

# VT 240 Series

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## Programmer Pocket Guide

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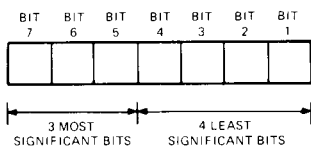
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This pocket guide provides a summary of the information in the *VT240 Programmer Reference Manual* (EK-VT240-RM) which you can order from Digital. The guide helps people with a knowledge of computer programming to access the VT240 features.

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## CHARACTER ENCODING

### 7-Bit Code



(DECIMAL VALUE IS  
COLUMN IN  
CODE TABLE)

(DECIMAL VALUE  
IS ROW IN  
CODE TABLE)

MA 0890-83

### 7-Bit ASCII Code Table

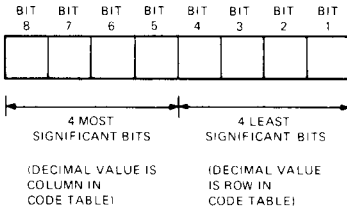
ASCII		0		1		2		3		4		5		6		7	
BITS																	
0 1 2 3 4 5 6 7		0 1		0 1		0 1		0 1		0 1		0 1		0 1		0 1	
0	0 0 0 0	NUL	0	DLE	20	10	SP	40	0	60	@	100	P	120	`	140	p
1	0 0 0 1	SOH	1	DC1	21	11	!	41	1	61	A	101	Q	121	a	141	q
2	0 0 1 0	STX	2	DC2	22	12	"	42	2	62	B	102	R	122	b	142	r
3	0 0 1 1	ETX	3	DC3	23	13	#	43	3	63	C	103	S	123	c	143	s
4	0 1 0 0	EOT	4	DC4	24	14	\$	44	4	64	D	104	T	124	d	144	t
5	0 1 0 1	ENQ	5	NAK	25	15	%	45	5	65	E	105	U	125	e	145	u
6	0 1 1 0	ACK	6	SYN	26	16	&	46	6	66	F	106	V	126	f	146	v
7	0 1 1 1	BEL	7	ETB	27	17	'	47	7	67	G	107	W	127	g	147	w
8	1 0 0 0	BS	8	CAN	28	18	(	48	8	68	H	108	X	128	h	148	x
9	1 0 0 1	HT	9	EM	29	19	)	49	9	69	I	109	Y	129	i	149	y
10	1 0 1 0	LF	10	SUB	30	20	*	50	:	70	J	110	Z	130	j	150	z
11	1 0 1 1	VT	11	ESC	31	21	+	51	;	71	K	111	[	131	k	151	{
12	1 1 0 0	FF	12	FS	32	22	,	52	<	72	L	112	\	132	l	152	
13	1 1 0 1	CR	13	GS	33	23	-	53	=	73	M	113	]	133	m	153	}
14	1 1 1 0	SO	14	RS	34	24	.	54	>	74	N	114	^	134	n	154	~
15	1 1 1 1	SI	15	US	35	25	/	55	?	75	O	115	_	135	o	155	DEL

#### KEY

CHARACTER	ESC	27	DECIMAL
	10h		HEX

MA 0893A-83

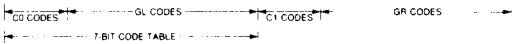
## 8-Bit Code



MA 0891 R3

## 8-Bit Code Table

COLUMN ROW	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
00	NUL	DLE	SP							DCS	///					
01	SOH	DC1								PU1						
02	STX	DC2								PU2						
03	ETX	DC3								STS						
04	EOT	DC4							IND	CCH						
05	ENG	NAK							NEL	MW						
06	ACK	SYN							SSA	SPA						
07	BEL	ETB							ESA	EPA						
08	BS	CAN							HTS							
09	HT	EM							HTJ							
10	LF	SUB							VTB							
11	VT	ESC							PLD	CSI						
12	FF	FS							PLU	ST						
13	CR	GS							RI	OSC						
14	SO	RS							SS2	PM						
15	SI	US						DEL	SS3	APC						///



MA 0892 R3

## DEC Multinational Character Set (C0 and GL Codes)

COLUMN		0	1	2	3	4	5	6	7
BITS		0 0 0 0	0 0 0 1	0 0 1 0	0 0 1 1	0 1 0 0	0 1 0 1	0 1 1 0	0 1 1 1
ROW	h8 b7 b6 b5 b4 b3 b2 b1								
0	0 0 0 0	NUL	DLE	SP	0	␣	P	'	p
1	0 0 0 1	SOH	DC1 (KON)	!	1	A	Q	a	q
2	0 0 1 0	STX	DC2	"	2	B	R	b	r
3	0 0 1 1	ETX	DC3 (KOFF)	#	3	C	S	c	s
4	0 1 0 0	EOT	DC4	\$	4	D	T	d	t
5	0 1 0 1	ENQ	NAK	%	5	E	U	e	u
6	0 1 1 0	ACK	SYN	&	6	F	V	f	v
7	0 1 1 1	BEL	ETB	'	7	G	W	g	w
8	1 0 0 0	BS	CAN	(	8	H	X	h	x
9	1 0 0 1	HT	EM	)	9	I	Y	i	y
10	1 0 1 0	LF	SUB	*	:	J	Z	j	z
11	1 0 1 1	VT	ESC	+	;	K	[	k	{
12	1 1 0 0	FF	FS	,	<	L	\	l	
13	1 1 0 1	CR	GS	-	=	M	]	m	}
14	1 1 1 0	SO	RS	.	>	N	^	n	~
15	1 1 1 1	SI	US	/	?	O	_	o	DEL

C0 CODES
GL CODES (ASCII GRAPHICS)

## KEY

CHARACTER	ESC	33	OCTAL
		27	DECIMAL
		1B	HEX



## DEC Multinational Character Set (C1 and GR Codes)

8	9	10	11	12	13	14	15	COLUMN	ROWS
0	1	2	3	4	5	6	7	BIT	
0	0	0	0	0	0	0	0	14 13 12 11	
200 128 80	DCS	220 144 96	240 160 AD	260 176 80	280 192 LC	300 208 D0	320 224 E0	340 240 F0	0
201 129 P1	PU1	221 145 91	241 161 A1	261 177 81	281 193 C1	301 209 D1	321 225 E1	341 241 F1	1
02 130 82	PU2	222 146 92	242 162 A2	262 178 82	282 194 C2	302 210 D2	322 226 E2	342 242 F2	2
203 131 83	STS	223 147 93	243 163 A3	263 179 83	283 195 C3	303 211 D3	323 227 E3	343 243 F3	3
204 132 84	CCH	224 148 94	244 164 A4	264 180 84	284 196 C4	304 212 D4	324 228 E4	344 244 F4	4
205 133 85	MW	225 149 95	245 165 A5	265 181 85	285 197 C5	305 213 D5	325 229 E5	345 245 F5	5
206 134 86	SPA	226 150 96	246 166 A6	266 182 86	286 198 C6	306 214 D6	326 230 E6	346 246 F6	6
207 135 87	EPA	227 151 97	247 167 A7	267 183 87	287 199 C7	307 215 D7	327 231 E7	347 247 F7	7
210 136 88	HTS	230 152 98	250 168 A8	270 184 88	290 200 C8	310 216 D8	330 232 E8	350 248 F8	8
211 137 89	HTJ	231 153 99	251 169 A9	271 185 89	291 201 C9	311 217 D9	331 233 E9	351 249 F9	9
212 138 9A	VTS	232 154 9A	252 170 AA	272 186 8A	292 202 CA	312 218 DA	332 234 EA	352 250 FA	10
213 139 9B	CSI	233 155 9B	253 171 AB	273 187 8B	293 203 CB	313 219 DB	333 235 EB	353 251 FB	11
214 140 9C	ST	234 156 9C	254 172 AC	274 188 8C	294 204 CC	314 220 DC	334 236 EC	354 252 FC	12
215 141 9D	OSC	235 157 9D	255 173 AD	275 189 8D	295 205 CD	315 221 DD	335 237 ED	355 253 FD	13
216 142 9E	PM	236 158 9E	256 174 AE	276 190 8E	296 206 CE	316 222 DE	336 238 EE	356 254 FE	14
217 143 9F	APC	237 159 9F	257 175 AF	277 191 8F	297 207 CF	317 223 DF	337 239 EF	357 255 FF	15

C1 CODES
 GR CODES  
 (DEC SUPPLEMENTAL GRAPHICS)

MA 0894-B3

## DEC Special Graphics

BITS		0	1	2	3	4	5	6	7
HEX	84 83 82 81								
0	0 0 0 0	NUL	DLE	SP	0	@	P	↑	—
1	0 0 0 1	SOH	DC1	!	1	A	Q	↑	—
2	0 0 1 0	STX	DC2	"	2	B	R	↑	—
3	0 0 1 1	ETX	DC3	#	3	C	S	↑	—
4	0 1 0 0	EOT	DC4	\$	4	D	T	↑	—
5	0 1 0 1	ENQ	NAK	%	5	E	U	↑	—
6	0 1 1 0	ACK	SYN	&	6	F	V	↑	—
7	0 1 1 1	BEL	ETB	'	7	G	W	↑	—
8	1 0 0 0	BS	CAN	(	8	H	X	↑	—
9	1 0 0 1	HT	EM	)	9	I	Y	↑	—
10	1 0 1 0	LF	SUB	*		J	Z	↑	—
11	1 0 1 1	VT	ESC	+		K	[	↑	—
12	1 1 0 0	FF	FS	,		L	\	↑	—
13	1 1 0 1	CR	GS	-		M	]	↑	—
14	1 1 1 0	SO	RS	.		N	^	↑	—
15	1 1 1 1	SI	US	/		O	(BLANK)	↑	DEL

CO CODES GL CODES (DEC SPECIAL GRAPHICS)

## KEY

CHARACTER	ESC	33	DCTAL
		27	DECTAL
		18	HEX

**British NRC Set**  
**(British Keyboard Selection)**

	C0	LMP	0	1	2	3	4	5	6	7
H8	BITS	0	1	0	0	0	0	0	0	0
R0W	h1 h2 h3 h4	0	1	0	0	0	0	0	0	0
0	0 0 0 0	NUL	DLE	SP	0	@	P	a	p	
1	0 0 0 1	SOH	DC1	!	1	A	Q	s	q	
2	0 0 1 0	STX	DC2	"	2	B	R	b	r	
3	0 0 1 1	ETX	DC3	#	3	C	S	c	s	
4	0 1 0 0	EOT	DC4	\$	4	D	T	d	t	
5	0 1 0 1	ENQ	NAK	%	5	E	U	e	u	
6	0 1 1 0	ACK	SYN	&	6	F	V	f	v	
7	0 1 1 1	BEL	ETB	'	7	G	W	g	w	
8	1 0 0 0	BS	CAN	(	8	H	X	h	x	
9	1 0 0 1	HT	EM	)	9	I	Y	i	y	
10	1 0 1 0	LF	SUB	*	:	J	Z	j	z	
11	1 0 1 1	VT	ESC	+	;	K	[	k	{	
12	1 1 0 0	FF	FS	,	<	L	\	l		
13	1 1 0 1	CR	GS	-	=	M	]	m	}	
14	1 1 1 0	SO	RS	.	>	N	^	n	~	
15	1 1 1 1	SI	US	/	?	O	_	o	DEL	

## KEY

CHARACTER	ESC		
	33	OCTAL	
	27	DECIMAL	
	1B	HEX	

# Dutch NRC Set (Dutch Keyboard Selection)

CIN JMN		0	1	2	3	4	5	6	7
BITS									
ROW									
0	0 0 0 0	NUL	DLE	SP	0	¼	P	'	p
1	0 0 0 1	SOH	DC1 XON	!	1	A	Q	a	q
2	0 0 1 0	STX	DC2	"	2	B	R	b	r
3	0 0 1 1	ETX	DC3 XOFF	£	3	C	S	c	s
4	0 1 0 0	EOT	DC4	\$	4	D	T	d	t
5	0 1 0 1	ENO	NAK	%	5	E	U	e	u
6	0 1 1 0	ACK	SYN	&	6	F	V	f	v
7	0 1 1 1	BEL	ETB	'	7	G	W	g	w
8	1 0 0 0	BS	CAN	(	8	H	X	h	x
9	1 0 0 1	HT	EM	)	9	I	Y	i	y
10	1 0 1 0	LF	SUB	*	:	J	Z	j	z
11	1 0 1 1	VT	ESC	+	;	K	[	k	**
12	1 1 0 0	FF	FS	,	<	L	½	l	f
13	1 1 0 1	CR	GS	-	=	M		m	¼
14	1 1 1 0	SO	RS	.	>	N	^	n	'
15	1 1 1 1	SI	US	/	?	O	_	o	DEL

## KEY

CHARACTER	ESC	33 27 1B	DICTAL DECIMAL +10 X
-----------	-----	----------------	----------------------------

# **Finnish NRC Set** (Finnish Keyboard Selection)

COL. CWN		0	1	2	3	4	5	6	7
BITS									
ROW									
0	0 0 0 0	NUL	DLE	SP	0	@	P	é	p
1	0 0 0 1	SOH	DC1 XON	!	1	A	Q	a	q
2	0 0 1 0	STX	DC2	"	2	B	R	b	r
3	0 0 1 1	ETX	DC3 XOFF	#	3	C	S	c	s
4	0 1 0 0	EOT	DC4	\$	4	D	T	d	t
5	0 1 0 1	ENQ	NAK	%	5	E	U	e	u
6	0 1 1 0	ACK	SYN	&	6	F	V	f	v
7	0 1 1 1	BEL	ETB	'	7	G	W	g	w
8	1 0 0 0	BS	CAN	(	8	H	X	h	x
9	1 0 0 1	HT	EM	)	9	I	Y	i	y
10	1 0 1 0	LF	SUB	*	:	J	Z	j	z
11	1 0 1 1	VT	ESC	+	:	K	Ä	k	ä
12	1 1 0 0	FF	FS	,	<	L	Ö	l	ö
13	1 1 0 1	CR	GS	-	=	M	Å	m	å
14	1 1 1 0	SO	RS	.	>	N	Ü	n	ü
15	1 1 1 1	SI	US	/	?	O	-	o	DEL

## **KEY**

CHARACTER	ESC	11	12	13
		CR	LF	DEL

# French NRC Set (Flemish and French/Belgian Keyboard Selections)

COLUMN				0	1	2	3	4	5	6	7							
BITS																		
14 13 12 11				10 9 8 7	6 5 4 3	2 1 0	15 14 13 12	11 10 9 8	7 6 5 4	3 2 1 0	15 14 13 12							
ROW	15	14	13	12	11	10	9	8	7	6	5							
0	0	0	0	0	NUL	0	DLE	20	SP	40	0	60	100	P	120	140	p	160
1	0	0	0	1	SOH	1	DC1 (KON)	21	!	41	1	61	101	Q	121	141	q	161
2	0	0	1	0	STX	2	DC2	22	11	42	2	62	102	R	122	142	r	162
3	0	0	1	1	ETX	3	DC3 (KOFF)	23	£	43	3	63	103	S	123	143	s	163
4	0	1	0	0	EOT	4	DC4	24	\$	44	4	64	104	T	124	144	t	164
5	0	1	0	1	ENQ	5	NAK	25	%	45	5	65	105	U	125	145	u	165
6	0	1	1	0	ACK	6	SYN	26	&	46	6	66	106	V	126	146	v	166
7	0	1	1	1	BEL	7	ETB	27	'	47	7	67	107	W	127	147	w	167
8	1	0	0	0	BS	8	CAN	30	(	50	8	70	110	X	130	150	x	170
9	1	0	0	1	HT	9	EM	31	)	51	9	71	111	Y	131	151	y	171
10	1	0	1	0	LF	10	SUB	32	*	52	:	72	112	Z	132	152	z	172
11	1	0	1	1	VT	11	ESC	33	+	53	;	73	113		133	153		173
12	1	1	0	0	FF	12	FS	34	,	54	<	74	114	¢	134	154	¸	174
13	1	1	0	1	CR	13	GS	35	-	55	=	75	115	§	135	155	¸	175
14	1	1	1	0	SO	14	RS	36	.	56	>	76	116	^	136	156	ˆ	176
15	1	1	1	1	SI	15	US	37	/	57	?	77	117	_	137	157	ˆ	177

## KEY

CHARACTER	ESC	33	OCTAL
		27	DECIMAL
		1B	HEX

# French Canadian NRC Set (French Canadian Keyboard Selection)

COLUMN		0	1	2	3	4	5	6	7
BITS		0 0		0 1		1 0		1 1	
ROW	b7 b6 b5 b4 b3 b2 b1								
0	0 0 0 0	NUL	DLE	SP	0	1	P	A	p
1	0 0 0 1	SOH	DC1 (XON)	!	1	A	Q	a	q
2	0 0 1 0	STX	DC2	"	2	B	R	b	r
3	0 0 1 1	ETX	DC3 (XOFF)	#	3	C	S	c	s
4	0 1 0 0	EOT	DC4	\$	4	D	T	d	t
5	0 1 0 1	ENQ	NAK	%	5	E	U	e	u
6	0 1 1 0	ACK	SYN	&	6	F	V	f	v
7	0 1 1 1	BEL	ETB	'	7	G	W	g	w
8	1 0 0 0	BS	CAN	(	8	H	X	h	x
9	1 0 0 1	HT	EM	)	9	I	Y	i	y
10	1 0 1 0	LF	SUB	*	:	J	Z	j	z
11	1 0 1 1	VT	ESC	+	;	K	[	k	{
12	1 1 0 0	FF	FS	,	<	L	\	l	
13	1 1 0 1	CR	GS	-	=	M	]	m	~
14	1 1 1 0	SO	RS	.	>	N	^	n	^
15	1 1 1 1	SI	US	/	?	O	_	o	DEL

## KEY

CHARACTER	ESC	33	OCTAL
		27	DECIMAL
		1B	HEX

MA-0803-83H

# German NRC Set (German Keyboard Selection)

COLUMN		0	1	2	3	4	5	6	7
BITS		0 0		0 1		1 0		1 1	
ROW	14 13 12 11	10 9 8 7	6 5 4 3	2 1 0	15 14 13 12	11 10 9 8	7 6 5 4	3 2 1 0	15 14 13 12
0	0 0 0 0	NUL	DLE	SP	0	\$	P	\	p
1	0 0 0 1	SOH	DC1 (XON)	!	1	A	Q	a	q
2	0 0 1 0	STX	DC2	"	2	B	R	b	r
3	0 0 1 1	ETX	DC3 (XOFF)	#	3	C	S	c	s
4	0 1 0 0	EOT	DC4	\$	4	D	T	d	t
5	0 1 0 1	ENQ	NAK	%	5	E	U	e	u
6	0 1 1 0	ACK	SYN	&	6	F	V	f	v
7	0 1 1 1	BEL	ETB	'	7	G	W	g	w
8	1 0 0 0	BS	CAN	(	8	H	X	h	x
9	1 0 0 1	HT	EM	)	9	I	Y	i	y
10	1 0 1 0	LF	SUB	*	:	J	Z	j	z
11	1 0 1 1	VT	ESC	+	.	K	Ä	k	ä
12	1 1 0 0	FF	FS	,	<	L	Ö	l	ö
13	1 1 0 1	CR	GS	-	=	M	Ü	m	ü
14	1 1 1 0	SO	RS	.	>	N	^	n	ß
15	1 1 1 1	SI	US	/	?	O	-	o	DEL

## KEY

CHARACTER	ESC	33	OCTAL
		27	DECIMAL
		1B	HEX

MA-0893-83K



# Italian NRC Set (Italian Keyboard Selection)

COLUMN		0	1	2	3	4	5	6	7
BITS		0 1		0 1		0 1		0 1	
ROW	N7 N6 N5 N4 N3 N2 N1	0 1		0 1		0 1		0 1	
		0 1		0 1		0 1		0 1	
0	0 0 0 0 0	MUL	DLE	SP	0	§	P	ù	p
1	0 0 0 0 1	SOM	DC1 XON	!	1	A	Q	a	q
2	0 0 0 1 0	STX	DC2	"	2	B	R	b	r
3	0 0 0 1 1	ETX	DC3 XOFF	£	3	C	S	c	s
4	0 0 1 0 0	EOT	DC4	\$	4	D	T	d	t
5	0 0 1 0 1	ENQ	NAK	%	5	E	U	e	u
6	0 0 1 1 0	ACK	SYN	&	6	F	V	f	v
7	0 0 1 1 1	BEL	ETB	'	7	G	W	g	w
8	0 1 0 0 0	BS	CAN	(	8	H	X	h	x
9	0 1 0 0 1	HT	EM	)	9	I	Y	i	y
10	0 1 0 1 0	LF	SUB	*		J	Z	j	z
11	0 1 0 1 1	VT	ESC	+		K	*	k	¸
12	0 1 1 0 0	FF	FS	.	<	L	ç	l	¸
13	0 1 1 0 1	CR	GS	-	=	M	é	m	¸
14	0 1 1 1 0	SO	RS	.	>	N	^	n	¸
15	0 1 1 1 1	SI	US	/	?	O	-	o	DEL

## KEY

CHARACTER	ESC	32 21 8	OCTAL DECIMAL HEX
-----------	-----	---------------	-------------------------

# Norwegian/Danish NRC Set (Danish and Norwegian Keyboard Selections)

ROW	COLUMNS				0	1	2	3	4	5	6	7
	b7	b6	b5	b4	0	1	2	3	4	5	6	7
0	0	0	0	0	NUL	DLE	SP	0	Ä	P	ä	p
1	0	0	0	1	SOH	DC1 (XON)	!	1	A	Q	a	q
2	0	0	1	0	STX	DC2	"	2	B	R	b	r
3	0	0	1	1	ETX	DC3 (XOFF)	#	3	C	S	c	s
4	0	1	0	0	EOT	DC4	\$	4	D	T	d	t
5	0	1	0	1	ENQ	NAK	%	5	E	U	e	u
6	0	1	1	0	ACK	SYN	&	6	F	V	f	v
7	0	1	1	1	BEL	ETB	'	7	G	W	g	w
8	1	0	0	0	BS	CAN	(	8	H	X	h	x
9	1	0	0	1	HT	EM	)	9	I	Y	i	y
10	1	0	1	0	LF	SUB	*	:	J	Z	j	z
11	1	0	1	1	VT	ESC	+	;	K	Æ	k	æ
12	1	1	0	0	FF	FS	<	<	L	Ø	l	ø
13	1	1	0	1	CR	GS	=	=	M	Å	m	å
14	1	1	1	0	SO	RS	.	>	N	Ü	n	ü
15	1	1	1	1	SI	US	/	?	O	-	o	DEL

KEY

CHARACTER	ESC	33	DECIMAL
		27	HEX
		1B	

MA-0003-830

# Spanish NRC Set (Spanish Keyboard Selection)

ROW	COLUMN							
	0	1	2	3	4	5	6	7
	0 0 0 0	0 0 1	0 1 0	0 1 1	1 0 0	1 0 1	1 1 0	1 1 1
0	NUL 0 0 0 0	DLE 16 10	SP 32 20	0 40 30	§ 100 84	P 120 90	˘ 140 100	p 160 112
1	SOH 1 1 1 1	DC1 (KON) 21 17	! 41 33	1 61 49	A 101 85	Q 121 91	a 141 101	q 161 113
2	STX 2 2 2 2	DC2 22 18	" 42 34	2 62 50	B 102 86	R 122 92	b 142 102	r 162 114
3	ETX 3 3 3 3	DC3 (KOFF) 23 19	£ 43 35	3 63 51	C 103 87	S 123 93	c 143 103	s 163 115
4	EOT 4 4 4 4	DC4 24 20	\$ 44 36	4 64 52	D 104 88	T 124 94	d 144 104	t 164 116
5	ENQ 5 5 5 5	NAK 25 21	% 45 37	5 65 53	E 105 89	U 125 95	e 145 105	u 165 117
6	ACK 6 6 6 6	SYN 26 22	& 46 38	6 66 54	F 106 90	V 126 96	f 146 106	v 166 118
7	BEL 7 7 7 7	ETB 27 23	' 47 39	7 67 55	G 107 91	W 127 97	g 147 107	w 167 119
8	BS 8 8 8 8	CAN 30 24	( 50 40	8 70 56	H 110 94	X 130 98	h 150 108	x 170 120
9	HT 9 9 9 9	EM 31 25	) 51 41	9 71 57	I 111 95	Y 131 99	i 151 109	y 171 121
10	LF 10 10 10 10	SUB 32 26	* 52 42	: 72 58	J 112 96	Z 132 100	j 152 110	z 172 122
11	VT 11 11 11 11	ESC 33 27	+ 53 43	; 73 59	K 113 97	_ 133 101	k 153 111	o 173 123
12	FF 12 12 12 12	FS 34 28	, 54 44	< 74 60	L 114 98	˜ 134 102	l 154 112	˜ 174 124
13	CR 13 13 13 13	GS 35 29	- 55 45	= 75 61	M 115 99	¿ 135 103	m 155 113	ç 175 125
14	SO 14 14 14 14	RS 36 30	. 56 46	> 76 62	N 116 100	À 136 104	n 156 114	˘ 176 126
15	SI 15 15 15 15	US 37 31	/ 57 47	? 77 63	O 117 101	— 137 105	o 157 115	DEL 177 127

## KEY

CHARACTER	ESC	33	OCTAL
		27	DECIMAL
		1B	HEX

# Swedish NRC Set (Swedish Keyboard Selection)

	COL-AM	0	1	2	3	4	5	6	7
	BITS								
ROW	17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1								
0	0 0 0 0	NUL	DLE	SP	0	É	P	é	p
1	0 0 0 1	SOH	DC1 XON	!	1	A	Q	a	q
2	0 0 1 0	STX	DC2	"	2	B	R	b	r
3	0 0 1 1	ETX	DC3 XOFF	#	3	C	S	c	s
4	0 1 0 0	EOT	DC4	\$	4	D	T	d	t
5	0 1 0 1	ENQ	NAK	%	5	E	U	e	u
6	0 1 1 0	ACK	SYN	&	6	F	V	f	v
7	0 1 1 1	BEL	ETB	'	7	G	W	g	w
8	1 0 0 0	BS	CAN	(	8	H	X	h	x
9	1 0 0 1	HT	EM	)	9	I	Y	i	y
10	1 0 1 0	LF	SUB	*	:	J	Z	j	z
11	1 0 1 1	VT	ESC	+	:	K	Ä	k	ä
12	1 1 0 0	FF	FS	,	<	L	Ö	l	ö
13	1 1 0 1	CR	GS	-	=	M	Å	m	å
14	1 1 1 0	SO	RS	.	>	N	Ü	n	ü
15	1 1 1 1	SI	US	/	?	O	—	o	DEL

## KEY

CHARACTER	ESC	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1

# Swiss NRC Set (Swiss/French and Swiss/German Keyboard Selections)

ROW	COLUMN				0	1	2	3	4	5	6	7
	BITS											
	b7	b6	b5	b4								
	104	103	102	101								
0	0 0 0 0	NUL	0	DLE	20	40	60	80	100	120	140	160
1	0 0 0 1	SOM	1	DC1	21	41	61	81	101	121	141	161
2	0 0 1 0	STX	2	DC2	22	42	62	82	102	122	142	162
3	0 0 1 1	ETX	3	DC3	23	43	63	83	103	123	143	163
4	0 1 0 0	EOT	4	DC4	24	44	64	84	104	124	144	164
5	0 1 0 1	ENQ	5	NAK	25	45	65	85	105	125	145	165
6	0 1 1 0	ACK	6	SYN	26	46	66	86	106	126	146	166
7	0 1 1 1	BEL	7	ETB	27	47	67	87	107	127	147	167
8	1 0 0 0	BS	8	CAN	28	48	68	88	108	128	148	168
9	1 0 0 1	HT	9	EM	29	49	69	89	109	129	149	169
10	1 0 1 0	LF	10	SUB	30	50	70	90	110	130	150	170
11	1 0 1 1	VT	11	ESC	31	51	71	91	111	131	151	171
12	1 1 0 0	FF	12	FS	32	52	72	92	112	132	152	172
13	1 1 0 1	CR	13	GS	33	53	73	93	113	133	153	173
14	1 1 1 0	SO	14	RS	34	54	74	94	114	134	154	174
15	1 1 1 1	SI	15	US	35	55	75	95	115	135	155	175

## KEY

CHARACTER	ESC	33	OCTAL
		27	DECIMAL
		1B	HEX

Display Controls Font

COLUMN		0	1	2	3	4	5	6	7
BITS		0 0 0 0	0 0 0 1	0 0 1 0	0 0 1 1	0 1 0 0	0 1 0 1	0 1 1 0	0 1 1 1
ROW	15 14 13 12 11								
0	0 0 0 0	N	0	0	0	0	0	0	0
1	0 0 0 1	S	1	1	1	1	1	1	1
2	0 0 1 0	S	2	2	2	2	2	2	2
3	0 0 1 1	E	3	3	3	3	3	3	3
4	0 1 0 0	E	4	4	4	4	4	4	4
5	0 1 0 1	E	5	5	5	5	5	5	5
6	0 1 1 0	A	6	6	6	6	6	6	6
7	0 1 1 1	L	7	7	7	7	7	7	7
8	1 0 0 0	B	8	8	8	8	8	8	8
9	1 0 0 1	M	9	9	9	9	9	9	9
10	1 0 1 0	L	10	10	10	10	10	10	10
11	1 0 1 1	Y	11	11	11	11	11	11	11
12	1 1 0 0	F	12	12	12	12	12	12	12
13	1 1 0 1	H	13	13	13	13	13	13	13
14	1 1 1 0	O	14	14	14	14	14	14	14
15	1 1 1 1	I	15	15	15	15	15	15	15



KEY

CHARACTER	ESC	33	OCTAL
		27	DECIMAL
		1B	HEX

## Display Controls Font (Cont)

8	9	10	11	12	13	14	15	COLUMN	ROW
1 0 0 0	1 0 0 1	1 0 1 0	1 0 1 1	1 1 0 0	1 1 0 1	1 1 1 0	1 1 1 1	16 BITS 16 15 14 13 12 11	
0	1	2	3	4	5	6	7	0 0 0 0	0
8	9	10	11	12	13	14	15	0 0 0 1	1
16	17	18	19	20	21	22	23	0 0 1 0	2
24	25	26	27	28	29	30	31	0 0 1 1	3
32	33	34	35	36	37	38	39	0 1 0 0	4
40	41	42	43	44	45	46	47	0 1 0 1	5
48	49	50	51	52	53	54	55	0 1 1 0	6
56	57	58	59	60	61	62	63	0 1 1 1	7
64	65	66	67	68	69	70	71	1 0 0 0	8
72	73	74	75	76	77	78	79	1 0 0 1	9
80	81	82	83	84	85	86	87	1 0 1 0	10
88	89	90	91	92	93	94	95	1 0 1 1	11
96	97	98	99	100	101	102	103	1 1 0 0	12
104	105	106	107	108	109	110	111	1 1 0 1	13
112	113	114	115	116	117	118	119	1 1 1 0	14
120	121	122	123	124	125	126	127	1 1 1 1	15

C1 CODES

GR CODES  
(DEC SUPPLEMENTAL GRAPHICS)

DEC 0004-1 83

### Escape Sequences

An escape sequence begins with the C0 character ESC, followed by one or more ASCII graphic characters. For example,

ESC # 6

is an escape sequence that changes the current line of text to double-width characters. Escape sequences use only 7-bit characters, and can be used in 7-bit or 8-bit environments.

### Control Sequences

A control sequence begins with CSI (9/11), followed by one or more ASCII graphic characters. CSI can also be expressed as the 7-bit code extension ESC [. So you can express all control sequences as escape sequences whose second character code is [. For example, the following two sequences are equivalent sequences that perform the same function (they cause the display to use 132 columns per line rather than 80).

CSI ? 3 h

ESC [ ? 3 h

Whenever possible, use CSI instead of ESC [ to introduce a control sequence. CSI can be used only in an 8-bit environment.

### Device Control Strings


A device control string is a delimited string of characters used in a data stream as a logical entity for control purposes. It consists of an opening delimiter DCS, a command string (data), and a closing delimiter ST.

DCS is an 8-bit control character that can also be expressed as ESC P when coding for a 7-bit environment.

ST is an 8-bit control character that can also be expressed as ESC / when coding for a 7-bit environment.

## TRANSMITTED CODES

### Main Keypad Function Keys

Key	Code Transmitted
	DEL character
Tab	HT character
Return	CR character only or a CR character and an LF character, depending on the set/reset state of line feed/new line mode (LNM).

---



## TRANSMITTED CODES (Cont)

### Main Keypad Function Keys

Key	Code Transmitted
Ctrl	Does not send a code.
Lock	Does not send a code.
Shift (2 keys)	Does not send a code.
Space bar	SP character.
Compose Character	Does not send a code.

### Editing Keys

Key	Code Generated VT200 Mode	VT100, VT52, 4010/4014 Modes
Find	CSI 1 ~	None
Insert Here	CSI 2 ~	None
Remove	CSI 3 ~	None
Select	CSI 4 ~	None
Prev Screen	CSI 5 ~	None
Next Screen*	CSI 6 ~	None

### Cursor Control Keys

Key	ANSI Mode† Cursor Key Mode		VT52 Mode†	
	Reset Normal	Set Application	Normal	Application
↑	CSI A	SS3 A	ESC A	ESC A
↓	CSI B	SS3 B	ESC B	ESC B
→	CSI C	SS3 C	ESC C	ESC C
←	CSI D	SS3 D	ESC D	ESC D

\* In 4010/4014 mode, **Next Screen** works as a "Clear Screen" key.

† ANSI mode applies to VT200 and VT100 modes. VT52 mode is an ANSI-incompatible mode.

## Auxiliary Keypad Keys

VT100/VT200 ANSI Mode*			VT52 Mode*	
Key	Keypad Numeric Mode	Keypad Application Mode	Keypad Numeric Mode	Keypad Application Mode
0	0	SS3 p	0	ESC ? p
1	1	SS3 q	1	ESC ? q
2	2	SS3 r	2	ESC ? r
3	3	SS3 s	3	ESC ? s
4	4	SS3 t	4	ESC ? t
5	5	SS3 u	5	ESC ? u
6	6	SS3 v	6	ESC ? v
7	7	SS3 w	7	ESC ? w
8	8	SS3 x	8	ESC ? x
9	9	SS3 y	9	ESC ? y
—	—(minus)	SS3 m	—	ESC ? m
,	,(comma)	SS3 l	,	ESC ? l†
.	.(period)	SS3 n	.	ESC ? n
Enter	CR or CR LF	SS3 M	CR or CR LF	ESC ? M‡
PF1	SS3 P	SS3 P	ESC P	ESC P
PF2	SS3 Q	SS3 Q	ESC Q	ESC Q
PF3	SS3 R	SS3 R	ESC R	ESC R
PF4	SS3 S	SS3 S	ESC S	ESC S†

\* ANSI mode applies to VT200 and VT100 modes. VT52 mode is an ANSI-incompatible mode.

† You cannot generate these sequences on a VT52 terminal.

‡ Keypad numeric mode. **Enter** generates the same codes as **Return**. You can change the code generated by **Return** with the line feed/new line mode. When reset, the line feed/new line mode causes **Return** to generate a single control character (CR). When set, the mode causes **Return** to generate two control characters (CR, LF).

## Top-Row Function Keys

Name on Legend Strip	Generic Name	Code Generated	
		VT200 Mode	VT100, VT52 Modes
Hold Screen	(F1)*	-	-
Print Screen	(F2)*	-	-
Set-Up	(F3)*	-	-
Data/Talk	(F4)*	-	-
Break	(F5)*	-	-
F6	F6	CSI 1 7 ~	-
F7	F7	CSI 1 8 ~	-
F8	F8	CSI 1 9 ~	-
F9	F9	CSI 2 0 ~	-
F10	F10	CSI 2 1 ~	-
F11 (ESC)	F11	CSI 2 3 ~	ESC
F12 (BS)	F12	CSI 2 4 ~	BS
F13 (LF)	F13	CSI 2 5 ~	LF
F14	F14	CSI 2 6 ~	-
Help	(F15)	CSI 2 8 ~	-
Do	(F16)	CSI 2 9 ~	-
F17	F17	CSI 3 1 ~	-
F18	F18	CSI 3 2 ~	-
F19	F19	CSI 3 3 ~	-
F20	F20	CSI 3 4 ~	-

---

\* F1 through F5 are local function keys and do not generate codes.

---

## Keys Used to Generate 7-Bit Control Characters

Control Character Mnemonic	Key Pressed With Ctrl (All Modes)	Dedicated Function Key
NUL	2, space	
SOH	A	
STX	B	
ETX	C	
EOT	D	
ENQ	E	
ACK	F	
BEL	G	
BS	H	F12 (BS)*
HT	I	Tab
LF	J	F13 (LF)*
VT	K	
FF	L	
CR	M	Return
SO	N	
SI	O	
DLE	P	
DC1	Q†	
DC2	R	
DC3	S†	
DC4	T	
NAK	U	
SYN	V	
ETB	W	
CAN	X	
EM	Y	
SUB	Z	
ESC	3, [	F11 (ESC)*
FS	4, /	
GS	5, ]	
RS	6, ~	
US	7, ?	
DEL	8	Delete

---

\* Keys **F11**, **F12**, and **F13** generate these 7-bit control characters only when the terminal is operated in VT100 mode, VT52 mode or 4010/4014 mode.

† These keystrokes are enabled only if XOFF support is disabled. If XOFF support is enabled, then **Ctrl-S** is a local hold screen function and **Ctrl-Q** is a local release screen function.

---

## RECEIVED CODES

### Compatibility Level (DECSCL)

Sequence	Action
CSI 6 1 " p	Set terminal for level 1 (VT100 mode).
CSI 6 2 " p	Set terminal for level 2 (VT200 mode, 8-bit controls).
CSI 6 2 ; 0 " p	Set terminal for level 2 (VT200 mode, 8-bit controls).
CSI 6 2 ; 1 " p	Set terminal for level 2 (VT200 mode, 7-bit controls).
CSI 6 2 ; 2 " p	Set terminal for level 2 (VT200 mode, 8-bit controls).

### CO (ASCII) Control Characters Recognized

Mnemonic	Name	Action
NUL	Null	Ignored when received.
ENQ	Enquiry	Generates answerback message.
BEL	Bell	Generates bell tone if bell is enabled.
BS	Backspace	Moves cursor to the left one character position. If cursor is at left margin, no action occurs.
HT	Horizontal tabulation	Moves cursor to next tab stop, or to right margin if there are no more tab stops. Does not cause autowrap.
LF	Line feed	Causes a line feed or a new line operation, depending on the setting of new line mode.
VT	Vertical tabulation	Processed as LF.
FF	Form feed	Processed as LF.
CR	Carriage return	Moves cursor to left margin on current line.
SO (LS1)	Shift out (lock shift G1)	Invokes G1 character set into GL. G1 is designated by a select character set (SCS) sequence.

**C0 (ASCII) Control Characters Recognized (Cont)**

<b>Mnemonic</b>	<b>Name</b>	<b>Action</b>
SI (LS0)	Shift in (lock shift G0)	Invoke G0 character set into GL. G0 is designated by a select character set (SCS) sequence.
DC1	Device control 1	Also referred to as XON. If XOFF support is enabled, DC1 clears DC3 (XOFF), causing the terminal to continue sending characters (keyboard unlocks) unless KAM mode is currently set.
DC3	Device control 3	Also referred to as XOFF. If XOFF support is enabled, DC3 causes the terminal to stop sending characters until a DC1 control character is received.
CAN	Cancel	If received during an escape or control sequence, terminates and cancels the sequence; no error character is displayed. If received during a device control string, terminates the DCS; no error character is displayed.
SUB	Substitute	If received during escape or control sequence, terminates and cancels the sequence; a reverse question mark is displayed. If received during a device control sequence terminates the DSC; a reverse question mark is displayed.
ESC	Escape	Processed as escape sequence introducer. Terminates any escape, control or device control sequence in progress.
DEL	Delete	Ignored when received. Note: May not be used as a time fill character.

---

## C1 Control Characters Recognized

<b>Mnemonic</b>	<b>Equivalent 7-Bit Code Extension</b>	<b>Name</b>	<b>Action</b>
IND	ESC D	Index	Moves cursor down one line in same column. If cursor is at bottom margin, screen performs a scroll up.
NEL	ESC E	Next line	Moves cursor to first position on next line. If cursor is at bottom margin, screen performs a scroll up.
HTS	ESC H	Horizontal tab set	Sets one horizontal tab stop at the column where the cursor is.
RI	ESC M	Reverse index	Moves cursor up one line in same column. If cursor is at top margin, screen performs a scroll down.
SS2	ESC N	Single shift G2	Temporarily invokes G2 character set into GL for the next graphic character. G2 is designated by a select character set(SCS) sequence.
SS3	ESC O	Single shift G3	Temporarily invokes G3 character set into GL for the next graphic character. G3 is designated by a select character set(SCS) sequence.
DCS	ESC P	Device control string	Processed as opening delimiter of a device control string for device control use.
CSI	ESC [	Control sequence introducer	Processed as control sequence introducer.
ST	ESC /	String terminator	Processed as closing delimiter of a string opened by DCS.

**CHARACTER SET SELECTION (SCS)****Designating Hard Character Sets**

Use the following list of escape sequence formats to designate hard character sets as G0 through G3.

<b>Escape Sequence</b>	<b>Designate As:</b>
ESC ( { final }	G0
ESC ) { final }	G1
ESC * { final }	G2 (VT200 mode only)
ESC + { final }	G3 (VT200 mode only)

The following is a list of available character sets and their associated final character.

<b>Character Sets</b>	<b>Final Character</b>
ASCII	B
DEC supplemental (VT200 mode only)	<
DEC special graphics	0
National replacement character sets	<b>NOTE</b> <b>Only one national character set is available for use at any one time (national mode).</b>
British	A
Dutch	4
Finnish	C or 5
French	R
French Canadian	Q
German	K
Italian	Y
Norwegian/Danish	E or 6
Spanish	Z
Swedish	H or 7
Swiss	=

**Examples**

ASCII as G0	ESC ( B
British as G3	ESC * A

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## Designating Soft (Down-Line Loadable) Character Sets

### Escape Sequence                      Designate As:

ESC ( Dscs	G0
ESC ) Dscs	G1
ESC * Dscs	G2
ESC + Dscs	G3

Dscs can consist of zero, one, or two intermediate characters and a final character.

Intermediate characters are in the range of 2/0 to 2/15; final characters are in the range of 3/0 to 7/14. (See ASCII Code Table for column/row notation.)

### Invoking Character Sets Using Lock Shifts

Control Name	Coding	Function
LS0 – lock shift G0	SI	Invoke G0 into GL. (default).
LS1 – lock shift G1	SO	Invoke G1 into GL.
LS1R – lock shift G1, right	ESC ~	Invoke G1 into GR (VT200 mode only).
LS2 – lock shift G2	ESC n	Invoke G2 into GL (VT200 mode only).
LS2R – lock shift G2, right	ESC }	Invoke G2 into GR (default, VT200 mode only).
LS3 – lock shift G3	ESC o	Invoke G3 into GL (VT200 mode only).
LS3R – lock shift G3, right	ESC	Invoke G3 into GR (VT200 mode only).

### Invoking Character Sets Using Single Shifts

Control Name	Coding	Function
SS2 – single shift G2	SS2 ESC N	Invokes G2 into GL for the next graphic character
SS3 – single shift G3	SS3 ESC O	Invokes G3 into GL for the next graphic character

## Select C1 Control Transmission

Control Name	Sequence*	Action
7-bit C1 control transmission (S7C1T)	ESC sp F	Converts all C1 codes returned to the application to their equivalent 7-bit code extensions.

### NOTE

The S7C1T sequence is ignored when the terminal is in VT100 or VT52 mode.

8-bit C1 control transmission (S8C1T)	ESC sp G	Returns C1 codes to the application without converting them to their equivalent 7-bit code extensions.
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## Terminal Modes

Name	Mnemonic	Set Mode	Reset Mode†
Keyboard action‡	KAM	Locked CSI 2 h	Unlocked CSI 2 l
Insert/ replace	IRM	Insert CSI 4 h	Replace CSI 4 l
Send/ receive	SRM	Off CSI 12 h	On CSI 12 l
Line feed/ new line	LNLM	New line CSI 20 h	Line feed CSI 20 l
Cursor key	DECCKM	Application CSI ? 1 h	Cursor CSI ? 1 l
ANSI/VT52	DECANM	N/A	VT52 CSI ? 2 l
Column	DECCOLM	132 column CSI ? 3 h	80 column CSI ? 3 l
Scrolling‡	DECSCLM	Smooth CSI ? 4 h	Jump CSI ? 4 l
Screen‡	DECSCLM	Reverse CSI ? 5 h	Normal CSI ? 5 l

\* sp is a space character

† The last character of each sequence is lowercase L (6/12).

‡ User preference feature

**Terminal Modes (Cont)**

<b>Name</b>	<b>Mnemonic</b>	<b>Set Mode</b>	<b>Reset Mode†</b>
Origin	DECOM	Origin CSI ? 6 h	Absolute CSI ? 6 l
Auto wrap	DECAWM	On CSI ? 7 h	Off CSI ? 7 l
Auto repeat‡	DECARM	On CSI ? 8 h	Off CSI ? 8 l
Print form feed	DECPFF	On CSI ? 18 h	Off CSI ? 18 l
Print extent	DECPEX	Full screen CSI ? 19 h	Scrolling region CSI ? 19 l
Text cursor enable	DECTCEM	On CSI ? 25 h	Off CSI ? 25 l
Keypad	DECKPAM DECKPNM	Application ESC =	Numeric ESC >
Tektronix 4010/4014	DECTEK	On CSI ? 38 h	Off CSI ? 38 l
Character set	DECNRCM	National CSI ? 42 h	Multinational CSI ? 42 l
Graphics expanded print	DECGEPM	Expanded CSI ? 43 h	Compressed CSI ? 43 l
Graphics print color	DECGPCM	Color CSI ? 44 h	Mono CSI ? 44 l
Graphics print color syntax	DECGPCS	RGB CSI ? 45 h	HLS CSI ? 45 l
Graphics print background	DECGPBM	Background CSI ? 46 h	No Background CSI ? 46 l
Graphics rotated print	DECGRPM	Rotated CSI ? 47 h	Compressed CSI ? 47 l

† The last character of each sequence is lowercase L (6/12).

‡ User preference feature

**Cursor Positioning**

<b>Name</b>	<b>Control Character</b>	<b>Sequence</b>	<b>Action</b>
Cursor up (CUU)	-	CSI Pn A	Moves cursor up Pn lines in the same column.
Cursor down (CUD)	-	CSI Pn B	Moves cursor down Pn lines in the same column.
Cursor forward (CUF)	-	CSI Pn C	Moves cursor right Pn columns.
Cursor backward (CUB)	-	CSI Pn D	Moves cursor left Pn columns.
Cursor position (CUP)	-	CSI PI ; Pc H	Moves cursor to line PI, column Pc. The numbering of the lines and columns depends on the state (set/reset) of origin mode (DECOM).
Horizontal and vertical position (HVP)	-	CSI PI ; Pc f	Moves cursor to line PI, column Pc. The numbering of the lines and columns depends on the state (set/reset) of origin mode (DECOM). Digital recommends using CUP instead of HVP.
Index (IND)	IND	ESC D	Moves cursor down one line in the same column. If the cursor is at the bottom margin the screen performs a scroll-up.

---

---

**Cursor Positioning (Cont)**

<b>Name</b>	<b>Control Character</b>	<b>Sequence</b>	<b>Action</b>
Reverse index (RI)	RI	ESC M	Moves cursor up one line in the same column. If the cursor is at the top margin the screen performs a scroll-down.
Next line (NEL)	NEL	ESC E	Moves the cursor to the first position on the next line. If the cursor is at the bottom margin the screen performs a scroll-up.
Save cursor (DECSC)	-	ESC 7	<p>Saves the following in terminal memory.</p> <ul style="list-style-type: none"><li>• cursor position</li><li>• graphic rendition</li><li>• character set shift state</li><li>• state of wrap flag</li><li>• state of origin mode</li><li>• state of selective erase</li></ul>
Restore cursor (DECRC)	-	ESC 8	Restores the states described for (DECSC) above. If none of these characteristics were saved: the cursor moves to home position, origin mode is reset, no character attributes are assigned, and the default character set mapping is established.

---

## Tab Stops

### NOTE

These sequences are affected by the user preference lock in set-up.

Name	Control Character	Sequence	Action
Horizontal tab set (HTS)	HTS	ESC H	Sets a tab stop at the current column.
Tabulation clear (TBC)	-	CSI g	Clears a horizontal tab stop at cursor position.
		CSI 0 g	Clears a horizontal tab stop at cursor position.
		CSI 3 g	Clears all horizontal tab stops.

### Select Graphic Rendition (SGR)

You can select one or more character renditions at a time using the following format:

CSI Ps ; ... Ps m

When you use multiple parameters, they are executed in sequence. The effects are cumulative. For example, to change from increased intensity to blinking-underlined, you can use:

CSI 0 ; 4 ; 5 m

When you select a single parameter, no delimiter (3/11) is used.

Ps	Action
----	--------

0	All attributes off
1	Display bold
4	Display underscored
5	Display blinking
7	Display negative (reverse) image
22	Display normal intensity
24	Display not underlined
25	Display not blinking
27	Display positive image

---

### Select Character Attributes (DECSCA)

You can select all subsequent characters to be erasable or not erasable using the following format. (See "Erasing" section.)

**NOTE:**

**This sequence is supported only in VT200 mode.**

CSI Ps " q

where:

<b>Ps</b>	<b>Action</b>
0	All attributes off. (Does not apply to SGR.)
1	Designate character as not erasable by DECSEL/DECSED (attribute on).
2	Designate character as erasable by DECSEL/DECSED (attribute off).

### Line Attributes

<b>Name</b>	<b>Sequence</b>	
	<b>Top Half</b>	<b>Bottom Half</b>
Double-height line (DECDHL)	ESC # 3	ESC # 4
	The same character must be used on both lines to form full character. If the line was single-width, single-height, all characters to the right of center are lost.	
Single-width line (DECSWL)	ESC # 5	
Double-width line (DECDWL)	ESC # 6	

**Editing**

<b>Name</b>	<b>Sequence</b>	<b>Action</b>
Insert line (IL)	CSI Pn L	Inserts Pn lines at the cursor.
Delete line (DL)	CSI Pn M	Deletes Pn lines starting at the line with the cursor.
Insert characters (ICH) (VT200 mode only)	CSI Pn @	Insert Pn blank characters at the cursor position, with the character attributes set to normal.
Delete character (DCH)	CSI Pn P	Deletes Pn characters starting with the character at the cursor position.

**Erasing**

<b>Name</b>	<b>Sequence</b>	<b>Action</b>
Erase character (ECH) (VT200 mode only)	CSI Pn X	Erases characters at the cursor position and the next n-1 character.
Erase in line (EL)      Erase in display (ED)	CSI K	Erases from the cursor to the end of the line, including the cursor position.
	CSI 0 K	Same as above.
	CSI 1 K	Erases from the beginning of the line to the cursor, including the cursor position.
	CSI 2 K	Erases the complete line.
	CSI J	Erases from the cursor to the end of the screen, including the cursor position.
	CSI 0 J	Same as above.
	CSI 1 J	Erases from the beginning of the screen to the cursor, including the cursor position.
	CSI 2 J	Erases the complete display.

---



## Erasing (Cont)

Name	Sequence	Action
Selective erase in line (DECSEL) (VT200 mode only)	CSI ? K	Erases all erasable characters (DECSCA) from the cursor to the end of the line.
	CSI ? 0 K	Same as above.
	CSI ? 1 K	Erases all erasable characters (DECSCA) from the beginning of the line to and including the cursor position.
Selective erase in display (DECSED) (VT200 mode only)	CSI ? 2 K	Erases all erasable characters (DECSCA) on the line.
	CSI ? J	Erases all erasable characters (DECSCA) from and including the cursor to the end of the screen.
	CSI ? 0 J	Same as above.
	CSI ? 1 J	Erases all erasable characters (DECSCA) from the beginning of the screen to and including the cursor.
	CSI ? 2 J	Erases all erasable characters (DECSCA) in the entire display.

## Set Top and Bottom Margins (DECSTBM)

CSI Pt ; Pb r

Selects top and bottom margins defining the scrolling region. Pt is the line number of the first line in the scrolling region. Pb is the line number of the bottom line. If you do not select either Pt or Pb, they default to top and bottom respectively. Lines are counted from 1.

## Printing

Before you select a print operation, check printer status using the print status report (DSR). (See Reports section.)

Name	Sequence	Action
Auto print mode	CSI ? 5 i	Turns on auto print mode. All following display lines print when you move the cursor off the line using a line feed, form feed, vertical tab, or auto wrap. The printed line ends with a carriage return and the character (LF, FF, or VT) which moved the cursor off the previous line. Auto wrap lines end with a line feed.
Printer controller	CSI ? 4 i	Turns off auto print mode.
	CSI 5 i	Turns on printer controller mode. The terminal sends received characters to the printer without displaying them on the screen. All characters and character sequences, except NUL, XON, XOFF, CSI 5 i, and CSI 4 i are sent to the printer. The terminal does not insert or delete spaces, or provide line delimiters, or select the correct printer character set.  Printer controller mode has a higher priority than auto print mode. It can be selected during auto print mode.  In printer controller mode, keyboard activity continues to be directed to the host.
	CSI 4 i	Turns off printer controller mode.
Print cursor line	CSI ? 1 i	Prints the display line containing the cursor. The cursor position does not change. The print cursor line sequence is complete when the line prints.

---

## Printing (Cont)

Name	Sequence	Action
Print screen	CSI i	Prints the screen display (full screen or scrolling region, depending on the print extent DECEXT selection). Printer form feed mode (DECPFF) selects either a form feed (FF) or nothing as the print terminator. The print screen sequence is complete when the screen prints.
	CSI 0 i	Same as above.

### NOTE

The above escape sequences are effective only if a printer is connected to the terminal's printer port. The following escape sequences are effective even if the terminal has no printer connected to its printer port.

Select graphics to printer	CSI ? i	Causes later ReGIS hardcopy commands to direct the graphics display to the printer port. Text that is part of the graphics screen prints with the graphics.
	CSI ? 0 i	Same as above.
Select graphics to host	CSI ? 2 i	Causes later ReGIS hardcopy commands to direct the graphics display to the host port.
No printer to host	CSI ? 8 i	Stops communication from the printer port to the host port.
Printer to host	CSI ? 9 i	Starts communication from the printer port to the host port.

**User-Defined Keys (DECUDK)**

The device control string format for down-line-loading UDK functions is:

DCS Pc;PI | Ky1/st1;ky2/st2;...kyn/stn ST

where:

**Pc            Meaning**

- None        Clear all keys before loading new values.  
0            Clear all keys before loading new values.  
1            Load new key values, clear old only where defined.

**PI            Meaning**

- None        Lock the keys against future redefinition.  
0            Lock the keys against future redefinition.  
1            Do not lock the keys against future redefinition.

**Key (kyn)    Value (stn)**

F6	17
F7	18
F8	19
F9	20
F10	21
F11	23
F12	24
F13	25
F14	26
Help	28
Do	29
F17	31
F18	32
F19	33
F20	34

Stn is a string of hex pairs of ASCII characters that define the specified key.

**NOTE**

To access the programmed values of the keys, you type Shift - (function key).

---

### Down-Line-Loading Characters (DRCS)

You can down-line-load your DRCS character set using the following DECDLD device control string format.

DCS Pfn;Pcn;Pe;Pcms;Pw;Pt { Dscs Sxbp1;Sxbp2;...;Sxbpn ST

Parameter descriptions are as follows.

#### DECDLD Parameter Characters

Parameter	Name	Description
Pfn	Font number	0 and 1.
Pcn	Starting character number	Selects starting character in DRCS font buffer to be loaded.
Pe	Erase control	0 = erase all characters in this DRCS set 1 = erase only the characters that are being reloaded 2 = erase all characters in all DRCS sets (this font buffer number and other font buffer numbers)
	Character Matrix size	0 = device default (7 × 10) 1 = (not used) 2 = 5 × 10 3 = 6 × 10 4 = 7 × 10
Pw	Width attribute	0 = device default (80 columns) 1 = 80 column 2 = 132 column
Pt	Text/full-cell	0 = device default (text) 1 = text 2 = full-cell

*Dscs* defines the character set name for the soft font, and is used in the SCS (select character set) escape sequence.

*Sxbp1;Sxbp2;...;Sxbpn* are sixel bit patterns (1 to 94 patterns) for characters separated by semicolons. Each sixel bit pattern has the form:

S...S/...S

where the first S...S represents the upper columns (sixel) of the DRCS character, the slash advances the sixel pattern to the lower columns of the DRCS character, and the second S...S represents the lower columns (sixel) of the DRCS.

**Clearing a Down-Line-Loaded Character Set**

You can clear a character set that you have down-line loaded using the following DECDDL control sequence.

DCS 1;1;2 { sp @ ST

Down-line-loaded character sets are also cleared by the following actions.

- Performing the power-up self-test
- Using the set-up "Recall" or "Default" fields
- Using RIS or ESC c sequences

**Reports****Device Attributes (DA)**

Communication	Sequence	Meaning
Host to VT240 (primary DA request)	CSI c or CSI 0 c	"What is your service class code and what are your attributes?"
VT240 to host (primary DA response)	CSI ? 62; 1; 2; 3; 4; 6; 7; 8; 9 c	"I am a service class 2 (VT200 family) terminal (62) with 132 columns (1), printer port (2), ReGIS display (3), sixel graphics I/O (4), selective erase (6), DRCS (7), and UDK (8). I support 7-bit national replace- ment character sets (9)."
Host to VT240 (secondary DA request)	CSI > c or CSI > 0 c	"What type of ter- minal are you, what is your firmware version, and what hardware options do you have installed?"

---

## Device Attributes (DA) (Cont)

Communication	Sequence	Meaning
VT240 to host (secondary DA response)	CSI > 1; Pv; Po c	<p>"I am a VT240 (2), my firmware version is ____ (Pv), and I have ____ (Po) options installed.</p> <p>Where: Pv = firmware/ software version Po: 0 = no options 1 = integral modem</p>

### Example

CSI>2;10;1c = VT240 version 1.0, with integral modem option

### NOTE

If the terminal is in VT100 mode and an ID other than VT240 ID is selected, then the following primary exchanges apply.

VT240 to host (VT100 ID selected in set-up)	ESC [ ? 1; 2 c	"I am a VT100 terminal with AVO."
VT240 to host (VT101 ID selected in set-up)	ESC [ ? 1; 0 c	"I am a VT101 terminal."
VT240 to host (VT102 ID selected in set-up)	ESC [ ? 6 c	"I am a VT102 terminal."
VT240 to host (VT125 ID selected in set-up)	ESC [ ? 12; 7; 1; 10; 102 c	"I am a VT125 terminal."

**Device Status Report (DSR)**

<b>Communication</b>	<b>Sequence</b>	<b>Meaning</b>
Host to VT240 (request for terminal status)	CSI 5 n	"Please report your operating status using a DSR control se- quence. Are you in good operating con- dition or do you have a malfunction?"
VT240 to host (DA response)	CSI 0 n	"I have no malfunction."
	CSI 3 n	or "I have a malfunction."
Host to VT240 (request for cursor position)	CSI 6 n	"Please report your cursor position using a CPR (not DSR) control sequence."
VT240 to host (CPR response)	CSI Pv; Ph R	"My cursor is posi- tioned at ____ (Pv); ____ (Ph)."  Where: Pv = vertical position (row) Ph = horizontal position (column)

**DSR - Printer Port**

<b>Communication</b>	<b>Sequence</b>	<b>Meaning</b>
Host to VT240 (request for printer status)	CSI ? 15 n	"What is the printer status?"
VT240 to host	CSI ? 13 n	"DTR has not been asserted on the printer port since power up or reset - in essence, I have no printer."
	CSI ? 10 n	"DTR is asserted on the printer port. The printer is ready."
	CSI ? 11 n	or "DTR is not currently asserted on the printer port. The printer is not ready."

---



## DSR – User-Defined Keys

Communication	Sequence	Meaning
Host to VT240 (request for UDK status)	CSI ? 25 n	"Are user-defined keys locked or unlocked?"
VT240 to host	CSI ? 20 n	"User-defined keys are unlocked."
	CSI ? 21 n	"User-defined keys are locked."

## DSR – Keyboard Language

Communication	Sequence	Meaning
Host to VT240 (request for keyboard language)	CSI ? 26 n	"What is the keyboard language?"
VT240 to host	CSI ? 27; Pn n	"My keyboard lan- guage is ____ (Pn)."

where:

### Pn Language

- 0 Unknown\*
- 1 North American
- 2 British
- 3 Flemish
- 4 French Canadian
- 5 Danish
- 6 Finnish
- 7 German
- 8 Dutch
- 9 Italian
- 10 Swiss (French)
- 11 Swiss (German)
- 12 Swedish
- 13 Norwegian
- 14 French/Belgian
- 15 Spanish

---

\* Sent by a terminal that for some reason cannot determine its keyboard language. The VT240 will never send this response.

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**Identification (DECID)**

ESC Z

Causes the terminal to send a primary DA response sequence. DECID, however, is not recommended. You should use the primary DA request for this purpose.

**ReGIS Graphics Protocol Controls Mode**

The ReGIS graphics mode is available through VT200 and VT100 modes only. You enter ReGIS by sending a ReGIS device control string to the terminal.

**Control String    Action**

DCS p or DCS 0 p	Causes VT240 to enter ReGIS at previous command level. (ReGIS is at the highest command level if the terminal was powered up after the last device control string.)
DCS 1 p	Causes VT240 to enter ReGIS at highest command level.
DCS 2 p	Causes VT240 to enter ReGIS at previous command level with commands displayed on the screen's bottom line (command display mode enabled).
DCS 3 p	Causes VT240 to enter ReGIS at highest command level with commands displayed on the screen's bottom line (command mode enabled).
ST	Exits ReGIS mode and returns to text mode.

## Terminal Reset

Name	Sequence	Action
Soft terminal reset (DECSTR)	CSI ! p	Sets terminal to power-up default states
Hard terminal reset (RIS)	ESC c	Replaces all set-up parameters with NVR values or power-up default values if NVR values do not exist.

## Tests (DECTST)

The sequence format for invoking terminal tests is as follows.

CSI 4 ; ..... ; Ps y

where:

Ps	Test
0	Test 1, 2, 3, 4, and 6
1	Power-up self-test
2	EIA port data loopback test
3	Printer port loopback test
4	Color bar test
5	(not used)
6	EIA port modem control line loopback test
7	20 mA port loopback test
8	(not used)
9	Repeat other test in parameter string
10	Full screen blue
11	Full screen red
12	Full screen green
13	Full screen white
14	Integral modem analog loopback test
15	Integral modem external loopback test
16 and up	(not used)

### NOTE:

**DECTST causes a communications line disconnect.**

## Adjustments (DECALN)

ESC # 8     Displays screen alignment pattern (full screen of E's).

**VT52 Escape Sequences**

<b>Escape Sequence</b>	<b>Function</b>
ESC A	Cursor up
ESC B	Cursor down
ESC C	Cursor right
ESC D	Cursor left
ESC F	Enter graphics mode
ESC G	Exit graphics mode
ESC H	Cursor to home
ESC I	Reverse line feed
ESC J	Erase to end of screen
ESC K	Erase to end of line
ESC Y line column*	Direct cursor address
ESC Z†	Identify
ESC =	Enter alternate keypad mode
ESC >	Exit alternate keypad mode
ESC <	Enter ANSI mode
ESC	Enter auto print mode
ESC _	Exit auto print mode
ESC W	Enter printer controller mode
ESC X	Exit printer controller mode
ESC J	Print screen
ESC V	Print cursor line

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\* Line and column numbers for direct cursor addressing are single character codes whose value is the desired number plus 37 (octal).

† The response to ESC Z in VT52 mode is ESC / Z.

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## ReGIS

### ReGIS Command Summary

Command Key Letter	ReGIS Command Name	Description
P	Position	Positions the graphics cursor without performing any writing.
V	Vector	Draws vectors (straight lines) between screen locations specified within the command.
C	Curve	Draws circles, arcs and/or curves using screen locations specified within the command.
T	Text	Controls display of graphics text strings, and lets you display specification of characters.
W	Write	Specifies writing controls, such as shading.
S	Screen	Specifies screen controls, such as erasing the screen.
F	Fill	Fills in single, closed polygons, such as circles and squares.
@	Macrograph	Defines a macrograph. Macrographs are used for storing and recalling ReGIS command strings. You can store a complex figure (that you will use more than once) as a macrograph, then select the figure with a single command.
L	Load	Controls definition and loading of alternate characters that you can display using the Text command.
R	Report	Reports information (such as active position, and error codes); initiates report position interactive mode.
;	Resynchronization	Semicolon serves as a resynchronization command.

---

**ReGIS Power-Up/Reset Default Values Summary**

<b>Command Type</b>	<b>Command</b>	<b>Default Description</b>
Screen control	S(A[0,0] [799,499])	Defines the screen as having coordinate values of [0,0] for upper-left corner, and [799,479] for lower right.
Screen control	S[0,0]	No scrolling is to occur.
Screen control	S(H(P[50,0]))	Any printing from the screen is offset at the printer 50 coordinates to approximate centering on 8-1/2 inch wide paper.
Screen control	S(M0(L0)1(L25)2(L50)3(L75))	Output map values for monochrome monitor are dark for M0, dim gray for M1, light gray for M2, and white for M3.
Screen control	S(M0(AD)1(AB)2(AR)3(AG))	Output map values for color monitor are dark for M0, blue for M1, red for M2, and green for M3.
Screen control	S(I0)	Output map location 0 is selected for background intensity value, with dark background for color and monochrome monitors (default value for M0).
Screen control	S(T0)	No time delay.
Write control	W(M1)	Selects pixel vector (PV)multiplication of 1.
Write control	W(P1)	Selects solid line for writing pattern.
Write	W(P(M2))	Selects pattern multiplication factor of 2.
Write control	W(N0)	Disables negative pattern control.
Write control	W(F3)	Enables writing to both bit map planes.

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**ReGIS Power-Up/Reset Default Values Summary (Cont)**

<b>Command Type</b>	<b>Command</b>	<b>Default Description</b>
Write control	W(I3)	Selects output map location 3 for write tasks, resulting in white for monochrome, green for color, since these are the default values for M3.
Write control	W(V)	Overlay writing in effect.
Write control	W(S0)	Disables shading.
Text	T(A0)	Selects character set containing standard ASCII characters for text processing.
Text	T(S1)	Selects standard character cell size 1 for text processing.
Text	T(S[9,20])	Selects display cell size associated with standard character cell size 1.
Text	T(U[8,20])	Selects unit cell size associated with standard character cell size 1.
Text	T[+9,+0]	Selects character positioning associated with standard character cell size 1.
Text	T(H2)	Selects height multiplication factor of 2.
Text	T(D0 S1 D0)	Disables string and character tilt.
Text	T(I0)	Disables italics.
Text	T(M[1,2])	Selects size multiplication factor of 1 for width, and 2 for height.
Load	L(A1)	Selects set 1 for loading.

---

**Screen Control Command Summary**

<b>Command</b>	<b>Description</b>
S (A[X,Y] [X,Y])	Display addressing– Lets you define addressing of screen at different size or orientation than actually true for VT240.
S [X,Y]	Scroll – Uses relative X and Y values to define scrolling of screen data in the bit map, while leaving coordinate system unchanged.
S <PV number>	Scroll – Uses PV offset values to define scrolling of screen data in the bit map, while leaving coordinate system unchanged.
S (H)	Hard copy control defining whole screen as print area.
S (H[X,Y] [X,Y])	Hard copy control defining amount of screen to print – Bracketed values are screen coordinates that identify opposite points of screen area to print.
S (H[X,Y])	Hard copy control defining amount of screen to print – Bracketed values are screen coordinates used with current cursor location to identify opposite points of screen area to print.
S (H(P[X,Y]))	Print offset– Defines relative offset value from current printhead location to where upper-left corner of image will print; [50,0] is default at power on, until new value is defined. Any new value remains in effect until redefined.
S (M<n>(<Lvalue>))	Output mapping for changing mono shade values – You can change any or all values in a given command. Defines the shade to store in selected (<n>) output map location.

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**Screen Control Command Summary (Cont)**

<b>Command</b>	<b>Description</b>
S (M<n>(<RGB>))	Output mapping for changing color values using RGB specifier – You can change any or all values in a given command. Defines the color to store in selected (<n>) output map location.
S (M<n>(HLS))	Output mapping for changing color values using HLS specifier – You can change any or all values in a given command. Defines the color to store in selected (<n>) output map location. Default values are HLS values for default RGB values.
S (I<n>)	Background intensity select – Selects output map location (<n>) for background.
S (I(RGB))	Background intensity select – Selects output map location containing closest color to RGB value specified.
S (I(HLS))	Background intensity select – Selects output map location containing closest color to HLS value specified.
S (T<0-255>)	Time delay – Defines number of ticks of real time clock counted for a delay.
S (E)	Screen erase – Rewrites all graphic images on screen at current background intensity.
S (I<value>,E)	Screen erase to defined background intensity – Defines a background intensity, and erases screen to that value.
S (W(M<n>))	Temporary write defining multiplication factor for PV values – Defines number of coordinates affected by each PV value specified for a scroll.
S (C<0 or 1>)	Graphic cursor control – Disables (C0) or enables (C1) display of diamond cursor.

---

**Position Command Summary**

<b>Command</b>	<b>Description</b>
P [X,Y]	Positioning using [X,Y] values to define a new active position – The [X,Y] values can be absolute, relative, or absolute/relative.
P <PV>	Positioning using PV values to define a relative repositioning of the active position.
P (W(M<n>))	Temporary write control defining multiplication factor for PV values – Defines number of coordinates affected by PV values.
P (B)	Begin a bounded sequence – Stores current active position for reference at the end of the sequence.
P (S)	Start an unbounded sequence – Stores a dummy position for reference at the end of the sequence.
P (E)	End of sequence – Causes last stored (B) or (S) value to be referenced; if value referenced was stored by a (B), active position is defined by the stored value. If value referenced was stored by (S), active position remains at its current location.
P [ ]	Null position – Used with write tasks to force write tasks to begin with first location of pattern memory.

**Write Control Command Summary**

<b>Command</b>	<b>Description</b>
W (M<n>)	PV multiplication – Defines multiplication factor (<n>) for PV values. Can be used as temporary write control for other types of commands.
W (P<0–9>)	Select standard pattern – Selects 1 of 10 stored write patterns for write tasks.
W (P<binary>)	Specify binary pattern – Allows specification of unique writing patterns for write tasks. The specified pattern can be up to 8 bits in length.

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**Write Control Command Summary (Cont)**

<b>Command</b>	<b>Description</b>
W P(M<1-6>))	Pattern multiplication – Defines the number of times each bit of the pattern memory is processed. You can use pattern multiplication with either select standard pattern or the specify binary pattern, or by itself, to define a multiplication factor for the last specified pattern.
W (N<0-1>)	Negative pattern control – When on (N1), lets you reverse currently selected write pattern.
W (F<0-3>)	Foreground plane control – Provides a mask that determines which planes of the bit map can be written to during write tasks.
W (I<0-3>)	Foreground intensity select – Defines an output map address (<0-3>) to use for write tasks. Writing puts address of that location into bit map.
W (I(<RGB>)	Foreground intensity select – Defines writing tasks to occur using the output map address containing the color closest to the RGB value specified.
W (I(<HLS>)	Foreground intensity – Defines writing to occur using output map address containing the color closest to the HLS value specified.
W (V,E,C, or R)	Four option letters available to define type of writing to occur – (C) for complement writing; (E) for erase writing; (R) for replace writing; (V) for overlay writing.
W (S<0-1>)	Shading on/off control – When on (S1), enables shading at currently selected pattern. The shading reference line is defined by the Y-axis value of the active position when (S1) is invoked.
W (S[,Y])	Shading reference line select – Selects a horizontal shading reference line defined by[,Y], which can be either an absolute or relative value.

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**Write Control Command Summary (Cont)**

<b>Command</b>	<b>Description</b>
W (S(x) [X])	Shading reference line select – Selects a vertical shading reference line defined by [X], which can be either an absolute or relative value.
W (S'<character>')	Shading character select – Lets you fill graphic objects with the character specified.

**Vector Command Summary**

<b>Command</b>	<b>Description</b>
V [ ]	Draw dot – Used to write to a single pixel defined by current active position. No cursor movement occurs.
V [X,Y]	Draw line – [X,Y] value defines an end point for a line to be drawn from the current active position. The [X,Y] value can be absolute, relative, or absolute/relative.
V <PV>	Draw line – PV values define an end point for a line to be drawn, relative to the current active position, in the direction defined by the PV value.
V (B)	Begin a bounded sequence – Stores current active position for reference at the end of the sequence.
V (S)	Start an unbounded sequence – Stores a dummy position for reference at the end of the sequence.
V (E)	End of sequence – References last stored (B) or (S) value. If value referenced was stored by (B), a line is drawn from the active position where (E) is sensed, to the location stored by (B). If value referenced was stored by (S), no line is drawn, and active position remains at current position.
V (W(<suboptions>))	Temporary write control – Lets you use write control values different from those currently in effect, without changing those write control values. Temporary write control values remain in effect only for the write tasks they are invoked for.

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**Curve Command Summary**

<b>Command</b>	<b>Description</b>
<b>C [X,Y]</b>	Circle with center at current position – [X,Y] defines a point on the circumference of the circle. The [X,Y] value can be absolute, relative, or absolute/relative.
<b>C (C) [X,Y]</b>	Circle with center at specified position – [X,Y] defines a point to serve as the circle center, while current active position defines a point on the circumference. The [X,Y] value can be absolute, relative, or absolute/relative.
<b>C (A&lt;degrees&gt;) [X,Y]</b>	Arc with center at current position – [X,Y] defines the starting point for drawing the arc. The signed value of the <degrees> (+ or –) determines which direction the arc is drawn from that point: + for counterclockwise, and – for clockwise. the [X,Y] value can be absolute, relative, or absolute/relative.
<b>C (A&lt;degrees&gt;)C [X,Y]</b>	Arc with center at specified position – [X,Y] defines the center, while the current active position is the point from which the arc is drawn. The signed value of <degrees> (+ or –) determines which direction the arc is drawn: + for counterclockwise, and – for clockwise. The [X,Y] value can be absolute, relative, or absolute/relative.
<b>C (B)&lt;positions&gt; (E)</b>	Closed curve sequence – Defines a closed curve graphic image built from interpolation of [X,Y] positions specified within the option. The [X,Y] values can be absolute, relative, or absolute/relative.
<b>C (S)&lt;positions&gt; (E)</b>	Open curve sequence – Defines an open curve graphic image built from interpolation of [X,Y] positions specified within the option. The [X,Y] values can be absolute, relative, or absolute/relative.

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**Curve Command Summary (Cont)**

<b>Command</b>	<b>Description</b>
C [ ]	Null position – Used with either open or closed sequence to affect interpolation. [] stores a position equal to the last specified active position as part of the positions to interpolate. When used at the beginning of a sequence, the value stored is the current active position.
C (W(<suboptions>))	Temporary write control – Used to select write control different from those currently in effect, without changing the current write control values. Temporary write control values remain in effect only for the write tasks they are invoked for.

**Text Command Summary**

<b>Command</b>	<b>Description</b>
T 'text'	Text string – Selects text to display. You must enclose text string characters in single quotes ('text'), or double quotes ("text").
T (A<0-3>)	Character set – Defines which of four possible character sets (<0-3>) to use for processing text string characters.
T (S<0-16>)	Standard character cell size – Defines a set of display cell, unit cell, and character positioning values to use in processing text string characters. 17 different sets (<0-16>) are available.
T (S[<width,height>])	Display cell size – Lets you vary size of cell used for text string characters. Default value comes from screen coordinate value associated with the standard character cell size default of (S1). If specified in pixels, [9,20] is [9,10].

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## Text Command Summary (Cont)

Command	Description
T [X,Y]	Character positioning – Lets you vary positioning between text string characters. Default value comes from position value associated with the standard character cell size default of (S1). [X,Y] values are relative.
T (U[<width,height>])	Unit cell size – Lets you vary size of unit used for text string characters. Default value comes from screen coordinate value associated with the standard character cell size default of (S1). In pixels, [8,20] is [8,10].
T (H<1-25>)	Height multiplier – When selected, changes the display cell and unit cell size height values to a value equal to 10 times the specified multiplier ([1-25]), without affecting width values, or positioning.
T (D<a> S<0-16>)	String tilt – Defines a tilt of text string characters, as a whole, relative to the normal horizontal baseline. <a> defines the degrees of the tilt; <0-16> provides a standard set value to compute positioning from during the tilt.
T (D<a> S<0-16> D«a»)	String/character tilt – Defines separate tilt values for the string, and the characters in the text string. The first <a> defines the degrees of tilt for the string; the second <a> defines the degrees of tilt for the characters in the string; <0-16> provides a standard set value to compute positioning from during the tilt.
T (I<a>)	Italics – Defines a degree of tilt (<a>) for characters without changing their orientation to the current baseline.

**Text Command Summary (Cont)**

<b>Command</b>	<b>Description</b>
T (B)<options>(E)	Temporary text control – Lets you select temporary text values without changing the current values. The temporary values remain in effect until (E) is invoked.
T <PV>	PV spacing – Uses PV values to enable superscript, subscript, and overstrike functions.
T (W(<options>))	Temporary write control – Lets you select temporary write control values without changing the current values. Temporary write control values are only in effect for the text command they are invoked for.
T (M[width,Height])	Size multiplication – Provides multiplication factors for the height and width values of the unit cell size associated with standard cell size 1. The minimum multiplication for height and width is 1; the maximum multiplication is 16 for width and 127 for height.

**Load Command Summary**

<b>Command</b>	<b>Description</b>
L (A<1-3>)	Select set – Selects one of three loadable character sets for any later load cell activity.
L (A"<name>")	Specify name – Provides a name ("<name>") of up to 10 characters for the currently selected set. Specify name also work, with the select set: (A<1-3> "<name>").
L "<ASCII>" <hex pairs>	Load cell – Generates characters to store in the selected set. "<ASCII>" is a single ASCII character that identifies the character cell. <hex pairs> define the bit pattern of the character to store on line-by-line basis.

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## Polygon Fill Command Summary

Command	Description
F (V<positions>)	Filled, vector-bounded polygon with vertices at the specified [X, Y] positions – Polygon fill command accepts all of the V command options and arguments.
F (C<positions>)	Filled circle with center at current [X, Y] position – Position arguments provide coordinate values for points along the circle's perimeter. Polygon fill command accepts all of the C command options and arguments.
F (C(A + <degrees>) <positions> P <position> ...)	Open curve option and P option used with the polygon fill command – Polygon fill command accepts all of the P command options and arguments.
F (W(<suboptions> <options>)	Temporary write control used as an option of the polygon fill command – Polygon fill command accepts all of the W command options and arguments.
@ :A <ReGIS commands> @; F ( @A) @ A	Using macrographs with the polygon fill command to fill complex polygons and draw their outlines.

## Macrograph Summary

Syntax	Description
@<letter>	Invoke macrograph – Displays content of the selected macrograph (<letter>), on the screen, starting at the current cursor location. <letter> is a single letter; uppercase and lowercase letters match (case insensitive).
@:<letter> <definition>@;	Define macrograph – Defines the single, case insensitive letter that identifies the macrograph and the definition to store.
@.	Clear all macrographs – When selected, deletes stored macrograph descriptions from all 26 macrograph storage locations.
@:<letter>@;	Clear defined macrograph – Clears the contents of a single macrograph storage location. This option is actually a define macrograph option with no definition.

## Report Command Summary

Command	Description
R (P)	Cursor position – Reports the current active position.
R (M(<letter>))	Macrograph contents – Reports the contents of the specified macrograph storage location.
R (M(=))	Macrograph storage status – Reports how much space is assigned to macrograph storage, and how much of that space is currently free.
R (L)	Character set – Reports which set is currently selected for loading.
R (E)	Error – Reports the last error found by the parser.
R (P(I))	Report position interactive – Places VT240 in a mode where you can move cursor from the keyboard.

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**Report Command Error Condition Option Responses**

<b>Code</b>	<b>Condition</b>	<b>Description</b>
0	No error	No error detected since the last resynchronization character(;). Always returns 0 for the error character (<M>).
1	Ignore character	An unexpected character was found and ignored. The error character (<M>) represents the character ignored.
2	Extra option coordinates	The syntax S(H[X,Y][X,Y]) contained more than two coordinate pairs. The extra coordinate pairs were ignored. Always returns 0 for the error character (<M>).
3	Extra coordinate elements	The syntax [X,Y] contained more than two coordinate elements and all but the first two elements were ignored. Always returns 0 for the error character (<M>).
4	Alphabet out of range	The syntax L(A<0-3>) contained a number less than 0 or greater than 3. Always returns 0 for the error character (<M>).
5	Reserved	-
6	Reserved	-
7	Begin/start overflow	The stacking limit of 16 (B) and (S) position and/or vector commands was exceeded. Later (B) or (S) commands were ignored. The error character (<M>) represents either a B or an S.
8	Begin/start underflow	A position or vector command (E) was found with no corresponding (B) or (S) option before it. The (E) option is ignored; the error character (<M>) represents the E option letter.
9	Text standard size error	A standard set number of less than 0 or greater than 16 was attempted by a text command standard set select. Always returns 0 for the error character (<M>).

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## 4010/4014

### Entering/Exiting 4010/4014 Mode

There are two ways to enter and exit 4010/4014 mode: set-up or escape sequences.

Sequence	Function
CSI ? 3 8 h	Enters 4010/4014 mode.
CSI ? 3 8 l	Exits 4010/4014 mode.

#### NOTE

**The VT240 enters 4010/4014 in alpha mode, and exits 4010/4014 to the VT200, 7-bit controls mode.**

### Alpha Mode Summary

ESC	Set LCE.*
ESC NUL	Set LCE.
ESC ESC.	Set LCE.
ESC ENQ	Set bypass and return terminal status.
BEL	Ring bell.
ESC BEL	Ring bell.
BS	Move one space left.
ESC BS	Move one space left.
HT	Move one space right.
ESC HT	Move one space right.
LF	Move one line down.
ESC LF	Set LCE. Ignore filler LF and CR.
ESC CR	Set LCE. Ignore filler LF and CR.
VT	Move one line up.
ESC VT	Move one line up.
ESC FF	Erase and home (page).
CR	Move to left margin.
ESC ETB	Make copy.
ESC CAN	Set bypass condition.
ESC SUB	Set GIN and bypass condition.
FS	Set point plot.
ESC FS	Set point plot.
GS	Set graph and dark vector.
ESC GS	Set graph and dark vector.
RS	Set incremental plot.
ESC RS	Set incremental plot.
SP	Move one space right.
ESC DEL	Set LCE.

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\* LCE is a flag indicating an escape sequence introduction condition.

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## Alpha Mode Summary (Cont)

### NOTE

The following section of the Alpha Mode Summary (ESC 8 through ESC 3) is divided into two parts. The first section represents aligned character mode. The second represents enlarged character mode.

### Aligned Mode

ESC 8 (default)	Selects largest character size – 35 lines of 74 characters.
ESC 9	Selects large character size – 38 lines of 81 characters.
ESC :	Selects small character size – 58 lines of 128 characters.
ESC ;	Selects smallest character size – 64 lines of 133 characters.

### NOTE

The following four sequences are not recommended.

ESC 0	Selects smallest character size – 64 lines of 133 characters.
ESC 1	Selects largest character size – 35 lines of 74 characters.
ESC 2	Selects largest character size – 35 lines of 74 characters.
ESC 3	Selects largest character size – 35 lines of 74 characters.

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## Alpha Mode Summary (Cont)

### Enlarged Mode

ESC 8 (default)	Selects large character size – 24 lines of 69 characters.
ESC 9	Selects large character size – 24 lines of 69 characters.
ESC :	Selects small character size – 47 lines of 125 characters.
ESC ;	Selects small character size – 47 lines of 125 characters.

#### NOTE

The following four sequences are not recommended.

ESC 0	Selects small character size 47 lines of 125 characters
ESC 1	Selects large character size – 24 lines of 69 characters
ESC 2	Selects large character size – 24 lines of 69 characters.
ESC 3	Selects large character size – 24 lines of 69 characters.

#### NOTE

All noncontrol ASCII characters are print characters in alpha mode.

## Graph and Point Plot Mode Summary

ESC NUL	Set LCE.*
ESC ENQ	Set bypass and return terminal status.
BEL	Ring bell.
ESC LF	Set LCE and ignore filler LFs and CRs.
ESC FF	Erase and home and go to alpha.
CR	Set alpha and left margin.
ESC ETB	Make copy.
ESC CAN	Set bypass condition.
ESC SUB	Set GIN and bypass condition.
FS	Set point plot.
ESC FS	Set point plot.
GS	Set graph and do a dark vector.
ESC GS	Set graph and do a dark vector.
RS	Set incremental plot.
ESC RS	Set incremental plot.
US	Set alpha mode.
ESC US	Set alpha mode.

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\* LCE is a flag indicating an escape sequence introduction condition.

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## Graph and Point Plot Mode Summary (Cont)

SP	High X- or high Y-coordinate value
!	High X- or high Y-coordinate value
"	High X- or high Y-coordinate value
#	High X- or high Y-coordinate value
\$	High X- or high Y-coordinate value
%	High X- or high Y-coordinate value
&	High X- or high Y-coordinate value
'	High X- or high Y-coordinate value
(	High X- or high Y-coordinate value
)	High X- or high Y-coordinate value
*	High X- or high Y-coordinate value
+	High X- or high Y-coordinate value
,	High X- or high Y-coordinate value
-	High X- or high Y-coordinate value
.	High X- or high Y-coordinate value
/	High X- or high Y-coordinate value
0	High X- or high Y-coordinate value
1	High X- or high Y-coordinate value
2	High X- or high Y-coordinate value
3	High X- or high Y-coordinate value
4	High X- or high Y-coordinate value
5	High X- or high Y-coordinate value
6	High X- or high Y-coordinate value
7	High X- or high Y-coordinate value
8	High X- or high Y-coordinate value
9	High X- or high Y-coordinate value
:	High X- or high Y-coordinate value
;	High X- or high Y-coordinate value
<	High X- or high Y-coordinate value
=	High X- or high Y-coordinate value
>	High X- or high Y-coordinate value
?	High X- or high Y-coordinate value
@	Low X-coordinate value
[	Low X-coordinate value
\	Low X-coordinate value
]	Low X-coordinate value
^	Low X-coordinate value
_	Low X-coordinate value

**Graph and Point Plot Mode Summary (Cont)**

`	Low Y-coordinate value.
ESC `	Set normal, solid vector.
ESC a	Set normal, dotted vector.
ESC b	Set normal, dot-dashed vector.
ESC c	Set normal, short dashed vector.
ESC d	Set normal, long dashed vector.
ESC e	Set normal, solid vector.
ESC f	Set normal, solid vector.
ESC g	Set normal, solid vector.
ESC h	Set bold, solid vector.
ESC i	Set bold, dotted vector.
ESC j	Set bold, dot-dashed vector.
ESC k	Set bold, short dashed vector.
ESC l	Set bold, long dashed vector.
ESC m	Set bold, solid vector.
ESC n	Set bold, solid vector.
ESC o	Set bold, solid vector.
	Low Y-coordinate value.
	Low Y-coordinate value.
	Low Y-coordinate value.
~	Low Y-coordinate value.
DEL	Low Y-coordinate value.†
ESC ?	Low Y-coordinate value.†
ESC DEL	Set LCE.*

**NOTE**

**You can use all uppercase alphabetical characters for low X- coordinate values.**

**You can use all lowercase alphabetical characters for low Y-coordinate values.**

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\* LCE is a flag indicating an escape sequence introduction condition.

† You can disable the effect of DEL as a low Y character with the "DEL Implies Low Y" field in graphics set-up. If DEL cannot be used, the program can substitute ESC ?, which performs the same function as DEL.

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**Incremental Plot Mode**

ESC NUL	Set LCE.*
ESC·ENQ	Set bypass and return terminal status.
ESC BEL	Ring bell.
ESC LF	Set LCE and ignore filler LFs and CRs.
ESC CR	Set LCE and ignore filler LFs and CRs.
ESC FF	Go alpha and erase and home.
CR	Set alpha and left margin.
ESC ETB	Make copy.
ESC CAN	Set bypass.
ESC SUB	Set bypass and GIN.
ESC	Set LCE.
ESC ESC	Set LCE.
FS	Set point plot mode.
ESC FS	Set point plot mode.
GS	Set graph mode.
ESC GS	Set graph mode.
US	Set alpha mode.
ESC US	Set alpha mode.
Space	Turn beam off (pen up).
P	Turn beam on (pen down).
D	Move up (north).
E	Move up, right (northeast).
A	Move right (east).
I	Move down, right (southeast).
H	Move down (south).
J	Move down, left (southwest).
B	Move left (west).
F	Move up, left (northwest).

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\* LCE is a flag indicating an escape sequence introduction condition.

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## GIN Mode

You can only exit GIN mode from the keyboard. In GIN mode, you use only arrow keys (shifted or unshifted) to move the cross hair cursor. To exit GIN mode, you activate any key normally active in VT100 mode. GIN mode exits to alpha mode.

## Bypass Condition

ESC ENQ	Set bypass and return terminal status.
ESC CAN	Set bypass with no other action.
ESC SUB	Set bypass and go to GIN mode.
BEL	Clear bypass and ring bell (if enabled).
ESC BEL	Clear bypass and ring bell (if enabled).
LF	Clear bypass and cause new line.
ESC LF	Clear bypass, set LCE, and ignore filler LFs and CRs.*
ESC CR	Clear bypass, set LCE, and ignore filler LFs and CRs.
CR	Clear bypass, move cursor to left margin, and go to alpha mode.
US	Clear bypass and go to graph mode.
ESC US	Clear bypass and go to graph mode.
ESC ETB	Clear bypass and make copy.
ESC FF†	Clear bypass, go to alpha mode, and clear screen and home.

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\* LCE is flag indicating an escape sequence introduction condition.

† **Next Screen** key performs same function as ESC FF.

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