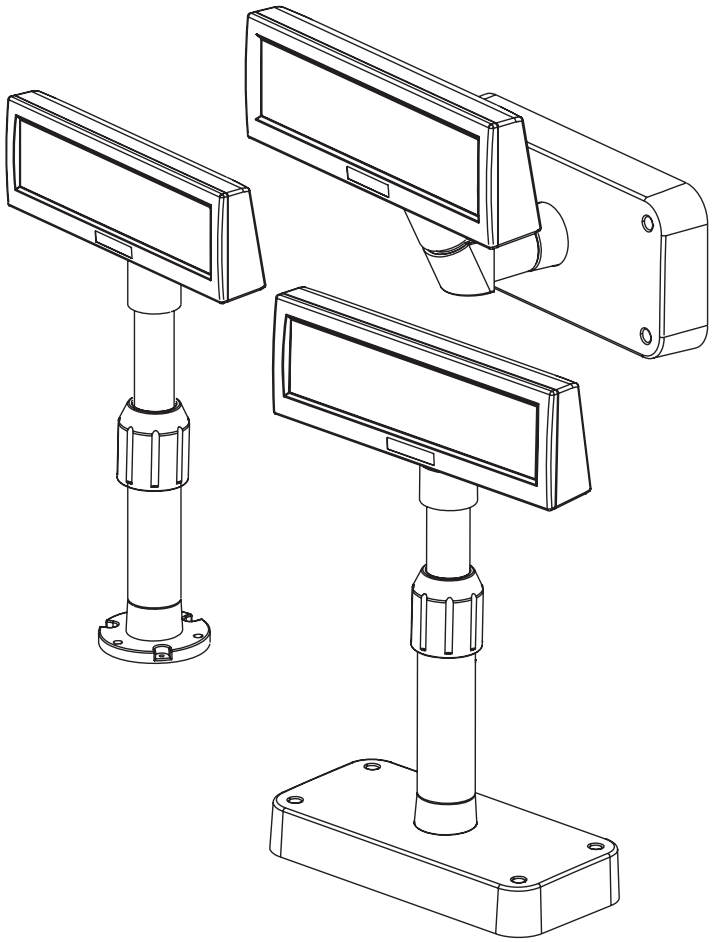
BIXOLON®
SAMSUNG mini printers

Command Manual

BCD-1000

Customer Display

Rev. 1.01



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1. Notice

This Control Commands Manual contains information on the protocol and functions of all control commands that can be used with this Customer Display (BCD-1000).

2. Control Commands List

*** Defaults (Initial State at Power-On) : The contents of the initial state are shown in below table.**

Setting Items	Setting Contents
Command emulation mode	BIXOLON's Customer Display Standard
Display mode	Overwrite mode
Cursor position	Home position (the upper left corner of the window)
Display screen	Clear
Window	Not defined
Character code table	PC-437 (*)
International character set	U.S.A (*)
User-defined characters	Not defined
Macro definition	Not defined
Reserved characters	Canceled
Display blinking	Canceled
Brightness adjustment	100% (*)
Peripheral device selection	Display (*)
Set-up time	00:00

(*) Set by the memory switch

3. Back Space (Move Cursor Left)

ASCII Format	<BS>	<ESC> [D	<NUL> K
Dec. Format	8	27, 91, 68	0, 75
Hex. Format	[08h]	[1Bh] [5Bh] [44h]	[00h] [4Bh]
Description	Moves the cursor one character position to the left. When the cursor is at the left end of a line, the operation of this command depends on the display mode, as follows : 1) Overwrite mode : When the cursor is at the left end of the lower line, it is moved to the right end of the upper line. When it is at the left end of the upper line, it is moved to the right end of the lower line. 2) Vertical scroll mode : When the cursor is at the left end of the lower line, it is moved to the right end of the upper line. When it is at the left end of the upper line, the display on the upper line is scrolled to the lower line and the upper line is cleared. At this time, the cursor moved to the right end of the upper line. 3) Horizontal scroll mode : All characters on the current line are scrolled on character to the right. The cursor is not moved, but the character area at the left end is cleared. * When a window is defined, the cursor is moved only within the current window.		

4. Horizontal Tab (Move Cursor Right)

ASCII Format	<HT>	<ESC> [C	<NUL> M
Dec. Format	9	27, 91, 67	0, 77
Hex. Format	[09h]	[1Bh] [5Bh] [43h]	[00h] [4Dh]
Description	Moves the cursor to the right. When the cursor is at the right end of a line, the operation of this command depends on the display mode, as follows : 1) Overwrite mode : When the cursor is at the right end of the upper line, it is moved to the left end of the lower line. When it is at the right end of the lower line, it is moved to the left end of the upper line. 2) Vertical scroll mode : When the cursor is at the right end of the upper line, it is moved to the left end of the lower line. When it is at the right end of the lower line, the display on the lower line is scrolled to the upper line and the lower line is cleared. At this time, the cursor moved to the left end of the lower line. 3) Horizontal scroll mode : All characters on the current line are scrolled on character to the left. The cursor is not moved, but the character area at the left end is cleared. * When a window is defined, the cursor is moved only within the current window.		

5. Move Cursor Downward (Line Feed)

ASCII Format	<LF>	<ESC> [B	<NUL> P
Dec. Format	10	27, 91, 66	0, 80
Hex. Format	[0Ah]	[1Bh] [5Bh] [42h]	[00h] [50h]
Description	Moves the cursor down one line. When the cursor is on the lower line, the operation of this command depends on the display mode, as follows : 1) Overwrite mode : The cursor is moved to the same column on the upper line. 2) Vertical scroll mode : The characters displayed on the lower line are scrolled to the upper line and the lower line is cleared. The cursor remains at the same position. 3) Horizontal scroll mode : The cursor is not moved. * When a window is defined, the cursor is moved only within the current window.		

6. Move Cursor Up

ASCII Format	<US><LF>	<ESC> [A	<NUL> H
Dec. Format	31, 10	27, 91, 65	0, 72
Hex. Format	[1Fh] [0Ah]	[1Bh] [5Bh] [41h]	[00h] [48h]
Description	Moves the cursor up one line. When the cursor is on the upper line, the operation of this command depends on the display mode, as follows : 1) Overwrite mode : The cursor is moved to the same column on the lower line. 2) Vertical scroll mode : The characters displayed on the upper line are scrolled to the lower line and the upper line is cleared. The cursor remains at the same position. 3) Horizontal scroll mode : The cursor is not moved. * When a window is defined, the cursor is moved only within the current window.		

7. Cursor Home (Move Cursor to Home Position)

ASCII Format	<HOM>	<ESC> [H	
Dec. Format	11	27, 91, 72	
Hex. Format	[0Bh]	[1Bh] [5Bh] [48h]	
Description	Moves the cursor to the left-most position on the upper line (home position). Home position indicates the fist column of the upper line. * When a window is defined, the home position is the upper left corner of the window.		

8. Carriage Return (Move Cursor to Left-most Position)

ASCII Format	<CR>	<ESC> [L	<NUL> G
Dec. Format	13	11, 91, 76	0, 71
Hex. Format	[0Dh]	[1Bh] [5Bh] [4Ch]	[00h] [47h]
Description	Moves the cursor to the left-most position on the current line. * The cursor is moved only within the current window.		

9. Move Cursor to Right-most Position

ASCII Format	<US><CR>	<ESC> [R	
Dec. Format	31, 13	11, 91, 82	
Hex. Format	[1Fh] [0Dh]	[1Bh] [5Bh] [52h]	
Description	Moves the cursor to the right-most position on the current line. * The cursor is moved only within the current window.		

10. Move Cursor to Bottom Position

ASCII Format	**<US> B**	**<ESC> [K**	
Dec. Format	**31, 65**	**11, 91, 75**	
Hex. Format	**[1Fh] [42h]**	**[1Bh] [5Bh] [4Bh]**	
Description	**Moves the cursor to the bottom position. The bottom position indicates the 20th column of the lower line. * When a window is defined, the bottom position is the lower right corner of the window.**		

11. Move Cursor to Specified Position

ASCII Format	**<US> $ x y**	**<ESC> 1 x y**	**<ESC> P x y**
Dec. Format	**31, 36, x, y**	**31, 108, x, y**	**31, 80, x, y**
Hex. Format	**[1Fh] [24h] x y**	**[1Bh] [6Ch] x y**	**[1Bh] [50h] x y**
Description	**Moves the cursor to the nth column on the mth line. If a value exceeding the range is specified for x (column) and/or y (line), this command is ignored and the cursor does not move. (rage : 1 ≤ x ≤ 20, y=1 ro 2)**		

12. Clear Display Screen and Clear String Mode

ASCII Format	**<CLR>**		
Dec. Format	**12**		
Hex. Format	**[0Ch]**		
Description	**Clear all the displayed characters. After the command is executed, the cursor moves to the home position. * When a window is defined, the cursor is moved only within the current window.**		

13. Clear Cursor Line and Clear String Mode

ASCII Format	**<CAN>**		
Dec. Format	**24**		
Hex. Format	**[18h]**		
Description	**Clears the line containing the cursor. After the command is executed, the cursor moves to the left-most position on the current line. * When a window is defined, the home position is the upper left corner of the window.**		

14. Initialize Display

ASCII Format	**<ESC> @**		
Dec. Format	**27, 64**		
Hex. Format	**[1Bh] [40h]**		
Description	**Reset the various display settings to their initial values. The software settings are reset to their power-on values. The jumper switches are not checked again. The data in the receive buffer is not cleared. After initializing the display, the display screen is cleared and the cursor moves to the home position.**		

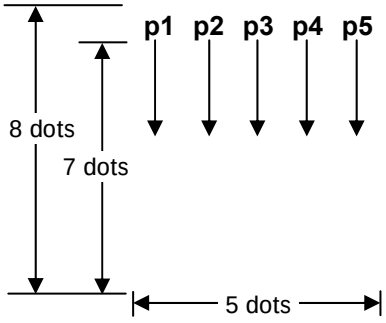
15. Select Peripheral Device(s)

ASCII Format	**<ESC> = n**		
Dec. Format	**27, 61, n**		
Hex. Format	**[1Bh] [3Dh] n**		
Description	**Select peripheral device(s).** *** n=01h, enable printer, disable display.** *** n=02h, disable printer, enable display.** *** n=03h, enable printer, enable display.** *** n=04h, display message for customer side (Display data can be accepted when J1 is opened).** *** n=05h, display message for operator side (Display data can be accepted when J1 is closed).**		

16. Select/Cancel User-defined Characters

ASCII Format	**<ESC> % n**		
Dec. Format	**27, 37, n**		
Hex. Format	**[1Bh] [25h] n**		
Description	**Selects or cancels the user-defined character set. (n=0 or 1, default n=0)** **When n is 1, the user-defined character set is selected. When the user-defined character set is not defined using the "<ESC> &" command, the internal character set is displayed.** **When n is 0, the user-defined character set is canceled. (The internal character set is selected.) In this case, this command has no effect on the user-defined characters that have already been defined using the "<ESC> &" command.** **This command has no effect on the characters already displayed.**		

17. Define User-defined Characters

ASCII Format	**<ESC> & x n m [a (p1...pa)] * (m-n+1)**
Dec. Format	**27, 38, s n m [a (p1...pa)] * (m-n+1), s=1, 32 ≤ n ≤ m ≤ 255, 0 ≤ p1...pa ≤ 255**
Hex. Format	**[1Bh] [26h] s n m [a (p1...pa)] * (m-n+1), s=01h, 20h ≤ n ≤ m ≤ FFh, 00h ≤ p1...pa ≤ FFh**
Description	**Defines user-defined characters.** *** s denotes the number of bytes in the vertical direction. (s=1)** *** n specifies the beginning character code for the definition, and m specifies the final character code. When only one character is defined, use n=m.** *** 224 characters can be defined between character codes 20h (32) and FFh (255) in the character code table.** *** a denotes the number of dots in the horizontal direction. When a < 5, the remaining dots on the right side of the user-defined characters are padded with spaces.** *** p1...pa is the dot data to be defined for the characters. This indicates the dot pattern for a dot in the horizontal direction from the left side.** *** The number of data items to be defined is s * a. When 8 bits are specified for the communication word length, the most significant bit is ignored.** *** Once the user-defined characters are defined, they remain effective until they are redefined, "<ESC> @" is executed, or the power is turned off.** *** When only the user-defined characters are defined and the user-defined character set is not selected using the "<ESC> %" command, the user-defined characters are not displayed.**
Example	**To define the character "€" at character code 20h (32) :**  **b7 MSB 0 0 0 0 0 1 1 1 1 1** **b6 0 0 1 1 0 0 0 1 1 0** **b5 0 1 0 0 1 0 1 0 0 1** **b4 1 1 1 0 0 o 1 1 1 0 0** **b3 0 1 0 0 0 r 0 1 0 0 0** **b2 1 1 1 0 0 1 1 1 0 0** **b1 0 1 0 0 1 0 1 0 0 1** **b0 LSB 0 0 1 1 0 0 0 1 1 0** **1) When the most significant bit is processed as "0", or when the communication word length is specified as 7 bits, the defined character definition is executed as shown below :** **[1Bh] [26h] [01h] : define user-defined character** **[20h] [20h] [05h] : code from 20h to 20h, each character will be composed by 5 bytes** **[12h] [2Ah] [7Fh] [2Ah] [24h] : left side of above define example (MSB="0")** **2) When the communication word length is specified as 8 bits and the most significant bit is processed as "1", the user-defined character definition is executed as shown below :** **[1Bh] [26h] [01h] : define user-defined character** **[20h] [20h] [05h] : code from 20h to 20h, each character will be composed by 5 bytes** **[92h] [AAh] [FFh] [AAh] [A4h] : right side of above define example (MSB="1")**

18. Delete User-defined Characters

ASCII Format	**<ESC> ? n**		
Dec. Format	**27, 63, n**		
Hex. Format	**[1Bh] [3Fh] n**		
Description	**Cancels user-defined characters. (20h ≤ n ≤ FFh) This command cancels the pattern defined for the character code specified by n. If specified code is transmitted after the pattern is canceled by this command, the internal character is displayed. If the specified character code is not defined, this command is ignored. This command has no effect on characters already displayed.**		

19. Store User-defined Characters into EEP-ROM

ASCII Format	**<ESC> s <MD1>**		
Dec. Format	**27, 115, 1**		
Hex. Format	**[1Bh] [73h] [01h]**		
Description	**Current using character data, including user-defined characters, is stored into EEP-ROM.**		

20. Restore User-defined Characters from EEP-ROM

ASCII Format	**<ESC> s <MD1>**		
Dec. Format	**27, 100, 1**		
Hex. Format	**[1Bh] [64h] [01h]**		
Description	**Character font table is reloaded from EEP-ROM, and the user-defined characters will be selected.**		

21. Select an International Code set

ASCII Format	**<ESC> R n**	**<ESC> f n**	
Dec. Format	**27, 82, n**	**27, 102, n**	
Hex. Format	**[1Bh] [52h] n**	**[1Bh] [66h] n**	
Description	**Set international code set. After setting international code set, the user-defined characters are subject to be deleted.**		

22. Select a Character Font Table

ASCII Format	**<ESC> t n**	**<ESC> c n**	
Dec. Format	**27, 116, n**	**27, 99, n**	
Hex. Format	**[1Bh] [74h] n**	**[1Bh] [63h] n**	
Description	**Select character font table.**		

23. Select/Cancel Window Range

ASCII Format	**<ESC> W n m x1 y1 x2 y2**
Dec. Format	**27, 87, n, m, x1, y1, x2, y2** **(1 ≤ n ≤ 4, m=0, 1, 48 or 49, 1 ≤ x1 ≤ x2 ≤ 20, 1 ≤ y1 ≤ y2 ≤ 2)**
Hex. Format	**[1Bh] [57h] n m x1 y1 x2 y2**
Description	**Selects or cancels a single window on the display screen.** *** n specifies the window number to be selected or canceled. (01h ≤ n ≤ 04h)** *** m specifies selection or cancellation.** **When m=1 or 49 (31h), a window is selected. (Values x1, y1, x2, and y2 are required)** **When m=0 or 48 (32h), a window is canceled. (Values x1, y1, x2, and y2 are not required)** *** x1 and y1 set the positions of the upper left column and line of the window, respectively.** **Up to four windows can be selected simultaneously on the display screen. However, the window ranges cannot overlap. If a value outside the display screen or overlapping another window is set, this command is ignored. To cancel a window, arguments for the window range (x1, y1, x2, and y2) must not be transmitted.**

24. Overwrite Mode

ASCII Format	**<US><MD1>**	**<ESC><DC1>**	
Dec. Format	**31, 1**	**27, 17**	
Hex. Format	**[1Fh] [01h]**	**[1Bh] [11h]**	
Description	**Selects overwrite mode as the screen display mode.** **In overwrite mode, entering a character code moves the cursor to the left end of the lower line when the cursor is at the right end of the upper line, and to the left end of the upper line when the cursor is at the right end of the lower line.** **This mode is selected when the power is turned on.** **Selecting overwrite mode cancels horizontal or vertical scroll mode.** **Except when the cursor is at the right end, entering a character code moves the cursor one character to the right after displaying the character.**		

25. Vertical Scroll Mode

ASCII Format	**<US><MD2>**	**<ESC><DC2>**	
Dec. Format	**31, 2**	**27, 18**	
Hex. Format	**[1Fh] [02h]**	**[1Bh] [12h]**	
Description	**Selects vertical scroll mode as the screen display mode.** **In vertical scroll mode, entering a character code moves the cursor to the left end of the lower line when the cursor is at the right end of the upper line, scrolls the characters displayed on the lower line to the upper line, and clears the lower line when the cursor is at the right end of the lower line. At this time, the cursor is moved to the left end of the lower line.** **Selecting vertical scroll mode cancels overwrite or horizontal scroll mode.** **Except when the cursor is at the right end, entering a character code moves the cursor one character to the right after displaying the character.**		

26. Horizontal Scroll Mode

ASCII Format	**<US><MD3>**	**<ESC><DC3>**	
Dec. Format	**31, 3**		
Hex. Format	**[1Fh] [03h]**	**[1Bh] [13h]**	
Description	**Selects horizontal scroll mode as the screen display mode. In horizontal scroll mode, entering a character code scrolls all displayed characters (including commas and periods) one character to the left, then displays the new character at the right end (when the cursor is at the right end of either line). Selecting horizontal scroll mode cancels overwrite or vertical scroll mode. Except when the cursor is at the right end, entering a character code moves the cursor one character to the right after displaying the character.**		

27. Set Display Screen Blink Interval

ASCII Format	**<US> E n**		
Dec. Format	**31, 69, n**		
Hex. Format	**[1Fh] [45h] n**		
Description	**Sets or cancels the blink interval of the display screen. (0 ≤ n ≤ 255) n specifies the blink interval. [(n*50ms.) ON / (n*50ms.) OFF] is repeated. When n=0, the display is kept on (cancels blinking). When n=255, the display is turned off but the contents of the display are maintained.**		

28. Set and Display Counter (Set Time)

ASCII Format	**<US> T h m**		
Dec. Format	**31, 84, h m**		
Hex. Format	**[1Fh] [54h] h m**		
Description	**The counter time is set and displayed at the right side of the bottom line. * h is hours, and m is minutes. (0 ≤ h ≤ 23, 0 ≤ m ≤ 59) When this command is entered, the screen is cleared and the time is displayed in 24-mode at the right side of the bottom line. The time counter start from the transmitted code h:m:00. After the time is displayed, the cursor moves to the home position. The counter display disappears when any of the following occurs : 1) The cursor moves to the bottom line. 2) Display characters move to the bottom line. 3) the <CLR> command is received. Even if the time counter is cleared, it continues to be updated in the display.**		

29. Display Counter (Display Time)

ASCII Format	**<US> U**		
Dec. Format	**31, 85**		
Hex. Format	**[1Fh] [55h]**		
Description	**Displays the time counter at the right side of the bottom line.** **If the time has already been set using the "<US> T h m" command, the elapsed time is displayed in real time in the format "hours : minutes : seconds".** **If the time has not yet been set, the elapsed time (from when the counter was initialized by turning on the power or from the "<ESC> @" command) is displayed in real time in the format "hours : minutes : seconds". After the counter is displayed, the cursor moves to the home position.** **The counter display is cleared when any of the following occurs :** **1) The cursor moves to the bottom line.** **2) Display characters move to the bottom line.** **3) the <CLR> command is received.** **Even if the time counter is cleared, it continues to be updated in the display.**		
Example	**1) Counter display just before receiving "<US> T h m" :**		

H	A	V	E		A		N	I	C	E		D	A	Y	!	!		
S	U	B	-	T	O	T	A	L						$	3	2	.	9	5

[Example] Display Before Setting the Counter

2) "<US> T h m" (1Fh 54h 17 35) is received :

_																		
												1	7	:	3	5	:	0	0

[Example] Counter Setting Indication
Above screen "HAVE A NICE DAY!! / SUB-TOTAL $32.95" is cleared, and the input time is displayed at the right side of the lower line ; counting begins from "17:35:00" seconds.
At this time, the cursor moves to the home position indicated by "_".

3) Display data "Welcome to E-SHOP!" is received :

W	e	l	c	o	m	e		t	o		E	-	S	H	O	P	!	_	
												1	7	:	3	5	:	0	0

[Example] Indication When the Cursor Does Not Move
Counter display in the bottom line has no effect on data displayed in the top line.

4) <LF> (0Ah) is received :

W	e	l	c	o	m	e		t	o		E	-	S	H	O	P	!		
																		_	

[Example] Indication When the Cursor Moves
Moving the cursor to the bottom line clears the time display, but counting continues internally. (Above example shows assumed overwrite mode.)

30. Brightness Adjustment (Dimming Control)

ASCII Format	**<US> X m**	**<ESC> * n**	
Dec. Format	**31, 88, n**	**27, 42, n**	
Hex. Format	**[1Fh] [58h] n**	**[1Bh] [2Ah] n**	
Description	**Set the brightness of the fluorescent character display tube. n selects the percentage of brightness as follows :** *** n=01h, Brightness=20%** *** n=02h, Brightness=40%** *** n=03h, Brightness=60%** *** n=04h, Brightness=100% (default)**		

31. Turn Reversed Character Mode On/Off

ASCII Format	**<US> r n**		
Dec. Format	**31, 114, n**		
Hex. Format	**[1Fh] [72h] n**		
Description	**Selects or cancels reverse display of the characters received after this command.** *** n=00h or 30h, reverse characters are canceled.** *** n=01h or 31h, reverse characters are selected.**		

32. Status Confirmation by DTR Signal

ASCII Format	**<US> v n**		
Dec. Format	**31, 118, n**		
Hex. Format	**[1Fh] [76h] n**		
Description	**Sets the DTR signal in the host interface to the MARK or SPACE state.** **When n=01h or 31h, the DTR signal goes to the MARK state, if it is already in the MARK state, the DTR signal does not change.** **When n=00h or 30h, the DTR signal goes to the SPACE state if the following conditions are satisfied, if it is already SPACE when n=0 is received, the DTR signal does not change :** **1) The receive buffer is not in the buffer-full state.** **2) The self-test is not being executed.** **This command is effective only when the display alone is selected by "<ESC> = 2" (printer disable & display enable). Therefore, if the printer is already selected this command (three bytes) is ignored and is processed as normal data. (The data is transmitted to the printer.)** **If any data is received during status confirmation using the DTR signal, normal interface timing control is executed immediately.**		

33. Execute Self-test

ASCII Format	**<US> @**		
Dec. Format	**31, 64**		
Hex. Format	**[1Fh] [40h]**		
Description	**A series of self-test is displayed. All set values except those listed below are initialized :** **1) User-defined character definitions** **2) Macro definitions** **3) Time counter value** **After completion of the self-test, the screen is cleared and the display position is moved to the home position.**		

34. Start/End Macro Definition

ASCII Format	**<US> :**		
Dec. Format	**31, 58**		
Hex. Format	**[1Fh] [3Ah]**		
Description	**Starts or ends a macro definition.** **Up to 80 bytes can be defined for macro processing (one byte per character). Macro definition processing starts with the first "<US> :" command and end with the second "<US> :" command.** **Receipt of either of the two types of data shown below is regarded as a macro definition error. Macro definition processing is stopped, and any following data is processed as normal data. At this time, the macro remains undefined.** **1) The "<US> ^" command is received during a macro processing definition.** **2) A macro processing definition exceeds 80 bytes (except for the "<US> :" command).** **To delete a macro definition, send a "<US> :" command just after "<US> :".**		

35. Execute and Quit Defined Macro

ASCII Format	**<US> ^ n m**		
Dec. Format	**31, 94, n m**		
Hex. Format	**[1Fh] [5Eh] n m**		
Description	**Executes the process defined as a macro. (00h ≤ n ≤ FFh, 00h ≤ m ≤ FFh) n specifies the time interval for displaying characters in units of [n*20msec] when a macro is executed. This specifies the time interval before displaying each successive character but does not affect the processing speed of command codes. m specifies the interval of execution. Where macro processing is repeated, it starts over from the beginning after the completion state of the previous macro processing is held for [m*50msec]. If data is received from the host during macro processing, the macro processing is terminated. After macro processing is finished, the current window is cleared and the cursor is moved to the home position in the current window. Display settings at the completion of macro processing remain valid. After macro processing is finished, the screen is cleared and the cursor is moved to the home position. Display settings in place at the completion of macro processing remain valid. If macro is undefined, this command is invalid and the display content is not affected. If "<ESC> = n", "<ESC> @", and "<US> @" are defined in the macro, these commands are ignored when executing the macro commands. Even if the printer is selected (by a peripheral device selection command) when macro processing is started, data is not transmitted to the printer during macro processing.**		

Example

1) Star Macro.....	**<US> : .....**	**1Fh, 3Ah**
2) Clear Display.....	**<CLR> .....**	**0Ch**
3) Set Blink (interval=0, blink off).....	**<US> E 0 .....**	**1Fh, 45h, 00h**
4) Displayed Character.....	**WELCOME TO SAMSUNG!!**	
5) Set Blink (interval=10*50ms=0.5s).....	**<US> E 10 .....**	**1Fh, 45h, 0Ah**
6) End Macro.....	**<US> : .....**	**1Fh, 3Ah**
7) Execute Macro (n=10, m=100).....	**<US> ^ 10 100 .....**	**1Fh, 5Eh, 0Ah, 64h**

*** 1) is the starting command and 6) is the ending command of a macro definition.**
*** Total 27-byte data from 2) to 5) is stored in the macro definition range. When the display receives the macro execution command, the defined data is in processed order.**
*** 2) is a screen clear command.**
*** 3) and 5) are blinking commands.**
*** Macro execution is started by #7). The time interval for displaying the characters is 200ms (n*20ms, n=10). When 100ms has passed after the character "W" has been displayed, the next character, "E" is displayed.**

W																		

After 200ms (n*20ms, n=10) interval

W	E																	

After 200ms (n*20ms, n=10) interval

W	E	L																

The macro execution interval is 5 seconds (m*50ms, m=100). After the blinking display show in the figure below is held for 5 seconds, macro processing is repeated from a clear screen.

W	E	L	C	O	M	E		T	O		S	A	M	S	U	N	G	!	!

36. Display Period

ASCII Format	**<US> . n**		
Dec. Format	**31, 46, n**		
Hex. Format	**[1Fh] [2Eh] n**		
Description	**Displays the specified character n and a period to the right of the character. (20h ≤ n ≤ FFh) n indicates a displayable character code. The period is displayed once only for the specified character n and is not displayed for subsequent characters. In overwrite mode, if any other character is written in the character position for which the period was displayed, the period is cleared. In vertical scroll mode, if the display position of the character for which the period was displayed is moved, the period moves with the character. In horizontal scroll mode, if the display position of the character for which the period was displayed is moved, the period moves with the character. The cursor moves one character to the right after displaying the period. The command is not valid for user-defined characters.**		

37. Display Comma

ASCII Format	**<US> , n**		
Dec. Format	**31, 44, n**		
Hex. Format	**[1Fh] [2Ch] n**		
Description	**Displays the specified character n and a period to the right of the character. (20h ≤ n ≤ FFh) n indicates a displayable character code. The comma is displayed once only for the specified character n and is not displayed for subsequent characters. In overwrite mode, if any other character is written in the character position for which the comma was displayed, the comma moves with the character. In horizontal scroll mode, if the display position of the character for which the comma was displayed is moved, the comma moves with the character. The cursor moves one character to the right after displaying the comma. The command is not valid for user-defined characters.**		

38. Display Period and Comma

ASCII Format	**<US> ; n**		
Dec. Format	**31, 59, n**		
Hex. Format	**[1Fh] [3Bh] n**		
Description	**Displays the specified character n and a semicolon (period and comma) to the right of the character. (20h ≤ n ≤ FFh) n indicates a displayable character code. The semicolon is displayed once only for the specified character n and is not displayed for subsequent characters. In overwrite mode, if any other character is written in the character position for which the semicolon was displayed, the semicolon is cleared. In vertical scroll mode, if the display position of the character for which the semicolon was displayed is moved, the semicolon moves with the character. In horizontal scroll mode, if the display position of the character for which the semicolon was displayed is moved, the semicolon moves with the character. The cursor moves one character to the right after displaying the semicolon. The command is not valid for user-defined characters.**		

39. Turn Annunciator On/Off

ASCII Format	**<US> # n m**		
Dec. Format	**31, 35, n, m**		
Hex. Format	**[1Fh] [23h] n m**		
Description	**Turns the annunciator at column m on or off. (n=00h, 01h, 30h or 31h, 0 ≤ m ≤ 20) When n=00h or 30h, the annunciator at column m is turned off. When n=01h or 31h, the annunciator at column m is turned on. m specifies the column number (the left-most column is column 1) where the annunciator to be turned on or off is located. However, when m equals 0, annunciators are either turned off or on, based on the corresponding value of n. The specification to turn on the annunciator (n=1) remains valid until : 1) The annunciator is turned off using this command (n=0). 2) The "<ESC> @", "<US> @", or "<CLR>" command is executed. 3) The power is turned off.**		

40. Set Cursor On/Off

ASCII Format	**<US> C n**	**<ESC> _ n**	
Dec. Format	**31, 67, n**	**29, 95, n**	
Hex. Format	**[1Fh] [43h] n**	**[1Fh] [5Fh] n**	
Description	**Set cursor ON or OFF (n=0 or 1). When n=00h, cursor is turned off. When n=01h, cursor is turned on.**		

41. Set Line Blinking

ASCII Format	**<US><DC1> n**		
Dec. Format	**31, 17, n**		
Hex. Format	**[1Fh] [11h] n**		
Description	**Set line blinking (n=31h or 32h). When n=31h, Upper line blinking. When n=32h, Lower line blinking.**		

42. Clear Line Blinking

ASCII Format	**<US><DC2> n**		
Dec. Format	**31, 18, n**		
Hex. Format	**[1Fh] [12h] n**		
Description	**Clear line blinking (n=31h or 32h). When n=31h, Clear upper line blinking. When n=32h, Clear lower line blinking.**		

43. Write String Character to Upper Line

ASCII Format	**<ESC> Q A d1 d2 d3 d4...dn <CR>**	**<ESC> F A d1 d2 d3 d4...dn <CR>**
Dec. Format	**27, 81, 65, d1, d2, d3, d4,...dn, 13**	**27, 70, 65, d1, d2, d3, d4,...dn, 13**
Hex. Format	**[1Bh] [51h] [41h] d1 d2 d3 d4...dn [0Dh]**	**[1Bh] [46h] [41h] d1 d2 d3 d4...dn [0Dh]**
Description	**Set the string display mode, write to upper line d1 d2 d3 d4...dn. (1≤n≤20, 20h≤dn≤FFh) The string display mode will be cancelled and revert back to the last mode after receiving either "<CLR>" or "<CAN>".**	

44. Write String Character to Lower Line

ASCII Format	**<ESC> Q B d1 d2 d3 d4...dn <CR>**	**<ESC> Q B d1 d2 d3 d4...dn <CR>**
Dec. Format	**27, 81, 66, d1, d2, d3, d4,...dn, 13**	**27, 70, 66, d1, d2, d3, d4,...dn, 13**
Hex. Format	**[1Bh] [51h] [42h] d1 d2 d3 d4...dn [0Dh]**	**[1Bh] [46h] [42h] d1 d2 d3 d4...dn [0Dh]**
Description	**Set the string display mode, write to lower line d1 d2 d3 d4...dn. (1≤n≤20, 20h≤dn≤FFh) The string display mode will be cancelled and revert back to the last mode after receiving either "<CLR>" or "<CAN>".**	

45. Upper Line Message Scroll Continuously

ASCII Format	**<ESC> Q D d1 d2 d3 d4...dn <CR>**	**<ESC> F D d1 d2 d3 d4...dn <CR>**
Dec. Format	**27, 81, 68, d1, d2, d3, d4,...dn, 13**	**27, 70, 68, d1, d2, d3, d4,...dn, 13**
Hex. Format	**[1Bh] [51h] [44h] d1 d2 d3 d4...dn [0Dh]**	**[1Bh] [46h] [44h] d1 d2 d3 d4...dn [0Dh]**
Description	**The upper line message will scroll continuously in the horizontal direction until a new command is received. (1≤n≤40, 20h≤dn≤FFh) The string display mode will be cancelled and revert back to the last mode after receiving either "<CLR>" or "<CAN>".**	

46. Lower Line Message Scroll Continuously

ASCII Format	**<ESC> Q O d1 d2 d3 d4...dn <CR>**	**<ESC> F O d1 d2 d3 d4...dn <CR>**
Dec. Format	**27, 81, 79, d1, d2, d3, d4,...dn, 13**	**27, 70, 79, d1, d2, d3, d4,...dn, 13**
Hex. Format	**[1Bh] [51h] [44h] d1 d2 d3 d4...dn [0Dh]**	**[1Bh] [46h] [44h] d1 d2 d3 d4...dn [0Dh]**
Description	**The lower line message will scroll continuously in the horizontal direction until a new command is received. (1≤n≤40, 20h≤dn≤FFh) The string display mode will be cancelled and revert back to the last mode after receiving either "<CLR>" or "<CAN>".**	