SCO® UNIX®
Operating System

International Supplement

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Operating System

International Supplement

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International Operating System Release Notes

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Preface

This document contains important information about the SCO International UNIX System V/386 Operating System Release 3.2. version 4.0. and subsequent releases, SCO International SCO Open Desktop Release 1.0. and subsequent releases, SCO International XENIX System V Operating System Release 2.3.4 and subsequent releases, SCO System V Operating System International Supplement Release 2.2.0 and SCO Open Desktop International Supplement Release 1.0.0.

NOTE SCO Open Desktop International Supplement Release 1.0.0. is for SCO Open Desktop Release 1.1 and subsequent releases.

These notes contain the following:

- Installation Notes
- Installation Procedure
- Internationalization Software Notes
- Device Configuration

NOTE Please read through the entire document before installing the SCO System V Operating System International Supplement.
The section on "Device Configuration" is detailed in Appendix A of these *Release Notes*.

SCO is always pleased to hear of users' experiences with our product, and recommendations of how it can be made even more useful. All written suggestions are given serious consideration.

Conventions used in these notes

The following conventions are used throughout this document:

- This document is designed to be used with the SCO UNIX System V, SCO XENIX System V, and SCO Open Desktop Operating Systems. The convention used to describe the operating system is SCO System V, which covers the family of products that includes SCO XENIX System V, SCO UNIX System V Release 3.2, and SCO Open Desktop.
- Commands that you are requested to enter are shown in boldface. For example: **custom**
- In text, commands are appended with the *SCO UNIX System V Operating System User's Reference* / *SCO XENIX System V Operating System User's Reference* section in parenthesis. For example: **mapchan**(M)
- Directories and filenames are printed in italics. For example: */usr/lib/vidi/850.8x16*
- Keyboard keys are shown in angled brackets. For example: ⟨Return⟩
- Screen text is shown in boxes. For example:

```
Select a product : [        ]

Choose a type    : [Entire Product]  Packages  Files
```

Contents of the international operating system

The International System V Operating System includes the complete distribution for SCO UNIX System V Operating System Release 3.2. version 4.0., SCO XENIX System V Operating System Release 2.3.4, SCO Open Desktop Release 1.0 and subsequent releases.

The documentation for SCO Open Desktop is as follows:

- *SCO Open Desktop Release Notes*
- *SCO Open Desktop Installation Guide*
- *SCO Open Desktop System Administrator's Reference*
- *SCO Open Desktop User's Reference*

The documentation for SCO UNIX System V Operating System Release 3.2. version 4.0 is as follows:

- *SCO UNIX System V Release Notes*
- *SCO UNIX System V Installation Guide*
- *SCO UNIX System V User's Guide*
- *SCO UNIX System V Administrator's Guide*
- *SCO UNIX System V User's Reference Manual*
- *SCO UNIX System V Administrator's Reference Manual*
- *SCO UNIX System V Tutorial*

The documentation for SCO XENIX System V Operating System releases subsequent to 2.3.4 is as follows:

- *SCO XENIX System V Release Notes*
- *SCO XENIX System V Installation Guide*
- *SCO XENIX System V User's Guide*
- *SCO XENIX System V Administrator's Guide*
- *SCO XENIX System V User's Reference Manual*
- *SCO XENIX System V Administrator's Reference Manual*
- *SCO XENIX System V Tutorial*

Diskette volumes in this distribution

For SCO Open Desktop, the diskette volume numbers are found in the SCO Open Desktop Release Notes.

For SCO UNIX System V Operating System Release 3.2. version 4.0 and subsequent releases, the diskette volume numbers are found in the Release Notes for SCO UNIX System V Operating System Release 3.2.

For SCO XENIX System V Operating System release 2.3.4 and subsequent releases, the diskette volume numbers are found in the Release Notes for SCO XENIX System V Operating System Release 2.3.

Contents of the OS International Supplement

The SCO System V Operating System International Supplement includes the following:

- SCO System V Operating System International Supplement Release and Installation Notes
- SCO System V International Operating System Guide
- SCO System V Operating System International Supplement diskettes

Files in this set

The SCO System V Operating System International Supplement distribution media contains the files listed below. Other files, for performing installation and initialization, may also be included:

/usr/lib/lang/english/uk/ascii/collate
/usr/lib/lang/english/us/ascii/collate
/usr/lib/lang/french/france/ascii/collate
/usr/lib/lang/german/germany/ascii/collate
/usr/lib/lang/portuguese/brazil/ascii/collate
/usr/lib/lang/spanish/spain/ascii/collate
/usr/lib/lang/spanish/america/ascii/collate
/usr/lib/lang/english/uk/8859/time
/usr/lib/lang/english/uk/ascii/time
/usr/lib/lang/english/uk/8859m/time
/usr/lib/lang/english/us/8859m/collate
/usr/lib/lang/english/uk/8859m/collate
/usr/lib/lang/french/france/8859m/collate
/usr/lib/lang/german/germany/8859m/collate
/usr/lib/lang/portuguese/brazil/8859m/collate
/usr/lib/lang/spanish/spain/8859m/collate
/usr/lib/lang/spanish/america/8859m/collate
/usr/lib/lang/english/uk/8859m/currency
/usr/lib/lang/english/uk/8859/currency
/usr/lib/lang/english/uk/ascii/currency
/usr/lib/lang/french/france/ascii/time
/usr/lib/lang/french/france/8859m/numeric
/usr/lib/lang/german/germany/8859m/numeric
/usr/lib/lang/portuguese/brazil/8859m/numeric

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/usr/lib/lang/spanish/spain/8859m/numeric
/usr/lib/lang/spanish/america/8859m/numeric
/usr/lib/lang/french/france/ascii/numeric
/usr/lib/lang/german/germany/ascii/numeric
/usr/lib/lang/portuguese/brazil/ascii/numeric
/usr/lib/lang/spanish/spain/ascii/numeric
/usr/lib/lang/spanish/america/ascii/numeric
/usr/lib/lang/french/france/8859/numeric
/usr/lib/lang/german/germany/8859/nu:neric
/usr/lib/lang/portuguese/brazil/8859/numeric
/usr/lib/lang/spanish/spain/8859/numeric
/usr/lib/lang/spanish/america/8859/numeric
/usr/lib/lang/french/france/ascii/currency
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/usr/lib/lang/french/france/8859m/currency
/usr/lib/lang/french/france/ascii/messages
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/usr/lib/lang/german/germany/8859m/currency
/usr/lib/lang/german/germany/8859m/messages
/usr/lib/lang/german/germany/ascii/messages
/usr/lib/lang/german/germany/8859/messages
/usr/lib/lang/german/germany/8859/time
/usr/lib/lang/german/germany/8859m/time
/usr/lib/lang/portuguese/brazil/ascii/messages
/usr/lib/lang/portuguese/brazil/8859/messages
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/usr/lib/lang/portuguese/brazil/ascii/time
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/usr/lib/lang/portuguese/brazil/8859m/currency
/usr/lib/lang/portuguese/brazil/ascii/currency
/usr/lib/lang/portuguese/brazil/8859/currency
/usr/lib/lang/spanish/spain/8859/collate
/usr/lib/lang/spanish/america/8859/collate

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/usr/lib/lang/spanish/spain/ascii/messages
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/usr/lib/keyboard/ps.ibm.ger
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/usr/lib/keyboard/ps.ibm.swf
/usr/lib/keyboard/ps.ibm.fra
/usr/lib/keyboard/ps.ibm.bel
/usr/lib/keyboard/ps.por.por
/usr/lib/keyboard/ps.spa.spa
/usr/lib/keyboard/ps.ibm.spa
/usr/lib/keyboard/ps.ibm.ita
/usr/lib/keyboard/ps.grk.grg
/usr/lib/keyboard/ps.grk.gra
/usr/lib/keyboard/ps.nor.dan
/usr/lib/keyboard/ps.nor.nor
/usr/lib/keyboard/ps.ibm.swe
/usr/lib/keyboard/at.ibm.usa
/usr/lib/keyboard/at.ibm.ukd
/usr/lib/keyboard/at.ibm.ger
/usr/lib/keyboard/at.ibm.fra
/usr/lib/keyboard/at.ibm.spa
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/usr/lib/keyboard/at.iso.fra
/usr/lib/keyboard/at.iso.spa
/usr/lib/keyboard/at.iso.ita
/usr/lib/keyboard/at.iso.nor
/usr/lib/keyboard/at.iso.swe
/usr/lib/keyboard/ps.850.bel
/usr/lib/keyboard/ps.850.can
/usr/lib/keyboard/ps.850.dan
/usr/lib/keyboard/ps.850.fin
/usr/lib/keyboard/ps.850.swe
/usr/lib/keyboard/ps.850.fra
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/usr/lib/terminfo/brasinfo.src
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/usr/lib/mapchan/nrc.ger
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/usr/lib/mapchan/nrc.spa
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/usr/lib/mapchan/tvi.fra
/usr/lib/mapchan/tvi.ger
/usr/lib/mapchan/tvi.nor
/usr/lib/mapchan/tvi.por
/usr/lib/mapchan/tvi.spa
/usr/lib/mapchan/tvi.swe
/usr/lib/mapchan/tvi.ukd
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/usr/lib/mapchan/w60.ibmfra.ans
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/usr/lib/mapchan/wy60.spa
/usr/lib/mapchan/ascii.spa
/usr/lib/mapchan/qvt.ger
/usr/lib/mapchan/cons.ibm

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/usr/lib/mapchan/hp.ansi.7.fra
/usr/lib/mapchan/hp.ansi.7.can
/usr/lib/mapchan/hp.ansi.7.dan
/usr/lib/mapchan/hp.ansi.7.nor
/usr/lib/mapchan/hp.ansi.7.fin
/usr/lib/mapchan/hp.ansi.7.ger
/usr/lib/mapchan/hp.ansi.7.grd
/usr/lib/mapchan/hp.ansi.7.ita
/usr/lib/mapchan/hp.ansi.7.ndl
/usr/lib/mapchan/hp.ansi.7.por
/usr/lib/mapchan/hp.ansi.7.spa
/usr/lib/mapchan/hp.ansi.7.swe
/usr/lib/mapchan/hp.ansi.7.swi
/usr/lib/mapchan/hp.ansi.7.ukd
/usr/lib/mapchan/hp.ansi.7.usa
/usr/lib/mapchan/hp.ascii.7.usa
/usr/lib/mapchan/hp.ansi.8
/usr/lib/mapchan/hp.ascii.7.bel
/usr/lib/mapchan/hp.ascii.7.fra
/usr/lib/mapchan/hp.ascii.7.can
/usr/lib/mapchan/hp.ascii.7.dan
/usr/lib/mapchan/hp.ascii.7.esp
/usr/lib/mapchan/hp.ascii.7.fin
/usr/lib/mapchan/hp.ascii.7.swe
/usr/lib/mapchan/hp.ascii.7.ger
/usr/lib/mapchan/hp.ascii.7.ita
/usr/lib/mapchan/hp.ascii.7.lsp
/usr/lib/mapchan/hp.ascii.7.ndl
/usr/lib/mapchan/hp.ascii.7.nor
/usr/lib/mapchan/hp.ascii.7.swi
/usr/lib/mapchan/hp.ascii.7.ukd
/usr/lib/mapchan/hp.roman.8
/usr/lib/mapchan/wx200.iso

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/usr/lib/mapchan/digi.brascii
/usr/lib/mapchan/digi.abicomp
/usr/lib/mapchan/tispc.abicomp
/usr/lib/mapchan/cons.bra
/usr/lib/mapchan/wy60.spa.asc
/usr/lib/mapchan/wy60.lat.asc
/usr/lib/mapchan/ibm.spa
/usr/lib/mapchan/wy60.spa.sk
/usr/lib/vidi/iso.8x8
/usr/lib/vidi/iso.8x14
/usr/lib/vidi/iso.8x16
/usr/lib/vidi/nor.8x8
/usr/lib/vidi/nor.8x14
/usr/lib/vidi/nor.8x16
/usr/lib/vidi/por.8x8
/usr/lib/vidi/por.8x14
/usr/lib/vidi/por.8x16
/usr/lib/vidi/spa.8x8
/usr/lib/vidi/spa.8x14
/usr/lib/vidi/spa.8x16
/usr/lib/vidi/grk.8x8
/usr/lib/vidi/grk.8x14
/usr/lib/vidi/grk.8x16
/usr/lib/vidi/isr.8x8
/usr/lib/vidi/isr.8x14
/usr/lib/vidi/isr.8x16
/usr/lib/vidi/850.8x8
/usr/lib/vidi/850.8x14
/usr/lib/vidi/850.8x16

Chapter 1

Important notes about installation

The SCO System V Operating System International Supplement Release 2.2.0 requires Release 3.2. version 4.0. or a subsequent release of SCO UNIX System V or release 2.3.4 or a subsequent release of SCO XENIX System V or SCO Open Desktop 1.0. The SCO Open Desktop International Supplement Release 1.0.0 requires Release 1.1 or a subsequent release of SCO Open Desktop. As the International Supplement is adding to, or modifying the Operating System, please note the following:

- The supplement must be installed in single user (System Maintenance) mode. The installation script will warn you if installation is attempted while other users are still on the system.
- When **custom**(ADM) lists the packages currently installed on your system, some of the International Supplement packages will register as fully or partly installed, despite the fact that you have not yet installed them. This is because there are 7-bit files from the standard operating system already in place and it is these that are shown as installed.
- If you do not have the MAPCHAN package currently installed, you will be asked to insert diskettes from the SCO System V Operating System distribution. Make sure you have these diskettes to hand.

Chapter 2

Installation procedure

This section explains how to install the SCO System V International Supplement on a computer currently running SCO UNIX System V Release 3.2. version 4.0. or a subsequent release, SCO XENIX System V release 2.3.4 or a subsequent release, or SCO Open Desktop 1.0 or a subsequent release. After the installation, configure your system to suit your hardware and language environment.

The installation instructions in this section are for all distribution types (96 and 135 tpi). Each distribution may contain a different number of volumes, but the steps are the same for all distributions. Just follow the instructions on the screen to insert the next disk when prompted.

If this Supplement was purchased as part of the International System V Operating System, perform the System V Operating System installation described in Chapter 2 of the *SCO UNIX System V Installation Guide* / *SCO XENIX System V Installation Guide* before continuing.

To install the SCO System V Operating System International Supplement, follow the instructions below. If you encounter a problem while using **custom**(ADM), press the ⟨Return⟩ key to continue:

1. Halt the system, by typing **/etc/shutdown**, reboot and enter single user (System Maintenance) mode. Type **custom**, and press ⟨Return⟩.
2. Under SCO UNIX System V, the system displays the main custom menu, which offers options to install, remove, list and quit. The menu also lists the products currently installed on your system:

```
Products Currently installed

The Operating System
The Development System
The Text Processing System
```

The software list on your screen is probably different from the one shown above. Use the arrow keys to highlight "Install" and press ⟨Return⟩.

If you are installing on a SCO XENIX System V system, select option 4 to add a supported product. The system then displays the following messages:

```
Installing custom data files ...

Insert distribution volume 1
and press 'Return' or enter q to quit:
```

If you are installing this package on SCO XENIX System V Release 2.3.4 or a later release, and you have not installed the "International Character set support" as part of the Operating System, you may be prompted to do so. This supplement cannot be installed until this is done.

For example:

```
International Character set support is not installed
Do you wish to install it now? (y/n)
```

You are advised to answer "y" to the prompt above, as the package will then be added to your system, and installation will continue as normal. If you answer "n", custom will terminate with the following error message:

```
This International Supplement cannot be installed
without the INTL package.
```

Follow this message, and after you press ⟨Return⟩ follow the instructions from step 6.

3. The Install screen appears:

```
Select a product : [                    ]

Choose an option : [Entire Product]  Packages  Files
```

The Install screen also shows a list of software:

```
A New Product
The Operating System
The Development System
The Text Processing System
```

Again, your software list might look different. If you are installing the International Supplement for the first time, select "A New Product" and press ⟨Return⟩.

If you are re-installing, an extra option is offered specifically for re-installation. Select the option, "SCO System V Operating System International Supplement".

4. The install screen offers the choice of installing the "Entire Product", "Packages" or "Files":

```
Select a product : [A New Product]

Choose an option : Entire Product  Packages  Files
```

To install the complete International System V Operating System Supplement select "Entire Product" and press ⟨Return⟩.

If you wish to select from a choice of packages select "Packages" and press ⟨Return⟩.

5. For XENIX, the Install screen directs you to insert SCO System V Operating System International Supplement volume 1:

```
Insert the requested volume and press ⟨Return⟩ to
continue the installation

Insert   : Distribution
Volume   : 1
```

Insert volume 1 and press ⟨Return⟩ to continue. The message "Installing custom data files..." appears at the top of the Install screen.

Under SCO UNIX System V, for the above screen, you are prompted to insert the distribution volume 1.

Next, the system instructs you to insert volume 1, which should still be in the drive. Press ⟨Return⟩.

The message "Extracting files" appears and remains on the screen as long as **custom** is extracting SCO System V Operating System International Supplement packages from the disk. If this release of the International Supplement has more than one volume, you are asked to load each additional volume in turn.

6. For SCO XENIX System V, the screen clears and the message "Executing Product Prep Script" is displayed. Press any key to continue the installation.

   Under SCO UNIX System V, you see the message "Executing International Supplement Prep Script" displayed.

   If you are installing the International Supplement in multi-user mode, the following message is displayed:

```
The Operating System Supplement should be installed in single-user
("System Maintenance") mode. Otherwise, unpredictable failures may
occur during installation.

Are you absolutely sure you wish to install in multi-user mode? (y/n)
```

   You are advised to answer "n" to the prompt above. The system will break out of **custom** for you to re-install the International Supplement from step 1.

   If you decide to continue in multi-user mode by pressing "y", you may receive errors later in the installation.

7. Under SCO UNIX System V, if you selected "Packages" from the screen offering package types, a list of the SCO UNIX System V Operating System International Supplement packages is displayed for you to choose from.

   Information about the packages is displayed in four columns; the name of the package is displayed first, followed by whether the package is partly or fully installed, followed by the size of the package, and a description of the package:

```
ALL      Part    7554    Complete International UNIX O.S. Supplement

RTSUP    Part    3032    Supplement to UNIX Run Time System

BASE     Part    1180    Supplement to basic extended utility set
EX       Part    454     Terminfo Files

MAPFILE  Part    1218    ISO 8859 mapchan files
FONT     Part    142     Font files for international character sets
```

Please note that the above example refers to a SCO UNIX System V installation. If you are using a SCO XENIX System V system, see below for the system display.

Note that the 'size' column in the above display may vary depending on release version.

Also note that under SCO UNIX System V only, selecting "ALL" is the same as if you had selected "Entire Package" from the screen offering package types.

If you installed the SCO UNIX System V Operating System, you will notice that the table above is very similar to the one displayed by **custom** during the operating system installation.

Some packages can be installed only if the corresponding standard product package has been installed already. If the standard product package is re-installed for any reason, the corresponding International Supplement package must also be re-installed. This is because the package will have been overwritten by the standard one.

NOTE MAPFILE adds a number of files which allow filtering of characters, both on input and output, using the **mapchan**(M) utility. Thus, a uniform and transparent interface is presented to the user.

FONT adds a number of files which can be used with the **vidi**(C) utility. They provide new console character sets to support alternative national language characters.

Under SCO UNIX System V, highlight the line(s) corresponding to the SCO UNIX System V Operating System International Supplement package(s) you wish to install, and press ⟨Space⟩ to select. Then press ⟨Return⟩. The message "Creating file lists..." appears at the top of the Install screen.

Please note that the above example refers to a SCO UNIX System V installation. If you are using a SCO XENIX System V system, the following will be displayed:

```
1. Install one or more packages
2. Remove one cr more packages
3. List the available packages
4. List the files in a package
5. Install a single file
6. Select a new set to customize
7. Display current disk usage
8. Help

Select an option or enter q to quit:
```

Select option 1 to install one or more packages. You will then be given a list of packages similar to the previous SCO UNIX System V example. Either type "ALL" to install the whole supplement (the recommended choice), or type the name of one module to install.

8. Again, the system instructs you to insert volume 1, which should still be in the drive. Press ⟨Return⟩.

   The message "Extracting files" appears and remains on the screen as long as **custom** is extracting SCO System V Operating System International Supplement packages from the disk. If this release of the International Supplement has more than one volume, you are asked to load each additional volume in turn.

   A list of the distribution-media files is included in the section "Files in this Set."

9. If you selected ALL, follow the instructions from step 10 through to step 14.

10. If you selected the RTSUP package, you will see the line:

```
System-wide locale initialization
---------------------------------
```

The current settings will be printed, similar to the following example:

```
Default system-wide locale setting when LANG is undefined:
LANG=english_us.ascii

Any partially defined LANG will be expanded to the first match from:
LANG=french_france.8859m
LANG=german_germany.8859
```

Before continuing this step, please read carefully the section entitled "Choosing a Locale" in the *International Operating System Guide*. Particular attention should be given to the differences between the ".8859" and ".8859m" locales.

Notice that these values will be different if someone has changed the file */etc/default/lang*.

You will then see the line:

```
Do you wish to change any of these? (y/n)
```

If you select "y", the message "Preserving old default locale settings in /etc/default/lang.old" appears. Then "Reading locale information ... Available locales are:" is displayed and you are presented with a list of the currently available locales. Choose an entry for the primary default:

```
Please enter your choice for the primary default [1 - n]
or enter q to quit
```

The new settings will now be displayed.

After setting your primary default, the system allows you the choice of setting other locales as defaults. If your environment variable for **LANG** is unset, then the primary default (as specified in your */etc/default/lang* file above) is used as your selected locale, for example:

```
LANG=english_uk.ascii.
```

However, if your environment variable (**LANG**) is only partially defined, for example:

```
LANG=english_uk
```

then the system expands this partially defined value to the first match available in the list of secondary defaults.

Next, you will be asked if you wish to remove the secondary defaults (the second list). Answer "y" if you wish to start the secondary defaults from scratch, or "n" if you wish to keep them.

You will then be asked if you wish to add more defaults for other languages. If you answer "yes," you will again be presented with a list of available locales. You can select any number of secondary defaults.

When you have selected as many locales as you need, press "q". You will see the message:

```
Default locale selection complete.
```

11. If you selected the BASE package, the following message is displayed:

```
Configuring Keyboards
---------------------

Please refer to the table of available keyboard files in the Release
and Installation Notes.
```

This information can be found in Appendix A of these *Release Notes*. You will then see a message:

```
Do you wish to have a keyboard map automatically
selected during system startup? (y/n)
```

If you select "y", you will see the message:

```
Enter the option number for your keyboard type [1-54] or
type 'q' to quit:
```

If you decide not to select a keyboard type, enter "q" and follow the instructions from step 13 onwards.

Select a keyboard type from the table below and enter the appropriate number.

PS/2 style keyboards (with the display character ROM type in parentheses if not IBM):	
1.	American
2.	United Kingdom
3.	German
4.	Swiss German
5.	Swiss French
6.	French
7.	Belgian
8.	Portuguese (Portuguese)
9.	Spanish (Spanish)
10.	Spanish International
11.	Italian
12.	Greek with Greek characters as default (Greek)
13.	Greek with ASCII characters as default (Greek)
14.	Danish (Norwegian)
15.	Norwegian (Norwegian)
16.	Swedish

PC-AT style keyboards:	
17.	American
18.	United Kingdom
19.	German
20.	French
21.	Spanish
22.	Italian

PC-AT style keyboards on a system using ISO 8859 mapchan:	
23.	American
24.	United Kingdom
25.	German
26.	Swiss German
27.	Swiss French
28.	French
29.	Spanish
30.	Italian
31.	Norwegian
32.	Swedish

PS/2 style keyboards using codepage 850:	
33.	American
34.	United Kingdom
35.	German
36.	Swiss German
37.	Swiss French
38.	French
39.	Belgian
40.	Portuguese
41.	Spanish
42.	Italian
43.	Danish
44.	Norwegian
45.	Swedish
46.	Finnish
47.	Canadian
48.	Latin Spanish
49.	Dutch

Siemens WX200 style keyboard:	
50.	American
51.	German
52.	German (old WX200)

Spanish PS/2 Style Keyboard, emulating AT style keyboard (by pressing ⟨Alt⟩ key).	
53.	Spanish

Latin American Spanish PS/2 Style Keyboard:	
54.	Latin Spanish

When you enter a valid option number, you will see the message:

```
Preserving ./usr/lib/keyboard/keys as ./usr/lib/keyboard/keys.old
```

Your keyboard will be mapped with the chosen option.

12. If you selected the MAPFILE package and the MAPCHAN package is partially installed or not installed at all, you are prompted to install MAPCHAN:

```
International Character set mapping is not installed.

Do you wish to install it now? (y/n)
```

or

```
International Character set mapping is only partially installed.

Do you wish to install it now? (y/n)
```

The MAPCHAN package must be installed so that the channel mapping features of the International Supplement can be used. Select "y", unless you do not wish to use channel mapping for peripheral devices. If you select "y" you are prompted for volumes from the Operating System distribution.

13. If you selected the MAPFILE package, you see the message:

```
The following procedure should be selected if you intend
to use the ISO 8859 internal character set, which is
recommended. If you wish to configure your own channel
maps, or leave in place maps which you have already
configured, reply 'n' to the next question:

Do you wish to configure automatic character set mapping? (y/n)
```

NOTE If you have a Greek PS/2 style keyboard you can also configure automatic character set mapping by entering "y" to the above question. The character set used for Greek does not conform to the ISO 8859 character set.

Unless you are re-installing the International Supplement, (or don't require mapping) you should select "y" at the prompt. If you enter "n", proceed to step 14. You will then see a message describing the next steps in configuring mapchan files, followed by a list of available tty lines and the following prompt:

```
Please enter a mapchan file type to assign to one or
more of these terminals [1-80] or enter q to quit:
```

You should select a mapchan file type from the following table, or answer "q" if you wish to set them all to a common type.

Note that the section "Terminals" in Appendix A of these notes, details which mapchan file to use with each supported terminal.

1. 7-bit ASCII
2. HP Laser Jet ROMAN-8
3. Console with PC character ROM
4. Console with ISO 8859 ROM
5. Console with PC Nordic ROM
6. Console with PC Portuguese ROM
7. Console with PC Spanish National ROM
8. Console with PC Greek ROM
9. Console with IBM PC 850 Multilingual code page
10. 7-bit French Canadian NRC
11. 7-bit Swiss German NRC
12. 7-bit French NRC (NFZ62-101 1982)
13. 7-bit German NRC (DIN66003)
14. 7-bit Italian NRC
15. 7-bit Norwegian NRC
16. 7-bit Spanish NRC
17. 7-bit Swedish NRC
18. 7-bit UK English NRC (BS4730)
19. Qume French NRC
20. Qume German NRC
21. TeleVideo French NRC
22. TeleVideo German NRC
23. TeleVideo Norwegian/Danish NRC
24. TeleVideo Portuguese NRC
25. TeleVideo Spanish NRC
26. TeleVideo Swedish/Finnish NRC
27. TeleVideo UK English NRC
28. TeleVideo US ASCII
29. DEC Multinational 8-bit
30. Wyse French (ANSI Keyboard)
31. Wyse French (ASCII Keyboard)

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32. Wyse French 8-bit (ANSI Keyboard)
33. Wyse French 8-bit (ASCII Keyboard)
34. Wyse German
35. Wyse 8-bit German
36. HP Belgian 7-bit ANSI
37. HP French 7-bit ANSI
38. HP Canadian English/French 7-bit ANSI
39. HP Danish 7-bit ANSI
40. HP Norwegian 7-bit ANSI
41. HP Finnish 7-bit ANSI
42. HP German 7-bit ANSI
43. HP German DIN 7-bit ANSI
44. HP Italian 7-bit ANSI
45. HP Dutch 7-bit ANSI
46. HP Portuguese 7-bit ANSI
47. HP Spanish 7-bit ANSI
48. HP Swedish 7-bit ANSI
49. HP Swiss German/French 7-bit ANSI
50. HP UK 7-bit ANSI
51. HP US 7-bit ANSI
52. HP Belgian 7-bit ASCII
53. HP French 7-bit ASCII
54. HP Canadian English/French 7-bit ASCII
55. HP Danish 7-bit ASCII
56. HP European Spanish 7-bit ASCII
57. HP Finnish 7-bit ASCII
58. HP Swedish 7-bit ASCII
59. HP German 7-bit ASCII
60. HP Italian 7-bit ASCII
61. HP Latin Spanish 7-bit ASCII
62. HP Dutch 7-bit ASCII
63. HP Norwegian 7-bit ASCII
64. HP Swiss German/French 7-bit ASCII
65. HP UK 7-bit ASCII
66. HP US 7-bit ASCII
67. HP ANSI 8-bit
68. HP ROMAN 8-bit
69. Siemens WX200 8-bit ISO 8859
70. Digibyte Portuguese (Brascii mode) 8-bit ISO 8859
71. Digibyte Portuguese (Abicomp mode) 8-bit ISO 8859
72. Sigma TisPC Portuguese (Abicomp mode) 8-bit ISO 8859
73. Console emulating Portuguese from PC character ROM
74. Wyse 60 (Spanish ANSI)
75. 7-bit ASCII device approximating 8-bit Spanish

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76. Wyse 60 (Spanish ASCII)
77. Wyse 60 (Latin American Spanish ASCII)
78. Wyse 60 with Spanish keyboard
79. Spanish from any device with an IBM character set
80. Other

You will then see:

```
Please enter serial lines to map as your choice or
enter 'q' to quit.
```

Enter, on one line separated by a space, the ttys you wish to have mapped by the selected mapchan file type.

You can now repeat this for another mapchan file type, or answer "q" to the "Please enter a mapchan ... " prompt. If there are many ttys unmapped after this stage, you will see the message below, followed by a list of unmapped ttys:

```
The following serial lines remain unmapped:
```

You are then prompted:

```
Do you wish to select a common channel map for all
these serial lines? (y/n)
```

If you answer "y" to this question, you must then answer the following question:

```
Please enter the mapchan file type for
all remaining terminals [1-80] or enter q to quit:
```

Select the table of mapchan file types given earlier in these notes. Note that channel mapping does not come into effect until the system is rebooted.

Notice that any serial line which is to be used by the uucp system should not have an associated channel mapping.

14. You are returned to the custom menu. The International Supplement is now installed on your system.

Chapter 3

Configuring the system

The installation procedure only configures some basic system requirements. It may also be necessary to modify the configuration to satisfy individual users' needs. Examples of areas which need consideration are:

- Terminals and printers may need to be adjusted. This is both with their own setup procedure and with the correct mapchan files.
- The system needs to be working with a consistent internal character set.
- Users may need to have their environment set, so that date, time, currency and numerical output meets their specific requirements.
- Collation sequences may need to be set so that sorting and use of regular expressions proceed according to specific requirements.
- If a mixture of 7 and 8-bit software is being used, the users must be aware of how to use both types together.

This is covered in the *International Operating System Guide*. The chapter on "Administering International System V" deals with the practical aspects of the above tasks, and the chapter on "Introducing International System V" gives more detail on the system.

For the spanish_spain.8859 and spanish_america.8859 locales, the proper collation of the 'ch' primary characters only works with SCO International UNIX System V Release 3.2 Operating System Version 4.0 and subsequent releases. See the **coltbl**(M) notes in the *International Operating System Guide* in this documentation set for more information. You will find these notes in "Choosing a locale" in the chapter entitled, "Administering International System V".

Chapter 4

Internationalization software notes

Use of 8-bit user names

This release of the International System V Operating System does not support the use of 8-bit characters in user names. Therefore, system administrators should not create user names containing 8-bit characters. See the section "The Systems Administrator and 8-bit Characters" in the *International Operating System Guide*, for details.

Using international locale definition commands

The **chrtbl**(M), **coltbl**(M), **mestbl**(M), **montbl**(M), **timtbl**(M) utilities allow the user to create new international locales. The international locale is a definition of local conventions used by System V libraries, utilities and applications. Each utility reads a specification file and produces a table format file in the current directory. This file is used by the **setlocale**. The table format file is generated with incorrect file access permissions. Use the **chmod**(C) command to change the table file access permissions to:

```
-rw-r--r--
```

Appendix A

Device configuration

Keyboard mapping for the console

The following mapkey files are supplied for PS/2 and PC-AT style keyboards and different character sets. The files are held in the directory */usr/lib/keyboard*.

Use the tables below to select the appropriate keyboard file for your console:

PS/2 style keyboard	ROM or vidi(C) font					
	PC Standard ibm	PC HP 850	PC Nordic nor	PC Portuguese por	PC Spanish spa	PC Greek grk
Belgian	ps.ibm.bel	ps.850.bel				
Canadian		ps.850.can				
Danish		ps.850.dan	ps.nor.dan			
Dutch		ps.850.ndl				
Finnish		ps.850.fin				
French	ps.ibm.fra	ps.850.fra				
German	ps.ibm.ger	ps.850.ger				
Greek (ASCII def.)						ps.grk.gra
Greek (Greek def.)						ps.grk.grg
Italian	ps.ibm.ita	ps.850.ita				
Latin Spanish	ps.ibm.lsp	ps.850.lsp				
Norwegian		ps.850.nor	ps.nor.nor			
Portuguese		ps.850.por		ps.por.por		
Spanish	ps.at.spa*				ps.spa.spa	
Spanish Intl.	ps.ibm.spa	ps.850.spa				
Swedish	ps.ibm.swe	ps.850.swe				
Swiss French	ps.ibm.swf	ps.850.swf				
Swiss German	ps.ibm.swg	ps.850.swg				
UK English	ps.ibm.ukd	ps.850.ukd				
USA English	ps.ibm.usa	ps.850.usa				

* Press the ⟨Alt⟩ key to emulate PC-AT style keyboard.

PC-AT style keyboard	ROM or vidi(C) font	
	PC Standard ibm	PC ISO 8859/1 iso
French	at.ibm.fra	at.iso.fra
German	at.ibm.ger	at.iso.ger
Italian	at.ibm.ita	at.iso.ita
Norwegian		at.iso.nor
Spanish	at.ibm.spa	at.iso.spa
Swedish		at.iso.swe
Swiss French		at.iso.swf
Swiss German		at.iso.swg
UK English	at.ibm.ukd	at.iso.ukd
USA English	at.ibm.usa	at.iso.usa

Note that the layout of different manufacturers' keyboards can vary, so some changes may be necessary to these files for correct operation on your system.

Siemens WX200 Style Keyboard	PC Standard ibm
American	wx.ibm.usa
German	wx.ibm.ger
German (old)	wx.ibm.ger.old

Dead key sequences

Six dead keys are supported by the map files provided with the UNIX system. The map files for the following terminals use the specified dead keys. The other map files do not provide dead keys, but can be modified to do so:

File	caret (^)	acute (´)	grave (`)	umlaut (¨)	tilde (~)	cedilla (¸)
ascii.spa	X	X	X	X		
cons.bra	X	X	X	X	X	
cons.ibm	X	X	X	X		
cons.nor	X	X	X	X	X	
cons.por	X	X	X	X	X	
cons.spa		X	X	X		
cons.850	X	X	X	X	X	X
cons.grk		X		X		
cons.iso	X	X	X	X		
digi.abicomp	X	X	X	X	X	
digi.brascii	X	X	X	X	X	
gvt.fra	X				X	
gvt.ger		X	X			
tispc.abicomp	X	X	X	X	X	
tvi.fra	X					
wy60.ger		X	X			
wy60.fra.asc	X			X		
wy60.fra.ans	X			X		
w60.ibmfra.ans	X			X		
w60.ibmfra.asc	X			X		
wy60.ibm.ger		X	X			
wy60.lat.asc		X		X		
wy60.spa	X	X	X	X		
wy60.spa.asc	X	X				
wy60.spa.sk		X		X		
ibm.spa		X		X		

Screen font mapping for the console

If you change **mapchan** mapping for a console with any type of display adapter, you will also need to change the character font.

The **vidi**(C) utility defines the font for one of the character sets given below. The following font definition files are available in the directory */usr/lib/vidi*:

Character Set	8x8 font	8x14 font	8x16 font
Codepage 850	850.8x8	850.8x14	850.8x16
ISO 8859	iso.8x8	iso.8x14	iso.8x16
PC Greek	grk.8x8	grk.8x14	grk.8x16
PC Israeli	isr.8x8	isr.8x14	isr.8x16
PC Nordic	nor.8x8	nor.8x14	nor.8x16
PC Portuguese	por.8x8	por.8x14	por.8x16
PC Spanish	spa.8x8	spa.8x14	spa.8x16
PC Standard	font.8x8	font.8x14	font.8x16

Setting up a printer

A printer can be used with any suitable mapchan file. A suitable file is one that maps from the internal character set to the character set used by the printer on output.

The table below, lists the mapchan files supplied for use with specific printers. All files are in the directory */usr/lib/mapchan*:

File	Device
hp.roman8	Hewlett-Packard LaserJet Printer ROMAN-8 set
ibm	Any printer using the IBM PC character set

Terminals

The following mapchan files are provided in */usr/lib/mapchan* to permit the use of international character sets on their corresponding terminals:

ascii	Any 7-bit US ASCII terminal
ascii.spa	Any 7-bit ASCII device to approximate 8-bit Spanish
ibm.spa	Any device with an IBM character set to approximate 8-bit Spanish
hp.roman8	ROMAN-8, i.e. Hewlett-Packard Laserjet II
cons.bra	Console-PC Standard ROM (emulates Portuguese)
cons.ibm	Console-PC standard ROM
cons.iso	Console-ISO 8859/1 ROM
cons.nor	Console-PC Nordic ROM
cons.por	Console-PC Portuguese ROM
cons.spa	Console-PC Spanish ROM
cons.grk	Console-PC Greek ROM
cons.850	Console-IBM PC Multilingual code page 850
digi.abicomp	Portuguese Digibyte terminal in Abicomp mode
digi.brascii	Portuguese Digibyte terminal in Brascii mode
nrc.can	Canadian 7-bit NRC terminals
nrc.chw	Swiss 7-bit NRC terminals
nrc.fra	French 7-bit NRC terminals
nrc.ger	German 7-bit NRC terminals
nrc.ita	Italian 7-bit NRC terminals
nrc.nor	Norwegian 7-bit NRC terminals
nrc.spa	Spanish 7-bit NRC terminals
nrc.swe	Swedish 7-bit NRC terminals
nrc.ukd	UK English 7-bit NRC terminals
qvt.fra	Qume QVT101 with French keyboard
qvt.ger	Qume QVT101 with German keyboard
tvi.fra	TVI924 with French keyboard
tvi.ger	TVI924 with German keyboard
tvi.nor	TVI924 with Norwegian/Danish keyboard
tvi.por	TVI924 with Portuguese keyboard
tvi.spa	TVI924 with Spanish keyboard
tvi.swe	TVI924 with Swedish/Finnish keyboard
tvi.ukd	TVI924 with UK keyboard
tvi.usa	TVI924 with US ASCII keyboard
dec	DEC Multinational, i.e. VT220
tispc.abicomp	Sigma TisPC Portuguese 8-bit ANSI keyboard

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wy60.fra.ans	Wyse60 French NRC with ANSI keyboard
wy60.fra.asc	Wyse60 French NRC with ASCII keyboard
w60.ibmfra.ans	Wyse60 French 8-bit ANSI keyboard
w60.ibmfra.asc	Wyse60 French 8-bit ASCII keyboard
wy60.ger	Wyse60 German keyboard (ANSI or ASCII)
wy60.ibm.ger	Wyse60 German 8-bit keyboard (ANSI or ASCII)
wy60.spa	Wyse60 Spanish 8-bit ANSI keyboard
wy60.lat.asc	Wyse60 Latin American Spanish ASCII keyboard
wy60.spa.asc	Wyse60 Spanish ASCII keyboard
wy60.spa.sk	Wyse60 with Spanish keyboard
wx200.iso	Siemens WX200 8-bit ANSI keyboard
hp.ansi.7.bel	HP with Belgian ANSI keyboard
hp.ansi.7.fra	HP with French ANSI keyboard
hp.ansi.7.can	HP with Canadian English/French ANSI keyboard
hp.ansi.7.dan	HP with Danish ANSI keyboard
hp.ansi.7.nor	HP with Norwegian ANSI keyboard
hp.ansi.7.fin	HP with Finnish ANSI keyboard
hp.ansi.7.ger	HP with German ANSI keyboard
hp.ansi.7.grd	HP with German (DIN) ANSI keyboard
hp.ansi.7.ita	HP with Italian ANSI keyboard
hp.ansi.7.ndl	HP with Dutch ANSI keyboard
hp.ansi.7.por	HP with Portuguese ANSI keyboard
hp.ansi.7.spa	HP with Spanish ANSI keyboard
hp.ansi.7.swe	HP with Swedish ANSI keyboard
hp.ansi.7.swi	HP with Swiss German/French ANSI keyboard
hp.ansi.7.ukd	HP with UK English ANSI keyboard
hp.ansi.7.usa	HP with US English ANSI keyboard
hp.ascii.7.bel	HP with Belgian ASCII keyboard
hp.ascii.7.fra	HP with French ASCII keyboard
hp.ascii.7.can	HP with Canadian English/French ASCII keyboard
hp.ascii.7.dan	HP with Danish ASCII keyboard
hp.ascii.7.esp	HP with European Spanish ASCII keyboard
hp.ascii.7.fin	HP with Finnish ASCII keyboard
hp.ascii.7.swe	HP with Swedish ASCII keyboard
hp.ascii.7.ger	HP with German ASCII keyboard
hp.ascii.7.ita	HP with Italian ASCII keyboard
hp.ascii.7.lsp	HP with Latin Spanish ASCII keyboard
hp.ascii.7.ndl	HP with Dutch ASCII keyboard
hp.ascii.7.nor	HP with Norwegian ASCII keyboard
hp.ascii.7.swi	HP with Swiss German/French ASCII keyboard

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hp.ascii.7.ukd	HP with UK English ASCII keyboard
hp.ascii.7.usa	HP with US English ASCII keyboard
hp.ansi.8	HP with 8-bit Dec Multinational Character set
hp.roman.8	HP with 8-bit ROMAN Character set

NOTE The cons.grk mapchan file does not conform to the ISO 8859 standard.

Files which are not designed for specific terminal makes (the *nrc.** files), may need some additions to account for the features of a particular terminal. As a guide, see how the *qvt.** files differ from their corresponding *nrc.** files.

Additional information on supported terminals

This section gives additional information on the following supported terminals:

- wyse60
- Olivetti ws685 and ws685pc
- HP 700/22, 700/32, 700/41, 700/43, 700/44, 700/45, 700/92

The tables below, help you choose which mapchan files to use with different terminals and keyboards.

wyse60

In order to load the correct font for use with 8-bit characters, set your terminal as follows:

TERM environment variable setting	Terminal configuration
wyse60	Wyse60 8-bit with ANSI/ASCII keyboard
wyse60n	Wyse60n 7-bit NRC with ANSI/ASCII keyboard

Note that the appropriate keyboard language must be configured on the terminal before login.

The following table gives the mapchan files for different keyboards and language sets:

Keyboard	Language		
	French	German	Spanish
NRC ANSI	wy60.fra.ans	wy60.ger	wy60.spa
NRC ASCII	wy60.fra.asc	wy60.ger	wy60.spa
8-bit ANSI	w60.ibmfra.ans	wy60.ibm.ger	wy60.spa
8-bit ASCII	w60.ibmfra.asc	wy60.ibm.ger	wy60.spa

Olivetti

Use the dec mapchan file with Olivetti ws685 and ws685pc terminals.

Hewlett-Packard

Use the following mapchan files with the HP 700/22 terminal:

Keyboard	vt220 7-bit mode NRC	vt220 8-bit mode DEC multilingual
Belgian	hp.ansi.7.bel	hp.ansi.8
Canadian French	hp.ansi.7.can	hp.ansi.8
Danish	hp.ansi.7.dan	hp.ansi.8
Finnish	hp.ansi.7.fin	hp.ansi.8
French	hp.ansi.7.fra	hp.ansi.8
German	hp.ansi.7.ger	hp.ansi.8
German (din)	hp.ansi.7.grd	hp.ansi.8
Italian	hp.ansi.7.ita	hp.ansi.8
Dutch	hp.ansi.7.ndl	hp.ansi.8
Norwegian	hp.ansi.7.nor	hp.ansi.8
Portuguese	hp.ansi.7.por	hp.ansi.8
Spanish	hp.ansi.7.spa	hp.ansi.8
Swedish	hp.ansi.7.swe	hp.ansi.8
Swiss	hp.ansi.7.swi	hp.ansi.8
British	hp.ansi.7.ukd	hp.ansi.8
American	hp.ansi.7.usa	hp.ansi.8

Use the following mapchan files for the HP 700/44 terminal:

Keyboard	vt220 7-bit mode NRC	vt220 8-bit mode DEC multilingual	HP-PCterm mode
Belgian	hp.ansi.7.bel	hp.ansi.8	cons.850
Canadian French	hp.ansi.7.can	hp.ansi.8	cons.850
Danish	hp.ansi.7.dan	hp.ansi.8	cons.850
Finnish	hp.ansi.7.fin	hp.ansi.8	cons.850
French	hp.ansi.7.fra	hp.ansi.8	cons.850
German	hp.ansi.7.ger	hp.ansi.8	cons.850
German (din)	hp.ansi.7.grd	hp.ansi.8	cons.850
Italian	hp.ansi.7.ita	hp.ansi.8	cons.850
Dutch	hp.ansi.7.ndl	hp.ansi.8	cons.850
Norwegian	hp.ansi.7.nor	hp.ansi.8	cons.850
Portuguese	hp.ansi.7.por	hp.ansi.8	cons.850
Spanish	hp.ansi.7.spa	hp.ansi.8	cons.850
Swedish	hp.ansi.7.swe	hp.ansi.8	cons.850
Swiss	hp.ansi.7.swi	hp.ansi.8	cons.850
British	hp.ansi.7.ukd	hp.ansi.8	cons.850
American	hp.ansi.7.usa	hp.ansi.8	cons.850

Use the following mapchan files for the HP 700/32 terminal:

Keyboard	vt220 7-bit mode NRC	vt220 8-bit mode DEC multilingual
Belgian	hp.ansi.7.bel	hp.ansi.8
Canadian French	hp.ansi.7.can	hp.ansi.8
Danish	hp.ansi.7.dan	hp.ansi.8
Finnish	hp.ansi.7.fin	hp.ansi.8
French	hp.ansi.7.fra	hp.ansi.8
German	hp.ansi.7.ger	hp.ansi.8
German (din)	hp.ansi.7.grd	hp.ansi.8
Italian	hp.ansi.7.ita	hp.ansi.8
Dutch	hp.ansi.7.ndl	hp.ansi.8
Norwegian	hp.ansi.7.nor	hp.ansi.8
Portuguese	hp.ansi.7.por	hp.ansi.8
Spanish	hp.ansi.7.spa	hp.ansi.8
Swedish	hp.ansi.7.swe	hp.ansi.8
Swiss	hp.ansi.7.swi	hp.ansi.8
British	hp.ansi.7.ukd	hp.ansi.8
American	hp.ansi.7.usa	hp.ansi.8

NOTE Mapping is not required for the HP 700/32 in vt320 ISO latin 1 mode.

Use the following mapchan files for the HP 700/41 and HP 700/43 terminals:

Keyboard	Wyse 30/50 ISO replacement
Belgian	hp.ascii.7.bel
Canadian French	hp.ascii.7.can
Danish	hp.ascii.7.dan
Finnish	hp.ascii.7.fin
French	hp.ascii.7.fra
German	hp.ascii.7.ger
European Spanish	hp.ascii.7.esp
Italian	hp.ascii.7.ita
Dutch	hp.ascii.7.ndl
Norwegian	hp.ascii.7.nor
Latin Spanish	hp.ascii.7.lsp
Swedish	hp.ascii.7.swe
Swiss	hp.ascii.7.swi
British	hp.ascii.7.ukd
American	hp.ascii.7.usa

Use the following mapchan files for the HP 700/45 terminal with ascii keyboard:

Keyboard	Wyse 60 ISO replacement
Belgian	hp.ascii.7.bel
Canadian French	hp.ascii.7.can
Danish	hp.ascii.7.dan
Finnish	hp.ascii.7.fin
French	hp.ascii.7.fra
German	hp.ascii.7.ger
European Spanish	hp.ascii.7.esp
Italian	hp.ascii.7.ita
Dutch	hp.ascii.7.ndl
Norwegian	hp.ascii.7.nor
Latin Spanish	hp.ascii.7.lsp
Swiss	hp.ascii.7.swi
British	hp.ascii.7.ukd
American	hp.ascii.7.usa

The following mapchan files for the HP 700/45 terminal with ansi keyboard:

Keyboard	vt220 7 bit mode NRC	vt220 8 bit mode DEC multilingual
Belgian	hp.ascii.7.bel	hp.ansi.8
Canadian French	hp.ascii.7.can	hp.ansi.8
Danish	hp.ascii.7.dan	hp.ansi.8
Finnish	hp.ascii.7.fin	hp.ansi.8
French	hp.ascii.7.fra	hp.ansi.8
German	hp.ascii.7.ger	hp.ansi.8
German (din)	hp.ascii.7.grd	hp.ansi.8
Italian	hp.ascii.7.ita	hp.ansi.8
Dutch	hp.ascii.7.ndl	hp.ansi.8
Norwegian	hp.ascii.7.nor	hp.ansi.8
Portuguese	hp.ascii.7.por	hp.ansi.8
Spanish	hp.ascii.7.spa	hp.ansi.8
Swedish	hp.ascii.7.swe	hp.ansi.8
Swiss	hp.ascii.7.swi	hp.ansi.8
British	hp.ascii.7.ukd	hp.ansi.8
American	hp.ascii.7.usa	hp.ansi.8

NOTE Mapping is not required for the HP 700/45 in vt320 ISO latin 1 mode.

Use the following mapchan files for the HP 700/92 terminal:

Keyboard	7 bit mode ISO replacement	8 bit mode
Belgian	hp.ascii.7.bel	hp.roman.8
Canadian French	hp.ascii.7.can	hp.roman.8
Danish	hp.ascii.7.dan	hp.roman.8
Finnish	hp.ascii.7.fin	hp.roman.8
French	hp.ascii.7.fra	hp.roman.8
German	hp.ascii.7.ger	hp.roman.8
European Spanish	hp.ascii.7.esp	hp.roman.8
Italian	hp.ascii.7.ita	hp.roman.8
Dutch	hp.ascii.7.ndl	hp.roman.8
Norwegian	hp.ascii.7.nor	hp.roman.8
Latin Spanish	hp.ascii.7.lsp	hp.roman.8
Swedish	hp.ascii.7.swe	hp.roman.8
Swiss	hp.ascii.7.swi	hp.roman.8
British	hp.ascii.7.ukd	hp.roman.8
American	hp.ascii.7.usa	hp.roman.8

Setting up a terminal

If you have one of the terminals listed below, follow the instructions in this section to set it up:

- HP 700/99
- HP 700/44
- HP 700/41
- Olivetti ws685
- Digibyte
- Sigma TisPC

Note that the compose character is different for some terminals configured to emulate the vt220, and with some settings of keyboard language (for example, North American). The compose character is generated by typing ⟨Ctrl⟩⟨Shift⟩/ or ⟨Ctrl⟩7, rather than by typing ⟨Ctrl⟩_.

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Chapter 1

Introducing International System V

Using International System V documentation

International System V is available when the International Supplement is used with the SCO System V Operating System. SCO System V is a family of products that includes SCO XENIX System V and SCO UNIX System V/386 Release 3.2. The documents which come as part of the International Supplement package and which describe how to use the International System V Operating System are as follows:

- The *SCO System V International Supplement Release and Installation Notes*, and
- this *SCO System V International Operating System Guide.*

This guide is aimed at those wishing to use the international features of International System V and for those administering the International Environment. The guide is designed so that each chapter can be read independently. As a result, some information may be duplicated. The chapters are as follows:

- Introducing International System V (this chapter)

  If you are unfamiliar with SCO System V, first consult the *SCO UNIX System V User's Guide/SCO XENIX System V User's Guide* and then read this chapter to learn about the key features of International System V.

- Using International System V

  This chapter describes how to use the international features of your System V operating system. It also shows how to avoid problems that may arise when working with users on non-international System V systems.

- Administering International System V

  This chapter explains how to configure your system with the correct language environment, including how to install the files for setting up terminals, printers and other peripheral devices. In order to use this chapter you must be familiar with the *SCO UNIX System V System Administrator's Guide/SCO XENIX System V System Administrator's Guide.*

- Appendix A contains copies of the following code set tables:
  - US ASCII
  - ISO 8859/1
  - HP® Roman 8
  - IBM® PC -8

What is International System V?

International System V aims to provide an environment in which anyone using the system does so in as natural a way as possible. There should be no need to do anything special because of a particular terminal, keyboard or language. An environment should match the customs used in the user's country for date, time and numerical formats. The way in which this environment is implemented is transparent to the user.

UNIX originated in the United States of America where the standard character set is ASCII. The number of characters (letters, numbers, symbols and control codes) in this set is 128, because the character set is only built on 7 bits. Outside America, a much larger range of characters is used, and some computer hardware manufacturers have also added graphics characters. One way of coping with these extra characters involves replacing part of the original ASCII set by the national characters (for example the accented characters); another way has been to define other standards for 8-bit character sets. The key utilities of International System V function with 8-bit character sets.

Allowing the use of 8-bit characters is not enough. There must be support of the character sets. Software being used on the system might be working with a number of standards for the character sets. Different programs may use different character sets. This presents a potential problem in a multi-user and multi-tasking environment, particularly if data is being used by more than one program. International System V overcomes these problems by defining a standard internal character set while allowing alternate character sets to be used if required.

Working in a country outside the USA involves more than just using extra characters because the language is different. Conventions vary in the use of date and currency format, and keyboard layouts can vary not only from country to country but also from terminal to terminal. It is possible that companies dealing with a number of non-English speaking countries might need more characters than can be supported on one keyboard. In order to address such requirements, International System V allows you to customize the user environment.

International System V also enables software developers to create international applications which use 8-bit character sets. Users can then run these applications in their own environment without recourse to any special configuration of the software.

Key features of International System V

The following features characterize International System V:

- 8-bit support in kernel and key utilities.
- Modification of runtime behavior according to geographical location and language (locale). This includes:
  - national language character sets;
  - character classification (for instance, to allow for upper and lower case on accented characters);
  - time/date display (names of days, months, clock format);
  - numeric display (decimal character, thousands delimiter);
  - ordering of characters (collation) for sorting purposes and string comparison, and
  - use of international characters within regular expressions.
- Support for peripherals which allow the user to enter and display national language characters.

Utilities for International System V

The following utilities work with 8-bit characters and, where appropriate, their operation is affected by the setting of the locale. Refer to the appropriate manual pages for details.

at(C)	**expr(C)**	**mv(C)**	**tar(C)**
cat(C)	**ex(C)**	**ncheck(C)**	**tee(C)**
chrtbl(M)	**file(C)**	**numtbl(M)**	**timtbl(M)**
cmp(C)	**find(C)**	**passwd(C)**	**tr(C)**
coltbl(M)	**finger(C)**	**pg(C)**	**ungetty(M)**
cp(C)	**fsck(C)**	**pr(C)**	**uucp(C)**
cpio(C)	**getty(M)**	**pwd(C)**	**uustat(C)**
cron(C)	**grep(C)**	**rcp(C)**	**uusub(C)**
cu(C)	**head(C)**	**remote(C)**	**uux(C)**
daemon.mn(M)	**ln(C)**	**rm(C)**	**vi(C)**
date(C)	**login(C)**	**rmdir(C)**	**wall(C)**
dd(C)	**ls(C)**	**sddate(C)**	**wc(C)**
diff(C)	**mail(C)**	**sdiff(C)**	**who(C)**
diff3(C)	**mestbl(M)**	**sed(C)**	**write(C)**
dos(C)	**micnet(M)**	**sh(C)**	**xbackup(ADM)**
echo(C)	**mkdir(C)**	**sort(C)**	**dumpdir(ADM)**
ed(C)	**montbl(M)**	**sysadmsh(ADM)**	**xrestore(ADM)**
env(C)	**more(C)**	**tail(C)**	

The reference to **sysadmsh**(ADM) in the table above, includes sysadmsh and its subshells.

Language environment utilities

International System V uses the **mapchan** utility to perform character set mapping. More information is given in the manual page **mapchan**(M) and in the "Administering International System V" chapter in this guide.

International System V has utilities for setting up the international environment. The utilities are used to define the following:

- character classification;
- time and date display;
- character used as decimal place marker;
- collation sequence;
- currency symbol, and
- response strings for messages.

Human-readable specification files are compiled into category tables for use by the operating system and utilities with **chrtbl**(M), **timtbl**(M), **numtbl**(M), **coltbl**(M), **montbl**(M)and **mestbl**(M). The different categories are selected by the environment variables described in **environ**(M) and **locale**(M).

locale(M)

A locale is a name used to refer to a set of national conventions that influence the behavior of library routines. These library routines perform such tasks as numeric formatting and character classification. Their actions can be varied to suit the needs of the user.

The locale is specified by a character string of the form:

language_territory.codeset

The language environment can be defined for individual users by assigning a locale string to the **LANG** environment variable in their *.profile* or *.login* files and/or as an entry in */etc/default/locale*. Refer to the **locale**(M) and **environ**(M) manual pages or the "Administering International System V" chapter of this guide.

environ(M)

In addition to the **LANG** environment variable, there are optional variables which permit the selection of locale attributes in any combination:

LC_COLLATE	affects collating sequence
LC_MONETARY	affects currency symbol
LC_CTYPE	affects character classification routines
LC_MESSAGES	affects the response string
LC_NUMERIC	affects numeric formatting
LC_TIME	affects time and date format

Utilities for creating locale data files

A number of utilities are used to compile human-readable specification files for the categories used in a locale.

chrtbl(M) generates a table of characters specific to a given character classification associated with a language (for example, a file for a Spanish NRC character set). This is associated with the **LC_CTYPE** category. You only need to specify non-ASCII characters.

timtbl(M) creates a table containing the names of the days of the week and months, and time/date formats. This is associated with the **LC_TIME** category.

numtbl(M) creates a numeric locale table containing the characters to be used as the decimal place marker (radix character) and the thousands delimiter (a comma in English format). This is associated with the **LC_NUMERIC** category.

coltbl(M) creates a table defining the ordering of characters during collation. This is associated with the **LC_COLLATE** category.

montbl(M) creates a table containing the currency symbol. This is associated with the **LC_MONETARY** category.

mestbl(M) creates a table containing the response strings a user might type in an application when prompted for a response to a yes/no answer. This is associated with the **LC_MESSAGES** category.

Chapter 2

Using International System V

International System V is available when the International Supplement is used with the SCO System V. This chapter describes how to use the facilities of International System V. If you want to know more background information, read the preceding chapter, "Introducing International System V". If you want to know more about how your particular terminal and account are set up, consult your system administrator.

Getting the right characters

You may have a keyboard which allows you to input all the characters you require, or you may have to use a number of keystrokes to produce some characters. The characters you want may not all be displayed on your screen. This section describes how to use your terminal in these cases.

If you have problems, you should consult your system administrator. This documentation can only describe the ways your system might be set up; the system administrator will know how it has been set up and may be able to solve problems you are having by configuring the system especially for you.

Terminals may have a setting up facility to set the characters for your language and keyboard layout. This is either a special key called something like ⟨Setup⟩, or a combination of keys. If your keyboard does not display the correct characters, check that your terminal is set correctly.

Some terminal keyboards do not have enough keys to assign one to each character. These may be 8-bit or 7-bit terminals. To enter characters which do not appear on the keyboard, either dead keys or compose sequences can be used. Dead keys generate no output when pressed but display a character when the next key is pressed; they are normally used for accented characters. Compose sequences allow you to press a number of keys to generate a particular character. International System V allows you to obtain international characters

using special dead key and compose key sequences. Your terminal may support dead keys, irrespective of the fact that you are using it with International System V. It may also have a dedicated special compose key. Ask your system administrator for the methods used by your terminal. The System V method is described below. If it does not work exactly as described, your system administrator may have modified the sequences.

8-bit terminals can usually display most, if not all, international characters. A number of 7-bit terminals allow you to use international characters. The only way they can display these characters, however, is to substitute other characters in the 7-bit ASCII set. This means that a character you input may not appear on the screen the way you expect.

For example, in French the pipe character (|) is displayed as a ù on some terminals. However, the character is interpreted as a pipe character.

If your terminal does not have a particular character to display, it will display the closest approximation. For example, an á is displayed as an unaccented "a".

Dead key sequences

Dead keys generate no output when pressed, but display a character when a subsequent key is pressed. This enables you to get an accented character which is not present as a specific key on the keyboard. The character is a combination of a dead key (the accent character) and the following key. For example, pressing the "´" dead key followed by an "a" displays the accented character, á.

If you want to display the dead key character, press it twice.

Six dead keys are supported by the International System V map files. A table of map files and supported dead keys, is given in the *International Supplement Release and Installation Notes.*

Compose sequences

Compose sequences allow you to press a number of keys to generate a particular character. The sequence starts with the compose key and is completed by two further keys, which specify the character input.

For example, the registered trade mark symbol (®) can be generated by typing the following:

⟨compose key⟩ r o

Some keyboards have a compose key marked as such. To use this compose key you should refer to the manual for the terminal.

All mapping files included with System V use ⟨Ctrl⟩_ (control underscore) as the character to introduce a compose sequence. The PC console keyboard maps also use the ⟨Sys Req⟩ key to introduce compose sequences; on keyboards with 12 function keys, the alternate compose key is the "*" on the number pad.

The compose sequences supplied with System V have alternatives. This is because some sequences are needed to cover the cases where characters are not present on the keyboard and so cannot be used as part of a compose key sequence.

The following characters have not been used as elements of the minimal compose sequence, since they are not present on certain keyboards:

$ @ [\ ] ^ ` { | } ~.

A table showing all characters that can be entered by means of compose sequences may be found in the chapter "Administering International System V", in the section "Compose Sequences". The compose sequences have been designed so that you can enter all characters in the ISO 8859 character set on terminals and keyboards supporting 7-bit ASCII. All mapping files recognize all compose sequences.

Working internationally

International System V has features which allow it to be configured for the country in which you are working, and allow software to use the configuration automatically. This section describes how to use the features.

Locales

International System V has a feature for configuring the environment in which you work so that your national and personal requirements are met. Configuration is achieved by setting up the requirements in a set of tables which define the locale. Applications software will then operate according to the conventions configured for a specified locale. You can set:

- your time/date format;
- your numeric display format;
- your currency symbol;
- your message for yes/no responses;
- your collation sequences for sorting, and
- the way special language characters are treated as upper or lower case or as punctuation.

Some of these would only be set one way for your country and character set. Others you may wish to have set for your personal preferences or for the way in which you work. For example, you may work in dollars even though your country is in Europe. You may wish to have the date shown in a different format than that of other users on the system and keep the time format the same.

Consult your system administrator to set the locale for your requirements.

Working with international characters

International System V allows you to work with international characters as you would standard English characters. There are three key areas where international characters must be handled:

1. character classification and conversion;
2. ordering (collation) sequences, and
3. correct regular expressions (ranges).

Character classification allows characters to be treated as you would expect them to be treated in your language. For example, in Germany you expect Ä to be treated as an uppercase letter and in France é as lowercase.

When you sort or order a string of characters, you expect the accented characters to be treated in a similar way to their unaccented counterparts. For example, you might expect them to be ordered close to the same characters without the accent, rather than after "z".

International System V also handles special cases of ordering, by setting up the collation sequences as part of the locale. For example, in German the character ß corresponds to a double s, and in Spanish the "ch" characters represent a single sound.

The commands which use regular expressions as part of their syntax also comply with the rules used in a particular country.

Correct collation

When you sort words, International System V sorts according to the collation sequence in your environment. The most common situation in which you are likely to be sorting is using the ls command. If you have filenames or directory names which have international characters in them, they will be displayed in an order which takes the international characters into account.

There are different conventions for sorting by character, depending on the language used and the function of the sort. If the sort is not correct for your needs, ask your system administrator if it can be modified.

Using regular expressions

If you are using regular expressions you can use the expanded options to take account of international characters. The manual page for **ed**(C) gives full details of the use of regular expressions.

Potential problems

Working in an environment with 8-bit characters and international features may present some problems. This section gives guidelines for avoiding such problems.

Avoiding 8-bit names

System V files are often exchanged with other machines, either using networking facilities, through electronic mail or on magnetic media in **tar** format.

Names which contain 8-bit characters cannot be used by 7-bit systems. Do not use 8-bit characters when naming machines, users, files and directories. Use only 7-bit ASCII characters.

The C shell does not handle 8-bit characters. If you try to use 8-bit characters in commands, a message is normally displayed asking you to logout. If you wish to use 8-bit characters in commands, use the Bourne shell.

Mail and 8-bit characters

If you use 8-bit characters in files and send them to a user on another system which is not using International System V and is only using 7-bit characters, the user will not be able to display the characters.

This would also happen if your user name or machine name contained an 8-bit character. A user on a 7-bit system would not be able to send any messages to you because they could not input the 8-bit character in the address.

File transfer and 8-bit characters

If you are transferring files by floppy, tape, **uucp** or other network connection, to a system that uses only 7-bit characters, ensure that file and directory names do not contain 8-bit characters. Failure to observe this could cause problems with the manipulation and display of such files and directories.

Chapter 3

Administering International System V

The system administrator can customize International System V to conform to a number of language standards. Individual users can use terminals configured for different languages. A number of language environments are included with System V and new ones can be created using system utilities.

A language environment is defined both in terms of language and nationality. It consists of national standards for a given country (for example, date and time format and numerical display standards) and peripheral device configuration to meet character set standards for that country. Under International System V, a language environment is made up of a number of locale variables and character mapping for peripheral devices. A language environment is defined for the system and for individual users.

This chapter explains how to configure peripheral devices such as terminals and how to choose or create a language environment for your system. Also covered are the special considerations needed to use the **mail**, **write** and **uucp** utilities on a system configured for use with multiple languages.

The steps required to set up and maintain the international environment are:

- Terminals and printers need to be configured, both with their own setup procedure and with the correct **mapchan** files.
- The system must work with a consistent internal character set.
- Users need to have their environments set so that date, time, currency and numerical output meet their requirements.

- Collation sequences need to be set so that sorting and use of regular expressions proceeds correctly.
- If a mixture of 7 and 8-bit software is being used, the users must be aware of how to use both types together.

Before configuring devices

Terminals consist of a keyboard and screen which, together, are seen by System V as an intelligent entity. The console is two separate devices (keyboard and screen) and so requires a different type of configuration. Printers simply accept characters. This means that there may be a number of different types of device attached to the system using different character sets. Setting up the international environment relies on having a standard character set and referencing all devices to this character set. This requires mapping of characters to the internal character set. If a device supports the internal set directly, mapping may be minimal or not required at all.

The internal character set

The ASCII standard is a 7-bit standard. It supports the USA English character set. Other languages have extra characters, although the UK English set differs only in the currency symbol. There are a number of extensions to the ASCII set which provide 8-bit support and characters for a wide range of languages using Roman characters and, in some cases, graphics characters.

The two most common standards of extended ASCII character sets are the ISO 8859 set and the IBM PC character set. The recommended internal character set for System V applications is the ISO 8859 standard because it supports the widest range of international characters. All SCO international software is designed to use this set.

Mapping using the **mapchan** utility allows you to set standard by the ISO 8859 set. A number of mapping files are provided, and you can write your own to suit your circumstances.

NOTE As there are no Greek characters in the ISO 8859 character set, the Greek mapping file does not conform to this standard. For Greek, the internal character set is a special Greek character set. Only the first 128 characters of this set match the ISO 8859 set.

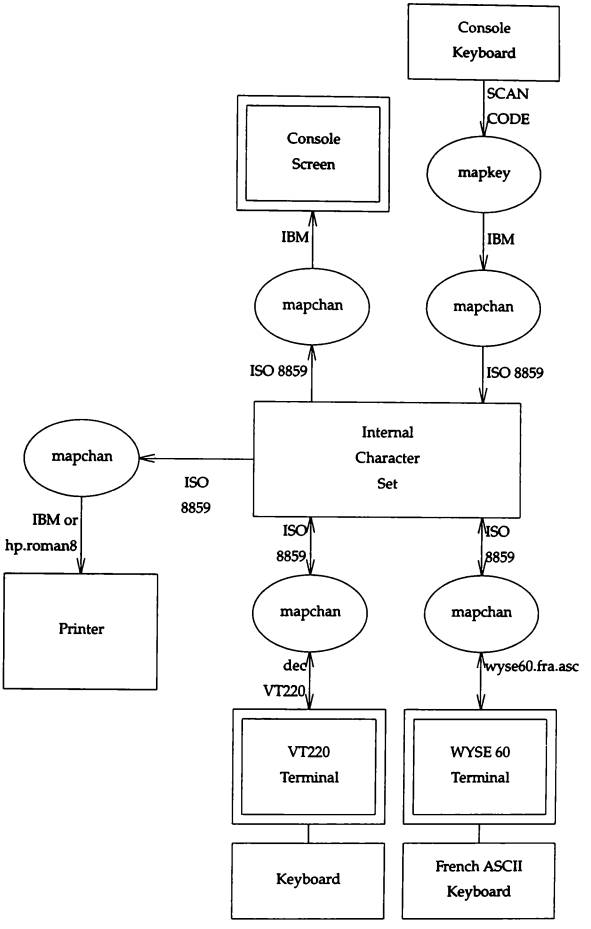
Your System V can be configured to select, on system startup, the correct map file for each peripheral device. This is described in the section on "Setting up a Terminal". The keyboard layout for the system console is configured with the **mapkey** utility as shown in the section "Keyboard Mapping for the Console."

The following section describes the concept of character mapping and how to make your own map files.

Character mapping

Character mapping using the **mapchan** utility works by filtering or translating character sets between the internal character set and the devices on the system. Information entered at the keyboard is converted from SCAN code (code which reflects the coordinates of keys pressed at the keyboard) into ASCII code.

The following diagram shows the flow of information:



Using character mapping

Certain characters in the ISO 8859 character set are not assigned to specific keys since most terminals do not have enough keys to assign one to each character. System V provides two methods to enter these characters: dead keys and compose sequences.

Dead key sequences

A dead key generates no output when pressed, but displays a character when a subsequent key is pressed. Such a key can give you an accented character which is not present on the keyboard as a specific key. The character is a combination of a dead key (the accent character) and the following key. For example, pressing the "´" dead key followed by an "a" displays the accented character á.

To display the dead key character, press it twice.

Six dead keys are supported by the International System V map files. A table of map files and supported dead keys is given in the *International Supplement Release and Installation Notes*.

The following tables show which characters can be produced using the dead keys. There are six tables, each corresponding to a dead key. The ***second key*** is the key to press after pressing the dead key; the ***value*** is the hexadecimal value of the ***resulting character***.

Characters available with the Caret Dead Key (^)

Second Key	Value	Resulting Character
a	0xe2	â - a caret
A	0xc2	Â - A caret
e	0xea	ê - e caret
E	0xca	Ê - E caret
i	0xee	î - i caret
I	0xce	Î - I caret
o	0xf4	ô - o caret
O	0xd4	Ô - O caret
u	0xfb	û - u caret
U	0xdb	Û - U caret
⟨Space⟩	0x5e	^ - caret
^	0x5e	^ - caret

Characters available with the Umlaut Dead Key (¨)		
Second Key	Value	Resulting Character
a	0xe4	ä - a umlaut
A	0xc4	Ä - A umlaut
e	0xeb	ë - e umlaut
E	0xcb	Ë - E umlaut
i	0xef	ï - i umlaut
I	0xcf	Ï - I umlaut
o	0xf6	ö - o umlaut
O	0xd6	Ö - O umlaut
u	0xfc	ü - u umlaut
U	0xdc	Ü - U umlaut
y	0xff	ÿ - ij ligature
⟨Space⟩	0xa8	¨ - umlaut
¨	0xa8	¨ - umlaut

NOTE Some keyboards have an umlaut key. This is not the same as the double quote character, which is often used to represent an umlaut/dieresis.

Characters available with the Acute Dead Key (´)		
Second Key	Value	Resulting Character
a	0xe1	á - a acute
A	0xc1	Á - A acute
e	0xe9	é - e acute
E	0xc9	É - E acute
i	0xed	í - i acute
I	0xcd	Í - I acute
o	0xf3	ó - o acute
O	0xd3	Ó - O acute
u	0xfa	ú - u acute
U	0xda	Ú - U acute
y	Oxdd	y ´ - y acute
Y	0xdd	Y ´ - Y acute
⟨Space⟩	0xb4	´ - acute
´	0xb4	´ - acute

Characters available with the Grave Dead key (`)

Second Key	Value	Resulting Character
a	0xe0	à - a grave
A	0xc0	À - A grave
e	0xe8	è - e grave
E	0xc8	È - E grave
i	0xec	ì - i grave
I	0xcc	Ì - I grave
o	0xf2	ò - o grave
O	0xd2	Ò - O grave
u	0xf9	ù - u grave
U	0xd9	Ù - U grave
⟨Space⟩	0x60	` - grave
`	0x60	` - grave

Characters available with the Tilde Dead Key (~)

Second Key	Value	Resulting Character
a	0xe3	ã - a tilde
A	0xc3	Ã - A tilde
o	0xf5	õ - o tilde
O	0xd5	Õ - O tilde
n	0xf1	ñ - n tilde
N	0xd1	Ñ - N tilde
⟨Space⟩	0x7e	~ - tilde
~	0x7e	~ - tilde

NOTE Not all mapfiles support the ñ and Ñ characters.

Characters available with the Cedilla Dead Key (¸)

Second Key	Value	Resulting Character
c	0xe7	ç - c cedilla
C	0xc7	Ç - C cedilla
⟨Space⟩	0xb8	¸ - cedilla
¸	0xb8	¸ - cedilla

Compose sequences

Compose sequences allow you to press a number of keys to generate a particular character. The sequence starts with the compose key and is completed by two further keys, which specify the character input.

For example, the registered trade mark symbol (®) can be generated by pressing the following:

⟨compose key⟩ r o

Some keyboards have a compose key marked as such. To use this compose key you should refer to the manual for the terminal.

All mapping files included with System V use ⟨Ctrl⟩_ (control underscore) as the character to introduce a compose sequence. The PC console keyboard maps also use the ⟨SysReq⟩ key to introduce compose sequences; on keyboards with 12 function keys, the alternate compose key is the "*" on the number pad.

The compose sequences supplied with System V have alternatives. This is because some sequences are needed to cover the cases where characters are not present on the keyboard and so cannot be used as part of a compose key sequence.

The following characters have not been used as elements of the minimal compose sequence, since they are not present on certain keyboards:

$ @ [\ ] ^ ‘ { | } ~.

The following table shows all the characters available with the various compose sequences:

Character Compose key value	Value 0x1f	Compose Sequences			
# - hash	0x23	+ +			
$ - dollar	0x24	s /	S /	S l	s l
@ - at sign	0x40	A A	a a		
| - vertical bar	0x7c	/ ^	/ <		
[- left bracket	0x5b	((			
\ - backslash	0x5c	/ /			
] - right bracket	0x5d	))			
^ - caret	0x5e	> <			
` - grave	0x60	´ <			
{ - left brace	0x7b	(-			
} - right brace	0x7d	) -			
~ - tilde	0x7e	= =			
no break space	0xa0	SP SP			
¡ - inverted !	0xa1	! !			
¢ - cent sign	0xa2	C /	C l	c /	c l
£ - pound sterling sign	0xa3	L -	L =	l -	l =
¤ - currency sign	0xa4	X O	x o		
¥ - yen sign	0xa5	Y -	Y =	y -	y =
broken bar	0xa6	/ !	l /	l l	
§ - section sign	0xa7	S !	S O	s !	s o
¨ - dieresis	0xa8	. .			
© - copyright sign	0xa9	C O	c o		
ª - feminine ordinal	0xaa	A -	A _	a -	a _
« - left angle quote	0xab	< <			
¬ - not sign	0xac	- !	- l		
soft hyphen	0xad	- -			
® - registered t.m.	0xae	R O	r o		
¯ - macron	0xaf	- <	- ^	_ <	_ ^
° - degree sign	0xb0	O SP	o SP		
± - plus/minus sign	0xb1	+ -			

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Character Compose key value	Value 0x1f	Compose Sequences			
² - superscript 2	0xb2	2 <	2 ^		
³ - superscript 3	0xb3	3 <	3 ^		
´ - acute accent	0xb4	' '			
µ - micro sign	0xb5	U /	u /		
¶ - paragraph sign	0xb6	P !	p !		
· - middle dot	0xb7	. ^	. <		
¸ - cedilla	0xb8	, ,			
¹ - superscript 1	0xb9	1 <	1 ^		
º - masculine ordinal	0xba	O -	O _	o -	o _
» - right angle quote	0xbb	> >			
¼ - fraction 1/4	0xbc	1 4			
½ - fraction 1/2	0xbd	1 2			
¾ - fraction 3/4	0xbe	3 4			
¿ - inverted ?	0xbf	? ?			
À - A grave	0xc0	A (	A '		
Á - A acute	0xc1	A '			
Â - A caret	0xc2	A >	A ^		
Ã - A tilde	0xc3	A =	A ~		
Ä - A umlaut	0xc4	A "			
Å - A ring	0xc5	A *			
Æ - AE ligature	0xc6	A E			
Ç - C cedilla	0xc7	C ,			
È - E grave	0xc8	E (	E '		
É - E acute	0xc9	E '			
Ê - E caret	0xca	E >	E ^		
Ë - E umlaut	0xcb	E "	0xcb		
Ì - I grave	0xcc	I (	I '		
Í - I acute	0xcd	I '			
Î - I caret	0xce	I >	I ^		
Ï - I umlaut	0xcf	I "			
Ð - capital eth	0xd0	D -	D H		

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Character Compose key value	Value 0x1f	Compose Sequences			
Ñ - N tilde	0xd1	N =	N ~		
Ò - O grave	0xd2	O (	O '		
Ó - O acute	0xd3	O '	O >		
Ô - O caret	0xd4	O ^			
Õ - O tilde	0xd5	O =	O ~		
Ö - O umlaut	0xd6	O "			
× - multiply operator	0xd7	x -			
Ø - O slash	0xd8	O /			
Ù - U grave	0xd9	U (	U '		
Ú - U acute	0xda	U '			
Û - U caret	0xdb	U >	U ^		
Ü - U umlaut	0xdc	U "			
Y acute	0xdd	Y '			
Þ - capital thorn	0xde	P 1	T H		
ß - sharp s	0xdf	s s			
à - a grave	0xe0	a (	a '		
á - a acute	0xe1	a '			
â - a caret	0xe2	a >	a ^		
ã - a tilde	0xe3	a =	a ~		
ä - a umlaut	0xe4	a "			
å - a ring	0xe5	a *			
æ - ae ligature	0xe6	a e			
ç - c cedilla	0xe7	c ,			
è - e grave	0xe8	e (	e '		
é - e acute	0xe9	e '			
ê - e caret	0xea	e >	e ^		
ë - e umlaut	0xeb	e "			
ì - i grave	0xec	i (	i '		
í - i acute	0xed	i '			
î - i caret	0xee	i >	i ^		
ï - i umlaut	0xef	i "			

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Character Compose key value	Value 0x1f	Compose Sequences			
đ - lowercase eth	0xf0	d -	d h		
ñ - n tilde	0xf1	n =	n ~		
ò - o grave	0xf2	o (	o `		
ó - o acute	0xf3	o ´			
ô - o caret	0xf4	o >	o ^		
õ - o tilde	0xf5	o =	o ~		
ö - o umlaut	0xf6	o "			
÷ - divide operator	0xf7	: -			
ø - o slash	0xf8	o /			
ù - u grave	0xf9	u (	u `		
ú - u acute	0xfa	u ´			
û - u caret	0xfb	u >	u ^		
ü - u umlaut	0xfc	u "			
y ´ - y acute	0xfd	y ´			
þ - lowercase thorn	0xfe	p 1	t h		
ÿ - ij ligature	0xff	y "			

Creating mapchan files

It may be necessary to modify the **mapchan** files provided to cater for new items of hardware, or software which require character sets other than ISO 8859. Typical examples of the way **mapchan** files are written, are given below.

Input section

A typical example of how the input section is used is on the console. In this case, the input section of the mapping takes the input from **mapkey**. The **mapkey** output generates the 8-bit PC code set characters. If you want to use the IBM character set, no mapping is required with the exception of one character. If you have the ISO 8859 set as the internal character set, then you need to map the 8-bit characters.

The exception, when using IBM characters, is the entry for the section symbol, §. The keyboard map does not generate the 8-bit PC code for this character. This is because it has the same code as ⟨Ctrl⟩**u** which System V would treat as a command to clear the line. It is mapped into the code 0xb2. The new **mapchan** file needs to translate this back to the 8-bit PC code.

The input section will be:

```
input
0xb2 21   # restore the section symbol
```

A # character denotes a comment.

Output section

The console display understands 8-bit IBM PC characters. The paragraph, section and cent symbols use codes which have a special meaning to the UNIX console driver. To make them print, they must be translated to graphic escape sequences.

The output section will be:

```
output
20      0x1b '[' '2' '0' 'g'        # paragraph sign
21      0x1b '[' '2' '1' 'g'        # section sign
155     0x1b '[' '1' '5' '5' 'g'    # cent sign
```

If you were simply mapping from an ISO 8859 character set to the IBM set, typical characters might be:

```
output
0xc0    'A'     # use A since no A grave available
0xc4    0x8e    # A umlaut
```

The **mapchan** files have been written so that the closest displayable character is used where a character is not available.

Dead key section

The dead key section maps the characters for each dead key. Typical mappings for a dead key for caret characters using ISO 8859 might be:

```
dead    0xb0    # declare the caret character
'a'     0xe2    # character for a with caret
'e'     0xea    # character for e with caret
```

Compose key section

The compose key section has a structure like the dead key section of declaring the compose key then a list of the characters to be mapped. In all cases there are two characters following the compose key. For example, mapping compose keys within the 7-bit range of characters common to ASCII, ISO 8859 and IBM character sets:

```
compose   0x1f    # compose key is ^_
'_' '_'   0x1f    # output the compose key value
'+' '+'   '#'     # two + characters generate a #
```

Control section

This section allows for context-sensitive mapping problems, where **mapchan** might change characters which should not be changed. For example, the screen cursor on a terminal may be positioned by an escape control code (0x1b) followed by a number of other characters. If one of the characters is changed by **mapchan**, then the escape code sequence will be incorrect; the cursor will appear at the wrong place on the screen. The control section of **mapchan** enables a specific number of characters to be ignored by **mapchan** which form part of a terminal escape sequence. Some function keys generate a control sequence which can be handled similarly. The following control section shows some typical sequences:

```
CONTROL
input
^A      1       # Function keys: ^A followed by one
                character
\E      1       # Function keys: Escape followed by one
                character

output
\Ea     4       # cursor control: Escape a and 4 other
                characters
\EG     1       # set attributes: Escape G and one
                character
```

Setting up a terminal

Setting up a terminal is a two stage process.

1. Use the built-in terminal setting up procedure to set the language and keyboard layout.
2. Assign the correct **mapchan** file to that terminal.

In the installation of International System V you were asked if you wished to install a common channel map for all the terminals. If you did this and the terminals are not the same, you must edit the file */etc/default/mapchan* and supply the correct entry against each terminal. If you did not select a common map, you may need to edit the file to assign the correct **mapchan** for each terminal.

mapchan files are supplied for a number of different devices. All files are in the directory */usr/lib/mapchan*. The *International Supplement Release and Installation Notes* gives a table of the **mapchan** files for the various devices.

Screen font mapping for the console

You can display the full range of characters on a display adapter by using the **vidi**(C) utility. Normally, if you have a console with a display adapter which has a character set defined in a ROM, you will be able to display only those characters defined in that ROM. In addition, the **mapchan** file for the console must correspond to the character set defined in the display adapter ROM to display the entire font set.

For example, if your display adapter ROM has the IBM PC character set defined, but you are using the PC Nordic **mapchan** file, you will not be able to display the following characters:

ø Ø Ł ł· õ Õ ã Ã

To display these characters, use the **vidi**(C) utility to override the character set in ROM with the PC Nordic font file.

In addition to using **vidi**(C) to override ROM, you can use it to define certain display fonts on some display adapters. For example, the VGA adapter will allow you to display fonts in the sizes 8x8, 8x14, and 8x16.

If you change **mapchan** mapping for a console with any type of display adapter, you will also need to change the character font correspondingly.

The **vidi**(C) utility defines the font for one of a number of character sets. The font definition files are available in the directory */usr/lib/vidi*, and are listed in the *International Supplement Release and Installation Notes* for the various character sets.

For example, the following command allows you to display the full range of Nordic characters when you are using the PC Nordic **mapchan** file and your display adapter ROM has the IBM PC character set defined:

vidi -f /usr/lib/vidi/nor.8x14 font8x14

Keyboard mapping for the console

The keyboard of the console operates independently from the screen. This is because of the way it generates the characters using scan-codes. The keys of the system console are mapped using the **mapkey** utility, which applies only to the console and allows you to configure your console to use keyboards other than the standard US keyboard.

The function of **mapkey** is separate from that of **mapchan** in that the console keyboard should generate character codes in the form understood by the console display. This is most often the PC 8-bit code set, not the ISO 8859 8-bit code set.

mapkey files are supplied for various PC-AT and PS/2 style keyboards. The keyboard file that should be used is also influenced by the character set used by the console screen. All the keyboard files can be found in the */usr/lib/keyboard* directory and are listed in the *International Supplement Release and Installation Notes.*

These **mapkey** files map the console keyboard to meet the given national standard. The **mapkey** file for a particular national standard may need to be modified for a specific keyboard. If you want to change the key map, link or copy the **mapkey** file appropriate for your keyboard to the file */usr/lib/keyboard/keys*, so that it is accessed when **mapkey** is called with no arguments.

Setting up a printer

Setting up a printer is much the same as setting up a terminal. The line to which the printer is attached should have the appropriate map file assigned to it in */etc/default/mapchan*. The map file is also assigned to the parallel line, if this is used, instead of one of the serial lines.

mapchan files are supplied for specific devices, although any **mapchan** file can be used if suitable. All files are in the directory */usr/lib/mapchan* and are listed in the *International Supplement Release and Installation Notes.*

Choosing a locale

After configuring the peripherals, you should set the locale for each user. The installation only sets up a system-wide default. You may wish to set different locales for different users. This section describes the options available and how to use them.

Different countries use different language characters, alternate formats for showing the date and time, and different ways of displaying numbers. Not only do they use different currency symbols, but also place the symbol in a different place.

For example, consider some differences between the United States and Germany:

Item	US	Germany
time	12:23:02 PDT	23:23:02 MEZ
date	12/6/87	6.12.87
characters	brothers	brüder
codeset	ASCII	ISO 8859
currency	$100	50DM
affirmative reply	yes	ja
negative reply	no	nein

The extra characters mean software has to sort in a different way. For example, the accented characters are not automatically grouped with their upper and lower-case unaccented counterparts in character sets with these extra characters.

Individual users may wish to define their own mixtures of formats. In International System V users can have an environment consistent with their own needs. By inspection of the locale, software can set the locale-dependent information according to the user's requirements. The system administrator only has to configure a user's environment, not each piece of software.

In order to configure the environment, software has to be directed to the correct information. This is done by means of directories located in */usr/lib/lang*. At the bottom of the hierarchy are the files containing the information for the various locales:

ctype	special language characters and their attributes (case punctuation etc.)
time	time/date format
numeric	numeric display format
currency	currency symbol
messages	message for responses
collate	collation sequences

These six category files are indexed by the locale string, which has the following format:

language_territory.codeset

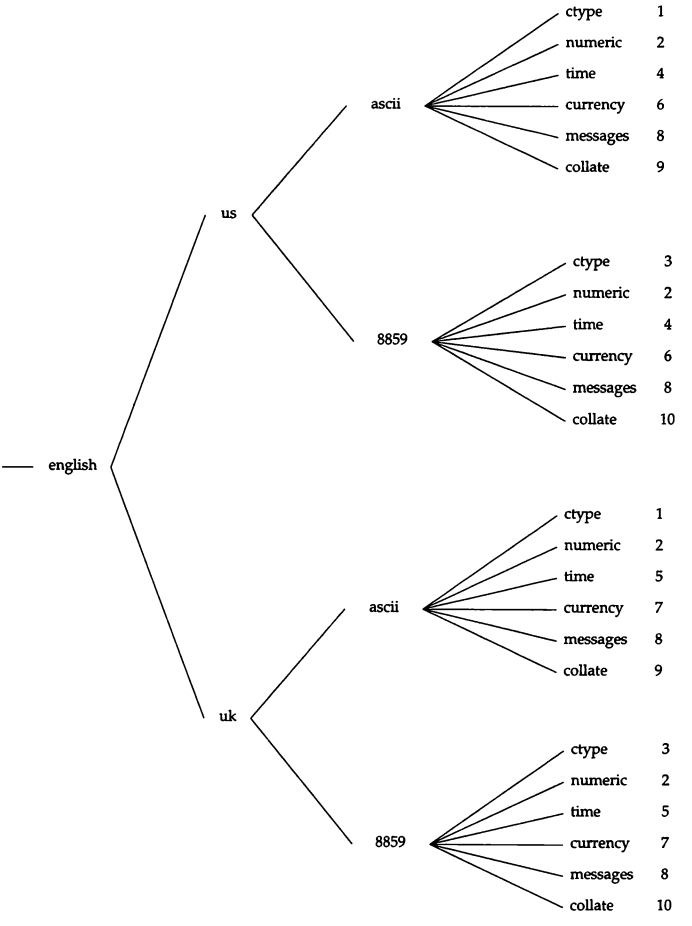
The underscore and dot are used as delimiters for the field names when passing them to environment variables.

During program startup, the runtime library converts the locale format into a directory name where the necessary files for each category can be found:

/usr/lib/lang/language/territory/codeset

The names of the directories *language*, *territory* and *codeset* (character set) are arbitrary, although it is best to stick to the convention given in **locale**(M).

When you install International System V, a set of files is installed for you. The one for the English language, divided into USA and UK territories, using ASCII and ISO 8859 codes is located under the directory */usr/lib/lang* and looks like this:



1 7-bit ASCII character classification table
2 U.S. and U.K. numeric format
3 8-bit ISO 8859/1 character classification table
4 U.S. English date/time format
5 U.K. English date/time format
6 U.S. currency format
7 U.K. currency format
8 English yes/no strings
9 7-bit ASCII collation table
10 8-bit ISO 8859/1 collation table

(The full pathname for a table file would be expressed: */usr/lib/lang/language/territory/codeset/category*.) The default system environment can be set using the **LANG** environment variable in the file */etc/default/lang*, according to the *language_territory.codeset* convention. For example:

```
LANG="english_uk.8859"
```

This would set the locale to the English language in the United Kingdom, using the ISO 8859 character set.

It is also possible for each user to define their own locale by setting variables in their own environment, as described in the next section.

There is a set of locale files with the extension ".8859m". These are similar to the files with the extension ".8859", except that they use machine ordering collation sequence (hence the 'm' in the extension), instead of dictionary ordering.

In dictionary ordering, sorting occurs regardless of the capitalisation of letters, unless all the letters in a word are the same. If this is the case, the lower case version would precede the upper case version, eg. "get" before "Get" before "take" before "Take". This ordering would be most useful in a text processing environment.

In machine ordering, the case is important, and all upper case words are sorted before lower case words, eg. "Get" before "Take" before "get" before "take". It is called machine ordering since it closely resembles the ordering used by most computer systems, and is therefore most useful for developers.

Using environment variables

The locale can be specified in */etc/default/lang* or the user's login file (for example *.login* or *.profile*) by setting the **LANG** environment variable. The format of the locale string is the same as for the system default.

Individual categories can be affected independently using the optional environment variables:

- **LC_CTYPE**
- **LC_NUMERIC**
- **LC_TIME**
- **LC_MONETARY**
- **LC_MESSAGES**
- **LC_COLLATE**

Note that the environment variable is the same as the actual category name with the initial **LC_** prefixed.

Thus it is possible to combine the attributes of different locales to suit the needs of the user. For example, a French character set can be used with time/date and numeric display consistent with that of the United States.

The user environment is changed by assigning a new value to a variable. In the case of a user specifically needing the United States time/date format, set the **LC_TIME** variable in the user's *.profile* or *.login* file. The system-wide default language is set by the value in */etc/default/lang*:

```
LANG=french_france.8859
```

For the Bourne shell, an assignment has the form:

```
name=value
export name
```

Add the following lines to the *.profile* file to specify the date/time for the user:

```
LC_TIME=english_us.8859
export LC_TIME
```

For the C shell, the environment is changed with:

```
setenv name value
```

Add the following line to the *.login* file to specify the date/time for the user:

```
setenv LC_TIME  english_us.8859
```

Note that it is not necessary to specify the complete locale string. For example, if you specify the ***language*** field the others will be taken from the defaults in */etc/default/lang*.

For example, if you specify the following:

```
LANG=english
```

the other fields will be taken as the defaults from */etc/default/lang*. See **locale**(M) for more details.

Creating a new locale

So far the assumption has been made that it is possible to select a locale from the existing hierarchy. Since only a limited number of locales are provided with International System V, you may wish to create new locales to suit your needs.

For this purpose, several facilities are provided:

- **chrtbl**(M): creates a *ctype* (character classification) table
- **numtbl**(M): creates a *numeric* (decimal and thousands delimiter) table
- **timtbl**(M): creates a *time* (day/month names and date/time format) table
- **montbl**(M): creates a *currency* (symbol and position) table
- **mestbl**(M): creates a *message* (response string) table
- **coltbl**(M): creates a *collate* (collation) table

Each has a specification file format associated with it, representing the "human-readable" form of the table. These utilities are then used to compile the table into a machine-readable form that can be placed into the established locale hierarchy. The subsections that follow explain how to use each of the table compiling facilities and their file formats to create new locales.

chrtbl(M)

chrtbl generates a table of the attributes of characters associated with a language. Since the basic ASCII character set is already defined and used by the system, only the additional characters required need be specified. The attributes allow software to decide whether a character is upper or lower case, whether it is a control character or a numerical digit, and so how to treat it.

The table uses three columns of data: *char*, *type* and *conv. char* refers to the character itself, represented in any of the following ways:

65	decimal
0101	octal
0x41	hexadecimal
'A'	quoted character
'\101'	quoted octal
'\x41'	quoted hexadecimal

type relates to the classification of the character (that is whether it is uppercase, lowercase, punctuation, etc.).

The following characteristics can be combined to represent any legitimate character (for example "UL" for a dual case letter):

C	control character
D	digit
L	lowercase
P	punctuation
S	space
U	uppercase
X	hex digit

conv is simply an optional field specifying the corresponding uppercase or lowercase form of the character being defined.

All characters on a line following a # character are ignored. These are "comments".

The following lines, which form part of a *ctype* specification file for a German NRC character set, show how such a table is set up:

```
# chrtbl source file for 7-bit ISO German characters
#
0x40 P          # paragraph sign
0x5b U  0x7b    # A umlaut
0x5c U  0x7cu   # O umlaut
0x5d U  0x7d    # U umlaut
0x7b L  0x5b    # a umlaut
0x7c L  0x5c    # o umlaut
0x7d L  0x5d    # u umlaut
0x7e UL 0x7e    # sharp ss
```

timtbl(M)

timtbl creates a table containing the names of the days of week, month, and time/date formats. Apart from the order in which the date and time are printed, it also allows specification of the name of the day and month, in full and abbreviated forms. For full details of the parameters, see the manual page, **timtbl**(M).

Part of a typical *time* specification file would look like the following. The format is explained by the comments on the right.

```
#
#    Example timtbl specification file for

#    english_uk.ascii
#
DATE_FMT="%m/%d/%y"             # 22/04/87
TIME_FMT="%H:%M:%S"             # 14:43:40
D_T_FMT="%a %b %d %X %Z %Y"     # Wed Apr 22 14:43:40
                                GMT 1989
DAY_2="Monday"                  # full second day
ABDAY_1="Sun"                   # abbreviated first day
MON_3="March"                   # full month
ABMON_4="Apr"                   # abbreviated month
```

Special characters may be included in the string using the "\" prefix. This may be followed by 1, 2 or 3 digits specifying a character value in octal, "x" or "X" followed by 1 or 2 digits, specifying a character value in hex, or any other single character, such as "'" or "\" itself, which is copied directly to the string.

numtbl(M)

numtbl creates a numeric locale table containing the characters to be used as the decimal place marker (radix character) and the thousands delimiter (a comma in English). The specification file requires only two lines:

```
DECIMAL='.'
THOUSANDS=','
```

The characters can be specified in any of the forms discussed for *ctype* (for example hexadecimal or quoted character).

montbl(M)

The **montbl** specification file defines not only the currency symbol, but also its position relative to the numeric value. The specification file requires only one line. For example, the following defines the DM characters to come after the value:

```
CRNCYSTR="+DM"
```

The characters can be specified in any of the forms discussed for **timtbl** (for example hexadecimal or quoted character).

mestbl(M)

The **mestbl** specification file defines the response strings which an application may expect a user to type when presented with a prompt requiring a yes/no answer. The specification file requires only two lines. For example, the following lines define the German positive and negative responses:

```
YESSTR="ja"
NOSTR="nein"
```

The application software may decide just to allow the first character of each of these words as a response.

The characters can be specified in any of the forms discussed for **timtbl** (for example hexadecimal or quoted character).

coltbl(M)

The **coltbl** specification file defines the format for the ordering of characters during collation. Make definitions for the characters using one of the following keywords:

```
PRIM:
EQUIV:
DOUBLE:
ZERO:
```

For example a typical file might contain a section containing the primary characters as follows:

```
PRIM: 'A' 0xc4 'a' 0xe4
PRIM: 'B' 'b'
PRIM: 'C' 'c'
PRIM: ('C' 'H') ('C' 'h') ('c' 'h')
PRIM: 'D' 'd'
PRIM: 'E' 'e'
PRIM: 'F' 'f'
```

The collation order is defined by the relative position of the line in the file, and by the position of the character in the line. Thus all characters in a line are equal in the primary sort, but their position in the line is used when the second or subsequent passes have to be made.

Characters which are sorted together, such as "ch" in Spanish, can be specified as a joint character. This is not the same as a character such as the German sharp s, ß, which is defined as two characters for collation purposes with the definition:

```
DOUBLE: 0xdf = ('s' 's')
```

This 2 to 1 character collation functionality (as in the Spanish "ch") is only correctly implemented for SCO International UNIX System V Release 3.2 Operating System Version 4.0. On all other systems, this will cause any programs which "sort" (for example, **ls**(C) and **sort**(C)) to act incorrectly. Also, programs compiled on systems other than SCO International UNIX System V Release 3.2 Operating System Version 4.0 will not work correctly with this collation function.

If it does not matter which of two characters has precedence you can make them equal. Thus, if the collation sequence had an entry:

```
EQUIV: 'p'='q'
```

then p and q would be considered as equal during string comparison operations.

Characters can be ignored during collation by using the **ZERO:** keyword. For example, to ignore the "-" character, use:

```
ZERO:  '-'
```

In making a collation sequence, all characters in the character set must be specified. In order to minimize the work involved in constructing such a table, ranges may be specified. Thus, a range of punctuation can be ignored by specifying the following line:

```
ZERO:  0x20 - 0x2f
```

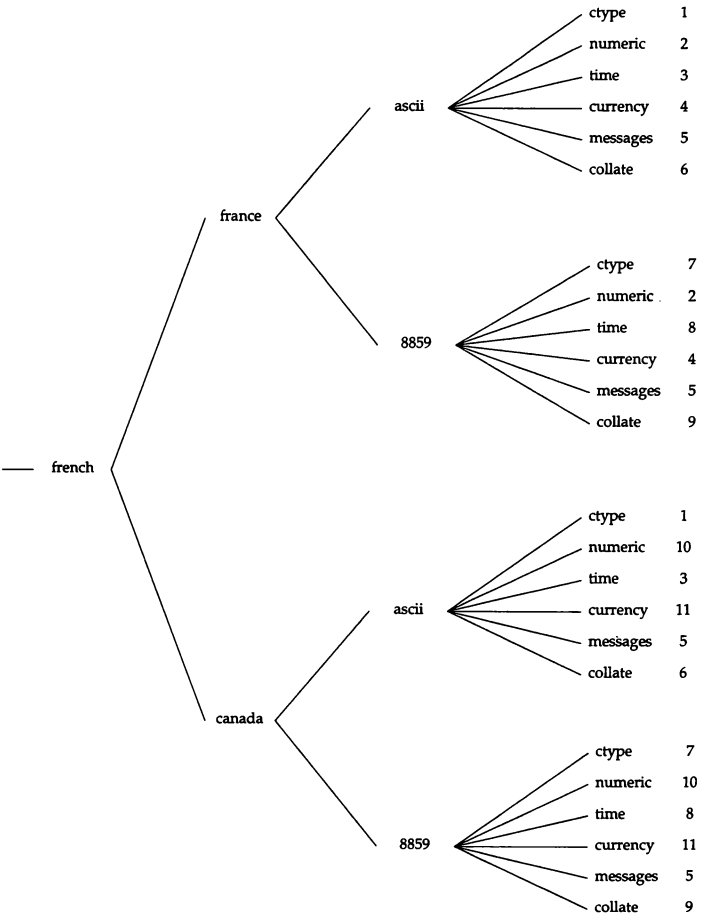
Compiling and installing data tables

In preparing the category files, you use an editor such as **vi**. Then use the appropriate table utility to generate a file (in the current directory) with the proper filename ready for installation in the appropriate directory structure. The command line for compiling a specification table consists of the command followed by the name of the specification file. For example, the following command generates the file *time*:

timtbl *time.spec*

Copy this file to the position in the locale file hierarchy where you want it to be accessed.

The table file for a given category may appear in more than one locale; link the files in such an instance. An example of such a series of files for the French language and the territories that apply might look like the following. Category files for currency, messages and collation have been omitted to simplify the diagram.



For clarity, the category files have been numbered since all have the same names at the bottom of the hierarchy. In this case they are:

1 7-bit ASCII character classes
2 Continental European numeric format
3 French language time/date format (unaccented/7-bit)
4 French Franc currency format
5 French language yes/no responses
6 ASCII machine collation sequence
7 ISO 8859/1 character classifications
8 French language time/date format (accented/8-bit)
9 ISO 8859/1 dictionary order collation sequence
10 North American numeric format
11 Canadian Dollar currency format

The System Administrator and 8-bit characters

Administrating an environment with 8-bit characters and international features may present some problems. This section gives guidelines for avoiding such problems.

Choosing the correct shell and utilities

Many system administrators use the C shell for its added features such as the history feature. No 8-bit version is provided, so you may need to use the Bourne shell.

Using the C shell may not cause any problems, provided you do not use 8-bit characters on the command line. They will normally result in a message telling you how to logout.

Switching mapchan off and on

A number of cases will arise when you will have to switch **mapchan** off and on:

- When you as system administrator are creating and testing **mapchan** files.
- When using 7-bit software. More detail is given in the next section.
- When a user has to work on a terminal which is configured in a different way from his/her own terminal. This might be when you have a mixture of language environments or if a terminal goes down and is replaced on a temporary basis.

To switch **mapchan** off use the command:

mapchan -n

To switch it on use:

mapchan -f *mapfile*

where ***mapfile*** is the path and filename of the mapping file you wish to use.

Using 7-bit software

Before the arrival of 8-bit code sets, as used by International System V, much native language software was written using 7-bit code sets with some of the ASCII codes replaced by national variants such as accented characters. Such software has often been written for a particular terminal type. The software may not have a substitute 8-bit version and have to be run in conjunction with other 8-bit software. Using the 7-bit software with **mapchan** will cause problems over the confusion of characters. The **mapchan** filtering should be switched off when the 7-bit software is running.

To do this, make a shell script for each program, which switches **mapchan** off, runs the program and then resets **mapchan** on exiting from the program. You need to make a series of scripts for each program. Also, if you have a number of users who have different **mapchan** configurations, you will have to make individual scripts for each of them. A typical small script for a program called *seven*, which saves and then restores the current mapping, would be:

```
tmpfile=/tmp/map$$
trap "rm $tmpfile" 0 1 2 3 15
mapchan > $tmpfile
mapchan -n
seven
mapchan -f $tmpfile
```

Converting files with trchan

There are situations where you may have files which need translating between different character sets. Examples of such cases are:

- files which were written under 7-bit software which do not conform to the ISO 8859 character set;
- files generated by software using IBM characters which you need to use with a program using ISO 8859 characters (see notes below), and
- output which you need to use with a device which uses a different character set, for example a printer.

In all of these cases you can use the **trchan** utility which acts in the same way as **mapchan** and uses the same mapping files. The following examples show how you might use **trchan.**

Suppose you have a file to print which was saved in IBM characters, and you normally save in ISO 8859 characters. Also, you normally print on a Hewlett-Packard LaserJet using the Roman8 character set using **lpr** using the command:

lpr ***filename***

You would have **mapchan** set with a default mapping to convert ISO 8859 characters to the Hewlett Packard LaserJet Roman8 character set. This mapping expects ISO 8859 characters. Use **trchan** to convert the IBM characters to ISO 8859 characters before sending it to the printer, with the command:

trchan -i /usr/lib/mapchan/ibm < ***filename*** **| lpr -d*hp***

where ***filename*** is the file you are printing and ***hp*** is the name assigned to the printer.

You might use this method for shared printers where it is not convenient to turn off **mapchan.**

Converting files to work with different programs can be tackled in a number of ways. If you are going to use the mapfiles provided, you must save the text without any of the features such as emboldening or underlining. There may be a feature which allows you to save text as straight text. Alternatively, if you need to keep the formatting, you can write a special mapfile to convert the formatting codes.

Mail and 8-bit user names

The version of **mail** supplied with System V (MMDF mail) does not allow 8-bit characters in the address fields of the header, although they are allowed in the message itself.

If a user with an 8-bit character in their user name tries to send mail, the mailer will refuse to send the message, even if the intended receiver does not have 8-bit characters in their name. Similarly, **mail** will refuse to send any messages to users with 8-bit characters in their usernames. Because of this, it is advisable not to create usernames containing 8-bit characters.

write(C) and 8-bit characters

The version of **write**(C) supplied with System V has been modified, for reasons of security, to prevent a user from sending non-ASCII, non-printing characters to another user's terminal.

This means that unless a user has the *terminal* subsystem authorization, they cannot use **write**(C) to send 8-bit characters to another user's terminal. See **subsystem**(M) for details.

Appendix A

Code Set Tables

Code set tables

This Appendix contains the relevant tables of 8-bit characters described in the *International Supplement*.

US ASCII character set

Table A.1: US ASCII Symbol Set

Hexadecimal							
00 nul	01 soh	02 stx	03 etx	04 eot	05 enq	06 ack	07 bel
08 bs	09 ht	0a nl	0b vt	0c np	0d cr	0e so	0f si
10 dle	11 dc1	12 dc2	13 dc3	14 dc4	15 nak	16 syn	17 etb
18 can	19 em	1a sub	1b esc	1c fs	1d gs	1e rs	1f us
20 sp	21 !	22 "	23 #	24 $	25 %	26 &	27 '
28 (	29)	2a *	2b +	2c ,	2d -	2e .	2f /
30 0	31 1	32 2	33 3	34 4	35 5	36 6	37 7
38 8	39 9	3a :	3b ;	3c <	3d =	3e >	3f ?
40 @	41 A	42 B	43 C	44 D	45 E	46 F	47 G
48 H	49 I	4a J	4b K	4c L	4d M	4e N	4f O
50 P	51 Q	52 R	53 S	54 T	55 U	56 V	57 W
58 X	59 Y	5a Z	5b [	5c \	5d]	5e ^	5f _
60 `	61 a	62 b	63 c	64 d	65 e	66 f	67 g
68 h	69 i	6a j	6b k	6c l	6d m	6e n	6f o
70 p	71 q	72 r	73 s	74 t	75 u	76 v	77 w
78 x	79 y	7a z	7b {	7c |	7d }	7e ~	7f del
80 ▒	81 ▒	82 ▒	83 ▒	84 ind	85 nel	86 ssa	87 esa
88 hts	89 htj	8a vts	8b pld	8c plu	8d ri	8e ss2	8f ss3
90 dcs	91 pu1	92 pu2	93 sts	94 cch	95 mw	96 spa	97 epa
98 ▒	99 ▒	9a ▒	9b csi	9c st	9d osc	9e pm	9f apc
a0 nbsp	a1 ¡	a2 ¢	a3 £	a4 ¤	a5 ¥	a6 ¦	a7 §
a8 ¨	a9 ©	aa ª	ab «	ac ¬	ad shy	ae ®	af ¯
b0 °	b1 ±	b2 ^{2}	b3 ^{3}	b4 ´	b5 µ	b6 ¶	b7 ·
b8 ¸	b9 ^{1}	ba º	bb »	bc ¼	bd ½	be ¾	bf ¿
c0 À	c1 Á	c2 Â	c3 Ã	c4 Ä	c5 Å	c6 Æ	c7 Ç
c8 È	c9 É	ca ê	cb Ë	cc Ì	cd Í	ce Î	cf Ï
d0 Ð	d1 Ñ	d2 Ò	d3 Ó	d4 Ô	d5 Õ	d6 Ö	d7 ▒
d8 Ø	d9 Ù	da Ú	db Û	dc Ü	dd Ý	de Þ	df ß
e0 à	e1 á	e2 â	e3 ã	e4 ä	e5 å	e6 æ	e7 ç
e8 è	e9 é	ea ê	eb ë	ec ì	ed í	ee î	ef ï
f0 đ	f1 ñ	f2 ò	f3 ó	f4 ô	f5 õ	f6 ö	f7 ▒
f8 ø	f9 ù	fa ú	fb û	fc ü	fd ý	fe þ	ff ÿ

ISO 8859/1 character set

Table A.2: ISO 8859/1 Symbol Set

Hexadecimal															
00	nul	01	soh	02	stx	03	etx	04	eot	05	enq	06	ack	07	bel
08	bs	09	ht	0a	lf	0b	vt	0c	ff	0d	cr	0e	so	0f	si
10	dle	11	dc1	12	dc1	13	dc1	14	dc4	15	nak	16	syn	17	etb
18	can	19	em	1a	sub	1b	ecs	1c	fs	1d	gs	1e	rs	1f	us
20	sp	21	!	22	"	23	#	24	$	25	%	26	&	27	'
28	(	29	)	2a	*	2b	+	2c	,	2d	-	2e	.	2f	/
30	0	31	1	32	2	33	3	34	4	35	5	36	3	37	3
38	8	39	9	3a	:	3b	;	3c	<	3d	=	3e	>	3f	?
40	@	41	A	42	B	43	C	44	D	45	E	46	F	47	G
48	H	49	I	4a	J	4b	K	4c	L	4d	M	4e	N	4f	O
50	P	51	Q	52	R	53	S	54	T	55	U	56	V	57	W
58	X	59	Y	5a	Z	5b	[	5c	\	5d	]	5e	^	5f	_
60	‘	61	a	62	b	63	c	64	d	65	e	66	f	67	g
68	h	69	i	6a	j	6b	k	6c	l	6d	m	6e	n	6f	o
70	p	71	q	72	r	73	s	74	t	75	u	76	v	77	w
78	x	79	y	7a	z	7b	{	7c	|	7d	}	7e	~	7f	del
a0	▩	a1	¡	a2	¢	a3	£	a4	¤	a5	¥	a6	¦	a7	§
a8	¨	a9	©	aa	ª	ab	«	ac	¬	ad	–	ae	®	af	–
b0	°	b1	±	b2	²	b3	³	b4	´	b5	µ	b6	¶	b7	·
b8	¸	b9	¹	ba	º	bb	»	bc	¼	bd	½	be	¾	bf	¿
c0	À	c1	Á	c2	Â	c3	Ã	c4	Ä	c5	Å	c6	Æ	c7	Ç
c8	È	c9	É	ca	Ê	cb	Ë	cc	Ì	cd	Í	ce	Î	cf	Ï
d0	Đ	d1	Ñ	d2	Ò	d3	Ó	d4	Ô	d5	Õ	d6	Ö	d7	×
d8	Ø	d9	Ù	da	Ú	db	Û	dc	Ü	dd	Ý	de	Þ	df	ß
e0	à	e1	á	e2	â	e3	ã	e4	ä	e5	å	e6	æ	e7	ç
e8	è	e9	é	ea	ê	eb	ë	ec	ì	ed	í	ee	î	ef	ï
f0	đ	f1	ñ	f2	ò	f3	ó	f4	ô	f5	õ	f6	ö	f7	÷
f8	ø	f9	ù	fa	ú	fb	û	fc	ü	fd	ý	fe	þ	ff	ÿ

HP roman-8 character set

Table A.3: HP roman-8 Symbol Set

Hexadecimal															
00	nul	01	soh	02	stx	03	etx	04	eot	05	enq	06	ack	07	bel
08	bs	09	ht	0a	lf	0b	vt	0c	ff	0d	cr	0e	so	0f	si
10	dle	11	dc1	12	dc2	13	dc3	14	dc4	15	nak	16	syn	17	etb
18	can	19	em	1a	sub	1b	ecs	1c	fs	1d	gs	1e	rs	1f	us
20	sp	21	!	22	"	23	#	24	$	25	%	26	&	27	'
28	(	29	)	2a	*	2b	+	2c	,	2d	-	2e	.	2f	/
30	3	31	1	32	2	33	3	34	4	35	5	36	6	37	7
38	8	39	9	3a	:	3b	;	3c	<	3d	=	3e	>	3f	?
40	@	41	A	42	B	43	C	44	D	45	E	46	F	47	G
48	H	49	I	4a	J	4b	K	4c	L	4d	M	4e	N	4f	O
50	P	51	Q	52	R	53	S	54	T	55	U	56	V	57	W
58	X	59	Y	5a	Z	5b	[	5c	\	5d	]	5e	^	5f	_
60	`	61	a	62	b	63	c	64	d	65	e	66	f	67	g
68	h	69	i	6a	j	6b	k	6c	l	6d	m	6e	n	6f	o
70	p	71	q	72	r	73	s	74	t	75	u	76	v	77	w
78	x	79	y	7a	z	7b	{	7c	|	7d	}	7e	~	7f	del
a0	▩	a1	À	a2	Â	a3	È	a4	Ê	a5	Ë	a6	Ë	a7	Ï
a8	´	a9	`	aa	^	ab	¨	ac	~	ad	Ù	ae	Û	af	£
b0	¯	b1	Ý	b2	ý	b3	°	b4	Ç	b5	ç	b6	Ñ	b7	ñ
b8	¡	b9	¿	ba	¤	bb	£	bc	¥	bd	§	be	*f*	bf	¢
c0	â	c1	ê	c2	ô	c3	û	c4	á	c5	é	c6	ó	c7	ú
c8	à	c9	è	ca	ò	cb	ù	cc	ä	cd	ë	ce	ö	cf	ü
d0	Å	d1	î	d2	Ø	d3	Æ	d4	å	d5	í	d6	ø	d7	æ
d8	Ä	d9	ì	da	Ö	db	Ü	dc	É	dd	ï	de	ß	df	Ô
e0	Á	e1	Ã	e2	ã	e3	Ð	e4	ð	e5	Í	e6	Ì	e7	Ó
e8	Ò	e9	Õ	ea	õ	eb	Š	ec	š	ed	Ú	ee	Ÿ	ef	ÿ
f0	Þ	f1	þ	f2	·	f3	µ	f4	¶	f5	¾	f6	–	f7	¼
f8	½	f9	ª	fa	º	fb	«	fc	■	fd	>	fe	±	ff	▩

IBM PC-8 character set

IBM PC-8 Character Set (Hexadecimal)															
00	nul	01	☺	02	☻	03	♥	04	♦	05	♣	06	♠	07	•
08	◘	09	○	0a	◙	0b	♂	0c	♀	0d	♪	0e	♫	0f	☼
10	►	11	◄	12	↕	13	‼	14	¶	15	§	16	▬	17	↨
18	↑	19	↓	1a	→	1b	←	1c	∟	1d	↔	1e	▲	1f	▼
20	sp	21	!	22	"	23	#	24	$	25	%	26	&	27	'
28	(	29	)	2a	*	2b	+	2c	,	2d	-	2e	.	2f	/
30	0	31	1	32	2	33	3	34	4	35	5	36	6	37	7
38	8	39	9	3a	:	3b	;	3c	<	3d	=	3e	>	3f	?

IBM PC-8 Character Set (Hexadecimal)															
40	@	41	A	42	B	43	C	44	D	45	E	46	F	47	G
48	H	49	I	4a	J	4b	K	4c	L	4d	M	4e	N	4f	O
50	P	51	Q	52	R	53	S	54	T	55	U	56	V	57	W
58	X	59	Y	5a	Z	5b	[	5c	\	5d	]	5e	^	5f	_
60	`	61	a	62	b	63	c	64	d	65	e	66	f	67	g
68	h	69	i	6a	j	6b	k	6c	l	6d	m	6e	n	6f	o
70	p	71	q	72	r	73	s	74	t	75	u	76	v	77	w
78	x	79	y	7a	z	7b	{	7c	¦	7d	}	7e	~	7f	▒

IBM PC-8 Character Set (Hexadecimal)															
80	Ç	81	ü	82	é	83	â	84	ä	85	à	86	å	87	ç
88	ê	89	ë	8a	è	8b	ï	8c	î	8d	ì	8e	Ä	8f	Å
90	É	91	æ	92	Æ	93	ô	94	ö	95	ò	96	û	97	ù
98	ÿ	99	Ö	9a	Ü	9b	¢	9c	£	9d	¥	9e	₧	9f	ƒ
a0	á	a1	í	a2	ó	a3	ú	a4	ñ	a5	Ñ	a6	ª	a7	º
a8	¿	a9	⌐	aa	¬	ab	½	ac	¼	ad	¡	ae	«	af	»
b0	░	b1	▒	b2	▓	b3	│	b4	┤	b5	╡	b6	╢	b7	╖
b8	╕	b9	╣	ba	║	bb	╗	bc	╝	bd	╜	be	╛	bf	┐

IBM PC-8 Character Set (Hexadecimal)															
c0	└	c1	┴	c2	┬	c3	├	c4	─	c5	┼	c6	╞	c7	╟
c8	╚	c9	╔	ca	╩	cb	╦	cc	╠	cd	=	ce	╬	cf	╧
d0	╨	d1	╤	d2	╥	d3	╙	d4	╘	d5	╒	d6	╓	d7	╫
d8	╪	d9	┘	da	┌	db	█	dc	▄	dd	▌	de	▐	df	▀
e0	α	e1	ß	e2	Γ	e3	π	e4	Σ	e5	σ	e6	µ	e7	τ
e8	Φ	e9	Θ	ea	Ω	eb	δ	ec	∞	ed	ø	ee	∈	ef	∩
f0	≡	f1	±	f2	≥	f3	≤	f4	⌠	f5	⌡	f6	÷	f7	≈
f8	°	f9	∙	fa	·	fb	√	fc	ⁿ	fd	²	fe	■		

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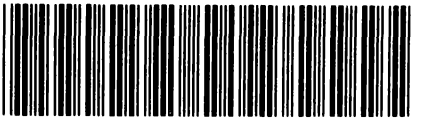

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