

Customizing the Vector Fonts

The Users' Library routine EFONT is a widget application that allows you to edit the Hershey fonts and save the results. Use this routine to add special characters or completely new, custom fonts to the Hershey fonts.

Character Sets and Positioning Commands

The commands to change the fonts are shown in the table below. The character following the exclamation mark can be either upper or lowercase.

Font Command	Description
!3	Simplex Roman (default)
!4	Simplex Greek
!5	Duplex Roman
!6	Complex Roman
!7	Complex Greek
!8	Complex Italic
!9(!M)	Math and special characters
!10	Special characters
!11(!G)	Gothic English
!12(!W)	Simplex Script
!13	Complex Script
!14	Gothic Italian
!15	Gothic German
!16	Cyrillic
!17	Triplex Roman
!18	Triplex Italic
!20	Miscellaneous
!X	Revert to the entry font

Table 9.1 Vector-Drawn Character Sets

Positioning Commands

The positioning and other font-manipulation commands are described in Table 9.2.

Figure 9.1 illustrates the relative positions and effects on character size of the level commands. In this figure, the letters “!N” are normal level and size characters.

Figure 9.2 also illustrates some typical uses of the Hershey character set.

The command string is reproduced underneath the graphic output to show how to format complex equations. Remember, the case of the character that follows the “!” command character is ignored. To illustrate, the bottom integral term of Figure 9.2 was formed by the following IDL procedure call:

!L!Exponent
!L!Index

!N!E
!N!I

!U!^E_I
!D!^E_I

!A!^E_I
!B!^E_I

Lower Normal ^{Up} _{Down} Above Below

Figure 9.1 Levels and Level Commands

Dr. A. V. Hershey
!wDr. A. V. Hershey

$$E = mc^2$$

!6E=mc!E2

$$E = mc^2$$

!3E = mc!E2

$$\int_p^x \rho_i U_i^2 dx$$

!MI!S!A!E!8X!r!b!ip!N !7q!ii!n!8U!S!E2!r!ii!N dx

Figure 9.2 Examples of Text Formatting

```
XYOUTS, 0, .2, $
  '!MI!S!A!E!8X!R!B!IP!N !7Q!II!N!8U!S!E2!R!II!Ndx', $
  SIZE = 3, /NORMAL
```

The string may be broken down into the following components:

- !MI**
Changes to the math set and draws the integral sign, uppercase I.

Positioning Commands	Action
!A	Shift above the division line (!/).
!B	Shift below the division line (!/).
!C	"Carriage return," begins a new line of text. Shift back to the starting position and down one line.
!D	Shift down to the first level subscript and decrease the character size by a factor of 0.62.
!E	Shift up to the exponent level and decrease the character size by a factor of 0.44.
!I	Shift down to the index level and decrease the character size by a factor of 0.44.
!L	Shift down to the second level subscript. Decrease the character size by a factor of 0.62.
!N	Shift back to the normal level and original character size.
!R	Restore position. The current position is set from the top of the saved positions stack.
!S	Save position. The current position is saved on the top of the saved positions stack.
!U	Shift to upper subscript level. Decrease the character size by a factor of 0.62.
!X	Return to the entry font.
!!	Display the ! symbol.

Table 9.2 Vector-Drawn Positioning and Miscellaneous Commands

!S

Saves the current position on the position stack.

!A!E!8x

Shifts above the division line and to the exponent level, switches to the Complex Italic font (Font 8), and draws the "x."

!R!B!lp

Restores the position to the position immediately after the integral sign, shifts below the division line to the index level, and draws the "p."

!N !7q

Returns to the normal level, advances one space, shifts to the Complex Greek font (Font 7), and draws the greek letter rho, which is designated by "q" in this set.

!!i!N

Shifts to the index level and draws the "i" at the index level. Returns to the normal level.

!8U

Shifts to the Complex Italic font (Font 8) and outputs the upper case "U."

!S!E2

Saves the position and draws the exponent "2."

!R!i

Restores the position and draws the index "i."

!N dx

Returns to the normal level and outputs "dx."

Vector-Drawn Font Example

IDL uses vector-drawn font when the value of the system variable !P.FONT is -1. This is the default condition. Initially, all characters are drawn using the Simplex Roman font (Font 3). When plotting, font changing commands may be embedded in the title strings keyword arguments (XTITLE, YTITLE, and TITLE) to select other fonts. For example, the following statement uses the Complex Roman font (Font 6) for the *x*-axis title:

```
PLOT, X, XTITLE = '!6X Axis Title'
```

This font remains in effect until explicitly changed. The order in which the annotations are drawn is main title, *x*-axis numbers, *x*-axis title, *y*-axis numbers, and *y*-axis title. Strings to be output also may contain embedded information selecting subscripting, superscripting, plus other features that facilitate equation formatting.

The following statements were used to produce Figure 9.3. They serve as an example of a plot using vector-drawn characters and of equation formatting.

```
X = FLTARR(128)           Define an array.
X(30:40) = 1.0           Make a step function.
X = ABS(FFT(X, 1))       Take FFT and magnitude.
PLOT_IO, X(0:64), XTITLE = '!17frequency', $
  YTITLE = '!5power', $
  TITLE = '!18example of vector drawn plot', $
  POSITION = [.2, .2, .9, .6] Produce a log-linear plot. Use the Tri-
                               plex Roman font for the x title (!17), Du-
                               plex Roman for the y title (!5), and
                               Triplex Italic for the main title (!18). The
                               position keyword is used to shrink the
                               plotting "window."
SS = '!6F(s) = (2!4p)!e-1/2!n !mi!s!a!e!m!$!r!b!i ' + $
  '!m!$!nf(x)e !e-i2!4p!3xs!ndx' String to produce equation.
XYOUTS, 0.1, .75, SS, SIZE = 3, /NORMAL, /NOCLIP
                               Output string over plot. The NOCLIP
                               keyword is needed because the previous
                               plot caused the clipping region to shrink.
```

$$F(s) = (2\pi)^{-1/2} \int_{-\infty}^{\infty} F(x) e^{-i2\pi xs} dx$$

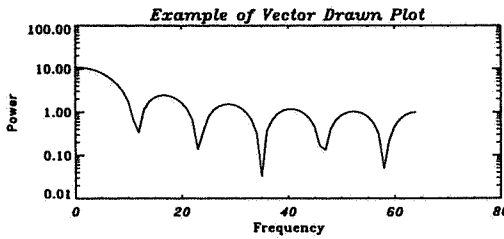


Figure 9.3 Example of a Vector-drawn Plot

Vector-Drawn Fonts

Font 3, Simplex Roman

Octal	00	01	02	03	04	05	06	07	10	11	12	13	14	15	16	17
04x		!	"	#	\$	%	&	'	()	*	+	,	-	.	/	
06x	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
10x	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
12x	P	Q	R	S	T	U	V	W	X	Y	Z	[\]	^	_		
14x	'	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
16x	p	q	r	s	t	u	v	w	x	y	z	{ \ }	^			
20x																
22x	1	'	'	'	~	-	v	.	..		o		"		v	
24x		i	ç	£	¤	¥	¦	§	¨	©	ª	«	¬	®	¯	
26x	°	±	²	³	´	µ	¶	·	¸	¹	º	»	¼	½	¾	¿
30x	À	Á	Â	Ã	Ä	Å	Æ	Ç	È	É	Ê	Ë	Ì	Í	Î	Ï
32x	Ð	Ñ	Ò	Ó	Ô	Õ	Ö	×	Ø	Ù	Ú	Û	Ü	Ý	Þ	ß
34x	à	á	â	ã	ä	å	æ	ç	è	é	ê	ë	ì	í	î	ï
36x	ò	ñ	ó	ô	õ	ö	÷	ø	ù	ú	û	ü	ý	þ	ÿ	

↓
 30 × 10 + 05 = 305 26 × 10 + 01 = 261
 不需要!3 切换
 A = string("305B")
 'EIT_175_' + string("305B") ⇒ EIT 175 Å

Font 4, Simplex Greek

A	B	Γ	Δ	E	Z	H	Θ	I	J
K	L	M	N	O	Π	Ρ	Σ	Τ	Υ
U	Φ	Ψ	Ω	∞	ζ	[\]	^
-	'	a	β	γ	δ	ε	ζ	η	θ
i	κ	λ	μ	ν	ξ	ο	π	ρ	σ
s	τ	υ	φ	χ	ψ	ω	∞	ζ	!
#	\$	%	&	'	()	*	+	,
-	.	/	0	1	2	3	4	5	6
7	8	9	:	;	<	=	>	?	@

Font 5, Duplex Roman

A	B	C	D	E	F	G	H	I	J
K	L	M	N	O	P	Q	R	S	T
U	V	W	X	Y	Z	[\]	^
-	'	a	b	c	d	e	f	g	h
i	j	k	l	m	n	o	p	q	r
s	t	u	v	w	x	y	z	!	"
#	\$	%	&	'	()	*	+	,
-	.	/	0	1	2	3	4	5	6
7	8	9	:	;	<	=	>	?	@

(... 9-3...)

Handwritten scribbles and marks at the bottom right of the page.

Font 6, Complex Roman

A	B	C	D	E	F	G	H	I	J
K	L	M	N	O	P	Q	R	S	T
U	V	W	X	Y	Z	[\]	^
_	'	a	b	c	d	e	f	g	h
i	j	k	l	m	n	o	p	q	r
s	t	u	v	w	x	y	z	!	"
#	\$	%	&	'	()	*	+	,
-	.	/	0	1	2	3	4	5	6
7	8	9	:	;	<	=	>	?	@

Font 7, Complex Greek

A	B	C	D	E	F	G	H	I	J
K	L	M	N	O	P	Q	R	S	T
U	V	W	X	Y	Z	[\]	^
_	'	a	b	c	d	e	f	g	h
i	ι	κ	λ	μ	ν	ξ	ο	π	ρ
σ	τ	υ	φ	χ	ψ	ω	∞	ℓ	!
#	\$	%	&	'	()	*	+	,
-	.	/	0	1	2	3	4	5	6
7	8	9	:	;	<	=	>	?	@

Font 8, Complex Italic

A	B	C	D	E	F	G	H	I	J
K	L	M	N	O	P	Q	R	S	T
U	V	W	X	Y	Z	[\]	^
_	'	a	b	c	d	e	f	g	h
i	j	k	l	m	n	o	p	q	r
s	t	u	v	w	x	y	z	!	"
#	\$	%	&	'	()	*	+	,
-	.	/	0	1	2	3	4	5	6
7	8	9	:	;	<	=	>	?	@

Font 9, Math and Special

A	~	B	□	C	✓	D	∂	E	∃	F	ℱ	G	∇	H	⊠	I	∫	J	ℳ
K		L		M		N	≍	O	†	P	φ	Q	⌈	R	√	S	⌋	T	⋮
U	♠	V	◇	W	♣	X	×	Y		Z		[\]]	^		^
_	---	'		a	∠	b	≧	c	α	d	∂	e	ε	f	♀	g		h	⊖
i	∫	j	j	k		l	≧	m	♂	n	⊙	o	‡	p	p	q	q	r	√
s	∫	t	∞	u	♥	v	♣	w	♣	x	⊥	y)	z		"	"	"	"
#	∥	\$	∞	%	°	&	§	'	()	*	*	+	±	,	,	,	,	,
-	≠	.		/	÷	0	∩	1	∪	2	}	3	∩	4	←	5	↓	6	→
7	↑	8		9		:	≡	;		<		=	≠	>		?	∞	@	⊗

Font 10, Special

A	B	C	D	E	F	G	H	I	J
K	L	M	N	O	P	Q	R	S	T
U	V	W	X	Y	Z	[\]	^
_	.	a	b	c	d	e	f	g	h
i	j	k	l	m	n	o	p	q	r
s	t	u	v	w	x	y	z		"
#	\$	%	&	'	()	*	+	,
-	.	/	0	1	2	3	4	5	6
7	8	9	:	;	<	=	>	?	@

Font 11, Gothic English

A	B	C	D	E	F	G	H	I	J
K	L	M	N	O	P	Q	R	S	T
U	V	W	X	Y	Z	[\]	^
_	'	a	b	c	d	e	f	g	h
i	j	k	l	m	n	o	p	q	r
s	t	u	v	w	x	y	z	!	,
#	\$	%	&	'	()	*	+	,
-	.	/	0	1	2	3	4	5	6
7	8	9	:	;	<	=	>	?	@

Font 12, Simplex Script

A	B	C	D	E	F	G	H	I	J
K	L	M	N	O	P	Q	R	S	T
U	V	W	X	Y	Z	[\]	^
o	'	a	b	c	d	e	f	g	h
i	j	k	l	m	n	o	p	q	r
s	t	u	v	w	x	y	z	!	"
#	\$	%	&	'	()	*	+	,
-	.	/	0	1	2	3	4	5	6
7	8	9	:	;	<	=	>	?	@

Font 13, Complex Script

A	B	C	D	E	F	G	H	I	J
K	L	M	N	O	P	Q	R	S	T
U	V	W	X	Y	Z	[\]	^
o	'	a	b	c	d	e	f	g	h
i	j	k	l	m	n	o	p	q	r
s	t	u	v	w	x	y	z	!	"
#	\$	%	&	'	()	*	+	,
-	.	/	0	1	2	3	4	5	6
7	8	9	:	;	<	=	>	?	@

Font 14, Gothic Italian

A	H	B	C	D	E	F	G	H	I	J
K	R	L	M	N	O	P	Q	R	S	T
U	U	V	W	X	Y	Z	{		}	^
-	~	'	a	b	c	d	e	f	g	h
i	j	k	l	m	n	o	p	q	r	'
s	t	u	v	w	x	y	z	!	"	'
#	\$	%	&	'	()	*	+	,	'
-	.	/	0	1	2	3	4	5	6	'
7	8	9	:	;	<	=	>	?	@	'

Font 15, Gothic German

A	U	B	C	D	E	F	G	H	I	J
K	R	L	M	N	O	P	Q	R	S	T
U	U	V	W	X	Y	Z	{		}	^
-	~	'	a	b	c	d	e	f	g	h
i	j	k	l	m	n	o	p	q	r	'
s	t	u	v	w	x	y	z	!	"	'
#	\$	%	&	'	()	*	+	,	'
-	.	/	0	1	2	3	4	5	6	'
7	8	9	:	;	<	=	>	?	@	s

Font 16, Cyrillic

A	Б	В	Г	Д	Е	Ж	З	И	Й
К	Л	М	Н	О	П	Р	С	Т	У
Ф	Х	Ц	Ч	Ш	Щ	Ы	Э	Ь	Ю
Я	'	а	б	в	г	д	е	ж	з
и	й	к	л	м	н	о	п	р	с
т	у	ф	х	ц	ч	ш	щ	!	ю
Ъ	\$	%	&	'	()	*	+	,
-	.	/	0	1	2	3	4	5	6
7	8	9	:	;	<	=	>	?	@

Font 17, Triplex Roman

A	B	C	D	E	F	G	H	I	J
K	L	M	N	O	P	Q	R	S	T
U	V	W	X	Y	Z	{	\	}	^
o	'	a	b	c	d	e	f	g	h
i	j	k	l	m	n	o	p	q	r
s	t	u	v	w	x	y	z	!	"
#	\$	%	&	'	()	*	+	,
-	.	/	0	1	2	3	4	5	6
7	8	9	:	;	<	=	>	?	@

Font 18, Triplex Italic

A	B	C	D	E	F	G	H	I	J
K	L	M	N	O	P	Q	R	S	T
U	V	W	X	Y	Z	{	\	}	^
°	'	a	b	c	d	e	f	g	h
i	j	k	l	m	n	o	p	q	r
s	t	u	v	w	x	y	z	!	"
#	\$	%	&	'	()	*	+	,
-	.	/	0	1	2	3	4	5	6
7	8	9	:	;	<	=	>	?	@

Font 20, Miscellaneous

A	B	C	D	E	F	G	H	I	J
K	L	M	N	O	P	Q	R	S	T
U	V	W	X	Y	Z	[\]	^
°	'	a	b	c	d	e	f	g	h
i	j	k	l	m	n	o	p	q	r
s	t	u	v	w	x	y	z	!	"
#	\$	%	&	'	()	*	+	,
-	.	/	0	1	2	3	4	5	6
7	8	9	:	;	<	=	>	?	@

