

CONTROL CHARACTERS

Control Character	Line Monitor Display	Press Control and	Control Character	Line Monitor Display	Press Control and
ACK	Ak	F	FF	FF	L
BEL	B!	G	FS	FS	|
BS	B _S	H	GS	GS	|
CAN	C _N	X	HT	HT	|
CR	C _R	M	LF	LF	|
DC1	D _{C1}	R	NAK	N _A K	2 (or space)
DC2	D _{C2}	X	NUL	N _U L	~
DC3	D _{C3}	O	RS	R _S	ON
DC4	D _{C4}	R	SI	S _I	A
DLE	D _L E	M	SO	S _O	B
EM	E _M	O	SOH	S _O H	N
ENQ	E _N Q	R	STX	S _T X	A
EOT	E _O T	R	SUB	S _U B	B
ESC	E _S C	R	SYN	S _Y N	Z
ETB	E _T B	R	US	U _S	V
ETX	E _T X	X	VT	V _T	K

CURSOR POSITIONING (V52 MODE)

ESC Y P I Pc

Line Code (Pl)		Col. Char.		Column Code (Pc)		Col. Char.	
Line No.	Char. Space	Col. No.	Char. Space	Col. No.	Char.	Col. No.	Char.
1		1		28	,	55	V
2	!	2	!	29	=	56	W
3	"	3	"	30	<	57	X
4	#	4	#	31	)	58	Y
5	\$	5	\$	32	?	59	Z
6	%	6	%	33	@	60	[
7	&	7	&	34	A	61	\
8	'	8	'	35	B	62]
9	(	9	(	36	C	63	^
10	)	10	)	37	D	64	_
11	*	11	*	38	E	65	`
12	+	12	+	39	F	66	a
13	,	13	,	40	G	67	b
14	-	14	-	41	H	68	c
15	.	15	.	42	I	69	d
16	/	16	/	43	J	70	e
17	0	17	0	44	K	71	f
18	1	18	1	45	L	72	g
19	2	19	2	46	M	73	h
20	3	20	3	47	N	74	i
21	4	21	4	48	O	75	j
22	5	22	5	49	P	76	k
23	6	23	6	50	Q	77	l
24	7	24	7	51	R	78	m
		25	8	52	S	79	n
		26	9	53	T	80	o
		27	:	54	U		

Note: Any undefined coordinate character will be ignored.

USA STANDARD CODE FOR INFORMATION INTERCHANGE

BIT NUMBERS		COLUMNS												
		0 ₀₀	0 ₀₁	0 ₁₀	0 ₁₁	1 ₀₀	1 ₀₁	1 ₁₀	1 ₁₁					
b ₇	b ₆	b ₅	b ₄	b ₃	b ₂	b ₁	ROW							
		0	0	0	0	0	NUL	DLE	SP	0	@	P	\	p
		0	0	0	1	1	SOH	DC1	|	1	A	Q	a	q
		0	0	1	0	2	STX	DC2	"	2	B	R	b	r
		0	0	1	1	3	ETX	DC3	#	3	C	S	c	s
		0	1	0	0	4	EOT	DC4	\$	4	D	T	d	t
		0	1	0	1	5	ENO	NAK	%	5	E	U	e	u
		0	1	1	0	6	ACK	SYN	&	6	F	V	f	v
		0	1	1	1	7	BEL	ETB	'	7	G	W	w	w
		1	0	0	0	8	BS	CAN	(	8	H	X	h	x
		1	0	0	1	9	HT	EM	)	9	I	Y	y	y
		1	0	1	0	10	LF	SUB	*	:	J	Z	z	z
		1	0	1	1	11	VT	ESC	+	;	K	[	k	{
		1	1	0	0	12	FF	FS	,	<	L	\	l	|
		1	1	0	1	13	CR	GS	-	=	M	]	m	~
		1	1	1	0	14	SO	RS	.	>	N	^	n	~
		1	1	1	1	15	SI	US	/	?	O	_	o	DEL

CONTROL FUNCTION DEFINITIONS

NUL	Null, or all zeros	DC1	Device control 1
SOH	Start of heading	DC2	Device control 2
STX	Start of text	DC3	Device control 3
ETX	End of text	DC4	Device control 4
EOT	End of transmission	NAK	Negative acknowledge
ENO	Enquiry	SYN	Synchronous idle
ACK	Acknowledge	ETB	End of transmission block
BEL	Bell, or alarm	CAN	Cancel
BS	Backspace	EM	End of medium
HT	Horizontal tabulation	SUB	Substitute
LF	Line feed	ESC	Escape
VT	Vertical tabulation	FS	File separator
FF	Form feed	GS	Group separator
CR	Carriage return	RS	Record separator
SO	Shift out	US	Unit separator
SI	Shift in	SP	Space
DLE	Data link escape	DEL	Delete

TELERAY

Model 100

PROGRAMMING REFERENCE CARD

October 1981

TELERAY 
 DIVISION OF  **RESEARCH INC**
 BOX 24064 MINNEAPOLIS, MINN. 55424
 PHONE (612) 841 3300

T 11503

PROGRAMMABLE FUNCTIONS

Operation	ANSI Mode	V52 Mode
Define Dynamic Function Ps	ESC [P Ps text	ESC P Ps text
End Dynamic Function Definition	ESC \	ESC \
Perform Dynamic Function Ps	ESC [Ps t	NA

DISPLAY FORMAT

Format	ANSI Mode
80/132 Columns	ESC [? 3 ℓ / ESC [? 3 h
Wide Mode On/Off	ESC [? 20 h / ESC [? 20 ℓ
Current Line to 80 Columns	ESC # 1
Current Line to 132 Columns	ESC # 2
Current Line to Double High--Top Half	ESC # 3
Current Line to Double High--Bottom Half	ESC # 4
Current Line Normal/Wide	ESC # 5 / ESC # 6
Start/End Protected Area (SPA/EPA)	ESC V / ESC W
Set Scrolling Window Between Pt and Pb	ESC [Pt; Pb r(1)
Select Character Attributes	ESC [Ps; Ps; ...Ps m(2)
Select Protected Graphic Renditions	ESC [Ps; Ps; ...Ps } (3)
Protect Mode On/Off	ESC [? 24 h / ESC [? 24 ℓ

(1) Pt is decimal number specifying top line
Pb is decimal number specifying bottom line

(2)Ps Value	Attribute	(3)Ps Value	Attribute
0 or none	Normal; cancel previous	0 or none	Normal; cancel previous
1	Bold on	1	Bold protected
2	Blank on	2	Blank protected
3	Overscore on	3	Overscore protected
4	Underscore on	4	Underscore protected
5	Blink on	5	Blink protected
7	Inverse on	7	Inverse protected
		254	Normal protected

CURSOR MANIPULATION

Operation	ANSI Mode	V52 Mode
One Up or Pn Up	ESC [Pn A	ESC A
One Down or Pn Down	ESC [Pn B	ESC B
One Right or Pn Right	ESC [Pn C	ESC C
One Left or Pn Left	ESC [Pn D or BS	ESC D or BS
Full Left (Cursor Return)	CR	CR
Home	ESC [H or ESC [f	ESC H
Line Feed	LF or VT or FF(1)	LF
New Line	LF or VT or FF(1)	LF(1)
Index	ESC E	NA
Reverse Index	ESC M	ESC I
Address Origin Window/Screen	ESC [? 6 h / ESC [? 6 ℓ	NA
Direct Address	ESC [Pn; Pn H(2)	ESC Y Pℓ Pc(3)
	or ESC [Pn; Pn f(2)	
Save Cursor	ESC 7	NA
Restore Cursor	ESC 8	NA

(1) ESC [20 h sets LF to New Line
ESC [20 ℓ sets LF to Index

(2) First Pn is decimal line number
Second Pn is decimal column number

(3) Pℓ is line code, Pc is column code per CURSOR POSITIONING table

TRANSMIT FUNCTIONS

Operation	ANSI Mode
Block Transmit*	ESC 5
Transmit Form	ESC 6
Transmit Key Xmit/Execute	ESC [? 14 ℓ / ESC [? 14 h
Transmit Line/Page	ESC [? 11 h / ESC [? 11 ℓ
Transmit Window/Message	ESC [16 h / ESC [16 ℓ
Guarded Area Transfer All/Unprotected	ESC [1 h / ESC [1 ℓ
Space Compression On/Off	ESC [? 13 h / ESC [? 13 ℓ
Transmit Termin. Char. FF/None	ESC [1 / ESC [0

*Also, press ENTER key.

TABS, CLEARS AND EDITS

Tab Operations	ANSI Mode	V52 Mode
Cursor to Next Tab Stop	HT	HT
Set Tab in Current Column	ESC H	NA
Clear Tab in Current Column	ESC [g	NA
Clear All Tabs	ESC [3 g	NA
Clear Operations		
To End of Line	ESC [K or ESC [0 K	ESC K
From Beginning of Line	ESC [1 K	NA
Entire Line	ESC [2 K	NA
To End of Screen	ESC [J or ESC [0 J	ESC J
From Beginning of Screen	ESC [1 J	NA
Entire Screen	ESC [2 J	NA
Reset (Clears Entire Memory)	ESC c	NA
Edit Operations		
Delete Pn Characters	ESC [Pn P	NA
Delete Pn Lines	ESC [Pn M	NA
Insert Pn Lines	ESC [Pn L	NA
Insert/Replacement Mode	ESC [4 h / ESC [4 ℓ	NA
Edit Mode On/Off*	ESC [? 10 h / ESC [? 10 ℓ	NA
Edit Key Xmit/Execute	ESC [? 16 ℓ / ESC [? 16 h	NA
Erase All/Unprotected	ESC [6 h / ESC [6 ℓ	NA

*Also, press SHIFT and EDIT keys.

SPECIAL KEYBOARD CODES

Key	ANSI Mode	V52 Mode	ANSI Cursor Key(1) Mode
↑	ESC [A	ESC A	ESC O A
↓	ESC [B	ESC B	ESC O B
→	ESC [C	ESC C	ESC O C
←	ESC [D	ESC D	ESC O D
(1) ESC [? 1 h enters Cursor Key Mode; ESC [? 1 ℓ exits Cursor Key Mode			
PF1	ESC O P	ESC P	
PF2	ESC O Q	ESC Q	
PF3	ESC O R	ESC R	
PF4	ESC O S	ESC S	
(2) ESC = enters Alternate Keypad Mode; ESC > exits Alternate Keypad Mode			
Key	Numeric Mode	V52 Alternate(2) Keypad Mode	ANSI Alternate(2) Keypad Mode
0	0	ESC ? p	ESC O p
1	1	ESC ? q	ESC O q
2	2	ESC ? r	ESC O r
3	3	ESC ? s	ESC O s
4	4	ESC ? t	ESC O t
5	5	ESC ? u	ESC O u
6	6	ESC ? v	ESC O v
7	7	ESC ? w	ESC O w
8	8	ESC ? x	ESC O x
9	9	ESC ? y	ESC O y
-	-	ESC ? m	ESC O m
.	.	ESC ? ℓ	ESC O ℓ
.	.	ESC ? n	ESC O n
Enter	CR	ESC ? M	ESC O M

(2) ESC = enters Alternate Keypad Mode; ESC > exits Alternate Keypad Mode

INSTALLATION/APPLICATIONS MODE CONTROL

Operation	ANSI Mode	V52 Mode
Right Margin Wrap On/Off	ESC [? 7 h / ESC [? 7 ℓ	NA
V52/ANSI Mode	ESC [? 2 ℓ	ESC <
Local Echo On/Off	ESC [12 h / ESC [12 ℓ	NA
Line Feed/New Line Mode	ESC [20 ℓ / ESC [20 h	NA
Dyn. Function Xmit/Execute	ESC [? 23 ℓ / ESC [? 23 h	NA
Keyboard Action Locked/Unlocked	ESC [2 h / ESC [2 ℓ	NA

OPERATOR CONVENIENCE MODES

Operation	ANSI Mode
Auto Key Repeat On/Off	ESC [? 8 h / ESC [? 8 ℓ
Auto Key Repeat 30/15 cps	ESC [? 21 ℓ / ESC [? 21 h
Screen Background Normal/Inverse	ESC [? 5 ℓ / ESC [? 5 h
Smooth Scroll On/Off	ESC [? 4 h / ESC [? 4 ℓ
Smooth Scroll Rate 5/10 lps	ESC [? 22 ℓ / ESC [? 22 h

CHARACTER SETS AND GRAPHICS

Character Set	G0(1) Designator	G1(2) Designator	V52 Mode
United Kingdom (UK)	ESC (A	ESC) A	NA
United States (ASCII)	ESC (B	ESC) B	ESC G
Special Graphics	ESC (0	ESC) 0	ESC F
Alternate Character ROM (optional)	ESC (1	ESC) 1	NA
Alt. Special Graphics ROM (optional)	ESC (2	ESC) 2	NA

(1) SI code invokes G0 (2) SO code invokes G1

ASCII Char.	Graphics Character	ASCII Char.	Graphics Character
-	Blank	o	— Horiz. Line-Scan 2
\	Diamond	p	— Horiz. Line-Scan 4
a	(Error indicator)	q	— Horiz. Line-Scan 6
b	HT	r	— Horiz. Line-Scan 8
c	FF	s	— Horiz. Line-Scan 10
d	CR	t	┌ Left T
e	LF	u	└ Right T
f	•	v	└ Bottom T
g	+ / -	w	└ Top T
h	NL	x	└ Vertical Bar
i	VT	y	< Less than or Equal to
j	J	z	> Greater than or Equal to
k	┌	{	π Pi
ℓ	└	|	≠ Not Equal to
m	┌	~	£ UK Pound Sign
n	+		• Centered Dot

PERIPHERAL INTERFACE MODE

Operation	ANSI Mode	V52 Mode
Auto Print Mode On/Off*	ESC [? 5 i / ESC [? 4 i	ESC ^ / ESC -
Printer Controller Mode On/Off	ESC [5 i / ESC [4 i	ESC W / ESC X
Print Cursor Line	ESC [? 1 i	ESC V
Print Screen**	ESC [i	ESC J
Print Extent Full/Window	ESC [19 h / ESC [19 ℓ	NA
Print Termination FF/None	ESC [18 h / ESC [18 ℓ	NA

*Also, press CTRL and ENTER keys.
**Also, press SHIFT and ENTER keys.