *base year*, is specified separately by the caller. For example, if the two-digit year **93** is interpreted according to *number*=1995, the window is [1995,2094], and **93** is taken to mean 2093. However, if *number*=1970, then the window is [1970,2069], and **93** is taken to mean 1993.

      To cause DATECONVERT to use the fixed-window technique to interpret a stamp with a two-digit year: Use the **BASEYEAR** keyword with *yearnumber*. Set the *yearnumber* parameter equal to the base year. For example, to cause a two-digit year to be interpreted according to the fixed window [*1900*,*1900*+*99*], use **BASEYEAR** with *yearnumber* set to 1900. This will give you the window [1900,1999].

    - Sliding Window Technique

      In this technique, a given two-digit year is assumed to reside in the 100-year span [*cy*+*signednumber*, *cy*+*signednumber*+99], where integer *cy* is the current year—that is, the year at the moment of the call—and *signednumber* is a constant added to the current year to show the first year of the window. For example, if the two-digit year **93** is interpreted according to *cy*=1995 and *signednumber*=-10, the window is [1985,2084], and **93** is taken to mean 1993. However, if *cy*=1995 and *signednumber*=0, then the window is [1995,2094], and **93** is taken to mean 2093.

      To cause DATECONVERT to use a sliding window technique to interpret a stamp with a two-digit year: Set the *signednumber* parameter equal to the offset of the start from the current year for the window. For example, to cause a two-digit year to be interpreted according to the sliding window [*cy*-50,*cy*+49], set *signednumber* to -50. If the *cy* is 1997, this will give you the window [1947,2046].

Another example, to cause a two-digit year to be interpreted according to the sliding window [*cy*+50,*cy*+50+99], set *signednumber* to 50. If the *cy* is 1997, this will give you the window [2047,2146].

A sliding window of *signednumber* = -97 and a fixed window of *number* = 1900 will produce the same results in the current year 1997. But when the current year changes to 1998, then the sliding window will move its base year to 1901; whereas the base year of the fixed window would remain at 1900.

16. Julian and Gregorian Calendars

    The DATECONVERT assumes the switch from the Julian calendar to the Gregorian calendar occurred on September 14, 1752 (Gregorian). This means:

    - All dates labeled September 2, 1752 and earlier are reckoned using the Julian calendar.
    - All dates labeled September 14, 1752 and later are reckoned using the Gregorian calendar.
    - The day immediately after the day labeled September 2, 1752 is labeled September 14, 1752.

    However, callers using format **REXX_DATE_B** need to remember that the REXX function DATE('B') assigns *all* its day numbers, including those on or before September 2, 1752, using Gregorian calendar rules. Because of this, DATECONVERT considers 639,796 — the DATE('B') value corresponding to Gregorian date September 14, 1752 — to be the minimum accepted value in dates using format **REXX_DATE_B**. Attempts to use values less than this threshold return a record that is not valid.

    For more information on these calendars, see the CSL routine DateTimeSubtract in *&dmsd0.*.

17. For more information, see TIMESTAMP and SPECS operands; TODCLOCK, C2I, and I2C.

Examples

These examples use the:

- Default sliding window of -50, unless otherwise specified.
- Date of May 15, 1997 as today.

Example 1

This example uses **SHOrtdate** to specify the input format. The length of six is specified for the input date of 1/2/97 because it does not contain the leading zeroes.

```
pipe literal 1/2/97|dateconv 1.6 short isodate|console
1997-01-02
Ready;
```

Example 2

This example uses **FULLDATE** to specify the output format.

```
pipe literal 01/02/97|dateconv 1.8 short fulldate|console
01/02/1997
Ready;
```

Example 3

This example uses INDATA EXEC to convert each date in the file INPUT DATA A from **REXXU** (REXX USA) to **REXXN** (REXX NORMAL) and writes the records with the converted dates to the file OUTPUT DATA A.

```
/* INDATA EXEC */
'Pipe < INPUT DATA A|dateconv W1 RexxU RexxN|> OUTPUT DATA A'
Exit rc
```

Figure 1. INDATA EXEC

```
 INPUT    DATA     A1  V 80  Trunc=80 Size=8 Line=0 Col=1 Alt=0

===== * * * Top of File * * *
      |...+....1....+....2....+....3....+....4....+....5....+....6....+....7...
===== 04/16/35    - Grandma
===== 01/20/47    - boundary low
===== 08/23/60    - Dad
===== 4/11/63     - Mom
===== 05/15/95    - Kid
===== 1/2/00      - Kid2
===== 11/6/29     - GrandKid
===== 1/2/46      - boundary high
===== * * * End of File * * *
```

Figure 2. INDATA Example: Input File Contents (INPUT DATA A)

```
 OUTPUT   DATA     A1  V 80  Trunc=80 Size=8 Line=0 Col=1 Alt=0

===== * * * Top of File * * *
      |...+....1....+....2....+....3....+....4....+....5....+....6....+....7...
===== 16 Apr 2035    - Grandma
===== 20 Jan 1947    - boundary low
===== 23 Aug 1960    - Dad
===== 11 Apr 1963     - Mom
===== 15 May 1995    - Kid
=====  2 Jan 2000      - Kid2
=====  6 Nov 2029     - GrandKid
=====  2 Jan 2046      - boundary high
===== * * * End of File * * *
```

Figure 3. INDATA Example: Output File Contents (OUTPUT DATA A)

Note: Grandma was really born 4/16/1935, not 4/16/2035. Her birthday is out of the 100 year sliding window range of [1947,2046] where the current year is 1997. A sliding window of -50,+49 is used.

Example 4

This example uses the DATECONVERT stage to change two-digit year dates to four-digit year dates. This file shows the two-digit year dates that are known to be all 19*xx* dates. Here, you have to be careful when picking the window. Let us choose a fixed window starting at 1900. The window range is [1900,1999].

Note the leading zeroes in the resulting dates in the FOURYEAR FILE.

```
pipe < twoyear file a|dateconv sho full window baseyear 1900
    |> fouryear file a
Ready;
```

```
 TWOYEAR  FILE     A1  V 80  Trunc=80 Size=8 Line=0 Col=1 Alt=0

===== * * * Top of File * * *
      |...+....1....+....2....+....3....+....4....+....5....+....6....+....7...
===== 04/16/12
===== 04/16/35
===== 01/20/46
===== 08/23/69
===== 4/11/79
===== 05/15/83
===== 1/2/95
===== * * * End of File * * *
```

Figure 4. Input File Contents (TWOYEAR FILE A)

```
 OUTPUT   DATA     A1  V 80  Trunc=80 Size=8 Line=0 Col=1 Alt=0

===== * * * Top of File * * *
      |...+....1....+....2....+....3....+....4....+....5....+....6....+....7...
===== 04/16/1912
===== 04/16/1935
===== 01/20/1946
===== 08/23/1969
===== 04/11/1979
===== 05/15/1983
===== 01/02/1995
===== * * * End of File * * *
```

Figure 5. Output File Contents (FOURYEAR FILE A)

Example 5

This example uses the REXX Date built in function to get the present Julian date. Then it passes it as input to the DATECONVERT stage to convert it to the user's default date format, which is set to fulldate. The CP QUERY DATEFORMAT shows the setting.

```
/* GETFULL EXEC */
'cp query dateformat'  /* shows us the user's default date format */
'pipe literal' 'DATE('J') '|dateconv 1.5 rexxj vmdate|console'
Exit rc
```

```
getfull
User Dateformat = FULLDATE
05/15/1997
Ready;
```

Example 6

This example uses the DATECONVERT stage to convert six dates from **FULLDATE** to **JULIAN**. It has one input stream and two output streams. All dates that are not valid are written to the secondary output stream.

```
/* VALJUL EXEC */
  /* set up input dates */
  dates.1 = '01/01/1997'          /* good date */
  dates.2 = '01/AA/1997'          /* bad  date */
  dates.3 = '02/30/1997'          /* bad  date */
  dates.4 = '02/29/1996'          /* good date */
  dates.5 = '02/28/1A97'          /* bad  date */
  dates.6 = '02/22/1996'          /* good date */
  dates.0 = 6
 'PIPE (END ?) STEM DATES.' ,
 '| SPEC RECNO 1 1-* 20 ' ,
 '|A: DATECONV 20.10 fulldate julian ' , /* convert,validate*/
 '| SPEC /GOOD DATE     Record number:/ 1 1-* NW' ,
 '| CONSOLE' ,
 '?A:',       /* secondary output stream */
 '| SPEC /BAD  DATE     Record number:/ 1 1-* NW' ,
 '| CONSOLE'
```

Running the VALJUL EXEC results in the three valid dates written to its primary output stream, and the three dates that are not valid being written to its secondary output stream. After invoking VALJUL EXEC, the console displays:

```
valjul
GOOD DATE     Record number:          1         1997.001
BAD  DATE     Record number:          2         01/AA/1997
BAD  DATE     Record number:          3         02/30/1997
GOOD DATE     Record number:          4         1996.060
BAD  DATE     Record number:          5         02/28/1A97
GOOD DATE     Record number:          6         1996.053
Ready;
```

Example 7

This example uses the NOT stage to validate the date and output the bad dates to the console. This is done by switching the primary and secondary streams.

```
 /* VALDATE - validate the dates */
 /* set up input dates           */
 dates.1 = '01/01/1997'
 dates.2 = '01/AA/1997'  /* bad  */
 dates.3 = '02/30/1997'  /* bad  */
 dates.4 = '02/29/1996'
 dates.5 = '02/28/1A97'  /* bad  */
 dates.6 = '02/22/1996'
 dates.0 = 6
'PIPE STEM DATES.' ,
'| NOT DATECONV 1.10 fulldate isodate' ,
'| INSERT /BAD DATE: / ' ,
'| CONSOLE'
```

Running the VALDATE EXEC results in the three bad dates written to the console:

```
valdate
BAD DATE: 01/AA/1997
BAD DATE: 02/30/1997
BAD DATE: 02/28/1A97
Ready;
```

Example 8

This example uses the DAYS2GO EXEC to tell you how many days to go until the year 2000. The first pipe command shows you can do multiple date conversions.

```
DAYS2GO EXEC:
/*************************************************************/
/* This will let you know how many days to go.               */
/* Useful to see how many days until something is due.       */
/* You can input an enddate.                                 */
/*************************************************************/
parse arg enddate
if enddate = '' Then enddate = '01/01/2000'
'pipe literal' 'DATE'('S') '|dateconv rs full|',
    'var tday|dateconv full rb|var today'
'pipe literal' enddate '|dateconv full rb|var endday '

diff = endday-today
say 'Today is' tday
 say 'You have' diff 'days to go until' enddate
exit
```

Running the DAYS2GO EXEC results in:

```
days2go
Today is 08/05/1997
You have 879 days to go until 01/01/2000
Ready;
```

Example 9

This example uses the DATECONVERT stage to convert an **ISODATE** format to a **POSIX** format.

```
pipe literal 1997-08-01|dateconv 1.10 iso posix|specs 1.8 c2x 1|
    console
0000000033E12700
Ready;

pipe literal 1970-01-01|dateconv 1.10 iso posix|specs 1.8 c2x 1|
    console
0000000000000000
Ready;
```

Example 10

This example shows a relative to relative format conversion. You may have many TOD clock units between events and want to calculate the number of full days until that particular event occurs.

We will convert from **TOD_RELATIVE** to **MET**. The **MET** tells us the number of full days by truncating the converted value.

```
pipe literal 000649534E000000|specs 1-* x2c 1|
     dateconv tod_relative met|console
         5
Ready;
```

This example shows the number of TOD clock units between days 5 and 6. Note due to the truncation of the **MET** value to whole days, any TOD clock value in the range of X'00064953 4E000000' - X'00078B30 C3FFFFFF' will produce the value *5* when converted to **MET**.

Here we convert 5 days to **TOD_RELATIVE**. This is the beginning range:

```
pipe literal 5|dateconvt met tod_relative|specs 1-* c2x 1|cons
000649534E000000
Ready;
```

Here we convert 6 days to **TOD_RELATIVE**:

```
pipe literal 6|dateconv met tod_relative|specs 1-* c2x 1|cons
00078B30C4000000
Ready;
```

Then, subtract one to get the ending range X'00078B30 C3FFFFFF' that will produce 5 days:

```
pipe literal 00078B30C3FFFFFF|specs 1-* x2c 1|
     dateconv tod_relative met|console
         5
Ready;
```

Example 11

This example shows conversions using a date and time. We will convert from **FULLDATE** to **ISODATE** with and without an input range and with and without the TIMEOUT operand.

Here we show that the input time is part of the input, but is not part of the output:

```
pipe literal 01/14/1959 04:12:13.123456|
     dateconv fulldate isodate|console
1959-01-14
Ready;
```

Here we specify an input range that includes only the date. This example converts only the fulldate to the isodate and simply appends the rest of the record, in this case a time, to the end:

```
pipe literal 01/14/1959 04:12:13.123456|
     dateconv 1.10 fulldate isodate|console
1959-01-14 04:12:13.123456
Ready;
```

Here we specify the entire input record and that we want the time as part of the output:

```
pipe literal 01/14/1959 04:12:13.123456|
     dateconv fulldate isodate timeout| console
1959-01-14 04:12:13.123456
Ready;
```

Here we specify an input range that includes only the date and that we want the time as part of the output. This example converts the fulldate to the isodate and appends the time of midnight since no time was specified in the input range. It also leaves the rest of the record alone, so the time that is already on the input line is appended to the output line. This may not be the answer that you want. You may have meant to use the syntax of one of the prior two examples.

```
pipe literal 01/14/1959 04:12:13.123456|
     dateconv 1.10 fulldate isodate timeout| console
1959-01-14 00:00:00.000000 04:12:13.123456
Ready;
```

Example 12

This example shows a conversion from an absolute time of day format to a fulldate format with the time also in the output. Note that the output time is in the local time zone.

```
pipe strliteral x69E604E9B7380000|
     dateconv todabs fulldate timeout| console
01/14/1959 04:12:13.123456
Ready;
```

REXX

The following REXX functions have been updated:

CMSFLAG()

Flag YEAR2000 has been added to the CMSFLAG function. This flag returns 1 if Year 2000 support is present in both CP and CMS, and returns 0 if Year 2000 support is not present in either CP or CMS.

DIAG()/DIAGRC()

The DIAG and DIAGRC functions have been enhanced to include support for Diagnose x′270′.

DIAG(270)/DIAGRC(270): The value returned is a string that is variable in length. The string contains identical information that would be obtained from the DIAGNOSE X′0C′ (the date, time, virtual time used, and total time used) plus the date in the FULLDATE format followed by the ISODATE format.

The values returned are as follows:

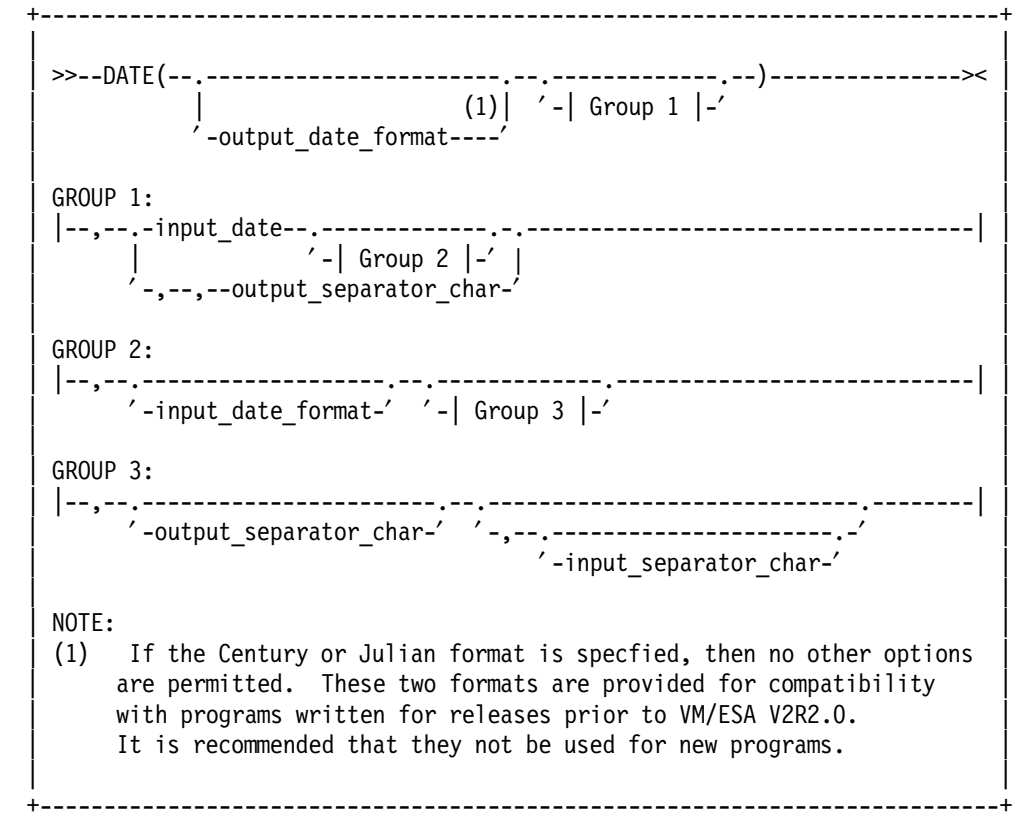
Position	Contents
1 through 8	The date (MM/DD/YY)
9 through 16	The time of day (HH:MM:SS)
17 through 24	The virtual CPU time used
25 through 32	The total CPU time used
33 through 42	The date in FULLDATE format (MM/DD/YYYY)
43 through 48	6 blanks
49 through 58	The date in ISODATE format (YYYY-MM-DD)
59 through 64	6 blanks

DATE()

The DATE() function was extended in VM/ESA V2R2.0 to provide date format conversion capability. The 'C' (Century) and 'J' (Julian) formats are supported as input formats for conversion, but not as conversion output formats (on V2R2.0, APAR VM60860 is required for this to work correctly).

DATE() was also enhanced in VM/ESA V2R4.0 to allow specification of separator characters for input and output dates. APARs VM62022 and VM62023 provide this function for VM/ESA V2R2.0 and V2R3.0.

The following are details of the enhanced DATE function:



DATE() returns, by default, the local date in the format: *dd mon yyyy* (day, month, year—for example, 25 Dec 1996), with no leading zero or blank on the day. Otherwise, the string *input_date* is converted to the format specified by *output_date_format*. *input_date_format* can be specified to define the current format of *input_date*. The default for *input_date_format* and *output_date_format* is **N**ormal.

input_separator_char and *output_separator_char* can be specified to define the separator character for the input date and output date, respectively. Any single nonalphanumeric character is valid.

You can use the following options to obtain specific date formats. (Only the capitalized and highlighted letter is needed; all characters following it are ignored.)

Base the number of complete days (that is, not including the current day) since and including the base date, 1 January 0001, in the format: *dddddd* (no leading zeros or blanks). The expression DATE('B')//7 returns a number in the range 0 – 6 that corresponds to the current day of the week, where 0 is Monday and 6 is Sunday.

Thus, this function can be used to determine the day of the week independent of the national language in which you are working.

Note: The base date of 1 January 0001 is determined by extending the current Gregorian calendar backward (365 days each year, with an extra day every year that is divisible by 4 except century years that are not divisible by 400). It does not take into account any errors in the calendar system that created the Gregorian calendar originally.

Century — the number of days, including the current day, since and including January 1 of the last year that is a multiple of 100 in the form: *ddddd* (no leading zeros). Example: A call to DATE('C') on March 13 1992 returns 33675, the number of days from 1 January 1900 to 13 March 1992. Similarly, a call to DATE('C') on 2 January 2000 returns 2, the number of days from 1 January 2000 to 2 January 2000.

Note: When the Century option is used for input, the output may change, depending on the current century. For example, if DATE('S','1','C') was entered on any day between 1 January 1900 and 31 December 1999, the result would be 19000101. However, if DATE('S','1','C') was entered on any day between 1 January 2000 and 31 December 2099, the result would be 20000101. It is important to understand the above, and code accordingly.

Days — the number of days, including the current day, so far in the current year in the format: *ddd* (no leading zeros or blanks).

Julian — date in the format: *yyddd*.

European — date in the format: dd/mm/yy.

Month — full name of the current month, in the active language. For example, August, if the active language is American English. Only valid for *output_date_format*.

Normal — date in the format: *dd mon yyyy*. **This is the default** (*dd* cannot have any leading zeros or blanks; *yyyy* must have leading zeros but cannot have any leading blanks). If the active language has an abbreviated form of the month name, then it is used (for example, Jan, Feb, and so on). If **N**ormal is specified for *input_date_format*, the *input_date* must have the month (*mon*) specified in English.

Ordered — date in the format: *yy/mm/dd* (suitable for sorting, and so forth).

Standard — date in the format: *yyyymmdd* (suitable for sorting, and so forth).

Usa — date in the format: *mm/dd/yy*.

Weekday — the name for the day of the week, in the active language. For example, Tuesday, if the active language is American English. Only valid for *output_date_format*.

Here are some examples, assuming today is 13 March 1992:

```
DATE()                          ->   '13 Mar 1992'
DATE(,'19960527','S')           ->   '27 May 1996'
DATE('B')                       ->   727269
DATE('B','27 May 1996',)        ->   728805
DATE('B','27*May*1996',,,'*')   ->   728805
DATE('C')                       ->   33675
DATE('E')                       ->   '13/03/92'
DATE('E',,,'+')                 ->   '13+03+92'
DATE('E','081698','U',,'')      ->   '16/08/98'
DATE('J')                       ->   92073
DATE('M')                       ->   'March'
DATE('N')                       ->   '13 Mar 1992'
DATE('N','35488','C')           ->   '28 Feb 1997'
DATE('O')                       ->   '92/03/13'
DATE('S')                       ->   '19920313'
DATE('S',,)                     ->   '19920313'
DATE('S',,,'-')                 ->   '1992-03-13'
DATE('U')                       ->   '03/13/92'
```

```
DATE('U','96/05/27','O')            ->   '05/27/96'
DATE('U','97059','J')               ->   '02/28/97'
DATE('U','1.Feb.1998','N','+','.')  ->   '02+01+98'
DATE('U','1998-08-16','S','','-')   ->   '081698'
DATE('W')                           ->   'Friday'
```

Notes:

1. The first call to DATE or TIME in one clause causes a time stamp to be made that is then used for *all* calls to these functions in that clause. Therefore, multiple calls to any of the DATE or TIME functions or both in a single expression or clause are guaranteed to be consistent with each other.
2. Input dates given in 2-digit year formats are interpreted as being within a 100 year window as calculated by:

   (current_year − 50) = low end of window
   (current_year + 49) = high end of window
3. The "active language" referred to in the Month, Normal, and Weekday options is the national language set by CMS during initial start up or by an explicit SET LANGUAGE command, for example, SET LANGUAGE UCENG.

   ```
   DATE('M')                  ->   'MARCH'
   DATE('N')                  ->   '13 MAR 1992'
   DATE('N','35488','C')      ->   '28 FEB 1997'
   DATE('W')                  ->   'FRIDAY'
   ```
4. *input_separator_char* and *output_separator_char* apply to the following formats and have the following default values:

Format Name	Format Structure	Default Separator Value
European	*dd/mm/yy*	'/'
Normal	*dd mon yyyy*	' '
Ordered	*yy/mm/dd*	'/'
Standard	*yyyymmdd*	''
Usa	*mm/dd/yy*	'/'

   Note: Null is a valid value for *input_separator_char* and *output_separator_char*.
5. For consistency with CMS date formats ISODATE and FULLDATE, a REXX program can convert dates to these formats by using a combination of the TRANSLATE and DATE functions:
   - This example returns the current date in ISODATE format:

     ```
     TRANSLATE('year-mn-dt',DATE('S'),'yearmndt')
     ```
   - This example returns the current date in FULLDATE format:

     ```
     TRANSLATE('mn/dt/year',DATE('S'),'yearmndt')
     ```

EXEC2

The following statements were added in VM/ESA V2R2.0:

&FULLDATE

This statement returns the date in Coordinated Universal Time (UTC) in the form YYYY/MM/DD.

&ISODATE

This statement returns the date in Coordinated Universal Time (UTC) in the form YYYY-MM-DD.

Commands

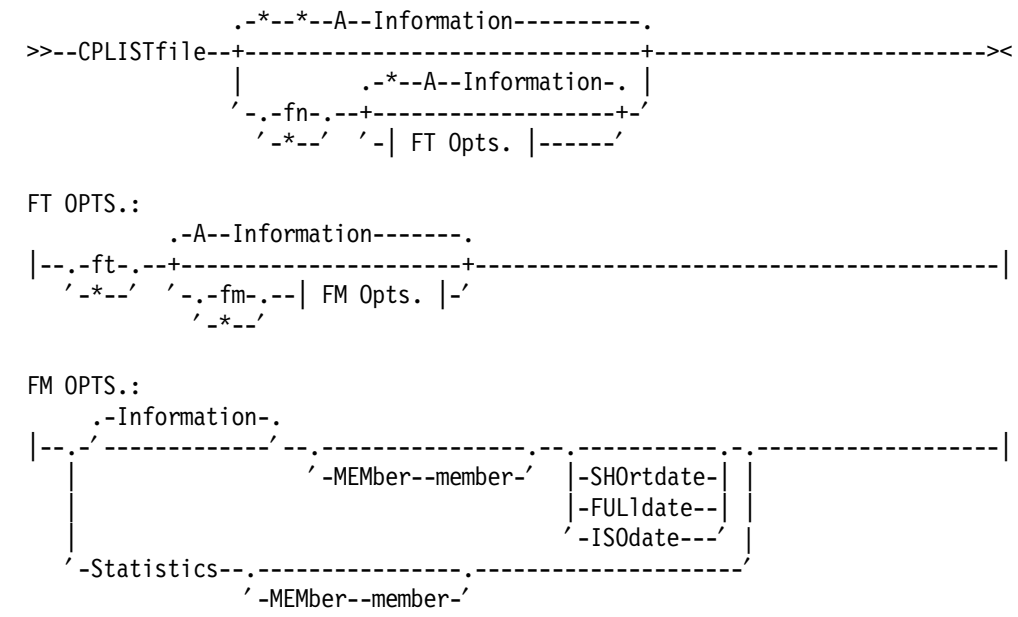
Many CP, CMS, and GCS commands which accept dates as input and/or provide dates as output have been enhanced to support date formats with 4-digit years.

CP Command Enhancements

The following CP commands accept date format operands and provide dates with 4-digit years. If no date format operand is specified, the user's default date format setting is used.

Except where noted for a specific command or operand, all enhancements to these CP commands to support date format operands and 4-digit years are available beginning with VM/ESA V2R2.0.

CPLISTFILE



Operands

.
.
.

SHOrtdate
Specifies that dates in the response to this command will be displayed in mm/dd/yy format, where mm is the month, dd is the day of the month, and yy is the 2-digit year.

FULldate
Specifies that dates in the response to this command will be displayed in mm/dd/yyyy, where mm is the month, dd is the day of the month, and yyyy is the 4-digit year.

ISOdate
Specifies that dates in the response to this command will be displayed in yyyy-mm-dd format, where yyyy is the 4-digit year, mm is the month, and dd is the day of the month.

Responses

If you want to see a list of all the LOGO files on CP's A-disk, enter the following:

```
cplistfile * logo a information fulldate
Filename Filetype FM Fmt LRecL    Records    Date      Time   Cache
DAVID    LOGO     A  F      78         15 09/05/1992 06:43:26 No
DEFAULT  LOGO     A  F      80         15 11/29/1992 06:42:14 No
EMILY    LOGO     A  F      80         15 02/14/1992 06:42:23 No
LDEV     LOGO     A  F      80         15 07/28/1992 06:41:48 No
LOCAL    LOGO     A  F      80         15 10/03/1992 06:41:40 No
MOD5     LOGO     A  F     132         15 10/03/1992 06:41:15 No
PVM      LOGO     A  F      78         15 11/29/1992 06:42:01 Yes
SNA      LOGO     A  F      78         15 09/05/1992 06:41:34 No
SVCDIR   LOGO     A  F      80         15 12/18/1992 22:06:27 No
SYSTEM   LOGO     A  F      80         15 11/29/1992 06:41:28 No
TCPIP    LOGO     A  F      78         15 10/03/1992 06:42:07 Yes
O8E4     LOGO     A  F      80         15 12/18/1992 06:41:21 No
O8E6     LOGO     A  F      80         23 12/18/1992 06:41:54 No
Ready;
```

If you want to see a list of all the TXTLIB files on CP's A-disk that contain CMS partitioned data set members starting with the prefix IEA, enter the following:

```
cplistfile * txtlib a information member iea* shortdate
Filename Filetype FM Fmt LRecL    Records   Date     Time   Cache
CMSLIB   TXTLIB   B  F      80        131 12/20/96 13:12:29 No
   Member IEAXPSIM  starts at record 2
   Member IEAXPALL  starts at record 8
   Alias  IEAXKALL  starts at record 8
   Member IEAXPDXR  starts at record 102
   Alias  IEAXKDXR  starts at record 102
Ready;
```

This response tells you that CP has one TXTLIB on its A-disk and that TXTLIB contains:

- 3 members whose names start with IEA at records 2, 8, and 102
- 2 aliases whose names starts with IEA for the two members at records 8 and 102.

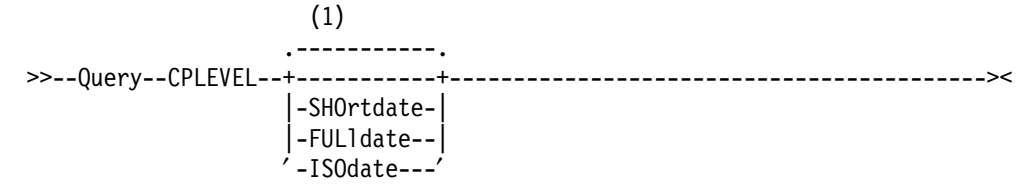
If you want to see the above response with the date in mm/dd/yyyy format, enter the following:

```
cplistfile * txtlib a information member iea* fulldate
Filename Filetype FM Fmt LRecL    Records    Date      Time   Cache
CMSLIB   TXTLIB   B  F      80        131 12/20/1996 13:12:29 No
   Member IEAXPSIM  starts at record 2
   Member IEAXPALL  starts at record 8
   Alias  IEAXKALL  starts at record 8
   Member IEAXPDXR  starts at record 102
   Alias  IEAXKDXR  starts at record 102
Ready;
```

If you want to see the above response with the date in yyyy-mm-dd format, enter the following:

```
cplistfile * txtlib a information member iea* isodate
Filename Filetype FM Fmt LRecL    Records    Date      Time   Cache
CMSLIB   TXTLIB   B  F      80        131 1996-12-20 13:12:29 No
   Member IEAXPSIM  starts at record 2
   Member IEAXPALL  starts at record 8
   Alias  IEAXKALL  starts at record 8
   Member IEAXPDXR  starts at record 102
   Alias  IEAXKDXR  starts at record 102
Ready;
```

QUERY CPLEVEL



NOTE:
(1) The default is the user's default date format.

Operands

SHOrtdate
specifies that dates in the response to this command will be displayed in *mm/dd/yy* format, where *mm* is the month, *dd* is the day of the month, and *yy* is the 2-digit year.

FULldate
specifies that dates in the response to this command will be displayed in *mm/dd/yyyy* format, where *mm* is the month, *dd* is the day of the month, and *yyyy* is the 4-digit year.

ISOdate
specifies that dates in the response to this command will be displayed in *yyyy-mm-dd* format, where *yyyy* is the 4-digit year, *mm* is the month, and *dd* is the day of the month.

Usage Notes

1. The default date format for certain CP and CMS commands can be set on a system-wide basis and also for the individual user. The system-wide default date format is set with the SYSTEM_DATEFORMAT system configuration statement. The user's default date format is set with the DATEFORMAT user directory control statement. The system-wide default and the user's default can also be set with the CP SET DATEFORMAT command. The user's default date format defaults to the system-wide default. The system-wide and user settings can be queried with the CP QUERY DATEFORMAT command. The hierarchy of possible date format settings for the QUERY CPLEVEL command, from highest priority to lowest, is:
   - QUERY CPLEVEL command operand
   - User default
   - System-wide default

Responses

If you enter QUERY CPLEVEL SHORTDATE, you get the following response:

```
VM/ESA VERSION v RELEASE r.m, SERVICE LEVEL yynn
GENERATED AT mm/dd/yy hh:mm:ss timezone
IPL AT mm/dd/yy hh:mm:ss timezone

---------------
```

If you enter QUERY CPLEVEL FULLDATE, you get the following response:

```
VM/ESA VERSION v RELEASE r.m, SERVICE LEVEL yynn
GENERATED AT mm/dd/yyyy hh:mm:ss timezone
IPL AT mm/dd/yyyy hh:mm:ss timezone

---------------
```

If you enter QUERY CPLEVEL ISODATE, you get the following response:

VM/ESA VERSION *v* RELEASE *r.m*, SERVICE LEVEL *yynn*
GENERATED AT *yyyy-mm-dd hh:mm:ss timezone*
IPL AT *yyyy-mm-dd hh:mm:ss timezone*

v
identifies the software version level.

r.m
identifies the software release level and the release modification level.

SERVICE LEVEL *yynn*
identifies the software service level number. The number indicates the most recent RSU service tape that has been applied. *yy* is the last 2 digits of the year and *nn* is the sequential number of the RSU tape for that year. It cannot indicate which individual updates have been incorporated into CP. The system programmer can find out what individual updates have been incorporated by using the VMSES/E tool.

GENERATED AT *mm/dd/yy hh:mm:ss timezone*
GENERATED AT *mm/dd/yyyy hh:mm:ss timezone*
GENERATED AT *yyyy-mm-dd hh:mm:ss timezone*
indicates the date and time (translated to the current active time zone) that the CP system software was written to DASD. One of the above responses is generated depending on the date format specified on the user's default date format.

IPL *mm/dd/yy hh:mm:ss timezone*
IPL *mm/dd/yyyy hh:mm:ss timezone*
IPL *yyyy-mm-dd hh:mm:ss timezone*
indicates the date and time the CP system software was last started. One of the above responses is generated depending on the date format specified on the user's default date format.

QUERY IMG

```
                .-ALL------.
>>--Query--IMG--+----------+--.------------------------.-----------------><
                |-CLass--c-|  |-COUNT------------------|
                |-NAME--fn-|  '-| Date Format Options |-'
                '-spoolid--'

DATE FORMAT OPTIONS:
|--.-----------.-------------------------------------------------------------|
   |-SHOrtdate-|
   |-FULldate--|
   '-ISOdate---'
```

Operands

.
.
.

SHOrtdate
Specifies that dates in the response to this command will be displayed in mm/dd format, where mm is the month and dd is the day of the month.

FULldate
Specifies that dates in the response to this command will be displayed in mm/dd/yyyy format, where mm is the month, dd is the day of the month, and yyyy is the 4-digit year.

ISOdate
Specifies that dates in the response to this command will be displayed in yyyy-mm-dd format, where yyyy is the 4-digit year, mm is the month, and dd is the day of the month.

Usage Notes

If no date format option is specified, then the user's default date format setting is used.

Responses

The following response is issued when you specify QUERY IMG with the SHORTDATE option.

```
OWNERID  FILE TYPE CL RECS DATE  TIME     FILENAME FILETYPE ORIGINID
*IMG     spid typ  c  nnnn mm/dd hh:mm:ss filename filetype originid

---------------
```

The following response is issued when you specify QUERY IMG with the FULLDATE option.

```
OWNERID  FILE TYPE CL RECS DATE       TIME     FILENAME FILETYPE ORIGINID
*IMG     spid typ  c  nnnn mm/dd/yyyy hh:mm:ss filename filetype originid

---------------
```

The following response is issued when you specify QUERY IMG with the ISODATE option.

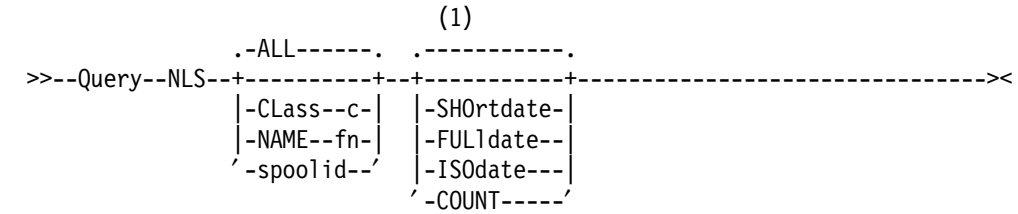
```
OWNERID  FILE TYPE CL RECS DATE       TIME     FILENAME FILETYPE ORIGINID
*IMG     spid typ  c  nnnn yyyy-mm-dd hh:mm:ss filename filetype originid

          .
          .
          .
```

DATE

identifies the date the file was closed. The format of the date is determined by the SHORTDATE, FULLDATE, or ISODATE options.

QUERY NLS



NOTE:
(1) If a date format is not specified, the user's default date format is used for responses that contain dates.

Operands

.
.
.

SHOrtdate
specifies that dates in the response to this command will be displayed in *mm/dd* format, where *mm* is the month and *dd* is the day of the month.

FULldate
specifies that dates in the response to this command will be displayed in *mm/dd/yyyy* format, where *mm* is the month, *dd* is the day of the month, and *yyyy* is the 4-digit year.

ISOdate
specifies that dates in the response to this command will be displayed in *yyyy-mm-dd* format, where *yyyy* is the 4-digit year, *mm* is the month, and *dd* is the day of the month.

.
.
.

Usage notes

The default date format for certain CP and CMS commands can be set on a system-wide basis and also for the individual user. The system-wide default date format is set with the SYSTEM_DATEFORMAT system configuration statement. The user's default date format is set with the DATEFORMAT user directory control statement. The system-wide default and the user's default can also be set with the CP SET DATEFORMAT command. The user's default date format defaults to the system-wide default. The system-wide and user settings can be queried with the CP QUERY DATEFORMAT command. The hierarchy of possible date format settings for the QUERY NLS command, from highest priority to lowest, is:

- QUERY NLS command operand
- User default
- System-wide default

Responses

The following response is issued when you specify QUERY NLS SHORTDATE:

```
OWNERID  FILE TYPE CL RECS DATE  TIME     FILENAME FILETYPE ORIGINID
*NLS     nnnn type c  nnnn mm/dd hh:mm:ss fn       ft       originid

---------------
```

The following response is issued when you specify QUERY NLS FULLDATE:

```
OWNERID  FILE TYPE CL RECS DATE       TIME     FILENAME FILETYPE ORIGINID
*NLS     nnnn type c  nnnn mm/dd/yyyy hh:mm:ss fn       ft       originid

---------------
```

The following response is issued when you specify QUERY NLS ISODATE:

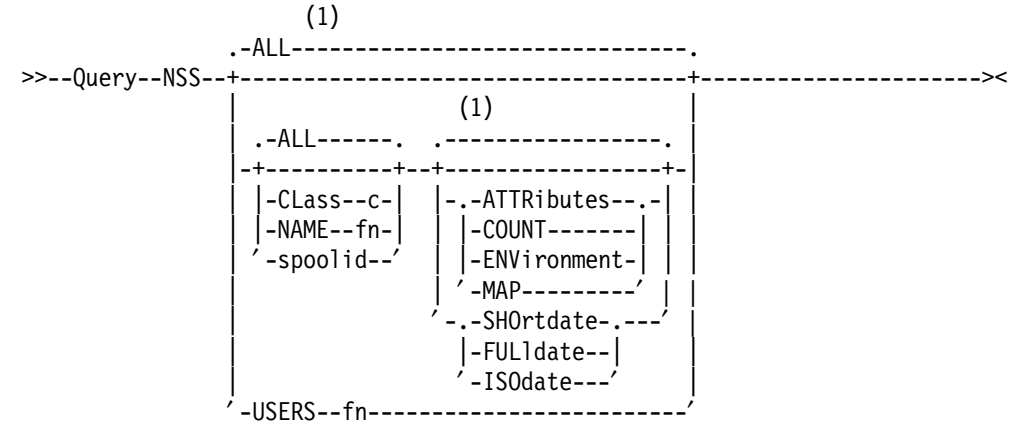
```
OWNERID  FILE TYPE CL RECS DATE       TIME     FILENAME FILETYPE ORIGINID
*NLS     nnnn type c  nnnn yyyy-mm-dd hh:mm:ss fn       ft       originid

          .
          .
          .
```

DATE

identifies the date the file was closed. The format of the date is determined by the SHORTDATE, FULLDATE, or ISODATE operand. If no date format operand is specified, the user's default date format setting is used.

QUERY NSS



NOTE:
(1) If a date format is not specified, the user's default date format is used for responses that contain dates.

Operands

.
.
.

SHOrtdate
specifies that dates in the response to this command will be displayed in *mm/dd* format, where *mm* is the month and *dd* is the day of the month.

FULldate
specifies that dates in the response to this command will be displayed in *mm/dd/yyyy* format, where *mm* is the month, *dd* is the day of the month, and *yyyy* is the 4-digit year.

ISOdate
specifies that dates in the response to this command will be displayed in *yyyy-mm-dd* format, where *yyyy* is the 4-digit year, *mm* is the month, and *dd* is the day of the month.

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Usage Notes

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The default date format for certain CP and CMS commands can be set on a system-wide basis and also for the individual user. The system-wide default date format is set with the SYSTEM_DATEFORMAT system configuration statement. The user's default date format is set with the DATEFORMAT user directory control statement. The system-wide default and the user's default can also be set with the CP SET DATEFORMAT command. The user's default date format defaults to the system-wide default. The system-wide and user settings can be queried with the CP QUERY DATEFORMAT command. The hierarchy of possible date format settings for the QUERY NSS command, from highest priority to lowest, is:

- QUERY NSS command operand
- User default
- System-wide default

Responses (ALL, CLASS, NAME, spoolid)

This response format is displayed for an ALL, CLASS, NAME, or *spoolid* request if SHORTDATE is specified or is the user's default date format. The response contains one record for each file that matches the criteria specified on the command. The fields in the response contain the following information:

```
OWNERID  FILE TYPE CL RECS  DATE  TIME     FILENAME FILETYPE ORIGINID
*NSS     spid NSS  c  recs  mm/dd hh:mm:ss fn       ft       originid
```

This response format is displayed for an ALL, CLASS, NAME, or *spoolid*request if FULLDATE is specified or is the user's default date format. The response contains one record for each file that matches the criteria specified on the command. The fields in the response contain the following information:

```
OWNERID  FILE TYPE CL RECS  DATE       TIME     FILENAME FILETYPE ORIGINID
*NSS     spid NSS  c  recs  mm/dd/yyyy hh:mm:ss fn       ft       originid
```

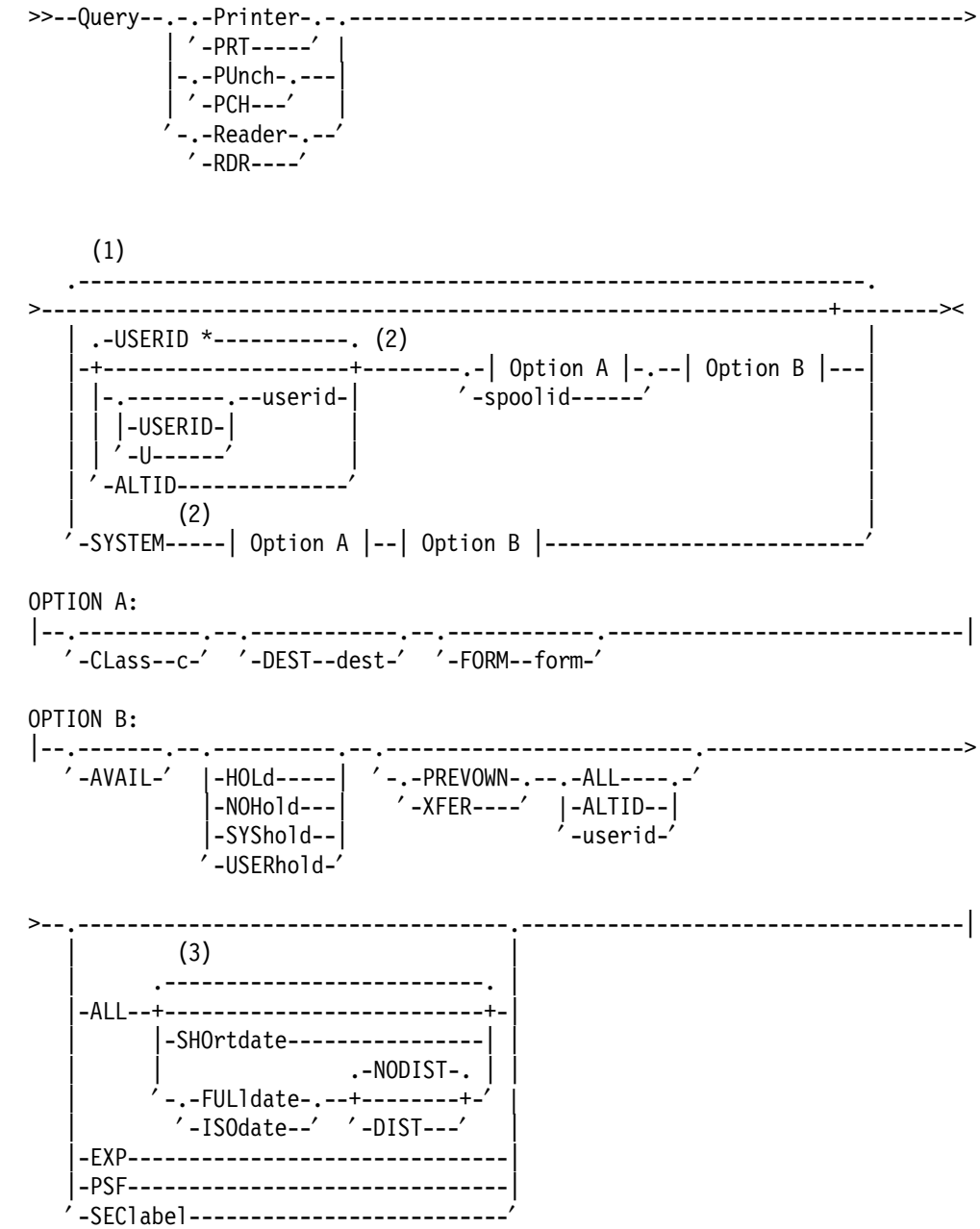
This response format is displayed for an ALL, CLASS, NAME, or *spoolid*request if ISODATE is specified or is the user's default date format. The response contains one record for each file that matches the criteria specified on the command. The fields in the response contain the following information:

```
OWNERID  FILE TYPE CL RECS  DATE       TIME     FILENAME FILETYPE ORIGINID
*NSS     spid NSS  c  recs  yyyy-mm-dd hh:mm:ss fn       ft       originid
```

.
.
.

DATE
identifies the date the NSS or saved segment was defined. The format of the date is determined by the SHORTDATE, FULLDATE, or ISODATE operand. If no date format operand is specified, the user's default date format setting is used.

QUERY READER/PRINTER/PUNCH ALL



NOTES:
(1) For class G, * is the default; for class D or class D and G, SYSTEM is the default.

(2) You can enter Options in any order.

(3) The default is the user's default date format.

Options

.
.
.

USERID
U

indicates that the next parameter is a userid. Class G users can specify only an asterisk (*) following USERID or U. U is the only abbreviation allowed for USERID.

This operand was added to VM/ESA V2R2.0 with APAR VM61276, and V2R3.0 with APAR VM61570.

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SHOrtdate

specifies that dates in the response to this command will be displayed in *mm/dd* format, where *mm* is the month and *dd* is the day of the month.

FULldate

specifies that dates in the response to this command will be displayed in *mm/dd/yyyy* format, where *mm* is the month, *dd* is the day of the month, and *yyyy* is the 4-digit year.

ISOdate

specifies that dates in the response to this command will be displayed in *yyyy-mm-dd* format. where *yyyy* is the 4-digit year, *mm* is the month, and *dd* is the day of the month.

NODIST
DIST

Specifies whether or not to display a distribution code when FULLDATE or ISODATE has been specified. The default is NODIST so each output record fits within an 80-character buffer.

Usage Notes

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.
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The default date format for certain CP and CMS commands can be set on a system-wide basis and also for the individual user. The system-wide default date format is set with the SYSTEM_DATEFORMAT system configuration statement. The user's default date format is set with the DATEFORMAT user directory control statement. The system-wide default and the user's default can also be set with the CP SET DATEFORMAT command. The user's default date format defaults to the system-wide default. The system-wide and user settings can be queried with the CP QUERY DATEFORMAT command. The hierarchy of possible date format settings for the QUERY RDR/PRT/PUN command, from highest priority to lowest, is:

- QUERY RDR/PRT/PUN command option
- User default
- System-wide default

Responses

The following response is issued when you specify QUERY RDR/PRT/PUN with the ALL and SHORTDATE option, or if the user's default date format setting is SHORTDATE:

```
ORIGINID FILE CLASS RECORDS   CPY HOLD DATE  TIME     NAME     TYPE
userid   spid c typ nnnnnnnn  nnn NONE mm/dd hh:mm:ss filename filetype
                             *nnn USER
                                  SYS
                                  USYS

DIST
distcode
```

The following response is issued when you specify QUERY RDR/PRT/PUN with the ALL, FULLDATE, and NODIST options:

```
ORIGINID FILE CLASS RECORDS   CPY HOLD DATE       TIME     NAME     TYPE
userid   spid c typ nnnnnnnn  nnn NONE mm/dd/yyyy hh:mm:ss filename filetype
                             *nnn USER
                                  SYS
                                  USYS
```

The following response is issued when you specify QUERY RDR/PRT/PUN with the ALL, ISODATE, and DIST options:

```
ORIGINID FILE CLASS RECORDS   CPY HOLD DATE       TIME     NAME
userid   spid c typ nnnnnnnn  nnn NONE yyyy-mm-dd hh:mm:ss filename
                             *nnn USER
                                  SYS
                                  USYS

TYPE     DIST
filetype distcode
```

Explanation of Response Contents

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mm/dd
mm/dd/yyyy
yyyy-mm-dd
is the date the file was created. The format of the date is determined by the SHORTDATE, FULLDATE, or ISODATE option. If no date format option is specified, the user's default date format setting is used.

.
.
.

QUERY TIME

```
                  (1)
                .-----------.
>>--Query--Time--+-----------+-------------------------------------------><
                |-SHOrtdate-|
                |-FULldate--|
                |-ISOdate---|
                '-Offset----'

NOTE:
(1)  If a date format is not specified, the user's default date format is
     used for responses that contain dates.
```

Operands

SHOrtdate
specifies that dates in the response to this command will be displayed in *mm/dd/yy* format, where *mm* is the month, *dd* is the day of the month, and *yy* is the 2-digit year.

FULldate
specifies that dates in the response to this command will be displayed in *mm/dd/yyyy* format, where *mm* is the month, *dd* is the day of the month, and *yyyy* is the 4-digit year.

ISOdate
specifies that dates in the response to this command will be displayed in *yyyy-mm-dd* format, where *yyyy* is the 4-digit year, *mm* is the month, and *dd* is the day of the month.

.
.
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Usage Notes

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The default date format for certain CP and CMS commands can be set on a system-wide basis and also for the individual user. The system-wide default date format is set with the SYSTEM_DATEFORMAT system configuration statement. The user's default date format is set with the DATEFORMAT user directory control statement. The system-wide default and the user's default can also be set with the CP SET DATEFORMAT command. The user's default date format defaults to the system-wide default. The system-wide and user settings can be queried with the CP QUERY DATEFORMAT command. The hierarchy of possible date format settings for the QUERY TIME command, from highest priority to lowest, is:

- QUERY TIME command operand
- User default
- System-wide default

Responses

If you enter QUERY TIME SHORTDATE, you get the following response:

TIME IS *hh:mm:mm zone weekday mm/dd/yy*

This shows the current real clock time (in hours, minutes, and seconds), the time zone (for example, EST), the day of the week, and the calendar date.

CONNECT= *hh:mm:ss*

The maximum value for this field is 99:59.59. A time value larger than the maximum will be indicated by this value.

VIRTCPU= *mmm:ss.hs*

The maximum value for this field is 999:59.99. A time value larger than the maximum will be indicated by this value.

TOTCPU= *mmm:ss.hs*

shows the time consumed in the current session. If you disconnect, the time does not revert to zero; you will see the actual clock time elapsed since you logged on. The maximum value for this field is 999:59.99. A time value larger than the maximum will be indicated by this value.

If you enter QUERY TIME FULLDATE, you get the following response:

TIME IS *hh:mm:mm zone weekday mm/dd/yyyy*

CONNECT= *hh:mm:ss* VIRTCPU= *mmm:ss.hs* TOTCPU= *mmm:ss.hs*

If you enter QUERY TIME ISODATE, you get the following response:

TIME IS *hh:mm:mm zone weekday yyyy-mm-dd*

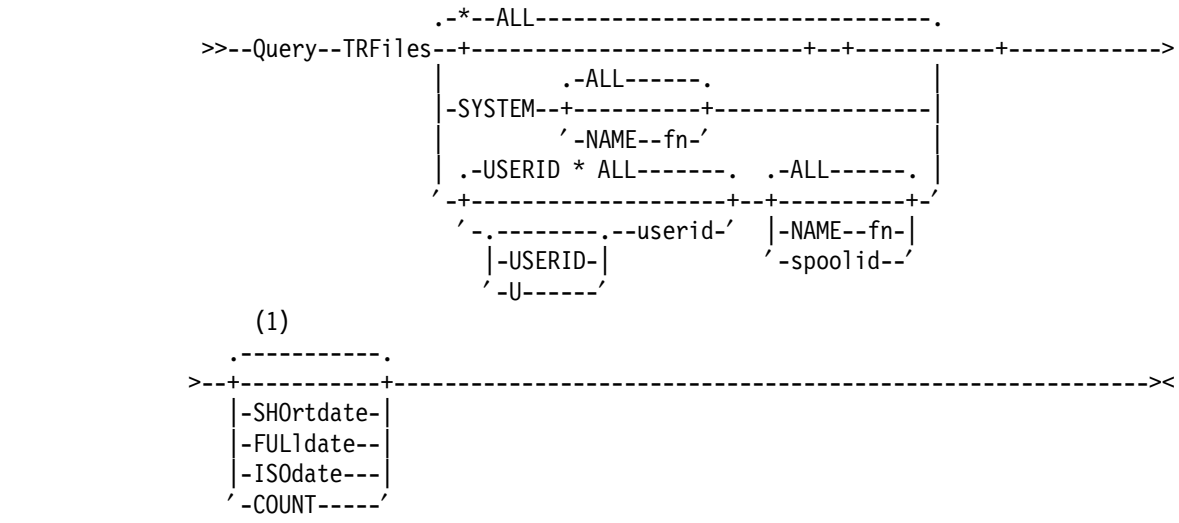
CONNECT= *hh:mm:ss* VIRTCPU= *mmm:ss.hs* TOTCPU= *mmm:ss.hs*

CONNECT= *hh:mm:ss*
identifies the actual clock time consumed in the current session in hours, minutes, and seconds. The maximum value for this field is 99:59.59. A time value larger than the maximum will be indicated by this value.

VIRTCPU= *mmm:ss.hs*
identifies the virtual processor time consumed in the current session in minutes, seconds, and hundredths of seconds. The maximum value for this field is 999:59.99. A time value larger than the maximum will be indicated by this value.

TOTCPU= *mmm:ss.hs*
identifies the total processor time (virtual and overhead) consumed in the current session in minutes, seconds, and hundredths of seconds. The maximum value for this field is 999:59.99. A time value larger than the maximum will be indicated by this value.

QUERY TRFILE



NOTE:
(1) If a date format is not specified, the user's default date format is used for responses that contain dates.

Operands

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.
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USERID
U

indicates that the next parameter is a userid. Class G users can specify only an asterisk (*) following USERID or U. U is the only abbreviation allowed for USERID.

This operand was added to VM/ESA V2R2.0 with APAR VM61276, and V2R3.0 with APAR VM61570.

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SHOrtdate

specifies that dates in the response to this command will be displayed in *mm/dd* format, where *mm* is the month and *dd* is the day of the month.

FULldate

specifies that dates in the response to this command will be displayed in *mm/dd/yyyy* format, where *mm* is the month, *dd* is the day of the month, and *yyyy* is the 4-digit year.

ISOdate

specifies that dates in the response to this command will be displayed in *yyyy-mm-dd* format, where *yyyy* is the 4-digit year, *mm* is the month, and *dd* is the day of the month.

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.
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Usage Notes

The default date format for certain CP and CMS commands can be set on a system-wide basis and also for the individual user. The system-wide default date format is set with the SYSTEM_DATEFORMAT system configuration statement. The user's default date format is set with the DATEFORMAT user directory control statement. The system-wide default and the user's default can also be set with the CP SET DATEFORMAT command. The user's default date format defaults to the system-wide default. The system-wide and user settings can be queried with the CP QUERY DATEFORMAT command. The hierarchy of possible date format settings for the QUERY TRFILES command, from highest priority to lowest, is:

- QUERY TRFILES command operand
- User default
- System-wide default

Responses

The following is an example of a response to QUERY TRFILES SYSTEM SHORTDATE:

```
OWNERID  FILE TYPE CL RECS DATE   TIME     FILENAME FILETYPE ORIGINID
ownerid  file type c  recs mm/dd  hh:mm:ss filename filetype orig

---------------
```

The following is an example of a response to QUERY TRFILES SYSTEM FULLDATE:

```
OWNERID  FILE TYPE CL RECS DATE       TIME     FILENAME FILETYPE ORIGINID
ownerid  file type c  recs mm/dd/yyyy  hh:mm:ss filename filetype orig

---------------
```

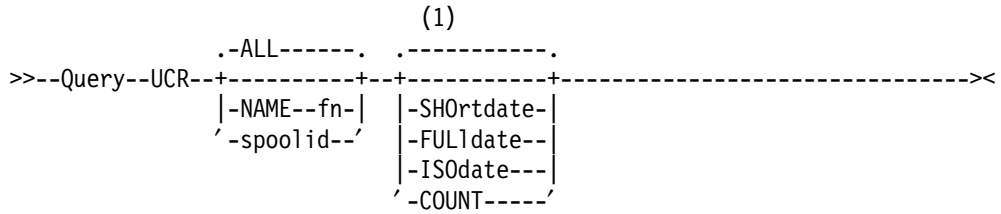
The following is an example of a response to QUERY TRFILES SYSTEM ISODATE:

```
OWNERID  FILE TYPE CL RECS DATE       TIME     FILENAME FILETYPE ORIGINID
ownerid  file type c  recs yyyy-mm-dd  hh:mm:ss filename filetype orig
```

.
.
.

DATE
identifies the date the file was closed. If the file is open for reading or writing, or if the file is being processed by the TRACERED command, OPEN-TRSAVE is displayed instead of a date and time. The format of the date is determined by the SHORTDATE, FULLDATE, or ISODATE operand. If no date format operand is specified, the user's default date format setting is used.

QUERY UCR



NOTE:
(1) If a date format is not specified, the user's default date format is used for responses that contain dates.

Operands

.
.
.

SHOrtdate
specifies that dates in the response to this command will be displayed in *mm/dd* format, where *mm* is the month and *dd* is the day of the month.

FULldate
specifies that dates in the response to this command will be displayed in *mm/dd/yyyy* format, where *mm* is the month, *dd* is the day of the month, and *yyyy* is the 4-digit year.

ISOdate
specifies that dates in the response to this command will be displayed in *yyyy-mm-dd* format, where *yyyy* is the 4-digit year, *mm* is the month, and *dd* is the day of the month.

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Usage Notes

The default date format for certain CP and CMS commands can be set on a system-wide basis and also for the individual user. The system-wide default date format is set with the SYSTEM_DATEFORMAT system configuration statement. The user's default date format is set with the DATEFORMAT user directory control statement. The system-wide default and the user's default can also be set with the SET DATEFORMAT command. The user's default date format defaults to the system-wide default. The system-wide and user settings can be queried with the QUERY DATEFORMAT command. The hierarchy of possible date format settings for the QUERY UCR command, from highest priority to lowest, is:

- QUERY UCR command operand
- User default
- System-wide default

Responses

The following response is issued when you specify QUERY UCR SHORTDATE:

```
OWNERID  FILE TYPE CL RECS DATE  TIME
ownerid  nnnn type c  nnnn mm/dd hh:mm:ss

FILENAME FILETYPE ORIGINID
fn       ft       originid
```

The following response is issued when you specify QUERY UCR FULLDATE:

```
OWNERID  FILE TYPE CL RECS DATE      TIME
ownerid  nnnn type c  nnnn mm/dd/yyyy hh:mm:ss

FILENAME FILETYPE ORIGINID
fn       ft       originid
```

The following response is issued when you specify QUERY UCR ISODATE:

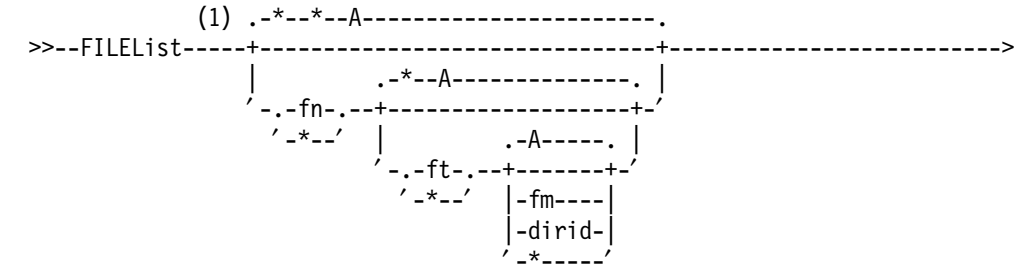
```
OWNERID  FILE TYPE CL RECS DATE      TIME
ownerid  nnnn type c  nnnn yyyy-mm-dd hh:mm:ss

FILENAME FILETYPE ORIGINID
fn       ft       originid
```

DATE
identifies the date that the file was closed. If the file is being created, ″OPEN-UCR″ is displayed instead of a date and time. The format of the date is determined by the SHORTDATE, FULLDATE, or ISODATE operand. If no date format operand is specified, the user′s default date format setting is used.

CMS Command Enhancements (V2R2.0)

The following CMS commands were enhanced in VM/ESA V2R2.0 to accept date format operands and/or provide dates with 4-digit years. If no date format operand is specified, the user's default date format setting is used (for FILELIST and RDRLIST, the CMS DEFAULTS date format setting is used).

FILELIST




```
OPTIONS:
               .-Nofilelist-.  .-PROFile--PROFFLST-.  .-ALLfile--.
|--.--------.--+------------+--+------------------+--+----------+---------->
   '-Append-'  '-Filelist---'  '-PROFile--fn-------'  '-AUThfile-'

   .-MIXEDOFF-.  .-STAts-------.
>--+----------+--+-------------+--.------------------------------.---------->
   '-MIXEDON--'  |-SHAre-------|  |-BEFore--date--.-------------.-|
                 |        (4)  |  |               '-AFTer--date-' |
                 |-SEArch------|  |-AFTer--date--.-------------.-|
                 |          (4)|  |              '-BEFore--date-' |
                 '-ALLDates----'  '-TODay-------------------------'

   .-OWNer-----.  .-VMDate----.
>--+-----------+--+-----------+-------------------------------------------|
   |-READOnly--|  |-SHOrtdate-|
   '-READWrite-'  |-FULldate--|
                  '-ISOdate---'

NOTES ON THE SYNTAX:
(1)  Special commands that can be used in the FILELIST environment are
     EXECUTE, DISCARD, ALIALIST, and AUTHLIST.

(2)  The default options you receive appear above the line in the Options
     group.

(3)  You can enter Options in any order between the parentheses.

(4)  If this option is chosen, you cannot use the BEFORE, AFTER, TODAY
     options.
```

Options

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.
.

BEFore *date*
lists only those files that were last written to BEFORE the date specified. The date can be specified as *mm/dd/yy*, *mm/dd/yyyy*, or *yyyy-mm-dd*. *mm* is the month, *dd* is the day of the month, *yy* is the 2-digit year, and *yyyy* is the 4-digit year. Variables *mm* and *dd* are one or two digit numbers.

The BEFORE option cannot be specified with the following options:

- SEARCH
- ALLDATES.

AFTer *date*
lists only those files that were last written to AFTER the date specified. The date can be specified as *mm/dd/yy*, *mm/dd/yyyy*, or *yyyy-mm-dd*. *mm* is the month, *dd* is the day of the month, *yy* is the 2-digit year, and *yyyy* is the 4-digit year. Variables *mm* and *dd* are one or two digit numbers.

The AFTER option cannot be specified with the following options:

- SEARCH
- ALLDATES.

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VMDate
displays the dates in the format specified by the user's default date format setting. This is the default. This option is ignored if specified with the SEARCH or SHARE option.

SHOrtdate
displays the dates in *mm/dd/yy* format, where *mm* is the month, *dd* is the day of the month, and *yy* is the 2-digit year. This option is ignored if specified with the SEARCH or SHARE option.

FULldate
displays the dates in *mm/dd/yyyy* format, where *mm* is the month, *dd* is the day of the month, and *yyyy* is the 4-digit year. This option is ignored if specified with the SEARCH or SHARE option.

ISOdate
displays the dates in *yyyy-mm-dd* format, where *yyyy* is the 4-digit year, *mm* is the month, and *dd* is the day of the month. This option is ignored if specified with the SEARCH or SHARE option.

Usage Notes

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If a date format is not specified on the FILELIST command, the default date format is determined by the setting of the DEFAULTS command. The DEFAULTS command default (the initial setting) is VMDATE, which indicates that the user's default date format is to be used. The DEFAULTS command setting can be changed by using DEFAULTS SET.

The default date format for certain CP and CMS commands can be set on a system-wide basis and also for the individual user. The system-wide default date format is set with the SYSTEM_DATEFORMAT system configuration statement. The user's default date format is set with the DATEFORMAT user directory control statement. The system-wide default and the user's default can also be set with the CP SET

DATEFORMAT command. The user's default date format defaults to the system-wide default. The system-wide and user settings can be queried with the CP QUERY DATEFORMAT command.

The hierarchy of possible date format settings for the FILELIST command, from highest priority to lowest, is:

- FILELIST command option
- DEFAULTS command setting or default
- User default
- System-wide default

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To display files using the BEFORE/AFTER/TODAY options, issue:

```
filelist * * a (after mm/dd/yy before mm/dd/yy
filelist * * b (before mm/dd/yy
filelist * * c (today
```

or

```
filelist * * a (after mm/dd/yyyy before mm/dd/yyyy
filelist * * b (before mm/dd/yyyy
filelist * * c (today
```

or

```
filelist * * a (after yyyy-mm-dd before yyyy-mm-dd
filelist * * b (before yyyy-mm-dd
filelist * * c (today
```

For example, to display all files between Jan 1, 1991 and Feb 1, 1991, issue:

```
filelist * * a (after 12/31/90 before 2/02/91
```

or

```
filelist * * a (after 12/31/1990 before 2/02/1991
```

or

```
filelist * * a (after 1990-12-31 before 1991-02-02
```

The 4-digit years are not supported on a file pool server that is running a release prior to VM/ESA Version 2 Release 2.0. However, for those dates associated with a file on this server, the system sets the year to 19*yy*, where *yy* is the 2-digit year.

An existing FILELIST profile (PROFFLST XEDIT) on your A-disk or in your search order may cause the files in your FILELIST to be sorted incorrectly when sorted by date with FULLDATE or ISODATE in effect. To ensure that the date sort function operates correctly, you should erase your old profile and build a new user profile that first calls the system profile for FILELIST (PROFFLST) followed by your customized changes.

Examples

For the examples in this section, the *fm* is portrayed as an SFS directory. Sample screens are shown in this section for the SEARCH, SHARE, ALLDATES and STATS options.

The following FILELIST screen was created by issuing the FILELIST command with no operands – which is equivalent to entering:

```
filelist * * a (stats
```

Note that the files are sorted by date and time, newest to oldest, and that FULLDATE is in effect.

Sample FILELIST Screen with STATS option

```
SMITH   FILELIST    A0  V 108  Trunc=108 Size=14  Line=1 Col=1 Alt=0
Directory = SERVER1:SMITH.GOODIES.FOOD
Cmd Filename Filetype Fm Format Lrecl Records Blocks   Date     Time
    PIZZA    TOPPINGS A1 F        107     281     10 10/04/1990 17:59:00
    COOKIE   ASSEMBLE A1 F         98      49      2 10/03/1990 15:17:01
    JELLY    BEANS    A1 F        120     277     10  9/25/1990  9:14:02
    DIETING  TIPS     A1 F         75      28      1  9/24/1990 12:10:03
    CHERRY   PIE      A1 F         80       0      0  9/24/1990  9:09:11
    RECIPES  OLD      A1 -          -       -      -  9/24/1990  9:01:00
    TAILOR   SCRIPT   A1 F        101      50      3  8/14/1990 15:09:05
    CUSTOMER LIST     A1 F         95      34      2  8/04/1990 21:12:04
    SALES             A  DIR        -       -      -  8/04/1990 14:34:34
    SEND     EXEC     A1 F         80     101      4  8/04/1990 15:33:05
    INVENTORIES       A  DIR        -       -      -  8/01/1990 16:50:06
    MYMACRO  XEDIT    A1 V         95      29      2  7/30/1990 20:58:07
    CMSFILES SCRIPT   A1 V         80     489     30  7/26/1990 16:05:08
    JUNK     FOOD     A1 -          -       -      -          -        -




1= Help     2= Refresh  3= Quit    4= Cancel     5= Sort(dir)  6=Sort(size)
7= Backward 8= Forward  9= FL /n  10= Share     11= XED/FILEL 12= Cursor

====>
                                                          X E D I T  1

---------------

          .
          .
          .

---------------
```

The following FILELIST screen was created by issuing:

```
filelist * * a (alldates fulldate
```

(The Filename column is shown with ellipsis (...) in this figure to avoid right-truncation of information.)

Sample FILELIST Screen with ALLDATES Option

```
   SMITH     FILELIST    A0  V 400  Trunc=400 Size=4   Line=1 Col=1 Alt=0 Directory = SERVER:SMITH.
Cmd   Fi... Filetype Fm Create-Dt   Create-Tm Lref-Dt    Update-Dt  Update-Tm
      PI... TOPPINGS A1 12/01/1990  12:24:46  10/10/1991 10/04/1991  17:59:00
      CO... ASSEMBLE A1 12/01/1990  12:24:46  10/10/1991 10/03/1991  15:17:01
      JE... BEANS    A1 12/01/1990  12:24:46  10/10/1991 09/25/1991   9:14:02
      DI... TIPS     A1 12/01/1990  12:24:46  10/10/1991 09/24/1991  12:10:03
      MY...          A        -         -         -      09/24/1991  12:10:07



1= Help       2= Refresh  3= Quit    4=Cancel    5= Sort(updt)  6= Sort(lrdt)
7= Backward   8= Forward  9=S(cdt) 10= Stats    11= XED/FILEL  12= Cursor

====>
                                                              X E D I T  1
File

---------------
```

Responses

Issuing FILELIST with the STATS and ISODATE option displays the following information:

```
Filename Filetype Fm Format Lrecl Records Blocks   Date   Time
   fn      ft     fm format lrecl norecs  noblks yyyy-mm-dd hh:mm:ss
   .       .    .  .       .    .      .         .        .
   .       .    .  .       .    .      .         .        .
   .       .    .  .       .    .      .         .        .
```

where:

.
.
.

yyyy-mm-dd
: is the date (year-month-day) that the file was last updated. Note that the date is displayed in ISODATE format. For a directory, the date the directory was created is displayed. A dash appears in this column for erased or revoked aliases.

.
.
.

IDENTIFY

```
                      (2)
             .-(--TYPE-----.
>>--IDentify--+-------------+-------------------------------------------><
              '-| Options |-'

OPTIONS:
                               (2)
     (1) .-TYPE------------.  .-----------.
|--(-----+-----------------+--+-----------+--.---------.--.-----.--.---.----|
         |        .-FIFO-. |  |-SHOrtdate-|  '-REFRESH-'  '-ALL-'  '-)-'
         |-STACK--+------+-|  |-FULldate--|
         |        '-LIFO-' |  '-ISOdate---'
         |-FIFO------------|
         '-LIFO------------'

NOTES ON THE SYNTAX:
(1)  You can enter Options in any order between the parentheses.

(2)  If a date format is not specified, the user's default date format is
     used.
```

Options

.
.
.

SHOrtdate
specifies that the date should be returned in *mm/dd/yy* format, where *mm* is the month, *dd* is the day of the month, and *yy* is the 2-digit year.

FULldate
specifies that the date should be returned in *mm/dd/yyyy* format, where *mm* is the month, *dd* is the day of the month, and *yyyy* is the 4-digit year.

ISOdate
specifies that the date should be returned in *yyyy-mm-dd* format, where *yyyy* is the 4-digit year, *mm* is the month, and *dd* is the day of the month.

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Usage Notes

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The default date format used for certain CP and CMS commands can be set on a system-wide basis and also for the individual user. The system-wide default date format is set with the SYSTEM_DATEFORMAT system configuration statement. The user's default date format is set with the DATEFORMAT user directory control statement. The system-wide default and the user's default can also be set with the CP SET DATEFORMAT command. The user's default date format defaults to the system-wide default. The system-wide and user settings can be queried with the CP QUERY DATEFORMAT command. The hierarchy of possible date format settings for the IDENTIFY command, from highest priority to lowest, is:

- IDENTIFY command option
- User default

- System-wide default

.
.
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Responses

To display the user ID information at your terminal, you would enter the following:

```
identify
```

The following information is displayed or stacked:

userid AT *node* VIA *rscsid date time zone day*

where:

userid is the user ID of your virtual machine.

node is the RSCS node of your computer.

rscsid is the user ID of the RSCS virtual machine.

date is the local date, in the form *mm/dd/yy*, *mm/dd/yyyy*, or *yyyy-mm-dd*.

time is the local time, in the form hh:mm:ss.

zone is the local time zone.

day is the day of the week.

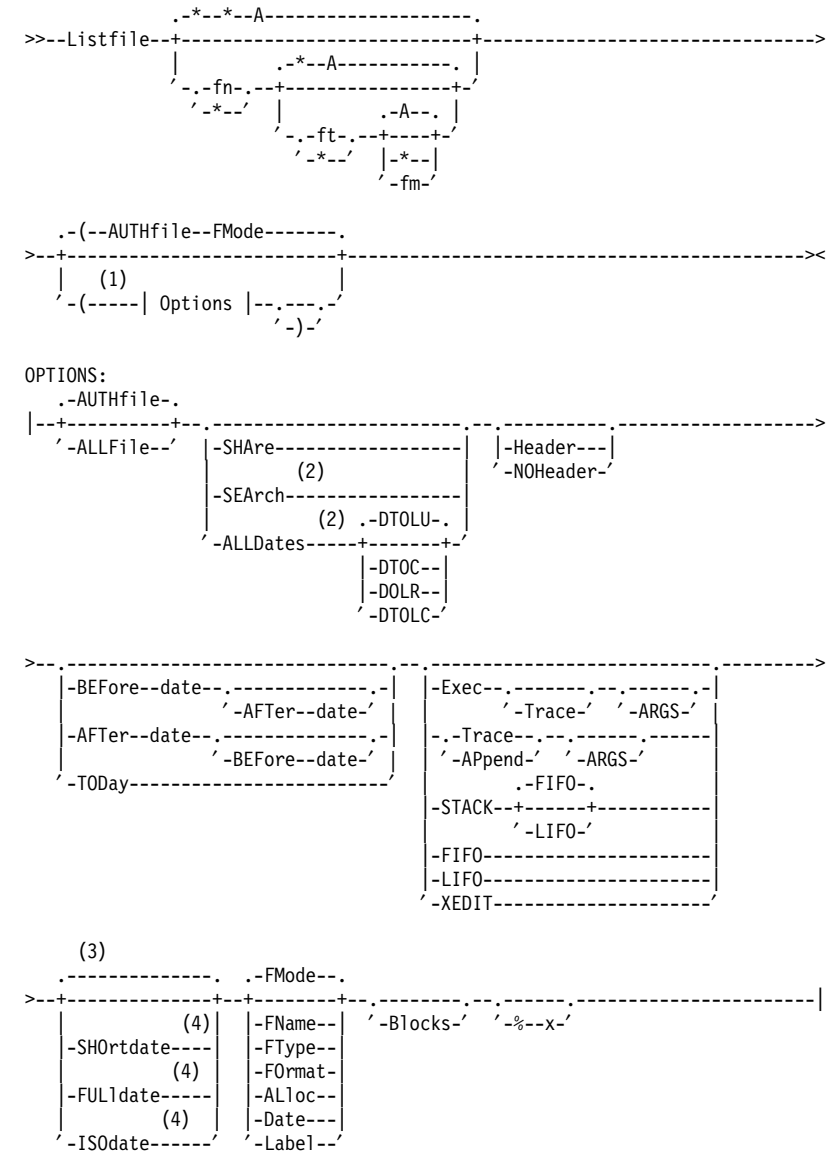
To display all the user ID information for all RSCS machines at your terminal, you would enter the following:

```
identify (type all
```

The following information is displayed or stacked, one line for each RSCS machine:

userid AT *node* VIA *rscsid date time zone day*
userid AT *node* VIA *rscsid date time zone day*
.
.
.

LISTFILE



NOTES ON THE SYNTAX:
(1) You can enter Options in any order between the parentheses.

(2) If this option is chosen, you cannot use the BEFORE, AFTER, TODAY options.

(3) If a date format is not specified, the user's default date format is used when the DATE or ALLDATES option is specified.

(4) If a date format of SHORTDATE, FULLDATE, or ISODATE is specified and the DATE or ALLDATES option is not specified, then LISTFILE operates as if the DATE option was specified.

Options

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.
.

The DTOC, DOLR, DTOLU, and DTOLC options determine which fields are in the records produced by LISTFILE (ALLDATES. The options are assigned priorities, and each option includes the options with higher priority numbers.

DTOLU
displays the date and time the file, alias, or external object was last updated in one of the following formats:

```
mm/dd/yy  hh:mm:ss
mm/dd/yyyy hh:mm:ss
yyyy-mm-dd hh:mm:ss
```

Priority is 2. DTOLU is the default.

DTOC
Displays the date and time of the object's creation in one of the following formats:

```
mm/dd/yy  hh:mm:ss
mm/dd/yyyy hh:mm:ss
yyyy-mm-dd hh:mm:ss
```

Priority is 4.

DOLR
displays the date of last reference to the object in one of the following formats:

```
mm/dd/yy
mm/dd/yyyy
yyyy-mm-dd
```

Priority is 3.

DTOLC
displays the date and time of last change for an object in one of the following formats:

```
mm/dd/yy  hh:mm:ss
mm/dd/yyyy hh:mm:ss
yyyy-mm-dd hh:mm:ss
```

Priority is 1.

Output Format Options

.
.
.

BEFore *date*
lists only those files that were last written to BEFORE the date specified. The date can be specified as *mm/dd/yy*, *mm/dd/yyyy*, or *yyyy-mm-dd*. *mm* is the month, *dd* is the day of the month, *yy* is the 2-digit year, and *yyyy* is the 4-digit year. Variables *mm, dd,* and *yy* are one or two digit numbers.

The BEFORE option cannot be specified with the following options:

- SEARCH
- ALLDATES.

AFTer *date*
lists only those files that were last written to AFTER the date specified. The date can be specified as *mm/dd/yy*, *mm/dd/yyyy*, or *yyyy-mm-dd*. *mm* is the month, *dd* is the day of the month, *yy* is the 2-digit year, and *yyyy* is the 4-digit year. Variables *mm, dd,* and *yy* are one or two digit numbers.

The AFTER option cannot be specified with the following options:

- SEARCH

- ALLDATES.

.
.
.

Output Disposition Options

.
.
.

SHOrtdate
displays the dates in *mm/dd/yy* format, where *mm* is the month, *dd* is the day of the month, and *yy* is the 2-digit year. This option is ignored if specified with the SEARCH or SHARE option.

FULldate
displays the dates in *mm/dd/yyyy* format, where *mm* is the month, *dd* is the day of the month, and *yyyy* is the 4-digit year. This option is ignored if specified with the SEARCH or SHARE option.

ISOdate
displays the dates in *yyyy-mm-dd* format, where *yyyy* is the 4-digit year, *mm* is the month, and *dd* is the day of the month. This option is ignored if specified with the SEARCH or SHARE option.

Supplemental Information Options

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Date
includes the date the file was last written in the list in one of the following formats:

```
mm/dd/yy  hh:mm:ss
mm/dd/yyyy hh:mm:ss
yyyy-mm-dd hh:mm:ss
```

Option priority is 2.

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Usage Notes

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The default date format for certain CP and CMS commands can be set on a system-wide basis and also for the individual user. The system-wide default date format is set with the SYSTEM_DATEFORMAT system configuration statement. The user's default date format is set with the DATEFORMAT user directory control statement. The system-wide default and the user's default can also be set with the CP SET DATEFORMAT command. The user's default date format defaults to the system-wide default. The system-wide and user settings can be queried with the CP QUERY DATEFORMAT command. The hierarchy of possible date format settings for the LISTFILE command, from highest priority to lowest, is:

- LISTFILE command option
- User default
- System-wide default

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The 4-digit years are not supported on a file pool server that is running a release prior to VM/ESA Version 2 Release 2.0. However, for those dates associated with a file on this server, the system sets the year to 19*yy*, where *yy* is the 2-digit year.

To display files using the BEFORE/AFTER/TODAY options, issue:

```
listfile * * a (after mm/dd/yy before mm/dd/yy
listfile * * b (before mm/dd/yy
listfile * * c (today
```

or

```
listfile * * a (after mm/dd/yyyy before mm/dd/yyyy
listfile * * b (before mm/dd/yyyy
listfile * * c (today
```

or

```
listfile * * a (after yyyy-mm-dd before yyyy-mm-dd
listfile * * b (before yyyy-mm-dd
listfile * * c (today
```

For example, to display all files between Jan 1, 1991 and Feb 1, 1991, enter:

```
listfile * * a (after 12/31/90 before 2/02/91
```

or

```
listfile * * a (after 12/31/1990 before 2/02/1991
```

or

```
listfile * * a (after 1990-12-31 before 1991-02-02
```

Responses

Unless the EXEC, TRACE, APPEND, STACK, LIFO, or FIFO option is specified, the requested information is displayed at the terminal. With the exception of the SHARE and SEARCH options and depending on the other options specified, as discussed above, the information displayed is:

```
FILENAME FILETYPE  FM  FORMAT LRECL RECS   BLOCKS      DATE     TIME   LABEL
   fn       ft     fm  format lrecl norecs noblks  mm/dd/yyyy hh:mm:ss volid
   .        .      .   .      .     .      .       .          .        .
   .        .      .   .      .     .      .       .          .        .
   .        .      .   .      .     .      .       .          .        .
```

where:

.
.
.

mm/dd/yyyy
is the date (month/day/year) that the file was last updated. Note that FULLDATE was in effect for this example. For a directory, the date the directory was created is displayed. A dash appears in this column for erased or revoked aliases.

```
.
.
.
```

If the ALLDATES and FULLDATE options are specified, the information displayed is:

```
Filename Filetype Fm Create-Dt   Create-Tm   Lref-Dt  Update-Dt   Update-Tm
fn       ft       fm mm/dd/yyyy  hh:mm:ss  mm/dd/yyyy mm/dd/yyyy  hh:mm:ss
.        .        .  .           .         .          .           .
.        .        .  .           .         .          .           .
.        .        .  .           .         .          .           .

         .
         .
         .
```

Create-Dt mm/dd/yyyy
is the date (month/day/year) the file was created. A dash appears in this column for erased aliases, revoked aliases, subdirectories, and minidisk files. This column contains 00/00/0000 if the file pool server does not support the creation date.

```
           .
           .
           .
```

Lref-Dt mm/dd/yyyy
is the date (month/day/year) the file was last referenced. A dash appears in this column for erased aliases, revoked aliases, external objects, subdirectories, and minidisk files. This column contains 00/00/0000 if the file pool server does not support the date of last reference.

Update-Dt mm/dd/yyyy
is the date (month/day/year) that the file was last updated. For a subdirectory, this is the date the subdirectory was created. A dash appears in this column for erased or revoked aliases.

```
         .
         .
         .
```

When the ALLDATES DTOLC and FULLDATE options are used, the information displayed is:

```
Filename Filetype Fm Create-Dt   Create-Tm   Lref-Dt  Update-Dt  Update-Tm Lchng-Dt     Lchng-Tm
fn       ft       fm mm/dd/yyyy  hh:mm:ss  mm/dd/yyyy mm/dd/yyyy hh:mm:ss  mm/dd/yyyy   hh:mm:ss
.        .        .  .           .         .          .          .         .            .
.        .        .  .           .         .          .          .         .            .
.        .        .  .           .         .          .          .         .            .
```

The first eight columns are the same as described above in the ALLDATES example, and

`Lchng-Dt mm/dd/yyyy`
is the date of last change (month/day/year) for the file, alias, external object, or directory. A dash appears in this column for erased or revoked aliases and minidisk files. This column contains 00/00/0000 if the file pool server does not support the date of last change.

.
.
.

NOTE

The Date header record, which indicates the date and time the note is prepared, includes 4-digit years. The date is displayed as *dd month yyyy*, where *dd* is the day of the month, *month* is the name of the month, and *yyyy* is the 4-digit year.

Examples

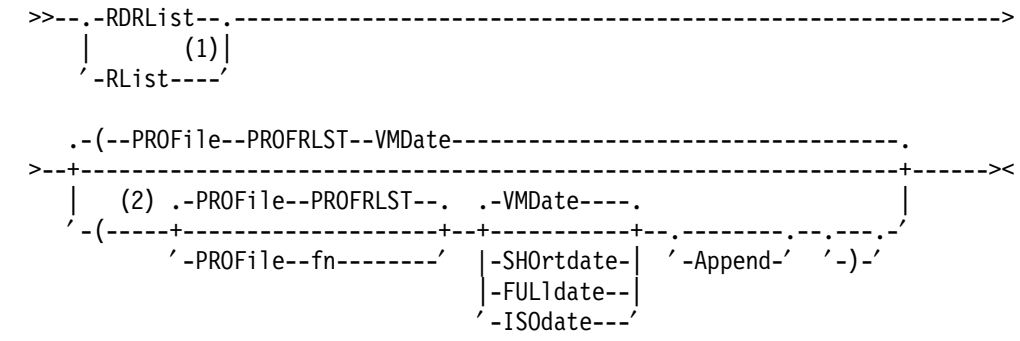
The command NOTE DWARFS CC: GORGEOUS, where DWARFS and GORGEOUS are nicknames in a names file, produces the following headings:

```
OPTIONS: NOACK  LOG  SHORT  NOTEBOOK ALL  CLASS A


Date: 11 February 1996, 11:04:52 EDT
From: Snow White                    ZZZ-ZZZZ             SNOWHITE at FOREST
To:   SNOOZY at COTTAGE, DUMMY at COTTAGE, BOSS at COTTAGE, SMILEY at COTTAGE
      GROUCHY at COTTAGE, SNIFFLES at COTTAGE, WISTFUL at COTTAGE
cc:   PRINCE at ATLARGE


---------------
```

If the command NOTE DWARFS CC: GORGEOUS (LONG is issued, the headings look like this:

```
OPTIONS: NOACK  LOG  LONG  NOTEBOOK ALL  CLASS A


Date: 11 February 1996, 11:04:52 EDT
From: Snow White                ZZZ-ZZZZ             SNOWHITE at FOREST
      Forest Primeval
To:   I. M. Dozing              777-7777             SNOOZY   at COTTAGE
      S. A. What                777-7777             DUMMY    at COTTAGE
      T.O.P. Banana             777-7777             BOSS     at COTTAGE
      H. A. Haas                777-7777             SMILEY   at COTTAGE
      E. B. Scrooge             777-7777             GROUCHY  at COTTAGE
      A. H. Choo                777-7777             SNIFFLES at COTTAGE
      R. U. Shy                 777-7777             WISTFUL  at COTTAGE
cc:   Prince Charming           111-1111             PRINCE   at ATLARGE
```

RDRLIST



NOTES ON THE SYNTAX:
(1) DISCARD and EXECUTE are special commands that can be used in the RDRLIST environment.

(2) You can enter Options in any order between the parentheses.

Options

.
.
.

VMDate
displays the creation date of each file in the format specified by the user's default date format setting. This is the default.

SHOrtdate
displays the creation date of each file as *mm/dd*, where *mm* is the month and *dd* is the day of the month.

FULldate
displays the creation date of each file as *mm/dd/yyyy*, where *mm* is the month, *dd* is the day of the month, and *yyyy* is the 4-digit year.

ISOdate
displays the creation date of each file as *yyyy-mm-dd*, where *yyyy* is the 4-digit year, *mm* is the month, and *dd* is the day of the month.

.
.
.

Usage Notes

.
.
.

If a date format is not specified on the RDRLIST command, the default date format is determined by the setting of the DEFAULTS command. The DEFAULTS command default (the initial setting) is VMDATE, which indicates that the user's default date format is to be used. The DEFAULTS command setting can be changed by using DEFAULTS SET.

The default date format for certain CP and CMS commands can be set on a system-wide basis and also for the individual user. The system-wide default date format is set with the SYSTEM_DATEFORMAT system

configuration statement. The user's default date format is set with the DATEFORMAT user directory control statement. The system-wide default and the user's default can also be set with the CP SET DATEFORMAT command. The user's default date format defaults to the system-wide default. The system-wide and user settings can be queried with the CP QUERY DATEFORMAT command.

The hierarchy of possible date format settings for the RDRLIST command, from highest priority to lowest, is:

- RDRLIST command option
- DEFAULTS command setting or default
- User default
- System-wide default

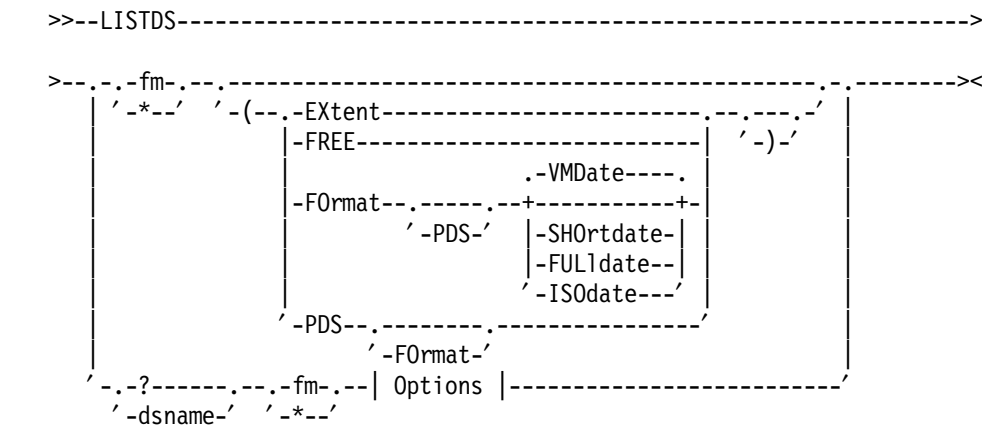
When FULLDATE or ISODATE is in effect, the columns to the right of the Date field will be shifted to the right to accommodate the addition of the 4-digit year.

An existing RDRLIST profile (PROFRLST XEDIT) on your A-disk or in your search order may cause the files displayed by RDRLIST to be sorted incorrectly when sorted by date with FULLDATE or ISODATE in effect. To ensure that the date sort function operates correctly, you should erase your old profile and build a new user profile that first calls the system profile for RDRLIST (PROFFLST) followed by your customized changes.

CMS Command Enhancements (V2R3.0)

The following CMS commands were enhanced in VM/ESA V2R3.0 to accept date format operands and/or provide dates with 4-digit years. If no date format operand is specified, the user's default date format setting is used (for NETDATA SEND and NETDATA RECEIVE, the CMS DEFAULTS date format setting is used).

LISTDS



Options

.
.
.

VMDate
displays VTOC dates using the system CP DATEFORMAT setting to determine the output format. This is the default.

SHOrtdate
displays the VTOC dates in *mm/dd/yy* date format. Where:

mm specifies the month

dd specifies the day of the month

yy specifies the 2-digit year

FULldate
displays the VTOC dates in *mm/dd/yyyy* date format. Where:

mm specifies the month

dd specifies the day of the month

yyyy specifies the 4-digit year

ISOdate
displays the VTOC dates in *yyyy-mm-dd* date format. Where:

yyyy specifies the 4-digit year

mm specifies the month

dd specifies the day of the month

Usage Notes

.
.
.

If a date format is not specified on the LISTDS command, the default date format is determined by the setting of the user′s default date format in CP.

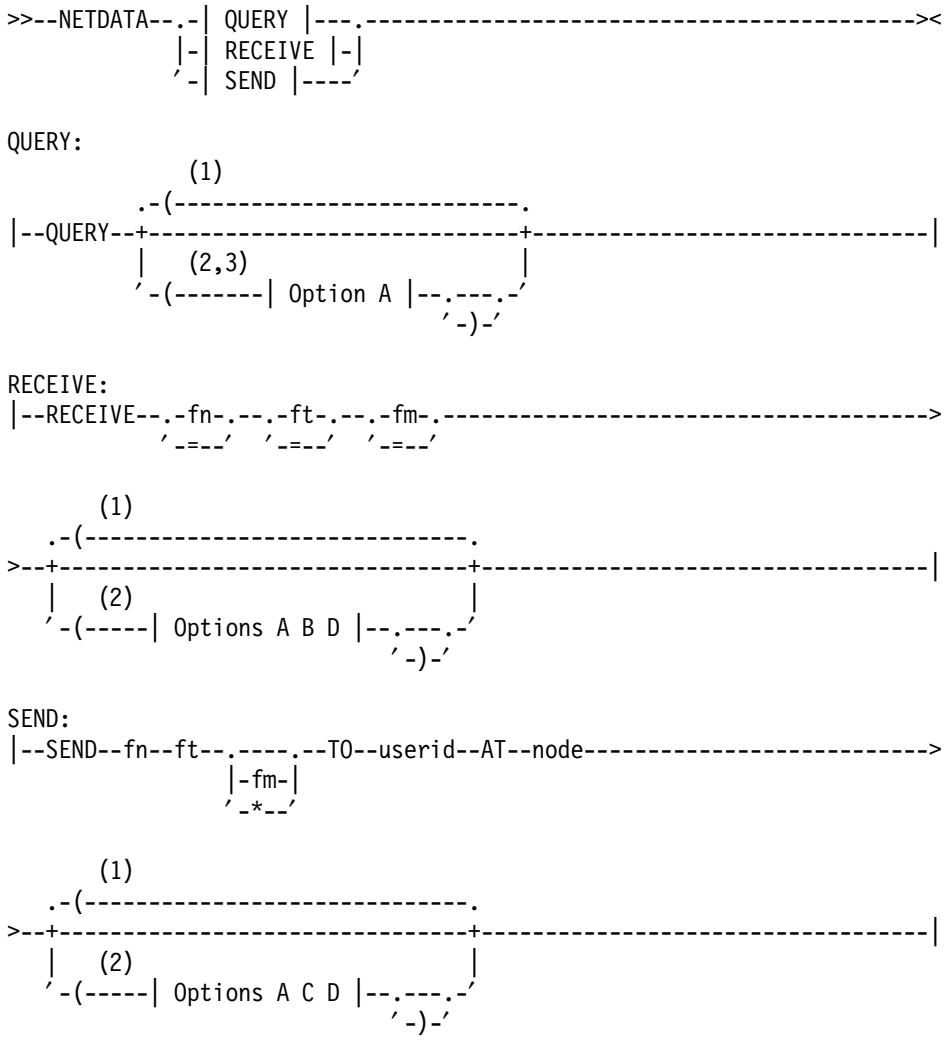
The default date format for certain CP and CMS commands can be set on a system-wide basis and also for the individual user.

The system-wide default date format is set with the SYSTEM_DATEFORMAT system configuration statement. The user′s default date format is set with the DATEFORMAT user directory control statement. The system-wide default and the user′s default can also be set with the CP SET DATEFORMAT command. If SET DATEFORMAT is not specified for an individual user and there is no DATEFORMAT statement in the user′s directory entry, the default format for that user is the system-wide default. The system-wide and user settings can be queried with the CP QUERY DATEFORMAT command.

The hierarchy of possible date format settings for the LISTDS command, from the highest priority to the lowest, is:

- LISTDS command option
- User default
- System-wide default

NETDATA


>>--NETDATA--.-| QUERY |---.----------><
|-| RECEIVE |-|
'-| SEND |----'
QUERY:
(1)
.-(----------.
|--QUERY--+----------+----------|
| (2,3) |
'-(-------| Option A |--.---.-'
'-)-'
RECEIVE:
|--RECEIVE--.-fn-.--.-ft-.--.-fm-.---------->
'-=--' '-=--' '-=--'
(1)
.-(----------.
>--+----------+----------|
| (2) |
'-(-----| Options A B D |--.---.-'
'-)-'
SEND:
|--SEND--fn--ft--.-----.--TO--userid--AT--node---------->
|-fm-|
'-*--'
(1)
.-(----------.
>--+----------+----------|
| (2) |
'-(-----| Options A C D |--.---.-'
'-)-'

```
OPTION A:
   .-TYPe------------.               .-VMDate------.
|--+-----------------+--.---------.--+-------------+-------------------|
   |-NOType----------|  |-MSGSubs-|  |-SHOrtdate---|
   |        .-FIFO-. |  '-MSGAll--'  |          (4)|
   |-STACK--+------+-|               |-FULLDate----|
   |        '-LIFO-' |               '-ISOdate-----'
   |-FIFO------------|
   '-LIFO------------'

OPTION B:
   .-Minprompt--.  .-Olddate-.  .-NOReplace-.
|--+------------+--+---------+--+-----------+--.------.----------------->
   |-Fullprompt-|  '-NEwdate-'  '-Replace---'  '-NOTE-'
   '-NOPrompt---'


>--.--------------.--.-------.-----------------------------------------|
   '-NOTEBook--fn-'  '-PURGE-'

OPTION C:
   .-NOAck-.            .-CLass A-.
|--+-------+--.------.--+---------+--------------------------------------|
   '-Ack---'  '-NOTE-'  '-CLass c-'

OPTION D:
   .-NOLog-.
|--+-------+--.---------.--.-------.--------------------------------------|
   '-Log---'  '-NOSpool-'  '-Xedit-'


NOTES ON THE SYNTAX:
  (1)  The defaults you receive appear above the line in the Options frag-
       ments.

  (2)  You can enter Options in any order between the parentheses.

  (3)  Option groups may be specified in any order.

  (4)  Fulldate must be a five-character abbreviation so that it does not
       conflict with fullprompt.
```

Options

.
.
.

VMDate
displays the dates in the format specified by the user's default date format setting. This is the default. For more information on the user's default date format setting, see

SHOrtdate
displays the dates in *mm/dd/yy* format. Where:

mm specifies the month

dd specifies the day of the month

yy specifies the 2-digit year

FULLDate
displays the dates in *mm/dd/yyyy* format. Where:

mm specifies the month

dd specifies the day of the month

yyyy specifies the 4-digit year

ISOdate
displays the dates in *yyyy-mm-dd* format. Where:

yyyy specifies the 4-digit year

mm specifies the month

dd specifies the day of the month

Usage Notes

.
.
.

The default date format used for certain CP and CMS commands can be set on a system-wide basis and also for the individual user. The system-wide default date format is set with the SYSTEM_DATEFORMAT system configuration statement. The user's default date format is set with the DATEFORMAT user directory control statement.

The system-wide default and the user's default can also be set with the CP SET DATEFORMAT command. If SET DATEFORMAT is not specified for an individual user and there is no DATEFORMAT statement in the user's directory entry, the default format for that user is the system-wide default. The system-wide and user settings can be queried with the CP QUERY DATEFORMAT command. The hierarchy of possible date format settings for the NETDATA command, from highest priority to lowest, is the:

- NETDATA command option
- DEFAULTS command setting or default
- User default
- System-wide default

.
.
.

Examples

.
.
.

Examples of date format options of SHORTDATE, FULLDATE, and ISODATE:

Note: These messages are displayed to the console.

1. netdata query (fulldate

   ```
   File LRECL 80 recv from MARY at ENDICOTT on 04/17/1997
   08:54:13 sent as TEST FILE A1
   Ready;
   ```

2. netdata query (isodate

```
File LRECL 80 recv from MARY at ENDICOTT on 1997-04-17
08:54:13 sent as TEST FILE A1
Ready;
```

3. netdata query (shortdate

```
File LRECL 80 recv from MARY at ENDICOTT on 04/17/97
08:54:13 sent as TEST FILE A1
Ready;
```

4. netdata query (msgall fulldate

```
File LRECL 80 recv from MARY at ENDICOTT on 04/17/1997
08:55:03 sent as TEST FILE A1
871002 TEST  FILE     A1 *        *        *  MARY ENDICOTT
    04/17/1997     08:55:03 *        *
    80 *        *     *  TEST FILE A1
Ready;
```

5. netdata query (msgsubs fulldate

```
871002 TEST  FILE     A1 *        *        *  MARY ENDICOTT
    04/17/1997 08:55:25 *        *
    80 *        *     *  TEST FILE A1
Ready;
```

6. netdata send test file a to mary at endicott (ack fulldate

```
File TEST FILE A1 sent to MARY at ENDICOTT
on 04/17/1997 08:55:58
Ready;
```

7. netdata receive a a a (purge fulldate

```
Ackn 04/17/1997 09:01:19 has been discarded
Ready;
```

New CMS Commands (V2R3.0)

The following CMS commands were added in VM/ESA V2R3.0.

FIXCENT

```
              .-191 A----.
>>--FIXCENT--+----------+-----------------------------------------><
              '-vdev--fm-'
```

Authorization

General User

Purpose

Use the FIXCENT command to set the century for all the files on a particular minidisk. The century is set according to a sliding window. The FIXCENT command should be used in the cases of:

- Migrations in the Year 2000 or later

  When there are minidisk files that are created or updated in the year 2000 or later, on a VM/ESA release that is not year 2000 ready. After migrating to a VM/ESA year 2000 ready release, these files will appear to have a 4-digit year of 19*xx*.

- Testing of year 2000

  During testing, the minidisk files that are created or updated appear to have a 4-digit year of 20*xx* but actually the 4-digit year should be 19*xx*.

Options

vdev
: is the virtual device number of the minidisk where the files reside. The valid numbers for XA and XC virtual machines are X'0001' through X'FFFF'.

  The default is 191 minidisk accessed at file mode A. If *vdev* is specified, you must specify *fm*

fm
: assigns a one-character file mode letter to all files on the minidisk. The file mode *S* is not valid. The *vdev* is accessed at this file mode. If another disk is accessed at this mode, it is released.

Usage Notes

1. The specified minidisk must be linked R/W.
2. The FIXCENT command will set the century portion of the year according to a sliding window of:

   [*cy-50,cy+49*], where integer *cy* is the current year—that is, the year at the moment of the call.

   For example, if a 2-digit year of a file is 05, and the current year (*cy*) is 1997, the window range is [1947,2046]. In this case, FIXCENT changes the 2-digit year of 05 associated with the file to the 4-digit year 2005.
3. If successful, the century of the date of last update of each file on the minidisk is corrected. The changes are saved after all the files have been processed. Either all the dates on the minidisk are processed, or none of them are processed.

4. After this command completes successfully, you should create new data backups because the old ones may not reflect the correct century for the minidisk files.

FILESERV FIXCENT

```
>>--FILESERV--FIXCENT-----------------------------------------------><
```

Purpose

Use the FILESERV FIXCENT command to set the century for all your SFS objects in the file pool server machine. This includes the four dates maintained by the server:

- last update
- creation
- last reference (DOLR)
- last changed (DOLC)

FILESERV FIXCENT should be used in the cases of:

- Migrations in the Year 2000 or later

  Objects are created or updated in the Year 2000 and later, on a VM/ESA release that is not Year 2000 ready. After migrating to a VM/ESA Year 2000 ready release, the objects will appear to have a 4-digit year of 19*xx*. Note that this command does not need to be run if you migrate your SFS file pool before the year 2000.

- Testing of Year 2000

  During testing, objects are created or updated and appear to have a 4-digit year of 20*xx* but actually the 4-digit should be 19*xx*.

In these cases, the FILESERV FIXCENT command can be used to set the correct century for all the objects in the file pool. The century is set according to a sliding window.

Here is a list of object types that may be updated:

- SFS files
- directories
- aliases (external, revoked, and erased)
- SFS files in migrated status (these are files that appear to be in the file pool, but which actually reside in the DFSMS/VM auxiliary storage repository).

Usage Notes

1. This command must be issued from a server machine. It is a dedicated maintenance mode command.
2. You can supply start-up parameters in a file named *serverid* DMSPARMS, where *serverid* is the user ID of the server machine. FILESERV FIXCENT will use the first *serverid* DMSPARMS file it finds in the CMS search order.
3. All messages are written to the server machine console.
4. The FILESERV FIXCENT command locates the file pool minidisks by using a POOLDEF file. The POOLDEF file it uses is the first file named *filepoolid* POOLDEF in its search order.

   The *filepoolid* POOLDEF file may reside on a CMS minidisk with other file pool definition files for other server machines. It can also reside in another file pool.
5. This command must be run in the server machine that owns the file pool minidisks. If the command is run in another machine, conflicts with the server processing may occur.
6. If successful, the century of each date for each object is corrected. One commit is done at the end of a successful run. Either all the dates in the filepool are processed, or none of them are processed.

7. You should back up the control data before running FILESERV FIXCENT. If a current backup is not available, you will be reminded by this message during FILESERV FIXCENT initialization:

   ```
   DMS3009R  A current control data backup is recommended before fixing
             dates in the file pool catalog data. Enter 1 to continue or
             0 to cancel the FILESERV FIXCENT
   ```

8. If you have any previous control data backups, you may want to create a new backup after this command completes successfully, because the old ones may not reflect the correct century of the file pool objects. Therefore, after this command completes successfully, the server will allow you to process only a FILESERV BACKUP, another FILESERV FIXCENT, or a FILESERV START with the RESTORE parameter in effect.

9. If the command does not complete successfully, it can be rerun. If the command still does not complete successfully, please call your systems support representative.

10. When FILESERV FIXCENT is completed it will issue message:

    DMS3729I *n* objects scanned; *m* objects updated; processing completed

    When processing a large file pool, for every 10,000 objects you will receive a status message:

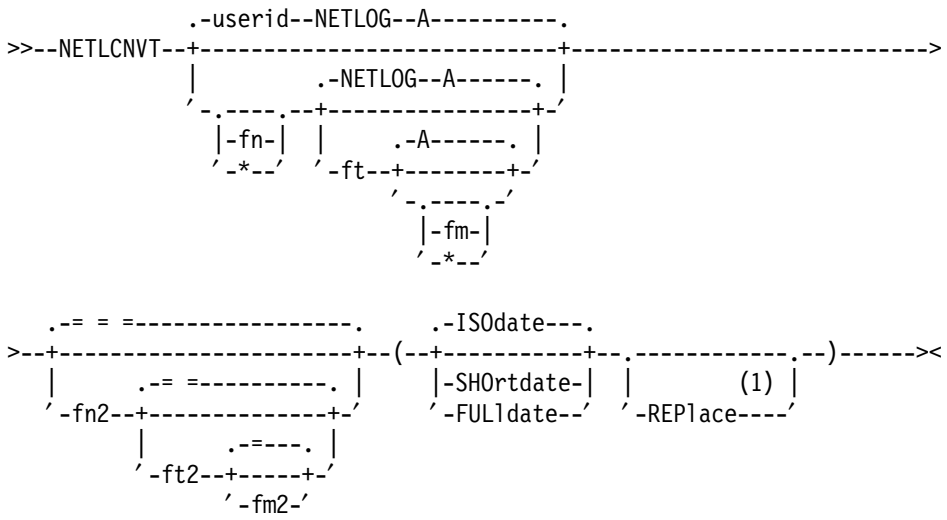
    DMS3729I *n* objects scanned; *m* objects updated; processing continuing

11. This command is not successful if any SFS logical units of work are found that have completed the first phase of the two-phase committing process. The logical units of work can be left in this condition by STOP IMMEDIATE or a server abend. This is also referred to as prepared-and-not-connected work. Generally, resynchronization resolves the prepared work when the server is executing in multi-user mode, making the prepared work consistent with the rest of the coordinated transaction. Before you enter FILESERV FIXCENT, restart the server, use QUERY PREPARED to verify that the prepared work has been committed, then enter the STOP command.

    If you cannot wait for resynchronization to be completed, for example, the communications line between the CRR recovery server and this file pool server is going to be down for a long time, you may manually resolve the prepared work by using the FORCE PREPARED command.

12. The FILESERV FIXCENT command will set the century portion of the year according to a sliding window of: cy-50, cy+49, where integer *cy* is the current year-that is, the year at the moment of the call. For example, if a 2-digit year of an object is 05, and the current year *cy* is 1997, the window range is 1947, 2046. The FILESERV FIXCENT command will set the century of the 2-digit year of 05 to be 20; thus, the 4-digit year of 2005.

NETLCNVT



Authorization

General User

Purpose

Use the NETLCNVT command to convert existing user ID NETLOGs that contain 2-digit years to 4-digit years, or 4-digit years to 2-digit years.

The entries in the *userid* NETLOG file may contain mixed date formats because of non-Year 2000 ready tools or applications writing to them. These are usually in the SHORTDATE date format of *mm/dd/yy*. If this should occur, you can issue the NETLCNVT command to convert the *userid* NETLOG file to contain all the same date formats. Contact your system administrator to update the tools used for the NETLOG file.

Options

userid **NETLOG A**
: identifies the user ID of the person who owns the NETLOG file. The default is the user ID where the NETLCNVT command is issued.

fn
: specifies the file name of the NETLOG file to be converted. The file name defaults to the user ID issuing the command. If an asterisk (*) is coded in this field, all file names are used.

ft
: specifies the file type of the NETLOG file to be converted. The file type defaults to NETLOG.

fm
: specifies the file mode of the NETLOG file to be converted. The file mode defaults to A. If an asterisk is coded, all accessed disks and directories are searched.

fn2

specifies the file name of the output NETLOG file that will contain the results of the NETLCNVT command.

fn2 ft2 fm2 defaults to:

= = =

respectively. The equal sign (=) may be coded for any of the *fn2, ft2, or fm2* parameters, indicating that it is the same as the corresponding component in the first file ID specified.

ft2

specifies the file type of the output NETLOG file that will contain the results of the NETLCNVT command.

fm2

specifies the file mode of the output NETLOG file that will contain the results of the NETLCNVT command.

ISOdate

specifies that the date(s) should be converted to *yyyy-mm-dd* format. This is the default.

Where:

yyyy specifies the 4-digit year

mm specifies the month

dd specifies the day of the month

SHOrtdate

specifies that the date(s) should be converted to *mm/dd/yy* format. Where:

mm specifies the month

dd specifies the day of the month

yy specifies the 2-digit year

FULldate

specifies that the date should be converted to *mm/dd/yyyy* format.

Where:

mm specifies the month

dd specifies the day of the month

yyyy specifies the 4-digit year

REPlace

specifies the output file ID to replace an existing file with the same file identifier. The default option is REPLACE when only one file ID is entered or when the output file ID is specified as:

= = =

Usage Notes

1. The input file and optional output file can have any file name, file type and file mode. If an output file:
   - Is not specified, the input file will be replaced.
   - Already exits and the output file ID is something other than:

     = = =

     then the user must specify REPLACE.

2. The NETLCNVT command only converts valid NETLOG records. The input file can contain mixed date formats, but they must be one of these valid date formats:

   - *mm/dd/yy*
   - *mm/dd/yyyy*
   - *yyyy-mm-dd*

   All records that are not valid NETLOG records are copied as is to the output file. The blank lines are not copied to the output file, they are discarded.

3. After the NETLCNVT command is issued, all the dates in the file will be converted to the date format specified.

4. After the conversion of the user ID NETLOG file, all the following entries written by CMS commands will be in the same date format as the first valid NETLOG record.

5. If a user ID NETLOG file is new, all new date entries will be in the ISODATE *yyyy-mm-dd* format. In earlier releases, a new NETLOG file was written in the shortdate *mm/dd/yy* format.

6. This command does not respect the virtual machine date setting.

7. The CMS DEFAULTS command has no effect on the date formats in the user ID NETLOG file.

8. If a user has mixed date formats in the user ID NETLOG file, this command can be run to convert the NETLOG, so that all the records have the same date format as specified by the user.

9. A sliding window is used when converting a NETLOG file containing 2-digit year dates as input to a file containing dates with 4- digit years as output.

   In this technique, a given 2-digit year is assumed to reside in the 100-year span [*cy-50*,*cy+49*], where integer *cy* is the current year—that is, the year at the moment of the call.

   For example, if a 2-digit year of 05 is being converted, and the current year (*cy*) is 1997, the window range is [1947,2046]. In this case, the calculation changes the 2-digit year of 05 to the 4-digit year 2005.

10. Existing NETLOGs in SFS directories that are replaced retain the same authorities, aliases, and extended file attributes that already existed.

    New output NETLOG files in SFS directories have none of the original file's authorities, aliases, and will have the current system defaults for the extended file attributes.

    If you create a new NETLOG in another user's directory, the owner of the directory becomes the owner of the file. You, as the creator of the file, automatically have write authority to it.

GCS Commands

Output from the following GCS commands has been changed to provide dates with 4-digit years.

IPL Message

The message issued when GCS is IPLed displays dates with 4-digit years.

Example

```
i gcsr30

GCS Release 3.0
Generated at 08/04/2000 08:01:38
GCTACC423I A (0191) R/W
```

QUERY MODDATE

QUERY MODDATE has been enhanced to display dates with 4-digit years.

Example

```
q moddate last

Date of GCTACC is 10/05/2001
```

Miscellaneous Changes

The following are additional changes which were made to VM/ESA V2R2.0 in support of 4-digit years and dates in Year 2000 and later.

CMS GUI Facility

The FILELIST and RDRLIST functions of the CMS Desktop have been enhanced to display correct 4-digit year information. New date format options that have been added to VM/ESA are not supported by the CMS GUI Facility.

File Status Table (FST)

When you access a disk or SFS directory, a file directory is stored in your virtual machine. The entries in the file directory for each CMS file are called the File Status Tables (FST). The FSTs describe the attributes of each file. One of the attributes of a file is the date/time of the last update which is currently stored in 6 bytes (*yy mm dd hh mm ss*), where each byte holds two decimal digits. This is the date and time that the accessed file was last updated.

A century flag (FSTCNTRY, x′08′) has been added to the FST flag byte (FSTFLAGS) for both the base and extended FST formats (see table below). This is bit 4. Bit 4 describes the century portion of the year the file was last written or updated. If bit 4 is off, then the year is 19xx. If bit 4 is on, then the year is 20xx. This solution supports years in the range 1900-2099.

The following is a portion of the FST mapping:

Base vs. Extended FST Format (not all field names shown)

HEX DISP	DEC DISP	SIZE	BASE	EXT	FIELD NAME	FIELD NAME DESCRIPTION
0	0	16	B	E	FSTDFNFT	File name File type
		8	B	E	FSTFNAME	File name
		8	B	E	FSTFTYPE	File type
10	16	2	B		FSTDATEW	Date (mm dd) last written
1F	31	1	B	E	FSTFLAGS	FST flag byte
		1 bit	B	E	FSTCNTRY	x′08′-Century of date last written (0=19,1=20)
26	38	2	B		FSTYEARW	Year (yy) last written
36	54	6		E	FSTADATI	Alternate date/time (yy mm dd hh mm ss)

DMSPLU

DMSPLU accepts dates with 4-digit years in the form mm/dd/yyyy. DMSPLU continues to accept dates with 2-digit years (mm/dd/yy) as well. When a 2-digit year is specified, a sliding window with a range -50 to +49 from the current year is used to determine the century portion of the year.

Prior to VM/ESA V2R2.0, DMSPLU only accepted years in the range (19)80 through (19)99. Beginning with VM/ESA V2R2.0, DMSPLU accepts dates beyond 1999 (and before 1980). Although there are no restrictions on the 4-digit years accepted by DMSPLU, since the CMS file system only supports files with dates from 1900-2099, specification of a date outside this range yields unpredictable results.

DMSPLU remains an unsupported utility.

SPTAPE

When a spool file is SPTAPE DUMPed, the century portion of the year is stored in hexadecimal at displacement x′8F′ in the SFBLOK that is written to tape (the spool file date is currently stored in format *mm/dd/yy* at displacement x′40′).

When a spool file is SPTAPE LOADed, the century portion of the year is included in TOD clock value in the SPFBK of the spool file that is being loaded.

DVF

When run on a VM/ESA CP which is Year 2000 ready (V2R2.0 or later), the TRACERED and VIEWSYM commands (and specifically the VDATE EXEC which is called by the VIEWSYM command) interpret 2-digit years with a sliding window of -50,+49.

If the new level of the Dump Viewing Facility (containing this function) is run on a VM/ESA CP that is not Year 2000 ready (prior to VM/ESA V2R2.0), dates are interpreted as they were previously.

VM Functions Which Do Not Provide 4-Digit Year Output

The following is a list of CP and CMS functions which do not provide date output with 4-digit years, although they are all Year 2000 ready.

CP Functions/Commands

- Accounting records
- LOGMSG header, QUERY LOGMSG
- LOGON/LOGOFF/FORCE/DISCONNECT
- Midnight message
- Printer Separator Pages
- QUERY CPXLOAD
- SPXTAPE log files

CMS Commands

- CSLGEN
- Dates with 2-digit years in messages issued by commands
- DOSLKED
- DSERV
- GENMSG
- LKED
- LOAD
- PRELOAD
- PROP
- PUNCH
- RDR
- READCARD
- SAVEFD
- SEGGEN
- UPDATE
- VSCREEN
- XEDIT (CTL
- ZAP

SFS server commands

- CRR QUERY LOG
- CRR QUERY LOGTABLE
- CRR QUERY LU
- CRR QUERY LUWID
- FILEPOOL FORMAT AUDIT (DATE keyword in control file
- FILEPOOL LIST BACKUP
- FILEPOOL COMMANDS
- FILESERV COMMANDS:
  - BACKUP
  - CONTROL BACKUP
  - DISK
  - MOVEUSER

  - REORG
  - START
- FORCE PREPARED
- QUERY FILEPOOL COMMANDS

Misc.

- Sample Files:
  - REXXCHEK EXEC
  - SFSTRANS EXEC
  - TALLY EXEC
  - WHO EXEC
- VMFDATE
- VMFMERGE
- VMFREMOV
- VMFZAP