QMS®/ANSI x3.64
Programming Manual

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Proprietary Statements

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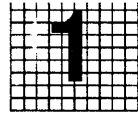
General

Developed by the American National Standards Institute (ANSI), the ANSI x3.64 command set facilitates the transfer of data between terminals capable of sending the ANSI commands and printers (or other output devices) capable of receiving them. These ANSI commands provide a wide range of capabilities for your QMS printer.

This manual describes the ANSI x3.64 commands that are supported by your printer. In addition to the standard ANSI commands, there are many commands that were uniquely designed for the QMS printer. These commands are distinguished by the letters "QMS" in their titles. In this manual, these commands are also referred to as "QMS/ANSI." The QMS/ANSI commands are ANSI x3.64 commands that have been designated for private use.

The explanations of the ANSI and QMS/ANSI commands are grouped together according to the functions they perform. The interaction between the standard ANSI and QMS/ANSI commands is explained where necessary for each command.

A special subset of seven QMS/ANSI commands is explained first. These special commands may be accessed when in any emulation mode. **All other ANSI and QMS/ANSI commands may only be accessed when in ANSI mode.** ANSI mode may be accessed either through the printer's keypad (Group 1 Options 1 and 2) or by using the QMSMOD software command which is one of the seven special QMS/ANSI commands.

Some of the standard ANSI commands are "toggle" commands. In other words, the same command is used to activate the command function and to deactivate the func-

tion. You are responsible for remembering which state the toggle command is in at any particular time. The QMS/ANSI commands use unique parameters for each condition rather than a toggle function.

Line/Box Drawing, Plot Mode, Overlays and changing or downloading fonts are some of the special features of the QMS/ANSI commands.

Some word processing packages allow you to embed ANSI commands while others do not. Refer to "Command Format Defined" later in this section for more information. Check your computer and word processor documentation to determine how to embed these commands. Requirements may be different for each system/word processor combination.

ransmitting Control Characters

Throughout this section, reference will be made to "control characters." Control characters are those ASCII characters with a hex value less than 20 and which have no printable equivalent. Your computer system or the software package you are using will have a specific method of embedding these characters in the data stream and you should refer to its documentation before experimenting with these ANSI commands. The QMSRED command explained in Section 2 of this manual also provides a method of embedding control characters.

Each terminal and computer system is different. Refer to your system's documentation before experimenting with the ANSI commands.

›mmand Format Defined

The following information explains the components or parts of an ANSI command. Be sure to read this section carefully so that you understand the various parts of a command as well as which parts are required and which parts may sometimes be omitted.

Throughout this manual, the syntax of any particular command is printed within a box.

<ESC>	This character is called the ESCape character and it requires special considerations. Since <ESC> (decimal 27) is an unprintable character, your system and/or software package must be able to use unprintable characters in order to use the ANSI commands in any way other than actually writing a program. You will need to embed the hexadecimal value, the decimal value, or the octal value (depending on your system) for this ESCape character if your system allows you to embed it. Refer to your system documentation.

If your system does not allow you to embed an ESCape character, here is a BASIC program that will redefine the "∧" to be interpreted as <ESC> by the printer:

```
10 LPRINT CHR$(27);"[0;0;94;27 ~"

20 RUN
```

The "tilde" in Line 10 is CHR$(126). Once this file has been sent to the printer, the printer will interpret every ∧ as an <ESC> character.

`<ESC>[`	The ESCape character followed by a bracket is called the "command initiator." It is used to begin most of the ANSI commands.
`;`	Semicolons are used as separators between certain parts (called "parameters") of a command. It is important that you use them correctly in order for the QMS printer to understand what you mean. Read the paragraphs below for an explanation of when and where to use semicolons.
`p1, p2, p3, p4, etc.`	These middle components of a command format are called "parameters." You will always substitute a numeric value in place of the "p1," "p2," etc. Be sure to read "Numeric Parameters Defined" on page 1-6, so that you understand what values may be used. If an invalid value is used, the parameter will be ignored.)

The variables "p1," "p2," and so on, generally indicate a specific number of numeric parameters which may be used with a particular command. You may sometimes wish to omit one or more of these parameters but you may never send more than is specified.

| Ps |

Parameters which are indicated with a "Ps" generally mean that the command will perform various functions, and you may choose several functions in one command. These commands are called multiple parameter commands.

Eight (8) is the maximum number of parameters that you may send at one time with any ANSI command. If you send more than 8 parameters the extra parameters will be ignored.

In the case of multiple parameter commands, all parameters do not need to be present. If a leading or middle parameter is omitted, a parameter separator (;) must be used but if the trailing parameter is omitted, no separator is required. Examples are given with most multiple parameter commands in this manual. Omitting a parameter will cause the default value for that parameter to be used if a default value exists. Default values are noted with appropriate commands.

NOTE: Spaces should not be included when using the commands unless the "Space" character <SP> is actually written in the command.

| s, x, r, } | These characters are a sample of what is called the "terminator" of a command. The command terminator is the last character appearing in the command syntax and is used to define or identify the specific command you want to use. Each example below is used to enable a different ANSI command. |

If the final character is a letter, be sure to note whether it is upper case or lower case. It does make a difference. Although the syntax of each of the two command examples below is similar, they are differentiated by their terminators ("h" and "k").

<ESC>[Psh <ESC>[Psk

umeric Parameters Defined

Many ANSI commands require that you indicate one or more numeric parameters. These numeric values will be listed in the description of each command. Each value will have a different meaning in the command. Values that are not in the specified ranges of the commands are invalid and will cause all or part of the command to be ignored.

These parameters are used to specify how far forward, backward, upward or downward you want the current print position to move in order to do such things as set margins and tabs. Numeric parameters are also needed to indicate the length of horizontal or vertical lines used in drawing lines and boxes. They are even more frequently used to select one of several functions which may be performed by a particular command.

Those numeric parameters which require you to indicate a distance from one point to another or a particular lo-

cation on the page are specified in a "Unit of Measure." Valid "Unit of Measure" categories includes dots, decipoints, thousandths of a centimeter, thousandths of an inch, or character/line spaces. (A few ANSI commands have a pre-assigned "Unit of Measure" but most of the commands allow you to select the desired "Unit of Measure.")

The "Unit of Measure" must be selected first before using any command which requires a measurement parameter to be indicated. A "Unit of Measure" is selected using the Reset Mode (RM), Set Mode (SM) or the QMSPRM command. These three commands override each other so the last one to be sent to the printer is the one which will be in effect when a command with a measurement parameter is used.

All Numeric parameters are "right justified" and may have up to 5 digits (nnnnn). This means that if you declare one number in the parameter it will be understood as the rightmost digit (nnnn5); if you declare two numbers they are interpreted as "nnn34"; three numbers as "nn100"; etc.

When the "Unit of Measure" is in Dots, Decipoints or Character/Line Spaces, the 5 digits are all interpreted as whole numbers.

When the measurement is in centimeters or inches the 5 available digits are interpreted a little differently. The three rightmost digits are, from right to left, thousandths/hundredths/tenths of an inch or centimeter. The remaining two leftmost digits are interpreted as whole numbers. **Whenever the "unit of measurement" is inches or centimeters, all trailing zeros MUST be included.**

Examples:
```
    01 =   00.001
   100 =   00.100
 01000 =   1
```

ummary of Supported Commands

The eleven categories of ANSI x3.64 commands supported by the QMS printer are summarized on the following pages. Each command is explained in detail later in this manual.

Seven Special Commands

<ESC>[p1;p2;p3s	QMSSFO (Select Font/Overlay)
<ESC>[p1p	QMSPGO (Select Page Orientation)
<ESC>[p1;p2x	QMSFCTL (Select Paper Feed)
<ESC>[p1u	QMSCCNT (Select Copy Count)
<ESC>[p1;p2r	QMSMOD (Select Emulation Mode)
<ESC>[Ps<SP>r	QMSCTL (Extended Printer Control)
<ESC>[Ps<SP>~	QMSRED (Redefine Font/Command Tables)

Set, Reset, Unit of Measure

<ESC>c	RIS (Reset to Initial State)
<ESC>[Psk	RM (Reset Mode)
<ESC>[Psh	SM (Set Mode)
<ESC>[p1;p2<SP>G	SPI (Line/Character Spacing)
<ESC>[p1;p2;p3;p4w	QMSSPC (Line/Character Spacing)
<ESC>[p1y	QMSPRM (Set Unit of Measure)

Font and Overlay Commands

<ESC>[p1;p2z	QMSSDF (Change Power-Up Default Font)
<ESC>[p1;p2;p3q	QMSCFO (Copy Font or Overlay to RAM)
<ESC>[p1<SP>{	QMSDFO (Delete Font or Overlay from RAM)

Margin Commands

<ESC>[p1;p2v	QMSLRM (Left/Right Margin)
<ESC>[p1;p2;<SP>v	QMSTBM (Top/Bottom Margin)

Horizontal and Vertical Tab Commands

\<VT>	Vertical Tab
\<HT>	Horizontal Tab
\<ESC>H	Set Horizontal Tab
\<ESC>[Psg	TBC (Tabulation Clear)
\<ESC>[Pst	QMSSHT (Set Horizontal Tab)
\<ESC>[Ps\<SP>t	QMSSVT (Set Vertical Tab)
\<ESC>[p1;p2\<SP>x	QMSAHV (Save/Recall Horiz./Vert. Tab)

Vertical Movement Commands

\<LF>	Line Feed
\<ESC>[p1B	CUD (Cursor Down)
\<ESC>[p1A	CUU (Cursor Up)
\<ESC>D	IND (Index)
\<ESC>K	PLD (Partial Line Down)
\<ESC>L	PLU (Partial Line Up)
\<ESC>[p1d	VPA (Vertical Position Absolute)
\<ESC>[p1;p2e	VPR (Vertical Position Relative)

Horizontal Movement Commands

\<CR>	Carriage Return
\<BS>	Backspace
\<ESC>[p1D	CUB (Cursor Backward)
\<ESC>[p1C	CUF (Cursor Forward)
\<ESC>[p1'	HPA (Horizontal Position Absolute)
\<ESC>[p1;p2a	HPR (Horizontal Position Relative)

Horizontal and Vertical Positioning Commands

\<ESC>[p1;p2f	HVP (Horizontal/Vertical Positioning)
\<ESC>E	NEL (Next Line)
\<ESC>[p1E	CNL (Cursor Next Line)
\<ESC>[p1F	CPL (Cursor Preceding Line)

Graphics Commands

<ESC>[p1<SP>y	QMSBLD (Enable/Disable Bold Printing)
<ESC>[p1;p2<SP>D	FNT (Assign Font Numbers)
<ESC>[Psm	SGR (Select Graphics Rendition)
<ESC>[Ps<SP>l	QMSBOX (Box Drawing)
<ESC>[Ps l	QMSLST (Line Drawing)

Special Printer Features

<ESC>[Ps<SP>F	JFY (Justify)
<ESC>Q	PU1 (Absorb Following Data)
<ESC>R	PU2 (Disable PU1)
<ESC>[p1<SP>z	QMSASF (Absorb System Forms Controls)
<ESC>[Ps<SP>H	QUAD (Quad Formatting)
<ESC>[Ps}	QMSCC (Define Printable Characters)

Download Fonts and Overlays

<ESC>[Pp1;p2;p3;p4}Font Header; Char. Header Bit Map Data;<ESC>\
QMSDLF (Download Fonts)

<ESC>[Pp1;p2;p3}Name;Definition<ESC>\
QMSOVR (Overlays)

Plot Mode

<ESC>[Pp1;p2;p3;p4;p5;p6}Plot Mode Data<ESC>\
QMSPLT (Plot Mode)

Seven Special
Commands
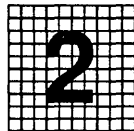
Overview

These QMS/ANSI commands may be invoked from any printer emulation mode.

- QMSSFO is used to select a desired font or overlay from memory. This same command is used to delete individual fonts or overlays from the printer RAM.

- QMSPGO is used to change the orientation of printing on the page (portrait or landscape).

- QMSFCTL allows you to select manual or automatic paper feed without taking the printer off-line. This command is also used to select the size of paper being used.

- QMSCCNT is used to change the "copy count" from one to as many as 5000 copies.

- QMSMOD allows you to switch from one emulation mode to another without using the keypad.

- QMSCTL can be used to pause the printer, enter Hex Dump Mode, print a Start-Up Page or print font test pages.

- QMSRED is used to redefine the Command and Font translation tables.

| <ESC>[p1;p2;p3s | QMSSFO

This command is used to select or delete a Font or Overlay.

The "p1" parameter is used to indicate the number of the desired Font or Overlay to be selected or deleted. The number may be in the range of 0 to 32767. If you omit this parameter, the default font number will be automatically selected in the specified (or default) Orientation. Default fonts are selected through configuration Groups L and P.

The "p2" parameter is used to indicate whether the number in "p1" is for a portrait orientation font or landscape orientation font or for an overlay. The valid values for "p2" are:

        p2 = 0 = Portrait Font
        p2 = 1 = Landscape Font
        p2 = 2 = Overlay

If "p1" is omitted and "Overlay" is selected in "p2", the entire command will be ignored (because omitting "p1" automatically selects "Font." If "p2" is not the same as your current orientation, the font selected in "p1" will be stored until you change page orientation. See QMSPGO.

The "p3" parameter is used to indicate the action for the printer to take. The valid values for "p3" are:

        p3 = 0 = Delete font
        p3 = 1 = Select font
        p3 = 2 = Delete ALL fonts
                     and overlays (ignores p1 and p2).
        p3 = 3 = Delete only fonts
                     and overlays in orientation
                     selected in p2 (p1 ignored).

Only download fonts may be deleted. The fourteen resident fonts cannot be deleted.

No other values are valid for "p2" and "p3". Invalid parameters will cause the command to be ignored.

Note for Epson Emulation Mode Users:
This command takes priority over the Epson Pica default font and any font selected through this command will remain in effect whenever Epson Pica Mode is entered.

You may use this command to select the Epson Pica font or you may send an Epson Reset command to select the Pica font. Performing an Option 0 "warm boot" of the printer will also select the Epson default Pica font.

Examples:

<ESC>[382s	Selects Font 382
<ESC>[32768s	Invalid parameter; command ignored
<ESC>[s	Selects the power-up default font in the current orientation
<ESC>[14;s	Selects Overlay 14
<ESC>[772;0;0s	Deletes Font 772 in Portrait

<ESC>[p1 p	**QMSPGO**

This command is used to select Portrait or Landscape Page Orientation.

Whenever a new page orientation is selected, the most recently used font in that orientation becomes the "current font." If the selected orientation has not been used since power-up (or since the last Reset), the current font will be the power-up default font for the selected orientation.

The valid values for "p1" are 0 (Portrait Orientation) or 1 (Landscape Orientation). If the parameter is omitted, the power-up default orientation will be selected. The power-up default orientation is set through Group 1 Option 3.

Examples:

<ESC>[0p	Selects Portrait Orientation
<ESC>[1p	Selects Landscape Orientation
<ESC>[17p	Invalid parameter; command is ignored
<ESC>[p	Selects power-up default orientation

Changing the page orientation will not affect the VAL-
UES for the Top, Bottom, Left, and Right Margins. See
the illustration below.

```
            TOP                             TOP
   ┌─────────────────┐          ┌──────────────────────┐
   │       1"         │          │          1"           │
   │  ┌ ─ ─ ─ ─ ─┐    │          │   ┌ ─ ─ ─ ─ ─ ─ ─ ┐  │
   │  │          │    │          │   │               │  │
   │  │          │    │          │   │               │  │
   │  │          │    │          │   │               │  │
   │2"│          │    │          │2" │               │  │
   │  │          │    │          │   │               │  │
   │  │          │    │          │   │               │  │
   │  │          │    │          │   └ ─ ─ ─ ─ ─ ─ ─ ┘  │
   │  └ ─ ─ ─ ─ ─┘    │          │       ·1 1/2"         │
   │    1 1/2"         │          └──────────────────────┘
   └─────────────────┘                 LANDSCAPE
        PORTRAIT
```
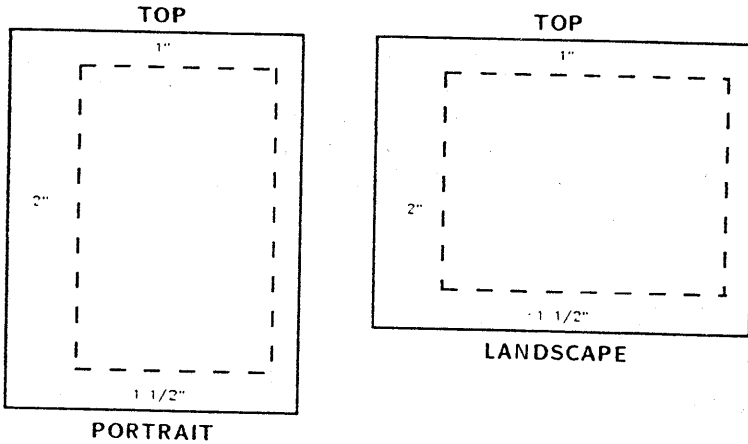
Remember that the margins are established at a specified
distance from the edge of the paper. When you change
orientations, you are changing the reference point for the
margins. If, for example, the Left Margin for Landscape
Orientation is set at 9" when Portrait Orientation is se-
lected, the Left Margin will still be set at 9" from the
left edge of the paper. This places the left margin one-
half inch beyond the right edge of the paper. The QMS
printer will sense an error and the Left Margin will de-
fault to the left edge of the paper. Always establish new
margins when changing orientations.

ESC>[p1;p2x]   QMSFCTL

This command allows you to select the Page Feed Source
and the paper size. If you are using an optional Paper
Plus™ sheet feeder, there are additional parameters
to the QMSFCTL command that are not listed here.
Refer to the Operator's Guide included with the Pa-
per Plus for details of the *Software Access Options*.

The valid values for "p1" are 0 (cassette feed) or 1 (man-

The valid values for "p1" are 0 (cassette feed) or 1 (manual feed). If the parameter is omitted, the power-up default Page Feed Source (cassette feed) is selected. If invalid parameters are used, the command will be ignored.

The valid values for "p2" are:

p2 = 0 = A4 paper size (Europe)
p2 = 1 = B5 paper size (Europe)
p2 = 2 = Legal paper size (USA)
p2 = 3 = Letter paper size (USA)
p2 = 4 = Mini paper size

Examples:

<ESC>[1;3x   Selects manual feed, letter size
<ESC>[x   Selects default source and paper size
<ESC>[1x   Selects manual feed, default paper size
<ESC>[;2x   Selects default paper source, legal size

<ESC>[p1 u   QMSCCNT

This command allows you to specify the number of multiple copies of the current printing job the printer will output. The number of copies will remain in effect until a new QMSCCNT command is entered or until a "warm boot" or power-off/power-on is performed. The range of valid values for "p1" are 1 through 5000. A value of zero or omitting this parameter will select the default value (1). Values greater than 5000 will cause the command to be ignored.

Examples:

<ESC>[10u   Print 10 copies
<ESC>[297u   Print 297 copies
<ESC>[u   Print 1 copy (default)
<ESC>[0u   Print 1 copy (default)
<ESC>[12000u   Invalid parameter; command is ignored

:ESC>[p1;p2r| QMSMOD

This command allows you to change Printer Emulation Modes and/or perform a Reset from any Mode. The Print Characteristics (e.g., tabs, margins, etc.) will not be affected when changing Emulation Modes. However, performing a Reset will return these parameters to their power-up default condition: Current Font, Page Margins, Horizontal and Vertical Tabs, Character Spacing, Line Spacing, and Absolute Horizontal and Vertical Position.

The valid values for "p1" are:

$$p1 = 0 = \text{Do NOT change Mode}$$
$$p1 = 1 = \text{Select ANSI x3.64 Mode}$$
$$p1 = 2 = \text{Select Diablo 630 Emulation Mode}$$
$$p1 = 3 = \text{Select Epson FX-80 Emulation Mode}$$
$$p1 = 4 = \text{Select Qume Sprint Emulation Mode}$$
$$p1 = 99 = \text{Return to previous mode}$$

The valid values for "p2" are:

$$p2 = 0 = \text{Reset to power-up conditions in selected emulation mode upon entering that mode.}$$
$$p2 = 1 = \text{Do not perform a reset when entering the selected emulation mode.}$$

The command to return to the previous mode is <ESC>[99r. This returns the printer to the last emulation mode that was used. This command can be used to switch between two different modes. If the following commands were issued in sequence the results would be as indicated.

<ESC>[3r   Enter Epson Emulation Mode
<ESC>[2r   Leave Epson, enter Diablo Mode
<ESC>[99r   Leave Diablo, return to Epson
<ESC>[99r   Leave Epson, return to Diablo

Examples:

<ESC>[r	Perform a reset within the current Mode (equivalent to <ESC>[0;0r)
<ESC>[3r	Change to Epson Emulation Mode and perform a reset upon entering that mode
<ESC>[;r	Perform a reset within the current Mode
<ESC>[4;1r	Change to Qume Emulation Mode and do not perform a reset.

<ESC>[Ps <SP>r   QMSCTL

This is the QMS Extended Print Control command. It has four unique functions that are accessed by changing the values for the "Ps" parameter. The <SP>character (hex 20) must be included in the command. The valid values for "Ps" are:

<ESC>[0<SP>r **Pauses printer.** This is used as necessary to stop printer operation in order to change paper size, current font, or similar functions.

<ESC>[1<SP>r **Enter Hex Dump Mode.** This allows you to place the QMS printer in Hex Dump Mode. Hex Dump Mode has its own page margins built into this command. In Hex Dump Mode, the hex value of all incoming data is printed. The hex value of every character received by the printer will be printed in 32 pairs on the left side of the page. Printable characters will appear on the right side. Unprintable characters and control characters (hex 20 and lower) will appear on the right side as periods. This command produces the same results as enabling Group 0 Option 3. Hex Dump Mode automatically establishes pre-set page margins in the printer. To exit Hex Dump Mode, perform a warm boot or power the printer off/on.

<ESC>[2<SP>r   **Print Status Summary Sheet.** The Status Summary Sheet contains information on configuration Options and fonts. This is the same page that is printed automatically at power-up.

<ESC>[3<SP>r   **Print Font Test Pages.** This parameter causes the printer to print a sample page for each font in its memory (downloaded and resident). Each page contains a complete character set.

Values other than these will cause the command to be ignored.

| ESC>[p1;p2;p3;p4;p5;p6;p7;p8<SP>⁻ | QMSRED |

WARNING: This feature of your QMS printer is designed for use by advanced programmers. Study these instructions carefully before using this command.

The QMSRED command is a very powerful programmer tool which may be used to modify the Command and Font Translation Tables. These tables (along with the standard 256 cell ASCII set of commands and characters) are used by the printer when it is translating data that it receives from the host computer. The decimal value locations in the Command and Font Translation Tables can be reassigned thereby giving you great control over how the printer converts incoming data into printed output. A feature of the printer and the QMSRED command allows you to store any modifications made to these translation tables in ZPRAM[1] (RAM that is not affected by turning the printer off) so that modified translation tables will be available immediately on printer power-up. Resetting the tables may also be performed through the QMSRED command.

Before you can use the QMSRED command, you must become acquainted with the decimal values associated

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[1]ZPRAM information is only applicable to certain QMS printers. Refer to your printer's User's Guide.

with the translation tables, the decimal values associated with the standard ASCII command (or control) characters, the locations of the printable characters in the fonts, and the locations of any "unprintable information" (i.e., empty locations) in the fonts. Both the Command Translation Table and the Font Translation Table have 256 assignable locations. The font tables in Appendix A of this manual will help you find the Hex value signifying the location of each character in each resident font in your printer. The conversion tables in Appendix B will enable you to convert Hex values to decimal values (the QMSRED command uses only decimal values) and will also show the decimal values of the ASCII control characters.

Changing the Command Translation Table

When you use the QMSRED command to modify the Command Translation Table, you are able to reassign decimal values normally associated with "printable" ASCII characters to decimal values associated with ASCII control characters. For example, the decimal value associated with the ASCII character ^ (decimal 94) can be reassigned to the ASCII control character <ESC> (decimal 27). Such a reassignment could be very helpful for users whose host computer or software does not allow them to send an <ESC> sequence to the printer or to imbed an <ESC> sequence in a document. By redefining the ^ to serve as an <ESC>, the special QMS commands described in this section and the supported emulation commands may be imbedded in a document and sent to the printer.

Important Considerations:

- *You may elect to store modifications to the Command Translation Table in ZPRAM. If you do so, the modified translation table will be available immediately on printer power-up.*

- *Once the Command Translation Table is modified, it will affect all emulation modes.*

- *Modifications to the Command Translation Table affect all fonts.*

- *If two or more people are using the same printer, all users need to be aware of modified translation tables.*

Changing the Font Translation Table

When you use the QMSRED command to modify the Font Translation Table, you are able to reassign decimal values associated with a font's characters to decimal values associated with other characters of the font that ordinarily may be outside the accesible range for your computer (such as characters in Font 382 from Hex 00 to Hex 0F). For example, if you were using Font 382 (Epson Pica 10 point) while in Diablo Emulation Mode and wished to print the symbol for the Japanese yen, you could reassign the decimal value for the yen symbol (decimal 31 in Font 382) to the decimal value for another character in the font (preferably a character that you would not need to print). If you used the QMSRED command to reassign decimal 31 (yen symbol) to decimal 36 (dollar sign) and you have selected Font 382, the printer will print a yen symbol whenever you send a dollar sign from your computer.

Important Considerations:

- *When the printer is in Epson Emulation Mode, the Font Translation Table is ignored. Any modifications to the translation table will not affect fonts selected during Epson Emulation Mode.*

- *Modifications to the Font Translation Table affect all fonts selected during any other mode except Epson Emulation Mode. All fonts, however, do not have the same characters in the same locations. If, in the example above, you reassigned the dollar sign to act as a yen symbol and selected Font 7504 (Courier), nothing would print when you sent the dollar sign to the printer. Font 7504 does not have*

a character in decimal 31. Refer to the font ta-
bles in Appendix B for the correct locations of all
characters in the resident fonts.

● *You may elect to use the QMSRED command to*
store modifications to the Font Translation Table in
ZPRAM. If you do so, the modified translation table
will be available immediately on printer power-up.

● *If two or more people are using the same printer,*
all users need to be aware of modified translation
tables.

Command Parameters

The "p1" parameter in the QMSRED is used to indicate
whether you wish to modify the Command Translation
Table or the Font Translation Table.

p1 = 0 = Command Translation Table
p1 = 1 = Font Translation Table

If "p1" is greater than 1, the entire command will be
ignored.

The "p2" parameter is used to indicate whether the table
specified in "p1" is to be redefined, reset to the ZPRAM
settings, or stored in ZPRAM.

p2 = 0 = Redefine table specified in p1.
**p2 = 1 = Reset table specified in p1 to
ZPRAM settings.**
**p2 = 2 = Store the current settings of the
table specified in p1 into ZPRAM.**
**p2 = 3 = Store the current settings of both
translation tables into ZPRAM.**

IMPORTANT: Knowing how to reset the translation
tables to their factory default values could be helpful if
you ever lose track of which decimal values have been
reassigned. Whenever p2 = 1, the table specified in p1
is reset to the settings stored in ZPRAM. If you have not
previously stored the table(s) into ZPRAM, translation
tables will be reset to factory default values (decimal
values 0 to 255) whenever the printer is powered off/on

or whenever a warm boot is performed (see Group 0 Option 6 in Section 6). If you have previously stored the table(s) into ZPRAM and you wish to restore the table(s) to factory configuration defaults, you must perform a "Configuration Reset." This is a printer keypad procedure and is described in Section 6 (see Group 0 Option 5). A configuration reset will reset **all** configuration options (including page margins, default fonts, interface settings, etc.) to factory default settings. After performing the configuration reset, you may use any of the following to reset the translation tables:

● Group 0 Option 9 to reset the Command Translation Table.

● Group 0 Option A to reset the Font Translation Table.

● Warm boot to reset both tables (depending on Group 0 Option 6)

● Power the printer off/on

CAUTION: In Plot or Graphics Mode, redefined characters may cause problems (depending upon what characters have been redefined). Plot mode is only affected by the Command Translation Table. Perform a configuration reset followed by a reset of the Command Translation Table before sending Plot or Graphics Mode data to the printer.

At power-up, the translation tables are always initialized to whatever values are stored in ZPRAM.

When p2 = 2 or p2 = 3, parameter p3 through p8 are ignored.

Parameters "p3;p4", "p5;p6", and "p7;p8" are "paired" parameters and must always be used in pairs. Through these three pairs of parameters three decimal values may be reassigned with each QMSRED command. The first half of a paired parameter (i.e., p3, p5, p7) indicates the decimal value of a location in the translation table. The

decimal value in the second half of the paired parameter will be reassigned to the decimal value in the first half (p3, p5, or p7).

WARNING: When redefining the Command Translation Table, never enter 27 in p3, p5 or p7. This would have serious consequences for your printer or software.

The decimal value in the second half of a paired parameter ("p4", "p6", or "p8") will be reassigned to the value that was specified in "p3," "p5," or "p7."

Valid values for parameters "p3" through "p8" are the decimal values 0 through 255.

Example:

<ESC>[0;0;94;27<SP>˜   Reassign decimal 27 to decimal 94 in the Command Translation Table. Every time the printer receives a decimal 94 it will act on it as if it were decimal 27 (<ESC>).

<ESC>[1;0;47;158<SP>˜   Reassign decimal 158 to decimal 47 in the Font Translation Table. Every time the printer receives a decimal 47 ("/") it will act on it as if it were decimal 158 (cent sign). Valid only when not in Epson Emulation Mode.
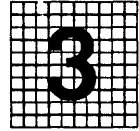
<ESC>[1;3<SP>˜ ·   Store current modified settings of both translation tables into ZPRAM.

You may use the BASIC command **LPRINT** to send the QMSRED to the printer. Redefining decimal 94 to serve as decimal 27 would require sending this command in BASIC:

LPRINT CHR$(27);"[0;0;94;27 ~"

Always be sure to include the space before the tilde when sending the command.

Set, Reset, and Unit of Measure

3

Overview

These commands are used to reset the printer and to establish the unit of measure which the printer will use with certain ANSI commands.

- RIS resets all conditions of the ANSI Mode to their power-up status.

- RM specifies PUM and LNM.

- SM specifies PUM and <LF> action.

- QMSPRM allows you to specify the unit of measurement for positioning commands that do not have a pre-assigned unit.

- SPI is used to specify in decipoints the horizontal and vertical spacing increments.

- QMSSPC is used to specify character spacing and line spacing in ANSI Mode.

| <ESC>c | **RIS**

Issuing this command causes a Reset to Initial State or, in other words, power-up conditions. This includes initializing tabs and margins to their default settings, setting the active Vertical and Horizontal positions to the top and left page margins, initializing the current font to the power-up default font, and resetting line and character spacing to the power-up defaults. The Justify and Quadding commands will be disabled. The printer will remain in the ANSI Mode.

<ESC>[Psl RM (PUM and LNM parameters)

This command is used to specify the Positioning Unit Mode (PUM) and the action that the printer will take in Line Feed/Newline Mode upon receiving an <LF> character (LNM).

The valid values for **Ps** are <VT> and <DC4>.

When <VT> is used as a value for Ps, horizontal positioning will be expressed in "character-widths" and vertical positioning will be expressed in "line spaces." The actual distance represented by these units of measure would depend on the font in use. One or both of the PUM and LNM parameters may be used in a single RM command as shown in the examples below.

Examples:

<ESC>[<DC4>l	<LF>= Line Feed only, PUM not affected
<ESC>[<DC4>;<VT>l	<LF>= Line Feed only, PUM is character-widths and line spaces
<ESC>[<VT>l	PUM is character-widths and line spaces, LNM is not affected

The PUM portion of the RM command will affect the interpretation of other ANSI commands. The following horizontal and vertical movement commands will be affected:

HPA	Horizontal Position Absolute
HPR	Horizontal Position Relative
HVP	Horizontal and Vertical Position
VPA	Vertical Position Absolute
VPR	Vertical Position Relative

The LNM portion of the RM command does not affect the Vertical Tab (<VT>), Form Feed (<FF>), Index (<IND>), or Next Line (<NEL>) commands.

| <ESC>Psh | SM |

The SM command specifies the "unit of measure" for Horizontal and Vertical positioning (PUM) and the action taken by the printer whenever it receives a <LF> character.

The valid values for **Ps** in this command are <VT> and <DC4>.

When <VT> is used as a value for **Ps**, horizontal and vertical positioning will be specified in "decipoints." When <DC4> is used as a value for **Ps**, a <LF> character will initiate a <LF><CR>. Either one or both parameters may be specified. If both values are established at the same time, separate the two values with a semicolon.

Examples:

<ESC>[<DC4>h	<LF>= Line Feed, Carriage Return
<ESC>[<DC4>;<VT>h	<LF>= Line Feed, Carriage Return and PUM is decipoints
<ESC>[<VT>;<DC4>h	PUM is decipoints and <LF>= Line Feed, Carriage Return
<ESC>[<VT>h	PUM is decipoints

The PUM portion of the SM command will affect the interpretation of other ANSI commands. The following horizontal and vertical movement commands will be affected:

HPA	Horizontal Position Absolute
HPR	Horizontal Position Relative
HVP	Horizontal and Vertical Position
VPA	Vertical Position Absolute
VPR	Vertical Position Relative

The LNM portion of the RM command does not affect the Vertical Tab (<VT>), Form Feed (<FF>), Index (<IND>), or Next Line (<NEL>) commands.

<ESC>[p1y QMSPRM

This command establishes the "unit of measure" for horizontal and vertical positioning (PUM). It is similar to the RM and SM commands, but can be used to establish a variety of "units." This command will not affect ANSI commands (such as SPI) which have their own pre-assigned unit of measure.

The valid values for **p1** are:

> **p1** = **0** = Unit of Measure is Dots
> **p1** = **1** = Unit of Measure is Deci-
> points
> **p1** = **2** = Unit of Measure is Cen-
> timeters
> **p1** = **3** = Unit of Measure is Inches
> **p1** = **4** = Unit of Measure is Charac-
> ter/Line Spaces

No other values are valid. Refer to "Numeric Parameters Defined" earlier in this section for an explanation of how to handle the actual digits when using commands that include parameters expressed in dots, decipoints, centimeters, inches, or character/line spaces.

ESC>[p1;p2<SP>G SPI

This is the Line and Character Spacing Increments command. The command is used to specify the distance to be moved horizontally for a single fixed-space and the distance to be moved vertically for a single line of vertical spacing while in ANSI mode. The parameter value is always expressed as decipoints regardless of the setting of the RM, SM, or QMSPRM commands.

The **p1** parameter is used to enter, in decipoints, the distance from one line to the next line. The **p2** parameter is used to enter, in decipoints, the amount of space allotted to a single character. Since there are 720 decipoints per inch, a parameter value in **p1** of 120 would specify 6 lines per inch. A value of 90 in **p2** would specify 8 characters per inch. The range of valid values for **p1**

Set, Reset, Unit of Measure

and **p2** are limited by the paper size and orientation. If either parameter is omitted, the power-up default for the omitted parameter will be used.

Examples:

<ESC>[<SP>G	The power-up defaults will be used
<ESC>[120;120<SP>G	6 lines per inch, 6 characters per inch
<ESC>[90;90<SP>G	8 lines per inch, 8 characters per inch
<ESC>[180;120<SP>G	4 lines per inch, 6 characters per inch

| <ESC>[p1;p2;p3;p4 | QMSSPC |

This command is used for setting the line and character spacing values to be used while in ANSI Mode.

The **p1** parameter sets the Character Spacing. Character Spacing may be either from the Font Table for the font in use or may be user-defined. If spacing is user-defined, the "Units of Measurement" selected in the QMSPRM command will affect spacing.

The values for **p1** are:

**p1 = 0 = Proportional character spac-
ing from the Font Table**

**p1 = 1 = Fixed character spacing from
the Font Table**

**p1 = 2 = Characters per "unit" as
defined in p2**

**p1 = 3 = "Units" per character as
defined in p2**

NOTE: The standard fonts that are resident on the printer may be printed using either proportional or fixed spacing of characters. This ability is a special feature of the resident fonts and is not typical of most font designs.

If **p1** = 1 and a proportional font (other than a resident font) is selected, the spacing cannot be forced to be fixed spacing. The data must be printed using proportional

spacing regardless of the parameter (**p1**) selected. The parameter does remain in effect but is ignored when such a situation is encountered.

The value for **p2** may be up to five digits and is dependent on the parameter value selected in **p1**. If **p1** is 0 or 1, then **p2** will be ignored. If **p1** is 2 or 3, then the values for **p2** are:

If p1 = 2, then p2 = characters per "unit"
If p1 = 3, then p2 = "units" per character

"Unit" is the "unit of measurement" selected in the QMSPRM command. For example, if "inches" were selected in the QMSPRM command and **p1** = 2, then **p2** would define the number of characters per inch. If "decipoints" were selected in the QMSPRM command and **p1** = 3, then p2 would define the number of decipoints per character.

The **p3** parameter sets the line spacing value. The valid values for **p3** are:

p3 = 1 = Use line spacing from Font Table
p3 = 2 = Lines per "unit" as defined in p4
p3 = 3 = "Units" per line as defined in p4

"Unit" is the "unit of measurement" selected in the QMSPRM command. Using the line spacing from the Font Table allows the line spacing stored in the Font Table (for the font in use) to be used.

The **p4** parameter may be up to five digits and is dependent on the value selected in **p3**. If **p3** = 1, the p4 parameter will be ignored. The values for **p4** are:

If p3 = 2, then p4 = Lines per "unit"
If p3 = 3, then p4 = "Units" per line

Set, Reset, Unit of Measure

"Units" are the "units of measurement" selected in the QMSPRM command. For example, if "inches" were selected in the QMSPRM command and **p3** = 2, then **p4** would define the number of lines per inch. If "deci-points" were selected in the QMSPRM command and **p3** = 3, then **p4** would define the number of decipoints per line.

Examples:

<ESC>[1;;1w	Use the values for fixed character spacing and line spacing stored in the Font Table.
<ESC>[2;10;2;6w	10 characters per "unit" and 6 lines per "unit."
<ESC>[0;;2;8w	Use the Font Table values for proportional character spacing and line spacing of 8 lines per "unit."
<ESC>[3;2;w	2 characters per "unit" and use the Font Table values for line spacing.
<ESC>[0;;3;2w	Use the Font Table values for proportional character spacing and line spacing of 2 lines per "unit."

Font and Overlay Commands
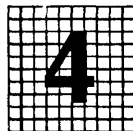
Overview

This group of commands is used to change the default font, to copy a font or overlay to RAM, or to delete fonts or overlays from RAM. The commands for defining Download Fonts or Overlays are not included in this group but are explained later in this manual. The command for selecting a font or overlay (QMSSFO) is explained in Section 2.

- QMSSDF allows you to change the power-up default font in either orientation.

- QMSCFO allows you to copy a Font or Overlay into RAM.

- QMSDFO allows you to delete a Font or Overlay from RAM.

| <ESC>[p1;p2z | QMSSDF

This command is used to change the power-up default font number. The command will remain in effect until a new QMSSDF command is issued or until a reset to power-up conditions is performed.

The range of valid values for p1 is 0-32767. This is the font number to be stored as the default font. The font selected must be available either as a resident font or in a Font Cartridge. Download fonts may not be selected as a power-up default font. The power-up status sheet will indicate whether or not a font is available in a Cartridge.

The p2 parameter is used to select the orientation of the default font. The valid values are 0 (Portrait orienta-

tion) and 1 (Landscape orientation). If this parameter is omitted, the value will default to the current orientation.

Examples:

<ESC>[382;1z   Selects Font 382 as default font in Landscape

<ESC>[824z   Selects Font 824 as default font in current orientation

<ESC>[37267z   Invalid parameter; command is ignored.

<ESC>[p1;p2;p3q	QMSCFO

This command is used to copy a font or overlay from a Font Cartridge into RAM. If there is not enough room in RAM to store the font or overlay, the command will be aborted.

The **p1** parameter indicates the font or overlay number to be copied into RAM. The **p2** parameter indicates the font or overlay number AFTER it has been copied into RAM. The font or overlay must have a new number when in RAM because it cannot exist in two places on the system with the same number.

The **p3** parameter indicates whether the QMSCFO command is for a font or overlay. The valid values for **p3** are 0 (Portrait font), 1 (Landscape font), or 2 (Overlay).

The QMSCFO command will copy the entire font (including headers and the font table) or overlay regardless of location.

Examples:

<ESC>[382;385;0q   Copy Portrait Font 382 to Font Number 385

<ESC>[7224;4227q   Copy Font 7224 in current orientation to Font Number 4227

<ESC>[10;15;1q   Copy Landscape Font 10 to Font Number 15

<ESC>[500;1000;2q   Copy Overlay 500 to Overlay Number 1000

`<ESC>[p1<SP>{` QMSDFO

This command is used to delete **all** fonts or overlays from the printer RAM. The valid values for **p1** are:

> **p1 = 0 =** Delete all portrait down-
> load fonts from RAM.
> **p1 = 1 =** Delete all landscape fonts
> from RAM.
> **p1 = 2 =** Delete all download over-
> lays from RAM.
> **p1 = 3 =** Delete all contents of printer
> RAM.

If a value for **p1** is omitted, a value of 3 will be inserted and the command will delete all contents of the printer RAM. If an invalid value is issued, the command will be ignored.

Examples:

`<ESC>[0<SP>{` Deletes all downloaded por-
trait fonts from RAM.

`<ESC>[1<SP>{` Deletes all downloaded land-
scape fonts from RAM.

`<ESC>[2<SP>{` Deletes all downloaded over-
lays from RAM.

`<ESC>[3<SP>{` Deletes all fonts and overlays
from RAM.

Margin
Commands
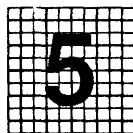
Overview

The commands in this group are used to define or advance to the top and bottom margins, or left and right margins.

- QMSLRM is used to establish or change the left and right margins.

- QMSTBM is used to establish or change the top and bottom margins.

| `<ESC>p1;p2v` | **QMSLRM**

This command is used to establish or change the left and right margins. The **p1** parameter establishes the left margin. Valid values for **p1** are limited by the page size and current "unit of measure" (see QMSPRM, RM, or SM commands). The **p1** parameter may have up to 5 digits. If either inches or centimeters is the unit of measure, measurements in the QMSLRM command MUST have five decimal places.

The **p2** parameter establishes the right margin. The valid values for **p2** are the same as for **p1**. If either **p1** or **p2** is omitted, the current value for the omitted parameter will remain the same.

The left margin value must be less than the right margin value or the command will be ignored. If the new left margin is greater than the current horizontal position, the current horizontal position will be reset to the new left margin.

The right margin value must be greater than the left mar-

gin value or the command will be ignored. If the new right margin is greater than the width of the paper, the right margin will be reset to the page width. If the new right margin is less than the current horizontal position, the current horizontal position will be reset to the right margin.

Both left and right margins are measured from the left edge of the page. Data that extends past the right margin may either be printed to the edge of the page or truncated (depending on Group A Option 6). The QMSBOX and QMSLST commands will ignore Group A Option 6 and the page margins and will draw boxes and lines to the edge of the page if instructed to do so.

Examples:

<ESC>[720;3600v	Left Margin set at 720 deci-points, Right Margin set at 3600 decipoints if unit of measure is decipoints
<ESC>[02000;06000v	Left Margin set at 2 inches, Right Margin set at 6 inches if unit of measure is inches

---

<ESC>[p1;p2<SP>v   **QMSTBM**

This command is used to specify the top and bottom margins. The **p1** parameter specifies the top margin and **p2** specifies the bottom margin. Valid values for both parameters are limited to 5 digits and depend on the unit of measure currently in effect (see QMSPRM, RM, or SM commands). If the unit of measure is inches or centimeters, the values used to specify the top and bottom margins MUST have five digits.

If either the **p1** or **p2** is omitted, the current value for the omitted parameter will not be changed.

The value entered for the top margin must be less than the value indicated for the bottom margin or the command will be ignored. If the top margin is greater than the current vertical position, the vertical position will be reset to the top margin.

Margin Commands

The value entered for the bottom margin must be greater than the value indicated for the top margin or the command will be ignored. If the bottom margin is less than the current vertical position, the page will be printed and the vertical position will be reset to the top margin of the next page.

The top and bottom margins are measured from the top edge of the page. Any command that exceeds the top or bottom margin will be truncated at the margin regardless of whether the margin is at the edge of the page or inside the edge of the page. The only exceptions to this are the forms (QMSBOX) and line (QMSLST) drawing commands and the superscript (PLU) and subscript (PLD) commands.
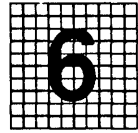
Examples:

<ESC>[720;3600<SP>v	Top Margin set to 720 decipoints, Bottom Margin set to 3600 decipoints if decipoints is the current unit of measure.
<ESC>[02000;08000<SP>v	Top Margin set to 2 inches, Bottom Margin set to 8 inches if inches is the current unit of measure.

Tab Commands

Overview

The commands in this section are used to define or advance to the horizontal and vertical tab settings. If no tabs are set while in ANSI Mode, the default values will be used. The default horizontal tabs are set at every 8 spaces. The default vertical tabs are set for every line.

NOTE: If you wish to establish your own tabs, the default tab values must be cleared before setting any new values. The command to clear tabs is TBC (explained below).

- Vertical Tab (<VT>) command moves the print position to the next vertical tab stop.

- Horizontal Tab (<HT>) command moves the print position to the next horizontal tab stop.

- HTS sets one horizontal tab stop at the current position.

- TBC clears all horizontal and vertical tabs.

- QMSSHT sets Absolute Horizontal Tabs regardless of the current position.

- QMSSVT sets Absolute Vertical Tabs regardless of the current position.

- QMSAHV allows you to "save" a particular position and then "return" to it at any time.

`<VT>` VERTICAL TAB

This command causes the vertical position to be moved down to the next available vertical tab location. If no vertical tab exists below the current vertical position no action is taken. If the vertical tab will take the active vertical position below the bottom page margin, a Form Feed is generated and the current active position is set to the top and left page margins.

A vertical tab does not change the horizontal position unless a Form Feed is generated.

`<HT>` HORIZONTAL TAB

This command causes the horizontal position to be moved to the right to the next available horizontal tab location. If the tab is beyond the current right margin then the active horizontal position is set to the right margin. If no horizontal tab exists beyond the current horizontal position no action is taken.

`<ESC>H` HTS

This command sets one horizontal tabulation stop at the current print position. This tab location is valid for all subsequent lines until it is cleared.

`<ESC>[ Ps g` TBC

This command is used to clear horizontal and vertical Tabs depending upon which value is selected for the "Ps" parameter.

The valid values for "Ps" are:

3 Clear all Horizontal Tabs
4 Clear all Vertical Tabs

No other values are valid for this parameter.

Example:

```
<ESC>[3g   (Clear all Horizontal Tabs)
<ESC>[4g   (Clear all Vertical Tabs)
```

Tab Commands

<ESC>[Pst QMSSHT

This command is used to set absolute horizontal tabs and store the tab locations in a table. Up to 8 tab locations may be stored per command and a total of 126 horizontal tabs may be accumulated in the table. The tab entries are automatically sorted by size in the table so they may be set in any order. These tab settings can be cleared using the "Reset to Initial State" (RIS) command, doing a "warm boot" or turning the printer OFF/ON. Use the <HT> command to locate the desired horizontal tab once it has been set.

The "Ps" parameter(s) is used to indicate the distance of the horizontal tab from the left edge of the page. Valid values (up to five digits - "nnnnn") will depend upon the "Unit of Measure" currently in effect. The Unit of Measure could be in dots, decipoints, thousandths of an inch, thousandths of a centimeter, or character/line spaces. (Unit of Measure is established using either the QMSPRM command or the "Positioning Unit Mode" parameter of the RM or SM commands.) If the unit of measure is either inches or centimeters, all five digits MUST be entered. An implicit decimal point exists after the second digit.

Example:

Ps = 02500 = 2.5"

If more than one horizontal tab is to be set, each tab value should be separated by an ASCII semicolon (;). No semicolon is needed after the last horizontal tab value.

If a horizontal tab causes the new active horizontal position to exceed the right margin, the active horizontal position will be placed at the right margin.

Example:

<ESC>[01000;02000;03000;04000;05000t

(Horizontal tabs set at 1,2,3,4, and 5 inches IF the Unit of Measure is set to "inches.")

(Horizontal tabs set at 720, 1440 2160, 2880 and 3600 decipoints IF the Unit of Measure is set to "decipoints".)

‹ESC›[Ps ‹SP›t | QMSSVT

This command is used to set absolute vertical tabs and store the tab locations in a table. Up to 8 tab locations may be stored per command and a total of 126 vertical tabs may be accumulated in the table. The tab entries are automatically sorted by size in the table so they may be set in any order. These tab settings can be cleared using the "Reset to Initial State" (RIS) command, doing a "warm boot" or turning the printer OFF/ON. Use the ‹VT› command to locate the desired vertical tab once it has been set.

The "Ps" parameter(s) is used to indicate the distance of the vertical tab from the top of the page. Valid values (up to five digits - "nnnnn") will depend upon the Unit of Measure currently in effect. The Unit of Measure could be in dots, decipoints, thousandths of an inch, thousandths of a centimeter, or character/line spaces. (Unit of Measure is established using either the QMSPRM command or the "Positioning Unit Mode" parameter of the RM or SM commands.) If the Unit of Measure is either inches or centimeters, all five digits MUST be given. An implicit decimal point exists after the second digit.

Example:

Ps = 02500 = 2.5"

If more than one vertical tab is to be set, each tab value should be separated by an ASCII semicolon (;). No semicolon is needed after the last vertical tab value.

If a vertical tab command causes the new active vertical position to exceed the bottom margin, the page will be ejected and the new active vertical position will be set to the top and left margins of a new page.

Example:

<ESC>[01000;02000;03000;04000;05000t

(Vertical Tabs set at 1, 2, 3, 4 and 5 Inches IF the Unit of Measure is set to "Inches".)

<ESC>[720;1440;2160;2880;3600 t

(Vertical Tabs set at 720, 1440 2160, 2880 and 3600 Decipoints IF the Unit of Measure is set to "Decipoints".)

| <ESC>[p1;p2<SP>x | QMSAHV

This command is used to save and recall a particular horizontal/vertical position. For example, if you are currently working toward the top of the page and want to draw a box enclosure near the bottom of the page and then return to your former position, "save" or store your current position using this QMSAHV command, then indicate the desired horizontal/vertical position for the box using the QMSBOX command, and finally, return to your former position using the "Recall" parameter of this command.

This routine will save and recall up to 8 horizontal/ vertical positions. It allows the active positions to be stored and later recalled in any desired order during a power-up cycle.

The **p1** parameter is used to indicate whether the position is to be saved or recalled according to the following parameter values:

p1 = 0 = Recall position and make it the new active position.
p1 = 1 = Save the current active position.

The **p2** parameter is used to indicate in which of 8 locations or "store areas" the desired horizontal/vertical position is to be stored so that it may be recalled for later use. Valid values for **p2** are 1-8.

Tab Commands   6-5

The vertical position that is stored is the baseline of the current font. A Recall will restore the active position to the same baseline even if the font is changed. The horizontal position that is stored is the left edge of the font for printing in ANSI mode and for printing with the Epson fonts and the center of the font for Qume and Diablo fonts.

These "locations" are all cleared when the printer is turned "OFF." The default "location" is the upper left-hand corner of the print page at power-up and when the RIS (Reset to Initial State) command is used.

If you attempt to recall a **p2** parameter that has not been stored/saved, the new active position will be set to the top left edge of the page.

Example:

<ESC>[1;1<SP>x	Save current position in first value
<ESC>[1;2<SP>x	Save current position in second value
<ESC>[1;3<SP>x	Save current position in third value
<ESC>[0;1<SP>x	Recall position of first value
<ESC>[0;3<SP>x	Recall position of third value

Vertical
Movement
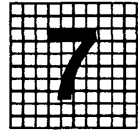
Overview

The commands which have been included in this section are those commands which cause the current print position to be moved in a vertical direction, either up or down. These commands do not include "vertical tab" commands which were explained in Section 6.

- LINE FEED (<LF>) command movement is determined by RM and SM commands.

- FORM FEED (<FF>) causes the page to be printed and moves the current position to next top-of-form.

- CUD moves the current position downward without affecting the horizontal position.

- CUU moves the current position upward without affecting the horizontal position.

- IND moves the current position down one line without affecting the horizontal position.

- PLD moves the current position down to the subscript printing level that is native to the font in use.

- PLU moves the current position up to the superscript printing level that is native to the font in use.

- VPA moves the current position to a specific vertical position without affecting the horizontal position.

- VPR moves the current position to a relative vertical position without affecting the horizontal position.

<LF>   LINE FEED

A Line Feed command may be strictly a vertical move or a combination of a horizontal/vertical move depending upon whether the Reset Mode (RM) or Set Mode (SM) command is active at the time of the Line Feed.

A Line Feed command causes the vertical position to be moved down one line without changing the current horizontal position when using the default Reset Mode (RM) command.

A Line Feed command causes the vertical position to be moved down one line and the horizontal position to be set to the left margin when using the Set Mode (SM) command.

<FF>   FORM FEED

This command causes the current page to be printed and ejected from the printer. The current print position will move to the next top-of-form position.

ESC>[p1B   CUD

This command moves the active vertical position downward without altering the horizontal position. The number of lines moved is determined by the value inserted in the **p1** parameter. If the parameter value is zero or one, the active vertical position is moved one line downward. If the parameter value is greater than 1, the active position is moved downward that number of lines.

The "Unit of Measure" for this command will always be "lines" and the default value is one line.

Example:

<ESC>[B   Moves the active position down 1 line without changing Horizontal position.

<ESC>[0B   Moves the active position down 1 line without changing Horizontal position.

<ESC>[5B   Moves the active position down 5 lines without changing the Horizontal position.

If the active position goes below the bottom margin as a result of this command, a Form Feed is generated and the active print position will be set to the top and left margins.

`<ESC>[p1A` CUU

This command moves the active vertical position upward in the direction of the top of the page without altering the horizontal position. The number of positions moved is determined by the value inserted in the **p1** parameter A parameter value of zero or one moves the active vertical position one line upward. If the parameter value is greater than 1, the active vertical position is moved upward that number of lines.

The "Unit of Measure" for this command is always "lines" and the default value is one line.

Example:

<ESC>[A	Moves the active position up 1 line toward the top of the page.
<ESC>[0A	Moves the active position up 1 line toward the top of the page.
<ESC>[5A	Moves the active position up 5 lines toward the top of the page.

If the active vertical position will go above the top of the print page as a result of this command, the active vertical position will be set to the top of the current page.

`<ESC>D` IND

This command works like the Index key on a typewriter. It moves the active vertical position downward one line without changing the horizontal position.

If the active print position goes below the bottom margin as a result of this command, a Form Feed is generated and the active print position is set at the top and left margins of the next print page.

PLD

This is the Partial Line Down command. It is used to allow subscript printing (n_{15}). The actual distance moved depends on the size of the font currently in use. The subscript value is stored in the font so that the distance moved is always appropriate for the font size.

Once the subscript is printed, a single PLU command (see PLU below) will return you to the normal baseline of the font. A second PLU command is required to place the active print position from subscript to superscript.

A subscript may be printed a partial line below the bottom margin provided the bottom margin is not the bottom edge of the page. If the bottom margin is the bottom of the page, the command will be attempted but the letters may be cut in half by the edge of the page.

|‾ <ESC>L | **PLU**

This is the Partial Line Up command. It is used to allow superscript printing (n^2). The actual distance moved depends on the size of the font currently in use. The superscript value is stored in the font so that the distance moved is always appropriate for the font size.

Once the superscript is printed, a single PLD command (see PLD above) will return you to the normal baseline of the font. A second PLD command is required to place the active print position from superscript to subscript.

A superscript may be printed a partial line above the top margin provided the top margin is not the top edge of the page. If the top margin is the top of the page, the command will be attempted but letters may be cut in half by the edge of the page.

|‾ ESC>[p1d | **VPA**

This is the Vertical Position Absolute command. The command is used to move the active position to a specific vertical location indicated in the **p1** parameter without changing the horizontal position. A parameter value of

zero or one moves the active vertical position to the first position. If the parameter value is greater than 1, the active vertical position is moved to that numbered position. This command always measures the specified number of positions down from the top of the page. The actual distance from one position to the next will depend on the current "Unit of Measure" as explained below.

Whether the parameter is expressed in units of line spaces, decipoints, dots, thousandths of a centimeter or thousandths of an inch depends on the current "Unit of Measure." The QMSPRM command and the Positioning Units Mode parameter of the SM and RM commands are used to determine which Unit of Measure will be active at the time a command is sent.

<ESC>[p1;p2e   VPR

This is the Vertical Position Relative command. The command moves the current print position up or down the number of positions specified by the first parameter. A parameter value of zero or one indicates a single-position move. If the parameter value is greater than 1, the active vertical position is moved to that numbered position (relative to the previous position). This command always causes a vertical move the desired number of positions FROM THE CURRENT POSITION. The actual distance from one position to the next will depend on the current "Unit of Measure" as explained two paragraphs below.

The p2 parameter defines the direction of the movement. A value of one in the p2 parameter indicates upward movement (toward the top margin). Any other value in the second parameter indicates downward movement (toward the bottom margin). If the p2 parameter is omitted, the default direction is downward.

Whether the parameter is expressed in units of line spaces, decipoints, dots, thousandths of a centimeter or thousandths of an inch depends on the current "Unit of Measure." The QMSPRM command and the Positioning Units Mode parameter of the SM and RM commands are used to determine which Unit of Measure will be active at the time a command is sent.

Horizontal
Movement
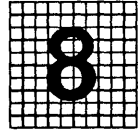
8

Overview
The commands which have been included in this section are those commands which cause the current print position to be moved in a horizontal direction, either backward or forward. Horizontal tab commands are not included.

- Carriage Return (<CR>) moves the current position to the Left Margin.

- Backspace (<BS>) moves the current position backward one space.

- CUB moves the current position backward a specific distance without affecting the vertical position.

- CUF moves the current position forward a specific distance without affecting the vertical position.

- HPA moves the current position to a specific position in the current line.

- HPR moves the current position to a relative position in the current line.

<CR> CARRIAGE RETURN
This command causes the active horizontal position to be moved to the left margin.

<BS> BACKSPACE
This command causes the active horizontal position to

be moved back toward the left edge of the page. If the Backspace command would cause the print position to go beyond the left edge of the print page, the active horizontal position is set to the left edge of the page.

Backspacing can go to the left of the left margin if the left margin is not equal to the left edge of the print page. The amount of each Backspace character is equal to the current horizontal space for a single character.

<ESC>[p1D CUB

This command is used to move the active horizontal position in a backward direction. The distance moved is determined by the parameter. If the parameter value is zero or one, the active horizontal position is moved one position backward. If the parameter value is greater than 1, the active horizontal position is moved that number of positions backward.

The "p1" parameter is used to indicate the number of desired backward spaces to be moved.

The "Unit of Measure" for the Backspace command is the value of a single character space which will depend on the size of the font currently being used.

If the "p1" parameter is omitted, the default value of one backward space is used.

Example:

<ESC>[D   Moves the active position to the left one character position.

<ESC>[0D   Moves the active position to the left one character position.

<ESC>[10D   Moves the active position to the left 10 character positions.

The valid values for "p1" are limited by the size of the page. If the value used in this command causes the active horizontal position to go off the left edge of the page, the active horizontal position will be set equal to the left edge of the printable page.

| <ESC>[p1C | CUF |

This command is used to move the active horizontal position in a forward direction. The distance moved is determined by the value inserted in the "p1" parameter. A parameter value of zero or one moves the active horizontal position one position forward toward the right margin. If the parameter value is greater than 1, the active horizontal position is moved that number of positions forward.

Example:

<ESC>[C	Moves the active position forward 1 character position.
<ESC>[0C	Moves the active position forward 1 character position.
<ESC>[10C	Moves the active position forward 10 character spaces.

The CUF command moves the active print position equivalent of a single fixed-character width. The default value is one.

The valid values for "p1" are limited by the size of the page. If the active print position goes beyond the right margin of the page, the active position will be set equal to the right margin. This may cause loss of data since nothing is printed beyond the right margin.

| <ESC>[p1' | HPA |

This is the Horizontal Position Absolute command. It moves the current print position within the active line to the position specified by the parameter. A parameter value of zero or one moves the active position to the first position of the active line. If the parameter value is greater than 1, the active position is moved to that numbered position of the active line. This command always measures the specified number of horizontal positions from the left edge of the page.

Whether the parameter is expressed in units of line spaces, decipoints, dots, thousandths of a centimeter or thousandths of an inch depends on the current "Unit of Mea-

Horizontal Movement   8-3

sure." The QMSPRM command and the Positioning Units Mode parameter of the SM and RM commands are used to determine which Unit of Measure will be active at the time a command is sent.

The "p1" parameter moves the active position to the position specified.

Example:

<ESC>['	Moves the active position to the first position of the current line.
<ESC>[0'	Moves the active position to the first position of the current line.
<ESC>[10'	Moves the active position to the 10th position in the current line.

<ESC>[p1;p2a   HPR

This is the Horizontal Position Relative command. It moves the current print position forward the number of positions specified by the parameter. A parameter value of zero or one indicates a single-position move. If the parameter value is greater than 1, the active position will be moved that number of positions forward (relative to the previous position). This command always causes a horizontal move the desired number of positions FROM THE CURRENT POSITION.

Whether the parameter is expressed in units of line spaces, decipoints, dots, thousandths of a centimeter or thousandths of an inch depends on the current "Unit of Measure." The QMSPRM command and the Positioning Units Mode parameter of the SM and RM commands are used to determine which Unit of Measure will be active at the time a command is sent.

The "p1" parameter causes the active horizontal position to be moved a specified distance.

The "p2" parameter defines the direction of the movement. A value of one in the "p2" parameter indicates movement toward the left margin. Any other value in the second parameter indicates forward movement in the direction of the right margin. If the "p2" parameter me-

ter is omitted, the default direction is toward the right margin.

Example:

<ESC>[a	Moves the active Horizontal position 1 "Unit" to the right.
<ESC>[10a	Moves the active Horizontal position 10 units to the right.
<ESC>[40a	Moves the active Horizontal position 40 units to the right.
<ESC>[8;1a	Moves the active Horizontal position 8 units towards the Left Margin.

The default value is 1 "Unit of Measurement" depending on the setting of the QMSPRM or the RM or SM command. Remember, only one of these "Unit of Measurement" commands can be active at a given time.
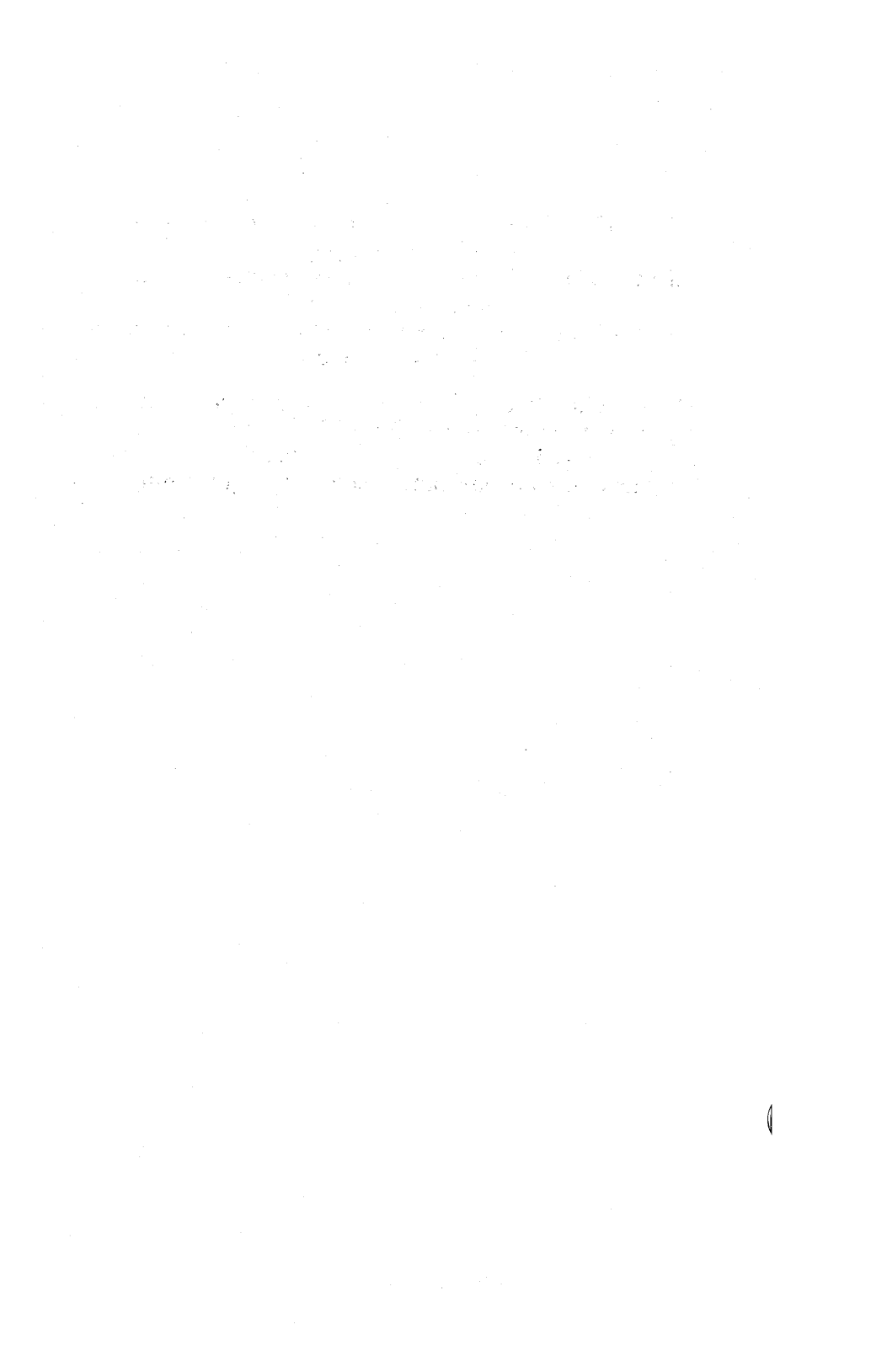
Positioning
Commands
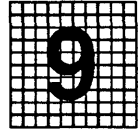
Overview

These commands affect the horizontal and vertical positions simultaneously.

- HVP is used to set the horizontal and vertical positions at the same time.

- NEL moves the current position to the first position on the next line.

- CNL moves the current position down to the first position of a line specified in the command.

- CPL moves the current position up to the first position of a line specified in the command.

`<ESC>[p1;p2f`	HVP

This command is used to set both the active horizontal and active vertical positions at the same time. The "p1" parameter specifies the active vertical position. The "p2" parameter specifies the active horizontal position.

Whether the parameter is expressed in units of line spaces, decipoints, dots, thousandths of a centimeter or thousandths of an inch depends on the current "Unit of Measure." The QMSPRM command and the Positioning Units Mode parameter of the SM and RM commands are used to determine which Unit of Measure will be active at the time a command is sent.

Example:

<ESC>[f   Moves active position to the first "unit" over and down.

<ESC>[;2f   Moves active position to the first "unit" down and the second "unit" over.

<ESC>[5;30f   Moves active position to the fifth "unit" down and the 30th "unit" over.

The default value is 1 "Unit of Measurement" depending on the setting of the QMSPRM or the RM or SM command. Remember, only one of these "Unit of Measurement" commands can be active at a given time.

The entire printable page is considered the display window. If the new vertical position goes below the bottom margin, a Form Feed is generated and the active print position is set equal to the top and left margins of a new print page. If the horizontal position goes beyond the right margin, the active position will be set equal to the right margin.

&boxed;<ESC>E&boxed;   NEL

This is the Next Line command which moves the current print position to the first position on the next line downward.

If the current print position goes below the bottom margin, a Form Feed is generated and the active print position is set equal to the top and left margins of the next print page.

<ESC>[p1E   CNL

This command moves the current print position to the first position of the next display line depending upon the parameter. The "p1" parameter moves the current print position to the first character position on the specified line down.

If a value for "p1" is omitted or is 0, the default value is 1.

Example:

\<ESC\>[E	Moves the current print position to the first character position of the next line down.
\<ESC\>[0E	Moves the current print position to the first character position of the next line down.
\<ESC\>[5E	Moves the current print position to the first character position of the 5th line down.

If the current print position goes below the bottom margin, a Form Feed is generated and the current position will be set to the top and left margins of the new page.

\<ESC\>[p1F	CPL

This command moves the current print position to the first position of the preceding display line or the Nth preceding display line, depending upon the parameter. If a value for "p1" is omitted or is 0, the default value is 1.

Example:

\<ESC\>[F	Moves the current print position to the first character position of the preceding line.
\<ESC\>[0F	Moves the current print position to the first character position of the preceding line.
\<ESC\>[5F	Moves the current print position to the first character position of the 5th preceding line.

The entire print page is considered the display window. If the current print position will go above the top of the print page the current print position will be set to the top of the page.

Graphics
Commands

10
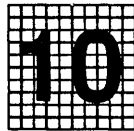
Overview

The commands in this section give you graphics capa-
bilities such as creating variations of fonts, form or box
drawing, and line drawing.

- FNT allows you to specify fonts to be used by the
  SGR command.

- SGR allows you to select fonts and perform special
  printing capabilities.

- QMSBLD is used to enable bolding of fonts.

- QMSBOX is used for printing boxes.

- QMSLST is used for printing lines.

`<ESC>[p1;p2<SP>D`	**FNT**

This command is used to assign "locations" to up to ten
specific font numbers. These locations will be used with
the Select Graphics Rendition (SGR) command to access
or recall a desired font.

The range of valid values for **p1** is 0-9. The **p2** parameter
must be a valid font number (0-32767). The font must
be stored in ROM, RAM, or in a Font Cartridge. **Note
to Epson Users: Do not assign Font 32767 to any
other font. This is the Epson download font.**

There is no default font in this command. If either pa-
rameter is missing or if **p1** is invalid, the command will
be ignored.

Font numbers must be assigned locations using this font
if you are to use the SGR command. Verification that
the font is actually available will not occur until the SGR
command is used. Font orientation is declared with the
SGR.

Examples:

<ESC>[0;404<SP>D	Font 404 assigned to location '0'
<ESC>[1;382<SP>D	Font 382 assigned to location '1'
<ESC>[10;380<SP>D	Invalid location; command is ignored

| <ESC>[Psm | **SGR**

This is the Select Graphics Rendition command. It is
used to select a specific font or graphic capability us-
ing unique parameter numbers for each available fea-
ture. (The fonts must first be defined using the FNT
command.) Whatever capability is invoked by this com-
mand will continue until the next occurrence of the SGR
is received.

Valid values for the "Ps" parameter are listed below with the corresponding capability:

Valid Value	Meaning
0	Primary Rendition. (Power-up default.)
1	Bold.
2	Faint.
4	Single Underline.
7	Negative (Reverse) Image.
10	Font designated as "0" by FNT.
11	Font designated as "1" by FNT.
12	Font designated as "2" by FNT.
13	Font designated as "3" by FNT.
14	Font designated as "4" by FNT.
15	Font designated as "5" by FNT.
16	Font designated as "6" by FNT.
17	Font designated as "7" by FNT.
18	Font designated as "8" by FNT.
19	Font designated as "9" by FNT.
44	Double Underline.

The SGR command is a toggle function. The first time that the option is given in an SGR command the option is enabled and will stay enabled until the next occurence of that same parameter in an SGR command.

Primary Rendition (Ps = 0)

The Primary Rendition parameter resets the printer to the default conditions of this command. The default font is selected and all other features are disabled.

Bold (Ps = 1)

If the Bold feature is selected, all text will be printed in a bold version of the current font.

Faint (Ps =2)

If the Faint feature is selected, all text will be printed in a faint or lighter-weight version of the current font. If the QUAD command is used in conjunction with this feature, text will be faint or gray but the "fill with leader" portions of the commands will be printed normally rather than gray.

Single and Double Underline (Ps = 4 or 44)

If the Single or Double Underline (underscore) feature is selected, data will be underlined until the command is toggled "OFF." If your hardware is configured for Qume or Diablo Emulation, all subsequent data and tabbed spaces will be underlined. If your hardware is configured for either ANSI or Epson Emulation, the spaces between Horizontal Tab positions will not be underlined but all data will be underlined.

Negative (Reverse) Image (Ps = 7)

If the Negative (Reverse) Image feature is selected, all subsequent text will be printed in white letters surrounded by black. If the QUAD command is used in conjunction with this feature, text will be reverse image but the "fill with leader" portions of the commands will be printed normally rather than reverse image. Neither Single or Double Underlining will be visible if used in conjunction with Reverse Image.

When doing reverse image work in landscape orientation, character spacing should not exceed 128 dots.

Examples:

<ESC>[4;12;2m   Select font designated as "2" by FNT, print in Faint, single underline.

<ESC>[17;7m   Select font designated as "7" by FNT, print in Negative Image.

The following actual examples of the SGR command use the commands from the previous page. FNT commands designating Font #382 as "2" and Font #380 as "7" have been issued.

The font designated as 2 by the FNT command was font #382, Epson Pica. Font 382 and the printing in faint with underscore will continue until another SGR command is received that toggles these renditions to off.

The font designated as 7 by the FNT command was font #380, Epson Compressed. The SGR command becomes an easy method of recalling print features.

`<ESC>[p1<SP>y`　QMSBLD

This command is used to enable and disable bold printing. The valid values for **p1** are:

p1　=　0　=　Disable horizontal and vertical bold

p1　=　1　=　Disable horizontal bold only

p1　=　2　=　Disable vertical bold only

p1　=　3　=　Enable horizontal and vertical bold

p1　=　4　=　Enable horizontal bold, disable vertical bold

p1　=　5　=　Enable vertical bold, disable horizontal bold

p1　=　6　=　Enable horizontal bold, no change to vertical bold

p1　=　7　=　Enable vertical bold, no change to horizontal bold

Also refer to PLD and PLU commands later in this manual.

Examples:

Horizontal and vertical bold enabled.

Horizontal bold only.

Vertical bold only.

This command may be used to draw the horizontal and vertical measurements of a box or form.

The "Ps" component of this command actually includes eight parameters which are needed in order to draw a box or form. Seven of the eight values must be declared or the command will be ignored. The "p8" parameter will default to solid black lines if not declared. Also, only the "p1" parameter may have a value of 0 or the command will be ignored. The sequence of parameters entered into the "Ps" of the command is as follows:

p1 = 0   Absolute page coordinates.
p1 = 1   Relative to current print position.

The "p1" parameter tells the printer whether the measurements are to be absolute (from the top left edge of the page) or relative (from the current print position).

p2 = nnnnn   X-coordinate start address.

The "p2" parameter is used to indicate the value of the X- coordinate starting point. The X- coordinate is the specified horizontal distance from the left edge of the page (absolute) or the specified horizontal distance from the current print position (relative). If the X- coordinate point is beyond the right edge of the page, the command will be ignored. The specified point may, however, be outside the established page margins.

Whether parameters p2 through p7 are expressed in units of character/line spaces, decipoints, dots, thousandths of a centimeter or thousandths of an inch depends on the current "Unit of Measure." The QMSPRM command and the Positioning Units Mode parameter of the SM and PM commands are used to determine which unit of measure will be active at the time the QMSBOX command is sent.

p3 = nnnnn   Y-coordinate start address

The "p3" parameter is used to indicate the value of the Y- coordinate starting point. The Y- coordinate is the specified vertical distance from the top edge of the page (absolute) or the specified vertical distance from the current print position (relative). If the Y- coordinate point is beyond the bottom edge of the page, the command will be ignored. The specified point may, however, be outside the established page margins.

p4 = nnnnn   Horizontal Bar Length

The "p4" parameter indicates the length of the horizontal bars of the box or form.

p5 = nnnnn   Vertical Bar Length

The "p5" parameter indicates the length of the vertical bars of the box or form.

p6 = nnnnn   Horizontal Bar Thickness

The p6 parameter indicates the thickness of the horizontal bars (i.e., a thick or thin line).

p7 = nnnnn   Vertical Bar Thickness

The p7 parameter indicates the thickness of the vertical bars (i.e., a thick or thin line).

p8 = nnnnn   Dot density pattern of bars

The p8 parameter controls dot patterns in order to create solid black lines, dotted lines, or broken lines. Valid values for this parameter are 1 – 65535 (ASCII decimal equivalent of a binary number). This parameter need not be entered. The default condition is solid black lines.

CAUTION: Not all patterns work equally as well as others. Any pattern using 16 dots may be used but if the X,Y coordinates happen to land in the "OFF" dots of a pattern, the box may not appear as you intended. If in doubt, stick to the default solid black line until you are ready to experiment with alternate patterns.

Some common 16-dot patterns are:

65535 = Solid black pattern, 16 dots ON, default pattern (FFFF).

61680 = Short dashes, 4 dots ON, 4 dots OFF, etc. (F0F0).

65280 = Long dashes, 8 dots ON, 8 dots OFF, etc. (FF00).

43690 = Gray pattern with dots alternating OFF and ON (AAAA).

52428 = Gray pattern with two dots alternating OFF and ON (CCCC).

Some examples of these patterns appear on the following page.

These parameters are dependent upon the current page margins and page orientation. However, if a box drawing extends beyond the edges of the printable page, only the portions of the box drawing that extends beyond the page are lost.
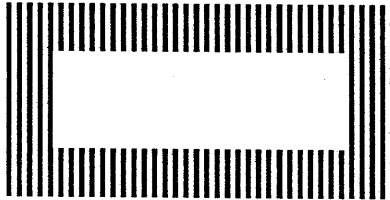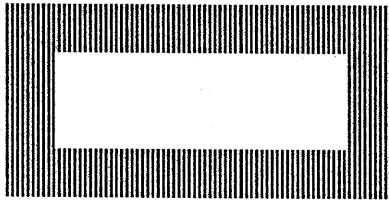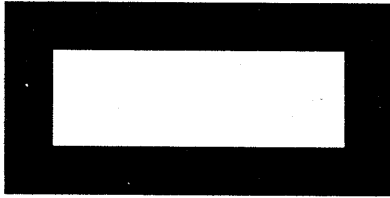
This input generated the above boxes:

```
<ESC>[0;01000;01500;02000;01000;00250;00250 ¦
<ESC>[0;01200;02900;02000;01000;00250;00250;61680 ¦
<ESC>[0;01000;04300;02000;01000;00250;00250;65280 ¦
```

The following QMSBOX commands generated the simple form below (Unit of Measure = inches):

```
<ESC>[0;01000;02500;03500;05000;00050;00050 |
<ESC>[0;01200;02800;01750;01000;00020;00020 |
<ESC>[0;01200;04200;03100;00250;00010;00010;43690 |
<ESC>[0;01200;04600;03100;02500;00010;00010;43690 |
```
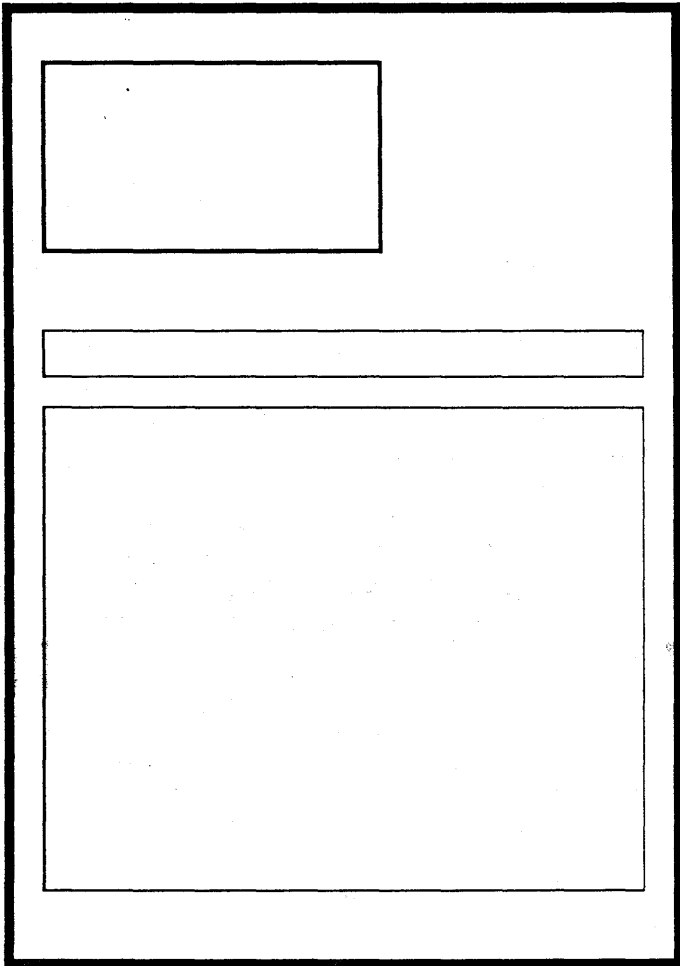
This command may be used to draw horizontal or vertical lines.

The "Ps" component of this command actually includes six parameters which are needed in order to draw a line. Five of the six parameter values must be declared or the command will be ignored. The "p6" parameter will default to solid black lines if not declared. Also, only the "p1" parameter may have a value of 0 or the command will be ignored. The sequence of parameters entered into the "Ps" portion of the command is as follows:

p1 = 0   Absolute page coordinates.
p1 = 1   Relative to current print position.

The "p1" parameter tells the printer whether the measurements are to be absolute (from the top left edge of the page) or relative (from the current print position).

p2 = nnnnn   X-coordinate start address.

The "p2" parameter is used to indicate the value of the X- coordinate starting point. The X- coordinate is the specified horizontal distance from the left edge of the page (absolute) or the specified horizontal distance from the current print position (relative). If the X- coordinate point is beyond the right edge of the page, the command will be ignored. The specified point may, however, be outside the established page margins.

Whether parameters p2 through p5 are expressed in units of character/line spaces, decipoints, dots, thousandths of a centimeter or thousandths of an inch depends on the current "Unit of Measure." The QMSPRM command and the Positioning Units Mode parameter of the SM and PM commands are used to determine which unit of measure will be active at the time the QMSLST command is sent.

p3 = nnnnn   Y-coordinate start address

The "p3" parameter is used to indicate the value of the Y- coordinate starting point. The Y- coordinate is the specified vertical distance from the top edge of the page (absolute) or the specified vertical distance from the current print position (relative). If the Y- coordinate point is beyond the bottom edge of the page, the command will be ignored. The specified point may, however, be outside the established page margins.

p4 = nnnnn   Horizontal Bar Length

The "p4" parameter indicates the length of the horizontal measurement of the line. If you are drawing a horizontal line, this measurement will be the length of the line. If you are drawing a vertical line, this measurement will be the thickness of the line.

p5 = nnnnn   Vertical Bar Length

The "p5" parameter indicates the length of the vertical measurement of the line. If you are drawing a horizontal line, this measurement will be the thickness of the line. If you are drawing a vertical line, this measurement will be the length of the line.

p6 = nnnnn   Dot density pattern of bars

The p6 parameter controls dot patterns in order to create solid black lines, dotted lines, or broken lines. Valid values for this parameter are 1 – 65535 (ASCII decimal equivalent of a binary number). This parameter need not be entered. The default condition is solid black lines.

CAUTION: Not all patterns work equally as well as others. Any pattern using 16 dots may be used but if the X,Y coordinates happen to land in the "OFF" dots of a pattern, the box may not appear as you intended. If in doubt, stick to the default solid black line until you are ready to experiment with alternate patterns.

Some common 16-dot patterns are:

65535 =	Solid black pattern, 16 dots ON, default pattern (FFFF).
61680 =	Short dashes, 4 dots ON, 4 dots OFF, etc. (F0F0).
65280 =	Long dashes, 8 dots ON, 8 dots OFF, etc. (FF00).
43690 =	Gray pattern with dots alternating OFF and ON (AAAA).
52428 =	Gray pattern with two dots alternating OFF and ON (CCCC).

Some examples of these patterns appear below.

These parameters are dependent upon the current page margins and page orientation. However, if a box drawing extends beyond the edges of the printable page, only the portions of the box drawing that extends beyond the page are lost.

From top: 65535, 61680, 65280.
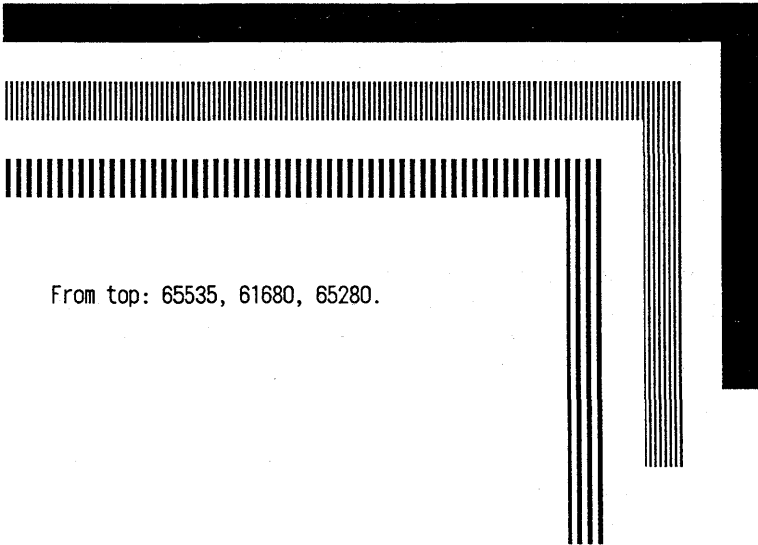
Example:

The following input combines the QMSBOX commands demonstrated earlier with QMSLST commands to generate the form on the next page:

```
<ESC>[03000;01300f<ESC>[380sName:<ESC>[03250;01300fAddress:
<ESC>[03500;01300fCity:
<ESC>[04400;01800fDescription
<ESC>[04400;03300fQty.<ESC>[04400;03850fAmt.


<ESC>[0;01000;02500;03500;05000;00050;00050 ¦
<ESC>[0;01200;02800;01750;01000;00020;00020 ¦
<ESC>[0;01200;04200;03100;00250;00010;00010;43690 ¦
<ESC>[0;01200;04600;03100;02500;00010;00010;43690 ¦
<ESC>[0;01200;03050;01750;00005¦<ESC>[0;01200;03300;01750;00005¦
<ESC>[0;01200;03550;01750;00005¦<ESC>[0;01400;04200;00010;00250¦
<ESC>[0;03200;04200;00010;00250¦<ESC>[0;03700;04200;00010;00250¦
<ESC>[0;01400;04600;00010;02500¦<ESC>[0;03200;04600;00010;02500¦
<ESC>[0;03700;04600;00010;02500¦<ESC>[0;01200;04700;03100;00005¦
<ESC>[0;01200;04800;03100;00005¦<ESC>[0;01200;04900;03100;00005¦
<ESC>[0;01200;05000;03100;00005¦<ESC>[0;01200;05100;03100;00005¦
<ESC>[0;01200;05200;03100;00005¦<ESC>[0;01200;05300;03100;00005¦
<ESC>[0;01200;05400;03100;00005¦<ESC>[0;01200;05500;03100;00005¦
<ESC>[0;01200;05600;03100;00005¦<ESC>[0;01200;05700;03100;00005¦
<ESC>[0;01200;05800;03100;00005¦<ESC>[0;01200;05900;03100;00005¦
<ESC>[0;01200;06000;03100;00005¦<ESC>[0;01200;06100;03100;00005¦
<ESC>[0;01200;06200;03100;00005¦<ESC>[0;01200;06300;03100;00005¦
<ESC>[0;01200;06400;03100;00005¦<ESC>[0;01200;06500;03100;00005¦
<ESC>[0;01200;06600;03100;00005¦<ESC>[0;01200;06700;03100;00005¦
<ESC>[0;01200;06800;03100;00005¦<ESC>[0;01200;06900;03100;00005¦
<ESC>[0;01200;07000;03100;00005¦
```

Name:

Address:

City:

	Description	Qty.	Amt.

Graphics Commands

Special Printer Features
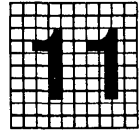
Overview

This section includes some of the special features which are available on the printer.

- JFY is used to justify text between the left and right margins.

- PU1 enables an ignore mode in the printer.

- PU2 disables the ignore mode.

- QMSASF is used to absorb system forms controls.

- QUAD allows you to use text with "leader dots."

- QMSCC allows you to define any character to be a printable character.

<ESC>[Ps<SP>F **JFY**

This is the ANSI Justify command which is used in text processing to control the layout of the printed material on the page. Once enabled, a Justify capability remains in effect until you disable it by sending the "0" parameter of the JFY command or by sending the JFY command with another parameter to enable a different Justify capability.

The QUAD command explained on page 11-4 in this section terminates justification for a single line and then the Justify command is reinstated.

The valid values for the "Ps" parameter are shown below.

Parameter	Parameter Meaning
0	Terminate ALL Justify Action (This is the same as Flush Left).
2	Interword Spacing.
5	Flush Left Margin.
6	Center Text between Margins.
7	Flush Right Margin.

The Interword Spacing parameter (2) causes the total amount of space between all the words of a line to be evenly distributed throughout the line so that the right margin is even. The space between words can be expanded up to 200% or reduced to 60% in order to achieve an even right margin. If a line of text is too long to allow an even right margin, the excess text will be printed beyond the right margin and up to the edge of the page. If the line of text is too short to allow an even right margin, the line will be printed with normal interword spacing.

Selecting the Flush Left Margin parameter (or the Terminate ALL Justify Action) will result in an even left margin with normal spacing between words and an uneven right margin.

The Center Text Between Margins parameter allows you to center headings or titles between the current left and right margins. The normal spacing will be used between the words in the heading. The space between the left margin and the beginning of the heading and the space between the end of the heading and the right margin will be even. If a line of text is too long to be justified or centered within the established Margins, the excess text will be printed in the right margin up to the page edge.

Examples:

<ESC>[6F This command centers all text that follows between the margins.

<ESC>[2F This command terminates all text to be centered and enables interword spacing justification.

<ESC>[F This command will terminate all justification action.

Special Printer Features

All command sequences and any command which changes the Vertical Position (except the PLD and PLU commands) will indicate the end of the line to be justified when justification is enabled. Below is a list of the Vertical Position commands which terminate the line to be justified.

```
<CR>   VPR   CPL
<LF>   VPA   IND
<VT>   HVP   CUU
<FF>   NEL   CUD
<LF>   CNL
```

Exceeding the 255 character buffer for a single line of text to be justified will also terminate justification.

<ESC>Q PU1

This command causes all text and commands that follow it to be absorbed without moving or changing the active print position. The command continues to absorb everything until a PU2 command (below) or system generated Form Feed is received.

This command together with the PU2 command are especially useful when using a plot mode or graphics package with a system that automatically generates a Carriage Return/Line Feed after a specific number of bytes. The Carriage Return/Line Feed will break up your plot data unless you use these two commands.

Use this command in conjunction with the PU2 command to make comments, notes or reminders to yourself in your file. The comments won't print. The command is also useful for de-bugging programs. Use the PU1 and PU2 commands to block off certain portions of your program.

<ESC>R PU2

This command disables the PU1 command. All text following this command is printed and all commands that follow it are processed.

`<ESC>[p1<SP>z` **QMSASF**

This command is used to absorb systems forms controls when printing text. The command does not apply to Graphics Mode, Download Fonts, Overlays or Plot Mode commands. The particular forms controls which may be absorbed are:

> **\<CR\>** Carriage Return
> **\<LF\>** Line Feed
> **\<FF\>** Form Feed
> **\<VT\>** Vertical Tab

The "p1" parameter is used to indicate whether this feature is enabled or disabled as follows:

0 =   Do not absorb systems forms controls
1 =   Absorb systems forms controls

Example:
`<ESC>[0<SP>z`   Does not absorb forms controls.
`<ESC>[1<SP>z`   Does absorb forms controls.

`:ESC>[Ps<SP>H` **QUAD**

This command performs a kind of formatting known as "Quadding." The QUAD command should immediately precede the material to be Quadded and a Vertical Positioning command will terminate the command. The Vertical Positioning commands which will effectively terminate a QUAD function are listed below.

> **\<CR\>** VPR CPL
> **\<LF\>** VPA IND
> **\<VT\>** HVP CUU
> **\<FF\>** NEL CUD
> **\<LF\>** CNL

This is NOT a toggle command. Quadding stays in effect for only a single line of text.

There are 6 types of Quadding functions. Access to the different functions requires a separate value in the "Ps" parameter as shown below.

Parameter	Parameter Meaning
0	Flush Left (default).
1	Flush Left/Fill with Leader.
2	Center.
3	Center and Fill with Leader.
4	Flush Right.
5	Flush Right/Fill with Leader.

The "Fill with Leader" feature means that dots (periods) will be used to fill in the white space between the text and margin(s). If there is no space left over no fill will be inserted. The font used for the text will determine the size of the dots because the "period" character from that font table will be used. If you send one of the "Fill with Leader" parameters but send no text, the entire line will be filled with dots from the font size that was last requested. A font must be declared before "Fill with Leader" can be used. The fill commands work best with proportional spacing.

If the Reverse Image or Faint features of the SGR command are used in conjunction with the fill commands, the dots will be in Reverse Image or Faint.

If you send multiple Quadding functions for the same section of text, the last QUAD command parameter is the only one that will be performed.

If different Quadding functions are desired for sections of text on the same line, the text and QUAD commands should be separated by a Carriage Return <CR> with no Line Feed <LF>.

If a QUAD command is received while Justify Mode is enabled, the Quad Mode will override the Justify Mode for a single line. If a JFY (Justify) command follows a QUAD command on the same line of text, the QUAD command will be ignored.

NOTE: The solid row of dots beneath each example indicates the page margins for reference only.

Flush Left: <ESC>[0<SP>H

This is the power-up printing default mode.

```
Special Printer Features
```

....

Flush Left and Fill with Leader: <ESC>[1<SP>H

This is the power-up printing mode with the exception that after the last character in the line to be printed the line will be filled out to the right margin with a "leader" character (ASCII "Period" is the leader character).

```
Special Printer Features . . . . . . . . . . . . . . . . . . . .
```

....

Center: <ESC>[2<SP>H

The Center function will take a line of text and center it between the left and right margins.

```
                Special Printer Features
```

....

Center and Fill with Leader: <ESC>[3<SP>H

This command will center the text in a line between the left and right margins. The leader character will be placed on both sides of the centered line and up to the left and right margins of the printed page.

```
..........Special Printer Features..........
.................................................
```

Flush Right: <ESC>[4<SP>H

The text following this QUAD command will be flushed to the right margin by placing the last character in the line against the right margin and then working toward the left margin.

```
                        Special Printer Features
.................................................
```

Flush Right and Fill with Leader: <ESC>[5<SP>H

This command will take a line of text and after processing that line of text the last character in the text line is placed on the right margin and the line is extended backward toward the left margin.

```
.....................Special Printer Features
.................................................
```

Special Printer Features   11-7

NOTE : If a line of text is too long to be centered be-tween the left and right margins, the line to be centered will start at the left margin and extend beyond the right margin of the page.

Before a line of text is Quadded in any way, the en-tire line of text including all associated commands is buffered up. The line of text is then treated as if it were in normal print mode and the last thing that is done is the Quadding. What this means to relative and absolute positioning commands is that they become relative to the text that is Quadded.

For users of Quadding that do not fully understand the effects of using absolute and relative positioning com-mands, including tabs, Quadding anything but text should be avoided until you have time to explore all of the inter-actions that occur when the Quad commands are used.

The following input used the QMSAHV, QMSLRM,

and QUAD commands to generate the example

above.

<ESC>[1r<ESC>[1;1 x<ESC>[01400;04900v<ESC>[380s

<ESC>[1 HChapter 1

<ESC>[1 HChapter 2

<ESC>[1 HChapter 3

<ESC>[04900;05100v

<ESC>[0;1 x

1

19

35

<ESC>[Ps} | QMSCC

This command allows you to define any character in the ASCII decimal range 0-255 to be a printable character. This is a one-time-only command. In other words, each time you want a character within this range to be printable, you must define it using this command. A maximum number of eight characters can be defined at the same time using the full eight-parameter limit.

Substitute the decimal value of the characters to be defined as printable in the "p1" through "p8" parameters.

If the defined decimal value is not in the range 0-255, the value will not be printed. If values are given to define several printable characters and only one is invalid, the remaining valid characters will print.

Download Fonts and Overlays
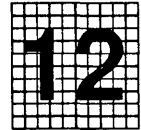
Overview

The commands for download fonts and overlays are more complex than the other ANSI or QMS/ANSI commands explained thus far. Read all information associated with the commands before attempting to use them.

- QMSDLF defines all parameters of a download font to be stored in printer RAM.

- QMSOVR defines all parameters of an overlay to be stored in printer RAM.

`<ESC>Pp1;p2;p3;p4}Font Header; Char. Header Bit Map Data;<ESC>\`

QMSDLF

The QMS Download Font feature enables you to generate your own fonts, special characters or symbols. You may want to define an entire character set or, perhaps, just a single character.

NOTE: Don't delete a download font while printing a job that requires that font. The font may be deleted before the buffered pages have finished printing.

The size of the download font is limited by the available number of bytes in RAM. Print a Start-Up Page first to determine the number of available bytes.

Parameters Defined

The **p1** parameter is used to indicate the Orientation of the font as follows:

p1 = 0   Portrait Font
p1 = 1   Landscape Font

If the **p1** parameter is omitted, the entire command is aborted. There is no default value. If an invalid parameter is used, the entire command is aborted.

The **p2** parameter is used to indicate the download font number. The valid range of font numbers is from 0-32767. The number "32767" should be reserved for the Epson Download Font but all others are unrestricted. If an invalid font number is used, the entire command is absorbed and you will get a diagnostic page indicating an error.

The **p3** parameter is a flag which is used to indicate whether a new font is being created or whether insertions are going to be made in an existing download font. The valid values are shown below.

p3 = 0   Insert into existing Font
p3 = 1   Create a new Font

If this parameter is omitted, the default condition is to create a font. If an invalid parameter is given, the command is absorbed until a <FF> or the command terminator <ESC>\ is encountered.

If a new font is being created and that font number is already resident in the printer controller or present in an installed font cartridge, the entire download font will be absorbed. If the font already exists as a download font, the current download font will be deleted and a new download font will be created. If there is an error in the parameters or header formats of the new font being created, the new font data will not be stored but the older version of the download font will already have been deleted.

If you indicate that you are going to insert additional characters in an already existing download font but that font doesn't exist, the entire command will be absorbed.

If you indicate that you are creating a new font, the Font Header must be present or data will be absorbed as though it were the Font Header.

If you indicate that you are inserting additional characters in an existing font, do not re-enter the Font Header information. Begin the Character Header following the "}" in the command sequence. If Font Header data is encountered when inserting characters in an existing font, everything to the ";" will be absorbed. If the printer can't print the character, an error message will be given.

The **p4** parameter is used to indicate the type of bit map data to be sent. Bit Map data may be sent using either binary (8-Bit data) or Hex (also known as ASCII-hex) values. This parameter only affects the bit map data and does not affect data in the Font Header or Character Headers.

If binary (8-Bit) data is used, each byte of data is used to define the next 8-bits of bit map data. Any 8-bit binary value is valid. The 0's of the binary value indicate "don't print this dot" and the 1's mean "print this dot." The pattern formed by the combination of eight 0's and 1's will be the same as the pattern of printed and unprinted dots. Your system editor will determine how the binary value must be sent on your computer (most often using the decimal equivalent). These values are shown in the ASCII Conversion Chart at the back of this manual. **Bit map data MUST be encoded in multiples of 16 dots per row. This may require padding each row on the right side with zero dot values.**

p4 = 0   Bit map data using Hex or ASCII-hex values (4-dot bit mapping)

p4 = 1   Bit map data using binary equivalents (8-dot bit mapping)

If the **p4** parameter is omitted, the default assumes that

binary values are used. If an invalid parameter is used, the command is absorbed.

FONT HEADER FORMAT

The Font Header data follows the "}" in the command. The Font Header data must be included if you are creating a new font and it must not be included if you are inserting characters in an existing font. Font Header data consists of twelve parameters, each providing special information about the size of the characters which make up the font. All parameters are required. Each of the twelve parameters requires a specific number of characters to define it as shown below.

Parameter Order & Meaning	Required # of Characters
Version	1
Name	20
Height	3
Baseline/Ascender Value	3
Font Fixed-Spacing	3
Underline Distance	3
Double Underline Distance	3
Underline Thickness	3
Horizontal Bold Offset	3
Vertical Bold Offset	3
Superscript Distance	3
Subscript Distance	3

The complete syntax for the Font Header is:

```
vnnnnnnnnnnnnnnnnnnnnhhhbbbfffunldnluntbdhbdvsupsub;
```

Descriptions of each of the twelve parameters follow in this section.

The semicolon after the 12th parameter value indicates the end of the Font Header. The printer expects a specific (minimum) number of characters when the semicolon is encountered and if that number of characters hasn't been

reached, the entire command is aborted and all related data will be absorbed. All parameters must be defined even if you fill the required number of character positions with zeros/spaces.

Alphanumeric parameters use "spaces" for fill and numeric parameters use "zeros." The Font "Version" number requires 1 alphanumeric position and the Font "Name" requires 20 alphanumeric positions. All other parameters require three numeric positions to define their value.

Version (v)

This value should indicate the version of the font which is being created. It may be either a letter or a number.

Name (nnnnnnnnnnnnnnnnnnnn)

This is for the font name. It is 20 characters long. If your font name is not 20 characters long, the remaining positions must be padded with spaces. Control codes (unprintable characters such as <ESC>or <NUL>) are not permitted in the font name.

Height (hhh)

This value is used to indicate the glyph height of each character including descenders and top and bottom borders. The value, which is measured in dots, is the same for all characters in a font. The maximum allowable height is 255 dots though it is recommended that your characters be no more than 85 dots high. The glyph height may be the same size as the bit map height in Portrait orientation or the bit map width in Landscape orientation.

The glyph height parameter also determines the appropriate Line Spacing value for the font. This Line Spacing value will be used if you do not indicate a Fixed Line Spacing (either from the keyboard or using an ANSI software command).

NOTE: If you set a Fixed Line Spacing value from the keyboard or a Line Spacing software command, be sure that the selected Line Spacing value is large enough to accommodate the biggest Font size used on a line.

The Line Spacing value designed into the download font definition is always proportional to the size of the font so you don't need to worry if you change font sizes on the same line.

Baseline/Ascender (bbb)

This parameter indicates the distance from the top of the glyph cell to the Font Baseline. The parameter is also referred to as the "Ascender" value. It is defined in absolute number of dots.

Font Fixed Character Spacing (fff)

This parameter indicates the best Fixed Character Spacing for this particular font size. A value of zero stored in this parameter will cause proportional character spacing.

Underline Distance (unl)

This parameter is used to indicate the location of the underline stroke. It is the distance in dots (range = 1 to 255) from the font baseline down to the top of the underline stroke.

Double Underline Distance (dnl)

This parameter is used to indicate the location for a second or double underline stroke. The distance, which is measured in dots (range = 1 to 255), is from the baseline down to the top of the second underline stroke.

Underline Thickness (unt)

This parameter is used to indicate the thickness of the

underline strokes. The valid range for line thickness is from 1 to 255 dots.

Horizontal Bold Offset (bdh)

This parameter is used to indicate the number of horizontal dot positions to move (from 1 to 255) when overprinting a character in order to achieve bold printing. Horizontal offset may be used alone or with vertical offset which is explained below.

Vertical Bold Offset (bdv)

This parameter is used to indicate the number of vertical dot positions to move (from 1 to 255) when overprinting a character in order to achieve bold printing. Vertical offset may be used alone or with horizontal offset which is explained above.

Superscript Distance (sup)

This parameter is used to indicate how many dots (range = 1 to 255) up from the Font baseline you wish to establish the baseline for the superscript characters.

Subscript Distance (sub)

This parameter is used to indicate how many dots (range = 1 to 255) down from the Font baseline you wish to establish the baseline for the Subscript characters.

After all the Font Header values have been properly defined, you may also include documentation comments (such as "Italic Font") before entering the semicolon. This is completely optional. The printer will absorb this data and it will not print, but it will be there for your information.

CHARACTER HEADER FORMAT

When creating a new font, the Character Header data follows the semicolon of the Font Header data. If you are inserting a character in an existing Font, the Character Header data follows the "}". The syntax for the Character Header data is:

aawwwwyyyxxx+/-ddd+/-eee

The Character Header portion of the QMSDLF command is used to define the characteristics of each letter, number or symbol in the font. The validity of these parameters is not tested. However, if they are not correct, the results may be other than what you expected. Do not use semicolons between the components defined below.

When defining more than one character, semicolon separators are required between the bit map of one character and the Character Header data of the next character.

It is not recommended that any of the 3-digit values be more than 85 dots but the maximum sizes are given and once you are comfortable with the download font format, you may want to experiment with values greater than 85 dots.

If very dense characters are defined, i.e., too much bit map data to be read in the scrolling window, the characters may never actually be printed on the page.

aa

This two-digit parameter is used to indicate the ASCII-hex equivalent for the desired letter, number or symbol that you are going to define.

www

This parameter is used to indicate, in dots, the glyph width for a character including the left and right borders. The value may not be zero.

The glyph width may be the same size as the bit map height for a Landscape character (1-85 dots) or the bit map width for a Portrait character (1-255 dots).

yyy

This parameter is used to indicate the height of the bit map. The recommended height is from 1-85 dots.

xxx

This parameter is used to indicate the width of the bit map. The recommended width is from 1-255 dots.

+/-ddd

The plus or minus value of this parameter is optional. If it is omitted, it is assumed to be a positive value or within the glyph. The parameter is used to indicate the number of dots from the upper border of the glyph to the start of the actual bit map. This is labeled the "Vertical Offset" on the GLYPH AND BIT MAP DIAGRAM in this section. If you define characters outside the glyph, you may not be able to take advantage of features like super- and subscript or bold characters.

+/-eee

The plus or minus value of this parameter is optional. If it is omitted, it is assumed to be a positive value or within the glyph. The parameter is used to indicate the number of dots from the left border of the glyph to the start of the actual bit map. This is labeled the "Horizontal Offset" on the GLYPH AND BIT MAP DIAGRAM in this section. If you define characters outside the glyph, you may not be able to take advantage of features like super- and subscript or bold characters.

The optional plus or minus values for "ddd" and "eee" must be used carefully. The resulting image may not be what you are expecting if a minus value is used which causes the bit map to be outside the glyph cell.

If the bit map extends horizontally outside of the cell for the Portrait Orientation or it extends vertically outside the cell for Landscape Orientation, everything should work fine. However, if the bit map extends vertically outside the cell for Portrait Orientation or horizontally outside the cell for Landscape Orientation the Font character could wrap with the window. This means that portions of the character being defined could print in different locations of the page.

Download Fonts and Overlays

GLYPH AND BIT MAP DIAGRAM

The following diagram shows the Glyph Height and Width, the Character Height and Width (also referred to as the actual Bit Map), the Horizontal and Vertical Offset distance and the direction in which the character is actually printed. The Bit Map may be the same size as the Glyph.

"X" ORIENTATION
CHARACTER DESCRIPTION

NOTE: A Font which is intended for use in both Orientations must be defined separately for each Orientation.

GLYPH WIDTH

HORIZONTAL OFFSET · CHARACTER WIDTH · VERTICAL OFFSET

DOT ROW ENCODING DIRECTION

GLYPH HEIGHT · CHARACTER HEIGHT

GLYPH HEIGHT

HORIZONTAL OFFSET · CHARACTER WIDTH · VERTICAL OFFSET

DOT ROW ENCODING DIRECTION

GLYPH WIDTH · CHARACTER HEIGHT
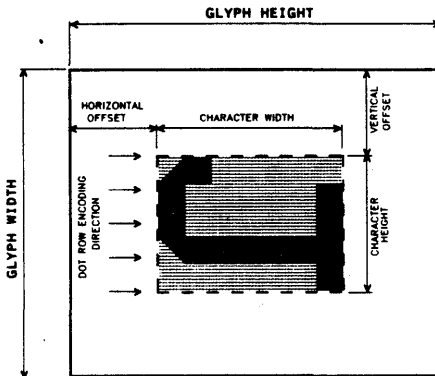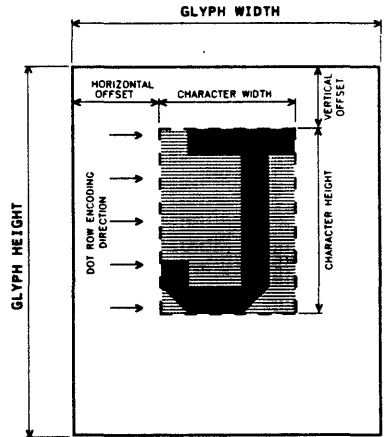
"Y" ORIENTATION
CHARACTER DESCRIPTION

BIT MAP DATA

The font character should be bit mapped using either Hex (ASCII-hex) or binary data according to what you indicate in the **p4** parameter of the QMSDLF command explained earlier. The binary values are shown in the rightmost column in the ASCII Conversion Table at the back of this manual. Your system editor may require you to enter this value using its Decimal equivalent. See the column in the Conversion Table labeled "DECIMAL." The Hex (ASCII-hex) is the column in the Conversion Table labeled "HEX."

Determine which value you need by looking at the right-hand column labeled "BINARY" and finding the dot pattern you want. After locating the desired dot pattern, find the equivalent decimal character (for binary or 8-bit) or Hex value (for 4-bit) by looking under the appropriate column on the same line as the desired dot pattern.

Bit map data MUST be encoded in multiples of 16 dots per row. This may require padding each row on the right side with zero dot values.

All Carriage Returns (<CR>), Line Feeds (<LF>) and Form Feeds (<FF>) will be absorbed from the bit map data stream. This is necessary because some computer systems automatically insert these system forms controls and they would interfere with your character bit mapping. However, if you wish to use the dot pattern of these values, see the chart on the following page for the way to handle these special characters.

When bit mapping the data, you can let your system arbitrarily break the data up but it is better if you control this yourself. For example, if you want the dot pattern of a <FF>, you must send an <ESC><FF> as shown on the chart on the following page. If you allow the system to break the data, the <ESC> may come at the end of a line and the <FF> at the beginning of the next line. The printer will not interpret this as you intended so you wouldn't get the dot pattern that you wanted.

If an invalid ASCII-hex character is sent, the Printer will replace the invalid character with a zero or null character.

For example:

ag will be interpreted as A0
yb will be interpreted as 0B
xy will be interpreted as 00

Some characters have to be handled in a special manner in order to use their binary bit patterns as bit map data. The following table gives a summary of how 8-bit and 4-bit data is handled.

For binary or 8-bit data:

DATA SENT	PRINTER:
<ESC><ESC>	prints <ESC>equivalent
<ESC><CR>	prints <CR>equivalent
<ESC><LF>	prints <LF>equivalent
<ESC><FF>	prints <FF>equivalent
<ESC>;	prints ; equivalent
<CR>	absorbed
<LF>	absorbed
<FF>	absorbed
;	terminates character definition
<ESC>\	terminates font and character definition
page eject (keyboard)	works the same as <ESC>\ and prints the page.
anything else	good data

For ASCII-hex or 4-bit data:

DATA SENT	DATA HANDLING/FUNCTION
0-9	valid 4-bit pattern (generates 0-9)
A-F	valid 4-bit pattern (generates A-F)
a-f	valid 4-bit pattern (generates A-F)
<CR>	absorbed
<LF>	absorbed
<FF>	absorbed
;	terminates character definition
<ESC>\	terminates font and character definition
page eject (keyboard)	works the same as <ESC>\ and prints the page.
anything else	invalid - replaced by zero

<ESC>Pp1;p2;p3}Name;Definition <ESC>\ | QMSOVR

This command is used to load a user-defined overlay function into the printer's dynamic RAM memory. An overlay may be composed of anything. For example, you can put the commands or other graphics data needed to generate a company form in an overlay. You can also store a standard letter or other text mixed with graphics in an overlay.

An overlay may be recalled later and printed using the QMSSFO command.

If there is insufficient room to store an entire overlay, you will get an error message indicating an overflow of RAM. It is best to request a status page first to see if you have enough room for the entire overlay.

The value in the **p1** parameter must always be "2" in

order to access this overlay command. Remember, this is the parameter which distinguishes between the Download Font, Overlay and Plot Mode commands.

The **p2** parameter is the reference number for the overlay. The valid range for an overlay number is 0-32767. If a number is selected and an overlay with that number already exists, the old overlay will be deleted.

The **p3** parameter is used to indicate the size of the "Overlay Definition" in bytes. The size includes only the data and not the overlay "Name." However, the overlay size must allow for systems forms controls even though they are absorbed.

If you omit the **p3** parameter, all data will be absorbed until the next <ESC>\ command terminator is encountered.

Name is an ASCII text string defining a name for the overlay. Up to 20 bytes of information may be stored. Excess name definition will be absorbed until the required semicolon (;) is encountered. If fewer than twenty bytes of name definition is provided, the Printer will pad the name definition with spaces to avoid conflicts.

Definition is a list of ASCII data that you want to store in the printer's RAM memory for later recall. This may consist of any combination of legal commands for the printer.

For example, box commands, line drawing commands and text may be stored in an overlay to create a form which you may later fill in with other information. If you wish to use a plot defined for Epson Mode as an overlay, the overlay definiton could contain a request to change to Epson Mode, print a plot and switch to ANSI Mode. Other combinations can also be constructed.

It should be noted that all information in an overlay is treated exactly as if it came from the host. Any changes to the printer environment (Font Selection, Page Orientation, Page Size, Mode, etc) will be in effect after completion of the overlay.

Overlays in progress can delete themselves.

Plot
Mode
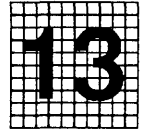
<ESC>Pp1;p2;p3;p4;p5;p6 }Plot Mode Data<ESC>\

QMSPLT

This command enables you to used three different types of Plot Mode formats depending upon which value you select in the **p2** parameter of the command.

Special ESCape sequences have been designed to provide useful capabilities while in ANSI Plot Mode.

Each byte of data which is not part of an ESCape sequence will be interpreted as Plot Mode data for the currently active type of Plot Mode. In addition, three special ESCape sequences, <ESC><CR>, <ESC><LF> and <ESC><FF> will be interpreted as Plot Mode data when in 8-Bit Plot Mode.

Parameters Defined

The value in the **p1** parameter must always be "3" in order to access Plot Mode. Remember that this parameter is used to distinguish between the Download Font, Overlay and Plot Mode commands.

The **p2** parameter is used to designate the type of Plot Mode you wish to use as shown below.

> **p2 = 0   ASCII-hex Plot Mode**
> **p2 = 1   Eight-Bit Plot Mode**
> **p2 = 2   Run-Length Plot Mode**

If the **p2** parameter is omitted, the default is 8-Bit Plot Mode.

Check the ASCII Conversion Table at the back of this manual for binary, hex and decimal values discussed below.

ASCII-hex Plot Mode
In this Plot Mode type, each byte of data is interpreted as an ASCII representation of a hex digit which defines the next four bits of plotmode data. Only values in the range of 48 (ASCII '0') through 57 (ASCII '9') and 65 (ASCII 'A') through 70 (ASCII 'F') are valid Plot Mode data. Other values will be treated as zero except Forms Controls (<FF><CR><LF>) which will be absorbed.

Eight-Bit Plot Mode
In this Plot Mode type, each byte of data is used to define the next 8-bits of Plot Mode data. Any 8-bit binary value is valid Plot Mode data. The 0's of the binary value indicate "don't print this dot" and the 1's mean "print this dot." The pattern formed by the combination of eight 0's and 1's will be the same as the pattern of printed and unprinted dots. Your system editor will determine how the binary values must be sent (usually the decimal equivalent).

Run-Length Plot Mode
In this Plot Mode type, the most significant bit of each byte determines the "print" (1 = ON, 0 = OFF) or "don't print" status. If the high-order or most significant bit is "ON," the dots are printed. If it is "OFF," the dots are not printed. The remaining seven bits of each byte determine how many dots in a row should be printed or not printed. These seven bits are used to indicate from 1-128 sequential dots with the same "ON" or "OFF" status (0 = 128).

The **p3** parameter is a five digit value (nnnnn) indicating the beginning horizontal page position (in dots). It also defines where you are positioned after an <ESC>C is received. If this parameter is omitted, the current horizontal position is the default starting point.

The **p4** parameter is a five digit value (nnnnn) indicating the beginning vertical page position (in dots). This starting point for Plot Mode data must be within the top and bottom margins. If this parameter is omitted, the current vertical positon is the default starting point.

The **p5** parameter is used to indicate the Horizontal Expansion factor. This is the number of times (1-5) each dot is duplicated Horizontally.

    p5 = 0 Horizontal Expansion factor of 1
    p5 = 1 Horizontal Expansion factor of 1
    p5 = 2 Horizontal Expansion factor of 2
    p5 = 3 Horizontal Expansion factor of 3
    p5 = 4 Horizontal Expansion factor of 4
    p5 = 5 Horizontal Expansion factor of 5

If a parameter value is not present, the default value is a Horizontal Expansion of 1.

The **p6** parameter is used to indicate the Vertical Expansion factor. This is the number of times (1-5) each dot is duplicated vertically.

    p6 = 0 Vertical Expansion factor of 1
    p6 = 1 Vertical Expansion factor of 1
    p6 = 2 Vertical Expansion factor of 2
    p6 = 3 Vertical Expansion factor of 3
    p6 = 4 Vertical Expansion factor of 4
    p6 = 5 Vertical Expansion factor of 5

If a parameter value is not present, the default value is a Vertical Expansion factor of 1.

Plot Mode Control Escape Sequences

Several commands have been created to allow you to perform various functions while in ANSI Plot Mode. Each of these functions is defined by an ESCape character followed by one to five bytes of data which define the function to be performed. Whenever the <ESC> character is encountered, the following byte is examined to determine the function to be performed. If the binary equivalent of the <ESC> character is intended to be Plot

Mode data, it should be replaced by a double occurrence of the <ESC> character. Likewise, if the binary equivalent of the <CR>, <LF> or <FF> character is intended to be Plot Mode data, it must be preceded by an <ESC> character (<ESC><CR>, <ESC><LF>, and <ESC><FF>).

The following information is a description of the ES-Cape sequences which are interpreted while in ANSI Plot Mode.

<ESC><ESC> – When the double ESCape sequence character is used, it is interpreted as a single occurrence of Plot Mode data whose value is hex (1B).

<ESC>L – This sequence generates a graphics Line Feed. The vertical position is increased by the current Vertical Expansion Factor.

<ESC>C – This sequence generates a graphics Carriage Return and a graphics Line Feed. The current horizontal position is set to the left margin and the vertical position is increased by the Vertical Expansion Factor.

<ESC>F – This sequence generates a graphics Form Feed. The current horizontal position is set to the left margin.

<ESC>A – This sequence changes the current Plot Mode type to ASCII Hex Plot Mode. The data following this ESCape sequence will be interpreted as ASCII Hex Plot Mode data.

<ESC>B – This sequence changes the current Plot Mode type to 8-Bit Plot Mode. The data following this ESCape sequence will be interpreted as 8-Bit Plot Mode data.

<ESC>H – This sequence is used to modify the Horizontal Expansion Factor. The Horizontal Expansion Factor will be set according to the following byte of data. If the following byte is not within the range of '1' (decimal 49) to '5' (decimal 53), the current Horizontal Expansion Factor will not be changed.

<ESC>R – This sequence changes the current Plot Mode type to Run-Length Plot Mode. The following byte of data will be interpreted as ANSI Run-Length Plot Mode data.

<ESC>V – This sequence is used to modify the Vertical Expansion Factor. The Vertical Expansion factor will be set according to the following byte of data. If the following byte is not within the range of '1' (decimal 49) to '5' (decimal 53), the current Vertical Expansion Factor will not be changed.

<ESC>X – This sequence will change the Absolute Horizontal Address. The current horizontal position is changed to the dot position defined by the four ASCII characters which immediately follow this ESCape sequence. This also defines the new value for a graphics Carriage Return.

If the new Horizontal Address is outside either the left or right margin setting, it will be limited to the corresponding margin value. If the desired horizontal position is less than four digits, the value should be zero-filled to the left.

Any non-numeric characters will cause the number conversion to be terminated and the remainder of the four characters to be absorbed.

<ESC>Y – This sequence changes the Absolute Vertical Address. The current vertical position is changed to the dot position defined by the four ASCII characters which immediately follow this ESCape sequence.

If the new Vertical Address is less than the value for the top margin, it will be limited to the value of the top margin. If the new Vertical Address is greater than the bottom margin, a page eject is performed and the new vertical position will be the upper left corner as defined by the top and left margin settings. If the desired vertical position is less than four digits, the value should be zero-filled to the left.

Any non-numeric characters will cause the number conversion to be terminated and the remainder of the four characters to be absorbed.

<ESC>\ – This sequence is used to exit any ANSI Plot Mode type. Once Plot Mode is exited, the following byte of data will be interpreted as an ANSI ESCape sequence.

Special Helps

You may want to encode a single line of Plot Mode data in an ESCape sequence (which is terminated by <ESC>\ and use existing ANSI Mode line and character spaces to move horizontally and vertically.

You may also define an entire plot with a single ESCape sequence and use the Plot-Mode-defined ESCape sequence to accomplish horizontal and vertical positioning.

A graphics Form Feed or page eject caused by exceeding the bottom margin does not cause Plot Mode to be terminated. Therefore, multiple pages of plots could all be performed within the same Plot Mode ESCape sequence.

Once you exceed the right margin, all further data will be absorbed until the Horizontal Position is changed by either a graphics Form Feed, Carriage Return, or an Absolute Horizontal Address command.

Plot Mode

ASCII HEX PLOT MODE EXAMPLE

This input generated the example below:

```
<ESC>P3;0;00900;01200;5;5}
003B00<ESC>C
002700<ESC>C
002480<ESC>C
0E4940<ESC>C
114920<ESC>C
14B220<ESC>C
3CB650<ESC>C
75FE88<ESC>C
17FF8C<ESC>C
175F14<ESC>C
1C07E2<ESC>C
3803C4<ESC>C
703182<ESC>C
F8EDFC<ESC>C
B2BBC2<ESC>C
BB6F84<ESC>C
31BFC2<ESC>C
18EA3C<ESC>C
0E3E00<ESC>C
07FC00<ESC>C
03F800<ESC>C
1E1800<ESC>C
1FF800<ESC>C
<ESC>\
```

Plot Mode

Appendix A: Configuration
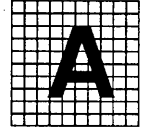
Summary of Configuration Options

The following pages summarize the groups and options used to configure the QMS printer. A more detailed explanation of each may be found in the printer's *User's Guide*.

```
GROUP A OPTIONS_____ANSI EMULATION OPTIONS.
GROUP C OPTIONS_____CURRENT FONT NUMBER SELECTION GROUP.
GROUP D OPTIONS_____DIABLO EMULATION OPTIONS.
GROUP E OPTIONS_____EPSON EMULATION OPTIONS.
GROUP L OPTIONS_____DEFAULT LANDSCAPE FONT NUMBER SELECTION GROUP.
GROUP P OPTIONS_____DEFAULT PORTRAIT FONT NUMBER SELECTION GROUP.
GROUP Q OPTIONS_____QUME EMULATION OPTIONS.
GROUP O OPTIONS_____SYSTEM FUNCTIONS.
GROUP 1 OPTIONS_____PAGE SETTINGS.
GROUP 2 OPTIONS_____COPY COUNT UNITS.
GROUP 3 OPTIONS_____COPY COUNT TENS.
GROUP 4 OPTIONS_____MARGIN SETTINGS.
GROUP 5 OPTIONS_____COMMON INTERFACE OPTIONS.
GROUP 6 OPTIONS_____SERIAL INTERFACE OPTIONS.
GROUP 7 OPTIONS_____PARALLEL INTERFACE OPTIONS.
GROUP 8 OPTIONS_____ALIGNMENT MARGIN SETTINGS.
GROUP 9 OPTIONS_____FACTORY OPTIONS.
```

```
NOTE :  Toggle any group option O to perform a warm boot
        of the print engine.  Also, any option not
        listed is not yet supported.
```

GROUP A OPTIONS

ANSI EMULATION SWITCH SELECTABLE OPTIONS.
(THIS OPTION CURRENTLY ONLY AFFECTS THE UNITS OF
MEASURE ON THE STATUS PAGE.)
* = factory default

```
   1    -    2         Set the type of unit measure to use.
disabled   disabled        Unit of measure is in dots.
enabled    disabled        Unit of measure is in Decipoints.
disabled   enabled         Unit of measure is in Centimeters.
*enabled   enabled         Unit of measure is in inches.
```

```
   3       Ansi character spacing
*enable    Fixed spacing from font
disable    Proportional spacing from font
```

```
   4    -    5         Line spacing
disable    disable        Font line spacing
enable     disable        4 lines per inch
*disable   enable         6 lines per inch
enable     enable         8 lines per inch
```

```
   6
*disable   Print text past the right margin and absorb
           text that exceeds the right edge of the page.
enable     Absorb text data that exceeds the right margin.
```

```
   7
*disable   Carriage return will not perform a line feed.
enable     Carriage return will perform a line feed.
```

```
   8
*disable   Line feed will not perform a carriage return.
enable     Line feed will perform a carriage return.
```

```
   9 .
*disable   Line feed will not perform 2 line feeds.
enable     Line Feed will perform 2 line feeds.
```

GROUP C OPTIONS

CURRENT FONT NUMBER SELECTION

1 – Selection of this option will enable entry of the
    ten thousands digit of the current font number.

2 – Selection of this option will enable entry of the
    thousands digit of the current font number.

3 – Selection of this option will enable entry of the
    hundreds digit of the current font number.

4 – Selection of this option will enable entry of the
    tens digit of the current font number.

5 – Selection of this option will enable entry of the
    units digit of the current font number.

Note: See font number entry procedure description at the end
      of this document.

Appendix A   A–3

GROUP D OPTIONS

   DIABLO EMULATION SWITCH SELECTABLE OPTIONS
   * = factory default

       1   2
   disabled   disabled   Proportional character spacing
   *enabled   disabled   Fixed character spacing 10 cpi
   disabled   enabled   Fixed character spacing 12 cpi
   enabled   enabled   Fixed character spacing 15 cpi

       3
   * disable   Carriage return = Carriage return
     enabled   Carriage return = Carriage return and Automatically
               performs a line feed.

       4
   * disable   Single line feed performs a single line feed
     enabled   Single line feed performs a double line feed

       6
   * disabled Use the font table for character spacing when in
               proportional spacing.
     enable   Do not use the font table for character spacing
               when in proportional spacing.

GROUP E OPTIONS

   EPSON EMULATION SWITCH SELECTABLE OPTIONS
   * = factory default

    1
*disabled Pica mode printing enabled
 enabled   Compressed mode enabled

    2
*disabled Normal pica printing is selected
 enabled   Emphasized pica printing is selected

   EPSON LANGUAGE SELECTION

    3   4   5
*enabled   enabled   enabled   U.S.A
 disabled   enabled   enabled   France
 enabled   disabled   enabled   Germany
 disabled   disabled   enabled   England
 enabled   enabled   disabled   Denmark
 disabled   enabled   disabled   Sweden
 enabled   disabled   disabled   Italy
 disabled   disabled   disabled   Spain

    6
*disabled   Carriage return will not perform a line feed
 enabled   Carriage return will perform a line feed

    7
*disabled   Don't keep up with partial dots during plot mode
            for horizontal motion.
 enabled   Keep up with partial dots during plot mode for
            horizontal motion.

Appendix A   A–5

(Group E, cont.)

8
*disabled   Don't keep up with partial dots for vertical motion.
 enabled   Keep up with partial dots for vertical motion.

9
*disabled   Print zeros without a slash.
 enabled   Print zeros with a slash.

A
*disabled   Use the default Pica font as the Pica Mode
                 font.
 enabled   Use the current font as the Pica Mode font.

DEFAULT LANDSCAPE FONT NUMBER SELECTION

1 - Selection of this option will enable entry of the
     ten thousands digit of the default landscape font
     number.

2 - Selection of this option will enable entry of the
     thousands digit of the default landscape font
     number.

3 - Selection of this option will enable entry of the
     hundreds digit of the default landscape font
     number.

4 - Selection of this option will enable entry of the
     tens digit of the default landscape font number.

5 - Selection of this option will enable entry of the
     units digit of the default landscape font number.

Appendix A   A–7

GROUP P OPTIONS

DEFAULT PORTRAIT FONT NUMBER SELECTION   (

1 - Selection of this option will enable entry of the
     ten thousands digit of the default portrait font
     number.

2 - Selection of this option will enable entry of the
     thousands digit of the default portrait font
     number.

3 - Selection of this option will enable entry of the
     hundreds digit of the default portrait font
     number.

4 - Selection of this option will enable entry of the
     tens digit of the default portrait font number.

5 - Selection of this option will enable entry of the   (
     units digit of the default portrait font number.

GROUP Q OPTIONS

QUME EMULATION SWITCH SELECTABLE OPTIONS

1	2	
disabled	disabled	Proportional character spacing
*enabled	disabled	Fixed character spacing 10 characters per inch
disabled	enabled	Fixed character spacing 12 characters per inch
enabled	enabled	Fixed character spacing 15 characters per inch

3
* disable   Line spacing = 6 lines per inch.
  enabled   Line spacing = 8 lines per inch.

4
* disable   Carriage return will not perform a carriage
             return line feed
  enabled   Carriage return will perform a line feed.

5
* disable   Do not perform an automatic carriage return and a
             line feed at right margin.
  enabled   Perform an automatic carriage return and line feed
             at the right margin.

6
* disable   Use the font table for character spacing
             when in proportional spacing.
  enabled   Do not use the font table for character
             spacing when in proportional spacing.

Appendix A   A–9

GROUP 0 OPTIONS

1
Toggle   Abort the current copy sequence and reset to zero.

2
Toggle   Clear all current pages already built and reset
                the test page.

3
*disabled   Keep the selected parser.
enabled   Hex dump will override the parser selected.

4
*disabled   Form Feed + Carriage Return = Form Feed
                                            + Carriage Return.
enabled   Form Feed + Carriage Return = Form Feed.

5
Toggle   Re-initialize to factory settings.

Note: Whenever options 1, 2, or 5 are toggled, they are not
       enabled or disabled, they are activated immediately.

6
*disabled   Reset Command and Font Translation Tables
                when entering new emulation mode or after
                warm boot.
enabled   Do not reset Command and Font Translation
                Tables.

(

Appendix A

(Group 0, cont.)

7
disabled   <FF> always ejects page.
*enabled   <FF> does not eject page if buffer is empty.

8
*disabled   Print Start-Up Page at warm boot.
 enabled   Never print Start-Up Page at warm boot.

9
Toggle   Reset Command Translation Table.

A
Toggle   Reset Font Translation Table.

GROUP 1 OPTIONS

1	2	Printer emulation selection
disabled	disabled	Ansi X3.64 emulation
enabled	disabled	Diablo 630 emulation
*disabled	enabled	Epson FX-80 emulation
enabled	enabled	Qume Sprint emulation

3	Power-up page orientation
*disabled	Portrait page orientation
enabled	Landscape page orientation

4	5	6	
disabled	disabled	disabled	A4 paper size
enabled	disabled	disabled	B5 paper size
disabled	enabled	disabled	Legal page size
*enabled	enabled	disabled	Letter page size
disabled	disabled	enabled	Mini page size

NOTE: Some QMS printers use Group 1 Options
      7 and 8 for automatic form feed. Refer to
      your QMS printer's User's Guide.

GROUP 2 OPTIONS

This group allows the user to select 0-9 copies, depending
on the option selected.

Example: If the user wants 6 copies, he enables option 6

GROUP 3 OPTIONS

This group allows the user to select 0-9 multiplied by 10
copies, depending on the option selected.

Example: If the user wants 60 copies, he enables option 6
in Group 3 and disables all options in Group 2.

If the user wants 56 copies, he enables option 6
in Group 2 and option 5 in Group 3.

Notes: Selection of an option in Groups 2 or 3 deselects all other
       options in that group.

       Selection of option zero in these or any other group causes
       a warm restart to be performed. The easiest way to deselect
       all options in a group is to select option 1 (which
       deselects all other options) and then deselect option 1 (no
       options are now selected).

GROUP 4 OPTIONS

POWER-UP MARGIN SETTINGS

1	2	3	4	Left Margin =
disabled	disabled	disabled	disabled	0.00 inches
* enabled	disabled	disabled	disabled	0.25 inches
disabled	enabled	disabled	disabled	0.50 inches
enabled	enabled	disabled	disabled	0.75 inches
disabled	disabled	enabled	disabled	1.00 inches
enabled	disabled	enabled	disabled	1.25 inches
disabled	enabled	enabled	disabled	1.50 inches
enabled	enabled	enabled	disabled	1.75 inches
disabled	disabled	disabled	enabled	2.00 inches
enabled	disabled	disabled	enabled	2.25 inches
disabled	enabled	disabled	enabled	2.50 inches
enabled	enabled	disabled	enabled	2.75 inches
disabled	disabled	enabled	enabled	3.00 inches
enabled	disabled	enabled	enabled	3.25 inches
disabled	enabled	enabled	enabled	3.50 inches
enabled	enabled	enabled	enabled	3.75 inches

5	6	7	8	Right Margin =
disabled	disabled	disabled	disabled	0.00 inches
* enabled	disabled	disabled	disabled	0.25 inches
disabled	enabled	disabled	disabled	0.50 inches
enabled	enabled	disabled	disabled	0.75 inches
disabled	disabled	enabled	disabled	1.00 inches
enabled	disabled	enabled	disabled	1.25 inches
disabled	enabled	enabled	disabled	1.50 inches
enabled	enabled	enabled	disabled	1.75 inches
disabled	disabled	disabled	enabled	2.00 inches
enabled	disabled	disabled	enabled	2.25 inches
disabled	enabled	disabled	enabled	2.50 inches
enabled	enabled	disabled	enabled	2.75 inches
disabled	disabled	enabled	enabled	3.00 inches
enabled	disabled	enabled	enabled	3.25 inches
disabled	enabled	enabled	enabled	3.50 inches
enabled	enabled	enabled	enabled	3.75 inches

Appendix A

(Group 4, cont.)

9	A	B	C	Top margin =	
disabled	disabled	disabled	disabled	0.00	inches
ᵏ enabled	disabled	disabled	disabled	0.25	inches
disabled	enabled	disabled	disabled	0.50	inches
enabled	enabled	disabled	disabled	0.75	inches
disabled	disabled	enabled	disabled	1.00	inches
enabled	disabled	enabled	disabled	1.25	inches
disabled	enabled	enabled	disabled	1.50	inches
enabled	enabled	enabled	disabled	1.75	inches
disabled	disabled	disabled	enabled	2.00	inches
enabled	disabled	disabled	enabled	2.25	inches
disabled	enabled	disabled	enabled	2.50	inches
enabled	enabled	disabled	enabled	2.75	inches
disabled	disabled	enabled	enabled	3.00	inches
enabled	disabled	enabled	enabled	3.25	inches
disabled	enabled	enabled	enabled	3.50	inches
enabled	enabled	enabled	enabled	3.75	inches

D	E	F	Bottom margin =	
disabled	disabled	disabled	0.00	inches
ᵏ enabled	disabled	disabled	0.25	inches
disabled	enabled	disabled	0.50	inches
enabled	enabled	disabled	0.75	inches
disabled	disabled	enabled	1.00	inches
enabled	disabled	enabled	1.25	inches
disabled	enabled	enabled	1.50	inches
enabled	enabled	enabled	1.75	inches

Appendix A   A–15

GROUP 5 OPTIONS

```
     1
* disabled      Centronics interface selected.
  enabled       RS232 serial interface selected.


     2
  disabled      Power up off line.
* enabled       Power up on line.
```

3	4	5	BUFFER SIZE SELECTION
disabled	disabled	disabled	132 chars
enabled	disabled	disabled	256 chars
disabled	enabled	disabled	512 chars
enabled	enabled	disabled	1 K
disabled	disabled	enabled	2 K
enabled	disabled	enabled	4 K
disabled	enabled	enabled	6 K
* enabled	enabled	enabled	8 K

6	7	BIT 8 STATUS TABLE
* disabled	disabled	Pass bit 8 through
disabled	enabled	Strip bit 8 on input
enabled	disabled	Set bit 8 on input
enabled	enabled	Toggle bit 8

NOTE: Some QMS printers use Group 5 options differently.
      Refer to your QMS printer's User's Guide.

GROUP 6 OPTIONS

     1
* disabled   No parity checking is performed.
  enabled   Parity checking is performed.

    NOTE : The first two selections in options 2 and 3
           require Group 6 option 1 to be enabled.

    2   3
* disabled   disabled   Odd parity generation check.
  enabled   disabled   Even parity generation check.
  disabled   enabled   Mark parity generation no-check.
  enabled   enabled   Space parity generation no-check.

    4
* disabled   Use 1 stop bit in data word
  enabled   Use 2 stop bits in data word

    5
* disabled   Use 8 bit data word
  enabled   Use 7 bit data word

Appendix A   A–17

(Group 6, cont.)

6	7	8	9	
* disabled	disabled	disabled	disabled	9600 BAUD
enabled	disabled	disabled	disabled	50 BAUD
disabled	enabled	disabled	disabled	75 BAUD
enabled	enabled	disabled	disabled	110 BAUD
disabled	disabled	enabled	disabled	134.58 BAUD
enabled	disabled	enabled	disabled	150 BAUD
disabled	enabled	enabled	disabled	300 BAUD
enabled	enabled	enabled	disabled	600 BAUD
disabled	disabled	disabled	enabled	1200 BAUD
enabled	disabled	disabled	enabled	1800 BAUD
disabled	enabled	disabled	enabled	2400 BAUD
enabled	enabled	disabled	enabled	3600 BAUD
disabled	disabled	enabled	enabled	4800 BAUD
enabled	disabled	enabled	enabled	7200 BAUD
disabled	enabled	enabled	enabled	9600 BAUD
enabled	enabled	enabled	enabled	19200 BAUD

A
disabled	Do not use DTR data throttle.
* enabled	Use DTR data throttle.

B
* disabled	Do not use RTS data throttle.
enabled	Use RTS data throttle.

C
disabled	XON/XOFF protocol is OFF.
* enabled	XON/XOFF protocol is ON.

Appendix A

1
* disabled Do not go busy on printer error.
  enabled   Go busy on printer error.

2
* disabled Do not set printer error on printer error.
  enabled   Set printer error on printer error.

3
* disabled Do not set fault on printer error.
  enabled   Set fault on printer error.

4
* disabled Do not go off line on printer error.
  enabled   Go off line on printer error.

NOTE : When this option is enabled the front panel
       will have to be used to return the printer
       to the on line state.

5
  disabled Do not Go busy on off-line.
  enabled   Go busy on off-line.

6
  disabled Do not use the busy bit to control dataflow from the host.
  enabled   Use the busy bit to control dataflow from the host.

Appendix A   A–19

ENGINE PAPER ALIGNMENT MARGINS.

				Offset from
1	2	3	4	Left Edge of Paper
disabled	disabled	disabled	disabled	0.00 inches
enabled	disabled	disabled	disabled	0.05 inches
disabled	enabled	disabled	disabled	0.10 inches
enabled	enabled	disabled	disabled	0.15 inches
disabled	disabled	enabled	disabled	0.20 inches
enabled	disabled	enabled	disabled	0.27 inches
disabled	enabled	enabled	disabled	0.32 inches
enabled	enabled	enabled	disabled	0.37 inches
disabled	disabled	disabled	enabled	0.43 inches
enabled	disabled	disabled	enabled	0.48 inches
disabled	enabled	disabled	enabled	0.53 inches
enabled	enabled	disabled	enabled	0.59 inches
disabled	disabled	enabled	enabled	0.64 inches
enabled	disabled	enabled	enabled	0.69 inches
disabled	enabled	enabled	enabled	0.75 inches
enabled	enabled	enabled	enabled	0.80 inches

Appendix A

(Group 8, cont.)

5	6	7	8	Offset from Top Edge of Paper
disabled	disabled	disabled	disabled	0.00 inches
enabled	disabled	disabled	disabled	0.05 inches
disabled	enabled	disabled	disabled	0.10 inches
enabled	enabled	disabled	disabled	0.15 inches
disabled	disabled	enabled	disabled	0.20 inches
enabled	disabled	enabled	disabled	0.27 inches
disabled	enabled	enabled	disabled	0.32 inches
enabled	enabled	enabled	disabled	0.37 inches
disabled	disabled	disabled	enabled	0.43 inches
enabled	disabled	disabled	enabled	0.48 inches
disabled	enabled	disabled	enabled	0.53 inches
enabled	enabled	disabled	enabled	0.59 inches
disabled	disabled	enabled	enabled	0.64 inches
enabled	disabled	enabled	enabled	0.69 inches
disabled	enabled	enabled	enabled	0.75 inches
enabled	enabled	enabled	enabled	0.80 inches

Appendix A

GROUP 9 OPTIONS

FACTORY OPTIONS

1
* disable   Do not scan the debugger address space for fonts.
  enabled   Scan the debugger address space for fonts.

E
* disable   The last printer interruption error
             will not be printed.
  enabled   The last occurrence of a printer interruption
             error is printed.

F
* disable   The debugger should only be initialized and normal
             execution continued if the debugger is present
             during system initialization.
  enable   Control should be passed to the debugger if it is
             present during initialization.

Appendix B:
Conversion Table

QMS ASCII CONVERSION TABLE

ASCII	HEX	DECIMAL	OCTAL	BINARY
				BIT 8765 4321
NUL	00	0	00	0000 0000
SOH	01	1	01	0000 0001
STX	02	2	02	0000 0010
ETX	03	3	03	0000 0011
EOT	04	4	04	0000 0100
ENQ	05	5	05	0000 0101
ACK	06	6	06	0000 0110
BEL	07	7	07	0000 0111
BS	08	8	10	0000 1000
HT	09	9	11	0000 1001
LF	0A	10	12	0000 1010
VT	0B	11	13	0000 1011
FF	0C	12	14	0000 1100
CR	0D	13	15	0000 1101
SO	0E	14	16	0000 1110
SI	0F	15	17	0000 1111
DLE	10	16	20	0001 0000
DC1	11	17	21	0001 0001
DC2	12	18	22	0001 0010
DC3	13	19	23	0001 0011
DC4	14	20	24	0001 0100
NAK	15	21	25	0001 0101
SYN	16	22	26	0001 0110
ETB	17	23	27	0001 0111
CAN	18	24	30	0001 1000
EM	19	25	31	0001 1001
SUB	1A	26	32	0001 1010
ESC	1B	27	33	0001 1011
FS	1C	28	34	0001 1100
GS	1D	29	35	0001 1101
RS	1E	30	36	0001 1110
US	1F	31	37	0001 1111
SP	20	32	40	0010 0000
!	21	33	41	0010 0001
"	22	34	42	0010 0010
#	23	35	43	0010 0011
$	24	36	44	0010 0100
%	25	37	45	0010 0101
&	26	38	46	0010 0110
'	27	39	47	0010 0111
(	28	40	50	0010 1000
)	29	41	51	0010 1001
*	2A	42	52	0010 1010

ASCII CONVERSION TABLE

ASCII	HEX	DECIMAL	OCTAL	BINARY
				BIT 8765 4321
+	2B	43	53	0010 1011
,	2C	44	54	0010 1100
-	2D	45	55	0010 1101
.	2E	46	56	0010 1110
/	2F	47	57	0010 1111
0	30	48	60	0011 0000
1	31	49	61	0011 0001
2	32	50	62	0011 0010
3	33	51	63	0011 0011
4	34	52	64	0011 0100
5	35	53	65	0011 0101
6	36	54	66	0011 0110
7	37	55	67	0011 0111
8	38	56	70	0011 1000
9	39	57	71	0011 1001
:	3A	58	72	0011 1010
;	3B	59	73	0011 1011
<	3C	60	74	0011 1100
=	3D	61	75	0011 1101
>	3E	62	76	0011 1110
?	3F	63	77	0011 1111
@	40	64	100	0100 0000
A	41	65	101	0100 0001
B	42	66	102	0100 0010
C	43	67	103	0100 0011
D	44	68	104	0100 0100
E	45	69	105	0100 0101
F	46	70	106	0100 0110
G	47	71	107	0100 0111
H	48	72	110	0100 1000
I	49	73	111	0100 1001
J	4A	74	112	0100 1010
K	4B	75	113	0100 1011
L	4C	76	114	0100 1100
M	4D	77	115	0100 1101
N	4E	78	116	0100 1110
0	4F	79	117	0100 1111
P	50	80	120	0101 0000
Q	51	81	121	0101 0001
R	52	82	122	0101 0010
S	53	83	123	0101 0011
T	54	84	124	0101 0100
U	55	85	125	0101 0101

QMS ASCII CONVERSION TABLE

ASCII	HEX	DECIMAL	OCTAL	BINARY
				BIT 8 7 6 5 4 3 2 1
v	56	86	126	0101 0110
W	57	87	127	0101 0111
X	58	88	130	0101 1000
Y	59	89	131	0101 1001
Z	5A	90	132	0101 1010
[	5B	91	133	0101 1011
BACKSLASH	5C	92	134	0101 1100
]	5D	93	135	0101 1101
^	5E	94	136	0101 1110
_	5F	95	137	0101 1111
ACCENT	60	96	140	0110 0000
a	61	97	141	0110 0001
b	62	98	142	0110 0010
c	63	99	143	0110 0011
d	64	100	144	0110 0100
e	65	101	145	0110 0101
f	66	102	146	0110 0110
g	67	103	147	0110 0111
h	68	104	150	0110 1000
i	69	105	151	0110 1001
j	6A	106	152	0110 1010
k	6B	107	153	0110 1011
l	6C	108	154	0110 1100
m	6D	109	155	0110 1101
n	6E	110	156	0110 1110
o	6F	111	157	0110 1111
p	70	112	160	0111 0000
q	71	113	161	0111 0001
r	72	114	162	0111 0010
s	73	115	163	0111 0011
t	74	116	164	0111 0100
u	75	117	165	0111 0101
v	76	118	166	0111 0110
w	77	119	167	0111 0111
x	78	120	170	0111 1000
y	79	121	171	0111 1001
z	7A	122	172	0111 1010
{	7B	123	173	0111 1011
l	7C	124	174	0111 1100
}	7D	125	175	0111 1101
~	7E	126	176	0111 1110
DEL	7F	127	177	0111 1111

Appendix B   B-3

QMS ASCII CONVERSION TABLE

ASCII*	HEX	DECIMAL	OCTAL	BINARY
				BIT [8][7][6][5] [4][3][2][1]
	80	128	200	1000 0000
	81	129	201	1000 0001
	82	130	202	1000 0010
	83	131	203	1000 0011
	84	132	204	1000 0100
	85	133	205	1000 0101
	86	134	206	1000 0110
	87	135	207	1000 0111
	88	136	210	1000 1000
	89	137	211	1000 1001
	8A	138	212	1000 1010
	8B	139	213	1000 1011
	8C	140	214	1000 1100
	8D	141	215	1000 1101
	8E	142	216	1000 1110
	8F	143	217	1000 1111
	90	144	220	1001 0000
	91	145	221	1001 0001
	92	146	222	1001 0010
	93	147	223	1001 0011
	94	148	224	1001 0100
	95	149	225	1001 0101
	96	150	226	1001 0110
	97	151	227	1001 0111
	98	152	230	1001 1000
	99	153	231	1001 1001
	9A	154	232	1001 1010
	9B	155	233	1001 1011
	9C	156	234	1001 1100
	9D	157	235	1001 1101
	9E	158	236	1001 1110
	9F	159	237	1001 1111
	A0	160	240	1010 0000
	A1	161	241	1010 0001
	A2	162	242	1010 0010
	A3	163	243	1010 0011
	A4	164	244	1010 0100
	A5	165	245	1010 0101
	A6	166	246	1010 0110
	A7	167	247	1010 0111
	A8	168	250	1010 1000
	A9	169	251	1010 1001
	AA	170	252	1010 1010

* The ASCII value varies

(Continued on the next page)

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QMS ASCII CONVERSION TABLE

ASCII*	HEX	DECIMAL	OCTAL	BINARY
				BIT [8][7][6][5] [4][3][2][1]
	80	128	200	1000 0000
	81	129	201	1000 0001
	82	130	202	1000 0010
	83	131	203	1000 0011
	84	132	204	1000 0100
	85	133	205	1000 0101
	86	134	206	1000 0110
	87	135	207	1000 0111
	88	136	210	1000 1000
	89	137	211	1000 1001
	8A	138	212	1000 1010
	8B	139	213	1000 1011
	8C	140	214	1000 1100
	8D	141	215	1000 1101
	8E	142	216	1000 1110
	8F	143	217	1000 1111
	90	144	220	1001 0000
	91	145	221	1001 0001
	92	146	222	1001 0010
	93	147	223	1001 0011
	94	148	224	1001 0100
	95	149	225	1001 0101
	96	150	226	1001 0110
	97	151	227	1001 0111
	98	152	230	1001 1000
	99	153	231	1001 1001
	9A	154	232	1001 1010
	9B	155	233	1001 1011
	9C	156	234	1001 1100
	9D	157	235	1001 1101
	9E	158	236	1001 1110
	9F	159	237	1001 1111
	A0	160	240	1010 0000
	A1	161	241	1010 0001
	A2	162	242	1010 0010
	A3	163	243	1010 0011
	A4	164	244	1010 0100
	A5	165	245	1010 0101
	A6	166	246	1010 0110
	A7	167	247	1010 0111
	A8	168	250	1010 1000
	A9	169	251	1010 1001
	AA	170	252	1010 1010

* The ASCII value varies

(Continued on the next page)

B-4   *Appendix B*

QMS ASCII CONVERSION TABLE

ASCII*	HEX	DECIMAL	OCTAL	BINARY
				BIT [8][7][6][5] [4][3][2][1]
	AB	171	253	1010 1011
	AC	172	254	1010 1100
	AD	173	255	1010 1101
	AE	174	256	1010 1110
	AF	175	257	1010 1111
	B0	176	260	1011 0000
	B1	177	261	1011 0001
	B2	178	262	1011 0010
	B3	179	263	1011 0011
	B4	180	264	1011 0100
	B5	181	265	1011 0101
	B6	182	266	1011 0110
	B7	183	267	1011 0111
	B8	184	270	1011 1000
	B9	185	271	1011 1001
	BA	186	272	1011 1010
	BB	187	273	1011 1011
	BC	188	274	1011 1100
	BD	189	275	1011 1101
	BE	190	276	1011 1110
	BF	191	277	1011 1111
	C0	192	300	1100 0000
	C1	193	301	1100 0001
	C2	194	302	1100 0010
	C3	195	303	1100 0011
	C4	196	304	1100 0100
	C5	197	305	1100 0101
	C6	198	306	1100 0110
	C7	199	307	1100 0111
	C8	200	310	1100 1000
	C9	201	311	1100 1001
	CA	202	312	1100 1010
	CB	203	313	1100 1011
	CC	204	314	1100 1100
	CD	205	315	1100 1101
	CE	206	316	1100 1110
	CF	207	317	1100 1111
	D0	208	320	1101 0000
	D1	209	321	1101 0001
	D2	210	322	1101 0010
	D3	211	323	1101 0011
	D4	212	324	1101 0100
	D5	213	325	1101 0101

* The ASCII value varies

QMS ASCII CONVERSION TABLE

ASCII*	HEX	DECIMAL	OCTAL	BINARY
				BIT 8 7 6 5 4 3 2 1
	D6	214	326	1101 0110
	D7	215	327	1101 0111
	D8	216	330	1101 1000
	D9	217	331	1101 1001
	DA	218	332	1101 1010
	DB	219	333	1101 1011
	DC	220	334	1101 1100
	DD	221	335	1101 1101
	DE	222	336	1101 1110
	DF	223	337	1101 1111
	E0	224	340	1110 0000
	E1	225	341	1110 0001
	E2	226	342	1110 0010
	E3	227	343	1110 0011
	E4	228	344	1110 0100
	E5	229	345	1110 0101
	E6	230	346	1110 0110
	E7	231	347	1110 0111
	E8	232	350	1110 1000
	E9	233	351	1110 1001
	EA	234	352	1110 1010
	EB	235	353	1110 1011
	EC	236	354	1110 1100
	ED	237	355	1110 1101
	EE	238	356	1110 1110
	EF	239	357	1110 1111
	F0	240	360	1111 0000
	F1	241	361	1111 0001
	F2	242	362	1111 0010
	F3	243	363	1111 0011
	F4	244	364	1111 0100
	F5	245	365	1111 0101
	F6	246	366	1111 0110
	F7	247	367	1111 0111
	F8	248	370	1111 1000
	F9	249	371	1111 1001
	FA	250	372	1111 1010
	FB	251	373	1111 1011
	FC	252	374	1111 1100
	FD	253	375	1111 1101
	FE	254	376	1111 1110
	FF	255	377	1111 1111

* The ASCII value varies

Glossary

ASCII

An acronym for American Standard Code for Information Interchange. It is a a 7-bit (or 8 bit) coding scheme for the computer representation of letters, numbers, and other symbols commonly found on a standard typewriter. It also represents special unprintable characters used by computer devices, e.g. carriage return, line feed, form feed, escape, etc.

Baseline

An imaginary line upon which the letters in a line sit.

Basic

A programming language designed for IBM computers.

Baud

The measure of speed at which information is transferred indicated by changes in line condition. Baud is equivalent to bits per second (BPS) which is the number of information bits that can be sent through a channel in a second.

Binary

A base 2 number system written with the digits "0" or "1." See BIT.

Bit

An acronym for binary digit. The bit is the most funda-
mental unit of information that a computer can accept.
It has two states called "1" (one) and "0" (zero), or "on"
and "off," and can be used to represent a yes/no type
of statement. Groups of bits are used to represent more
complex statements such as a character (see ASCII). The
most common grouping of bits is called a byte, consist-
ing of eight bits.

Bit Map

A method of printing in which each dot of a character or
graphics display is controlled by a bit of digitally coded
information.

Buffer

A storage device used to compensate for a difference
in rate or sequence of data flow when transmitting data
from one device to another.

Centronics

An industry-standard parallel interface.

Character

A single letter, number, symbol, space, or punctuation
mark. Printable characters are those normally associ-
ated with a typewriter. Unprintable characters are special
characters normally used by a computer to control a sys-
tem, e.g. line feed, backspace, carriage return, escape,
bell, start of text, etc.

Command

An instruction comprised of a specific sequence of con-
trol characters and/or printable characters which enables
a computer or printer to perform a specific task.

Computer Program

A set of computer commands which translates data entered by an operator into a sequence of instructions suitable for processing by the computer.

Configure

To select particular features using the front panel keypad of the printer.

Control Codes

Non-printable characters used to control the position of printed or displayed data. See LINE FEED, FORM FEED, and CHARACTER.

Copy Count

A configuration which allows multiple copies of each page to be printed.

Decimal

The number system with a base of 10.

Default

A preset value programmed into a computer or printer which it will use unless changed by a switch setting or software command.

Diagnostic Page

A page ejected by the printer following a fatal error listing the problem or problems which caused the error condition.

Disable/Enable

The status of an Option. "Disable" is to turn off (0) and "Enable" is to turn on (1).

Dot Patterns

A sequence of "on" or "off" dots defined by the user to generate graphics.

Emulation

In this manual, emulation refers to the ability of the printer to respond to commands that are intended for a different type of printer. For example, when the printer is configured in the Qume Emulation Mode, the printer will respond to the same commands as a Qume printer would.

Enable/Disable

The status of an Option. "Disable" is to turn off (0) and "Enable" is to turn on (1).

Error Code

A two character code appearing in the display window of the control panel indicating an error condition in the printer.

Escape

A non-printable control character (usually abbreviated ESC) used with specific sequences of characters to define commands.

Form Feed

A control character which causes the print or display position to move to the next page.

Forms Length

The length, in lines, of printed page. The number of lines which may be printed before a Form Feed will be invoked. See Addressable Area and Printable Area Tables in the "Printer Specifications" section.

Font

A complete character set in one size and style.

Graphics

Printing, through special software commands, of graphs, diagrams, or other pictoral images.

Group

The major classification of configuration parameters.

Hex

An abbreviation of hexadecimal, a number system with the base 16. The hexadecimal system uses sixteen number symbols (0 through 9, and A through F) and is used as a simple way to represent binary numbers.

Host Computer

A computer transmitting data to a printer or other peripheral device.

Image

The representation on the printed page of the data sent to the printer. It is formed of closely placed dots of toner which are placed on the page electrostatically and fused.

Interface

A hardware component which allows two devices to communicate.

Interface Cable

A special cable used to connect the printer to the computer so they can communicate.

Invalid

Not understood by the printer. Refers to hardware or software communication.

Keypad

A pressure-sensitive panel on the front of the printer used to place the printer on or off line, toggle the Manual Feed, invoke a Form Feed, and configure the printer.

Landscape

A page orientation in which printing is done along the long dimension of the page. See PORTRAIT.

Line Feed

A character which causes the print position to move to the corresponding position on the next line. See CHARACTER.

Memory

Data storage capacity of a computer or printer controller.

Mode

One of several alternative conditions or methods of operation of a device, such as Qume Emulation Mode, Epson Emulation Mode, or Diablo Emulation Mode.

Numeric Characters

Characters represented by the digits 0-9.

Octal

A number system with the base 8. The octal system uses eight number symbols (0 through 7) and is used as a simple way to represent binary numbers.

Option

The "sub-classification" of Groups. Each Option controls a different printer default condition.

Overlay

A string of printer-supported commands which may be stored in RAM and recalled at any time.

Page Orientation

The relationship of the printed data to the long or short dimensions of the page. See PORTRAIT and LANDSCAPE.

Parameter

The variables within a command that determine the action which the command will initiate.

Parallel

A means of transferring data where the data bits representing each character are sent simultaneously along parallel lines or wires. See SERIAL.

Pitch

Characters per inch.

Point Size

The height of a font expressed in points, where a point is 1/72 inch. Also called type size.

Portrait

A page orientation in which printing is done along the short dimension of the page.

Print Engine

The "non-intelligent" portion of the printer including the laser, print drum, and paper feeding mechanism.

Print Cartridge

A disposable cartridge containing dry toner and a print drum.

Print Position

The position on the page where the next printed character will appear, determined by software commands, control codes, and text length.

Print Quality

A general measure of the appearance and readability of a printed page. Criteria of Print Quality include the darkness, clearness, and sharpness of the printed image.

Print Wheel

A rotating disk containing a type font which rotates to present a specified character to the print position.

Printable Characters

Characters representing letters (a-z), numbers (0-9), or punctuation (? : ; " . , etc.).

Proportional Characters

Characters assigned various widths according to their letterforms.

PROM

An acronym for Programmable Read Only Memory. A storage device that can be programmed by electrical pulses. A PROM does not lose its memory when it is powered off.

RAM

Random Access Memory.

ROM

Read Only Memory.

Raster Line

One horizontal line of dots of a laser-printed page.

Resolution

The density of the printed page expressed in "dots per inch."

Serial

A method of transferring data where the data bits representing each character are sent sequentially along a single line or wire. See PARALLEL.

Specifications

A written description listing requirements and specific technical information.

Status Code

A two digit code appearing in the display window of the printer's control panel indicating an error condition or change of mode or status.

Start-Up Page

A page generated by the printer which shows the current fonts and selected printer options. This page is automatically printed each time the printer is powered up.

Support

Ablity to comply with software commands or produce specific results. The QMS printer supports features and software commands of Qume, Diablo, and Epson.

Terminal

A device, usually equipped with a keyboard and display, capable of sending and receiving information.

Toggle

To turn either on or off with the same action.

Toner

A powered ink which is electrostatically applied to the paper and then fused to form the image on the page.

Top-Of-Form

The first line of a page.

Truncate

Cut off the end of a stream of data.

Warm Boot or Restart

A printer feature which allows the printer controller to be reset without a power off / power on cycle. This allows configuration changes to take effect without losing any enabled options.

Word Processing Package

A software program which provides the ability to add, change, move, and delete text.

ZPRAM

An acronym for Zero-Power Random Access Memory. It is RAM that is not affected by turning the printer off.

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