FormsMaster 8000 Series

ImagerPlus for Printronix IGP

Programmer's Manual

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Introduction

The Printek ImagerPlus is a printer resident graphics coprocessor board that has been specially designed for the Printek FormsMaster 8000 Series printers. The primary function of the ImagerPlus is to translate Printronix IGP commands or QMS Magnum Code V commands into graphic commands for the printer. The command syntax allows software previously designed for use with IGP or QMS capable printers to print on the FormsMaster 8000 with comparable results. With these commands, the ImagerPlus may be used to print bar codes, large characters, and labels with lines, boxes, etc.

Note: This manual describes how to use the ImagerPlus for Printronix 10/20/40 IGP emulation. The factory default mode of the ImagerPlus is to emulate QMS Magnum Code V commands. Prior to using the ImagerPlus in an IGP environment, the IGP emulation and the desired Special Function Control Character must be selected as described in "ImagerPlus Setup" on page 7. To use the ImagerPlus for QMS Code V emulation, please refer to the *ImagerPlus for QMS Magnum Code V* manual.

This manual is intended to be used as a programming reference. It is not intended to teach programming. Users should already be familiar with techniques of logical program construction. While a programming language may be used to generate ImagerPlus commands, the ImagerPlus interface does not require that any special, non-printing control characters be sent to the printer except for normal line terminating characters such as Carriage Return (CR) or Line Feed (LF), and Form Feed (FF) to separate pages. Otherwise, all ImagerPlus commands are made up of printable ASCII characters.

MANUAL ORGANIZATION

This manual provides complete instructions for programming the ImagerPlus. Information is presented as you will need it, starting with the basics. The following is a brief summary of each chapter:

Overview	Provides an introduction to the ImagerPlus IGP including a theory of operation, special features, and a description of the various operating modes. The I/O port sharing capability of the FormsMaster 8000 series printers is also discussed.
ImagerPlus Setup	Describes the FormsMaster 8000 front panel Setup Menu for the ImagerPlus and the options available.
Command Syntax	Explains the rules governing the ImagerPlus command interpretation and defines some items common to most commands.
Normal Mode Commands	Provides detailed descriptions of the ImagerPlus commands available in the Normal operating mode.
Creating and Printing Forms and Logos	Provides detailed descriptions of the ImagerPlus commands available for the Create Form, Create Logo, and Execute Form modes.
Bar Codes	Provides detailed descriptions of the commands used to print the various types of bar codes available with the ImagerPlus
Character Sets and Fonts	Describes how to access the various language character sets and how to create user defined character sets.

Command Summary	Provides a brief listing of the commands available in each operating mode.
Character Set Tables	Provides tables of the character sets for each language font.
Error Codes	Provides descriptions of the error codes that may be reported in debug mode.

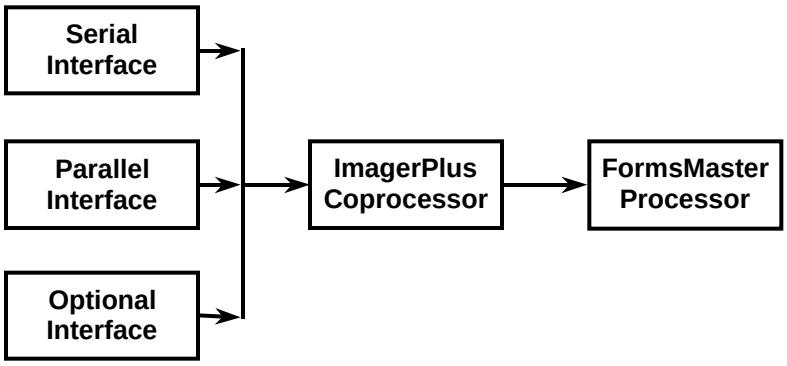
Overview

INTRODUCTION

This chapter will provide general information on the ImagerPlus. Included are sections on Theory of Operation, Special I/O Considerations, and a brief list of ImagerPlus IGP features.

THEORY OF OPERATION

The ImagerPlus is conceptually a command "filter" inserted in the pipeline between the host computer interfaces and the printer's internal command processor as shown below.



As a filter, the ImagerPlus will simply pass all data received on through to the printer until it receives special commands instructing it to do otherwise. These special commands will then be filtered out, processed, and replaced with native printer commands (typically graphic commands).

Special I/O Considerations

The FormsMaster 8000 series printers will automatically accept data from the Parallel Interface, the RS-232 Serial Interface, and any optionally installed hardware interface (Coax/Twinax, IPDS Coax, IPDS Twinax, or 10BaseT LAN). This feature is always active and does not require user intervention to change ports.

In most installations, the printer is only connected to one computer and this feature may be ignored. In other installations the printer may be attached to two or three computers. The printer will automatically switch control of the printer from one hardware interface port to another as described in the following paragraphs.

Note that since any one of these ports can become active at any time, items which pertain to each port need to be set up as described in the FormsMaster 8000 Series Operator's Manual. Each port may select its own native printer emulation (Epson, Proprinter, Printek, etc.) to be used when not using ImagerPlus commands. When not processing ImagerPlus IGP commands, the printer is considered to be in its "Normal" mode of operation. Ports that will not be used (not installed or not connected to a computer) do not need to be set up. Optional interfaces that are not installed are not displayed in the Setup menus.

When the first data are received at any port after turning on power to the printer, that port becomes the "active" port. While one of the ports is active, each of the other ports will accept only a limited number of characters before reflecting a "busy" condition to the computer attached to those ports.

To change which port is active, the printer's buffer must be empty for at least 15 seconds and data must be received from a different port. Therefore, if data are never received from more than one port, that port is always the active port.

It is the programmer's responsibility to ensure that the port transitions are achieved in a manner that does not affect their own output or the output from other hosts. This is really no different than running multiple programs on the same host with one major exception.

On a single computer, output is generally spooled or one program has to wait until another program has finished with the printer. When multiple host computers are involved, this introduces the ability for one computer/program to interrupt another computer/program. The printer provides some control of this interruption by requiring the 15 second delay as described above. Programs that may pause for 15 or more seconds before completion should perhaps save their output in a file and then copy the data to the printer to protect their output from being interrupted by another host.

To help ensure a "clean" transition when the active port changes, the printer will automatically perform a Carriage Return (CR) and reselect the emulation that was in effect for that port. The default emulation is set in the Interface Setup Menus for the Serial, Parallel, and EtherLink interfaces. The Coax/Twinax and IPDS interfaces default to Printek Emulation. The printer will also perform a Form Feed if not already at the top of form. All other states of the printer such as the currently selected form, character pitch, character attributes, line pitch, etc. are under the control of the programmer(s).

The best programming practice is for the programs at each host to leave the printer in a "clean" state. This means that all programmers on all the hosts should probably agree on some known state that they can all expect to find the printer in, and be expected to leave the printer in that state when their program is finished.

All data from all ports will pass through the ImagerPlus. Therefore, if one host leaves the ImagerPlus in a particular state, it may affect data received from another host.

FEATURES

The ImagerPlus adds several new printing capabilities to the FormsMaster 8000. The following is a partial list of some of the most frequently used ImagerPlus features.

- **Variable Print Size** — Alphanumeric characters up to 9.9 by 9.9 inches in size.
- **Reversed Print** — White characters on a dark background.
- **Alphanumeric Rotation** — Rotate characters 90º, 180º, or 270º.
- **Multinational Character Sets** — 32 character sets are available. Custom character sets may also be created using existing characters.
- **Bar Codes** — Code 3 of 9, Interleaved 2 of 5, UPC-A, UPC-E, MSI A through D, Code 128 Subset B and C, EAN 8, EAN 13, and POSTNET.
- **Logo Creation** — Create logos using various print and shading features.
- **Forms and Label Generation** — Various lines, boxes, and logos may be combined with bar codes and text using fixed (hard coded), dynamic or overlaid (using variables) data.

OPERATING MODES

The ImagerPlus supports four modes of operation. These are Normal, Create Form, Create Logo, and Execute Form. In each mode, a sequence of characters may be used to invoke the commands available for that particular mode. The modes themselves may be selected by some of these commands. The following paragraphs provide a brief description of each mode, and the remainder of this manual describes the commands available in each.

Normal Mode

In Normal mode, the ImagerPlus monitors the data stream for ImagerPlus Normal mode commands. In this mode, characters which do not represent a valid ImagerPlus command are simply "passed through" to the printer processor and will be acted upon by the printer just as if there was no ImagerPlus installed. These "passed through" characters will be processed according to the emulation selected for the printer port which received them. For more information on setting up the port emulation, please refer to the *FormsMaster 8000 Series Operator's Manual.* For information on commands specific to a native printer emulation, please refer to the *FormsMaster 8000 Series Programmer's Manual.*

Create Form Mode

In Create Form mode, a form may be defined using commands for lines, boxes, bar codes, characters, and previously defined logos. The form may then be printed using the Execute Form mode.

Create Logo Mode

The Create Logo mode is available within the Create Form mode. Here a logo image may be designed to be "called", during the Create Form mode.

Execute Form Mode

Execute Form mode is used to actually print the form defined earlier. Depending upon how the form was created, several copies may be printed and may even have fields which automatically increment on each form or have variable data entered just prior to printing the form(s).

ImagerPlus Setup

This section describes the various FormsMaster control panel settings which affect the operation of the ImagerPlus.

Note: **Two Setup changes are required** before using the ImagerPlus for Printronix IGP emulation the first time. The ImagerPlus is capable of operation in either Printronix IGP or QMS emulation modes. The factory default is "QMS CodeV v2". Therefore, "Emulation" must be changed to "Printronix IGP" as described below.

In addition, the factory default setting for the Special Function Control Character (<SFCC>), or "ControlCharacter" is a carat (^). In most IGP environments the control character should be set to tilde (~) as described below.

Although it may be necessary to modify some of the other setup parameters, there is a good chance that the ImagerPlus will work perfectly with the factory default values. You may want to try printing with only the changes described in the above note before changing any values.

If you are not already familiar with how to use the Setup features of the printer, please refer to the "Introduction to Setup" section "Printer Configuration" chapter of the *FormsMaster 8000 Series Operator's Manual*. To access the following items, use the SETUP button to access the INTERFACE MENU, and press the SUBMENU button until ImagerPlus is displayed as shown below. The remainder of this section described the different items which may be set for the Imager and the possible values for each.

INTERFACE
MENU
ImagerPlus

Emulation

Emulation
Printronix IGP

Possible Values: QMS CodeV v2*, PTX CodeV v2, Printronix IGP

This item sets the Imager emulation mode. QMS CodeV v2 selects QMS Code V version 2. PTX CodeV v2 selects the Printronix version of QMS CodeV version 2. Printronix IGP selects Printronix 10/20/40 IGP emulation.

Control Character

ControlCharacter
~ (7E Hex)

Possible Values: ^ (5E Hex)*
SOH (01 Hex) through HT (09 Hex),
SO (0E Hex) through (FF Hex)

This item sets the control character used to begin commands. The character normally used for QMS is the caret (^). The character normally used for IGP is the tilde (~).

Line Terminator

Line Terminator
LF

Possible Values: LF*, CR

This item specifies a carriage return or line feed as the line terminator . This allows the user to dictate which character (a carriage return or a line feed) will be the last character on a line. The user should check the host device (computer) attached to the printer to determine what this setting should be.

Bar Code Density

Bar Code Density
High-Res

Possible Values: Low-Res, Medium-Res, High-Res*,
Graphics Med-Res

This item sets the density, or graphics resolution, for bar codes. Typically the higher the resolution, the higher the quality of the bar code. However, for printing large bar codes that will be read from a distance, lower resolution will still provide good readability and provide faster throughput.

IGP Character Set

IGP Char Set
ASCII

Possible Values:

ASCII*	English
Germany	Dutch
Sweden	France
Denmark	Spain
Norway	Italy
Finland	Turkey

This item selects the default character set.

Delete Logos

Delete Logos
No

Possible Values: No*, Yes

This item selects whether logos used in a form should be automatically deleted when a that form is deleted.

Quiet Mode

Quiet Mode
Not Active

Possible Values: Not Active*, Active

This item selects whether or not the quiet mode is active at power on.

Spacing Mode

Spacing Mode
IGP 10/20/40

Possible Values: IGP 10/20/40*, IGP

This item selects the spacing mode.

Command Syntax

The ImagerPlus monitors the input data stream for the Special Function Control Character (SFCC). In most IGP installations, the SFCC is the tilde (~) character. The ImagerPlus may be set to recognize a different control character as described in the following "ImagerPlus Setup" chapter.

When the SFCC character is encountered, the ImagerPlus will examine the characters which immediately follow it to determine if an ImagerPlus function is being requested. If a valid ImagerPlus command is detected, the ImagerPlus will begin to process characters accordingly. In Normal mode, characters which do not make up valid ImagerPlus commands will be "passed through" to be processed according to the native printer emulation selected for the port which received the data (refer to the *FormsMaster 8000 Series Operator's Manual*). In other modes, the ImagerPlus will process commands according to the syntax described in this manual.

Syntax Rules

The ImagerPlus commands have a specific format which must be followed for proper operation. Improperly formatted commands will produce unpredictable results.

Note: There must be no blank spaces in front of a command. Lines of code cannot be indented when programming in this language.

The format for valid commands is as follows:

<SFCC>COMMAND;*n*;*(D)ASCII String(D)*;*VAR1*;[*VAR2*]<LF>

where:	<SFCC>	=	Special Function Control Character. See more below.
	COMMAND	=	The name of the actual command to be performed.
	;	=	Semicolons are used to separate commands and parameters. See more below.
	n	=	Numeric variable which must be supplied for this particular command.
	(D)	=	Delimiters used to enclose an ASCII String. See more below.
	ASCII String	=	A string of alphanumeric characters. The string may not include the character used as delimiters.
	VAR1	=	A parameter variable required for this particular command.
	[ ]	=	Brackets are used to enclose optional parameters.
	VAR2	=	An optional parameter for this particular command (enclosed in brackets).
	<LF>	=	Line Feed line terminator. (May be a CR LF pair.)

Special Notes

No Leading Spaces — Commands must begin at the beginning of a line. There may be no blank spaces in front of commands. Unlike other programming languages, this means that lines of code may not be indented.

<SFCC>	The Special Function Control Character, <SFCC>, identifies a command directed to the ImagerPlus. The tilde (~) character is typically used to begin IGP commands, however, a different character may be selected as descried in the "ImagerPlus Setup".
UPPERCASE Characters	Commands are case sensitive. All commands and form names must be entered in uppercase.
Italic Characters	Variables which are to be replaced with numeric values or from a list of specific values are shown in italics.
(D)	Delimiters are used to enclose printable characters. The *(D)* shown represents a single character. Do not enter the parenthesis. The delimiter typically used for IGP commands it the double quotation (") mark. Delimiters may be any printable character other than a space, slash (/), or the <SFCC>. The character used for the delimiter may not appear within the ASCII String.
<SFCC>, ";", *(D)* and <LF>	For clarity and to save repetition, the definitions for command syntax used throughout the remainder of this manual will not continue to define the Special Function Control Character, <SFCC>; the semicolon (;) used to separate command parameters; the ASCII text delimiter, *(D)*; or the line terminator, <LF>. Their position in the commands will be shown, but they will not be redefined.
Comments	Comments may be added to a command line or on a separate line to describe programming steps. Comments must be preceded by a slash (/) character.

Normal Mode Commands

INTRODUCTION

All commands covered in this section are available in the Normal mode of operation. Commands are listed alphabetically according to function for easy reference.

The following Normal mode commands are covered in this chapter:

Compressed Print	DENSITY
Create Form Mode	CREATE
Delete Form	DELETE FORM
Delete Logo	DELETE LOGO
Directory	DIRECTORY
Execute Form Mode	EXECUTE
Expanded Print	EXPAND
Listen	LISTEN
Multinational Character Set	ISET / USET
Normal Mode	NORMAL
Quiet	QUIET
Reset	RESET
Scaling	SCALE
Vertical Line Spacing	LPI

COMPRESSED PRINT COMMAND — DENSITY

The Compressed Print command dictates the printing density in characters per inch (cpi). A DENSITY command sets the print size for all subsequent alphanumerics until another DENSITY command, a NORMAL command, or a RESET command is entered. The standard print density is 10 cpi.

<SFCC>DENSITY;*n*<LF>

where: DENSITY = Density command.
n = Character density in characters per inch (cpi). See the following table.

n	Character Density
10	10 cpi
12	12 cpi
13	13 cpi
15	15 cpi
17	17 cpi
10A	10 cpi OCR-A
10B	10 cpi OCR-B

CREATE FORM MODE COMMAND — CREATE

This command places the ImagerPlus in the Create Form mode. Refer to "Create Command" on page 19 for a complete description of the CREATE command syntax and how the ImagerPlus operates while in this mode.

<SFCC>CREATE;[/]*FORMNAME*[;*FL*]<LF>

(Create Mode Commands)

END<LF>

DELETE FORM COMMAND — DELETE FORM

The Delete Form command is used to delete a form (identified by form name) from the directory and ImagerPlus memory. If "Delete Logos" is set to "Yes" (refer to "ImagerPlus Setup" on page 7), then any logos associated with this form will also be deleted.

<SFCC>DELETE FORM;*FORMNAME*<LF>

where: DELETE FORM = Delete Form command.
FORMNAME = Name of form to delete.

DELETE LOGO COMMAND — DELETE LOGO

The Delete Logo command deletes the logo from the directory and ImagerPlus memory. Once a logo is deleted, any attempt to print a form containing that logo will produce an error message.

<SFCC>DELETE LOGO;*LOGONAME*<LF>

where: DELETE LOGO = Delete Logo command.
LOGONAME = Name of logo to be deleted. The entire logo directory can be deleted by entering *ALL as the *LOGONAME*.

DIRECTORY COMMAND — DIRECTORY

Use this command to print the following information:

- All memory resident forms and logos
- Logo assignments to forms
- Memory usage and free space available

Up to 32 forms and 16 logos may be stored in the ImagerPlus memory provided total storage does not exceed available memory. The form will not print if memory is full. Free memory area must be equal to or greater than the size of the form being executed.

<SFCC>DIRECTORY<LF>

where: DIRECTORY = Directory command.

EXECUTE FORM MODE COMMAND — EXECUTE

The Execute Form mode command executes a previously created form. Refer to "Execute Form Mode Command" on page 32 for a complete description of this command.

<SFCC>EXECUTE;*FORMNAME*[;PAGE *n*][;*FC*]<LF>

[*Overlay Data*<LF>]

[<SFCC>AF*n*;*(D)ASCII TEXT(D)*<LF>]

[<SFCC>BF*n*;*(D)DATA FIELD(D)*<LF>]

<SFCC>NORMAL<LF>

EXPANDED PRINT COMMAND — EXPAND

The Expanded Print command is used to enlarge alphanumeric characters vertically (character height) and horizontally (character width) up to 99 times the standard size.

<SFCC>EXPAND;*VE*;*HE*<LF>

where: EXPAND = Expand print command
VE = Vertical Expansion factor. *VE* = 0 to 113.
HE = Horizontal Expansion factor. *HE* = 0 to 113.

Both the *VE* and *HE* parameters must be zero or greater. A *VE* or *HE* setting of 1 gives single size characters using the expanded font; a setting of 0 results in standard size characters. All alphanumerics following an Expanded Print command will be printed at the specified *VE* and *HE* values until the occurrence of another Expanded Print command, a Normal mode command, or a Reset command.

LISTEN COMMAND — LISTEN

The LISTEN command returns the ImagerPlus to the standard operating state when in the "quiet" state (see QUIET command).

<SFCC>LISTEN<LF>

where: LISTEN = Listen command.

MULTINATIONAL CHARACTER SET COMMANDS — ISET / USET

The ISET (International Character Set) and USET (User-Defined Character Set) commands provide access to multinational and custom character sets. Refer to “Character Sets and Fonts” on page 59 for a complete description of these commands.

<SFCC>ISET;*n*<LF>

<SFCC>USET;*n*<LF>

C*a*;F*a*<LF>

. . .

END<LF>

NORMAL MODE COMMAND — NORMAL

The ImagerPlus defaults to the Normal mode when power is applied, a RESET command, or after a reset is issued to the ImagerPlus (a reset occurs after any changes are made in printer’s control panel Setup menus). Use the NORMAL command to return the ImagerPlus to the Normal mode of operation after performing a function in the Execute, Create, or Create Logo modes.. While in the Normal mode, the ImagerPlus does not process the data stream, but looks for the SFCC followed by a valid ImagerPlus command. All other data are passed through to the printer processor.

Note that a NORMAL command following an EXECUTE command must be preceded by an blank line (<LF>).

[<LF>]<SFCC>NORMAL<LF>

where:
- <LF> = Optional line terminator (required to generate a blank line if immediately following an EXECUTE command).
- <SFCC> = Special Function Control Character.
- NORMAL = Normal command.
- <LF> = Line terminator.

QUIET COMMAND — QUIET

Use the QUIET command to put the ImagerPlus in the Quiet state; that is, when you wish to have all characters passed unchanged to the printer. The ImagerPlus will remain in the Quiet state until the next occurrence of a LISTEN command that enables standard ImagerPlus operation.

The following commands are valid in the Quiet state:

Listen	LISTEN
Select Format On	SFON
Select Format Off	SFOFF
Ignore Sequence On	IGON
Ignore Sequence Off	IGOFF

Note: The ImagerPlus will ignore the QUIET command while in the Execute Form mode.

<SFCC>QUIET<LF>

where: QUIET = Quiet command.

RESET COMMAND — RESET

The RESET command deletes all forms and logos from ImagerPlus memory. A reset can also be accomplished by cycling power (turning the printer off and on), or by changing a parameter in the printer's control panel Setup menus.

<SFCC>RESET<LF>

where: RESET = Reset command.

SCALING COMMAND — SCALE

The Scaling command sets the vertical and horizontal pitch for form printing. Refer to "Scale Command" on page 29 for a complete description of this command.

SCALE;DOT<LF>

or

SCALE;CHAR[;*LPI*;*CPI*]<LF>

VERTICAL LINE SPACING COMMAND — LPI

The Vertical Line Spacing Command is used to change the vertical printing format. The default line spacing is 6 lpi (lines per inch). All alphanumerics after an LPI command will be printed at the specified value until the occurrence of another LPI, NORMAL, or RESET command.

<SFCC>LPI;*n*<LF>

where: LPI = Vertical Line Spacing command.
n = Line spacing to 6, 8, 9, 10 lines per inch.

Note that the LPI command affects only ImagerPlus alphanumerics. The printer's line spacing is not changed for data printed using the printer's emulation. Therefore, if the printer receives an 8 lpi command while the ImagerPlus is set to 9 or 10 lpi, the top of the first character line may be cut off. This truncation can be avoided by issuing two line feeds before the 8 lpi data stream.

Creating and Printing Forms and Logos

This section includes the commands used to create forms and logos, as well as forms printing. Create Form commands are used to design forms including all form components such as boxes, corners, and bar codes. Forms are not printed in the Create Form mode, but in the Execute Form mode. Each form element has its own specific set of commands and parameters that determine size, location, and content. The Create Form, Create Logo, and Execute Form commands described in this chapter are as follows:

Creating Forms

Create Command	CREATE
Alphanumerics	ALPHA
Boxes	BOX
Corners	CORNER
End Command	END
Form Length	LFORM6 / LFORM8
Horizontal Duplication	HDUP
Horizontal Lines	HORZ
Logo Call	LOGO
Page Number	PAGE
Reverse Print	REVERSE
Scale	SCALE
Scale and CP.DP Format	CP.DP
Vertical Duplication	VDUP
Vertical Lines	VERT

Creating Logos

Create Logo Mode	LOGO

Printing Forms

Execute Form Mode	EXECUTE

CREATE COMMAND — CREATE

To begin form design, the Create Form mode must be accessed using the CREATE command.

<SFCC>CREATE;[/]*FORMNAME*[;*FL*]<LF>

where: CREATE = Create Form mode command.

/ = Optional debug parameter. Causes each line of the program to be checked for invalid characters or parameters when printing the form is attempted in Execute Form mode. Only error messages will be printed. To actually print the form the "/" must be removed.

FORMNAME = Name of form being created. The form name may contain a maximum of eight alphanumeric characters. No spaces, semicolons, slashes, or the SFCC are allowed.

FL = Optional Form Length. May be used specify the maximum length of the form in dot rows, 1 to 65,535 dot rows. 6 lpi line spacing = 12 dot rows per line; 8 lpi line spacing = 9 dot rows per line. The default length of 792 dot rows (11 inches) will be used if this parameter is left blank. You can also enter 0 to denote an unspecified length. Under this setting, the form will end automatically after the last element has been printed.

ALPHANUMERICS COMMAND — ALPHA

The standard ALPHA command is used to define and position a data field on a form. Other forms of the ALPHA command are used to automatically increment, decrement, duplicate, and reset alphanumeric data field values (see Incrementing Alphanumeric Data).

Depending on the parameters used, a printed alphanumeric data field will be treated as either static (preprinted) or dynamic data. Dynamic data is entered when the form is printed. The position of a dynamic data field is set in the Create Form mode; the entered alphanumeric data must be redefined before each print as the form is produced in the Execute Form mode.

In addition to alphanumeric data string entry, ALPHA command parameters provide the following data field manipulation options:

90º clockwise and counterclockwise rotation

180º rotation

Reverse print (white on black) with two density options

Elongated character printing (non-rotated print only)

Compressed print settings (non-rotated print only)

Dynamic data field positioning

Vertical and horizontal character expansion

The standard ALPHA command syntax is as follows:

ALPHA<LF>

[R[D][L];][E;][C*n*;][AF*n*;*L*;][*DIR*;[UC;]]*SR*;*SC*;*VE*;*HE*;

***(D)ASCII Text(D)*<LF>**

STOP<LF>

where: ALPHA = Alphanumeric command.

R[D][L] = Optional Reverse, Dense and Long Field parameter. An R specifies a black background, RD specifies a denser black background.
L is used only when defining a dynamic data field to include a long background field for characters with descenders (g, j, p, q, y). The L option is not required for a static data field; the reverse field length will be adjusted automatically to include descenders.

E = Optional Elongation parameter. Specifies elongated character printing (approximately double height and single width). If the E option is used, the *VE* and *HE* parameters must be set to 0. The E option is not allowed with rotated alphanumerics.

C*n* = Optional Compressed Print parameter. *n* specifies 10, 12, 13, 15, or 17 cpi, 10A for 10 cpi OCR-A, or 10B for 10 cpi OCR-B. If the C*n* option is used, the *VE* and *HE* parameters must be set to 0. The C*n* option is not allowed with rotated alphanumerics.

AF*n*;*L* = Optional Alpha Form Location and Length parameter. Specifies the form location and length of a dynamic data field. If used, the actual text cannot be entered during the Create Form mode (do not use the *ASCII Text* parameter). Dynamic text is entered during the Execute Form mode, so it may be changed without redefining or recreating the form (refer to "Execute Dynamic Alphanumeric Data" on page 33). *n* = 1 to 127 to specify the alphanumeric string location on the form. The *SR* and *SC* parameters specify the precise position (starting row and column) for field *n*. *L* = 1 to 226 to specify the maximum number of characters allowed for this alphanumeric string. The number of characters of dynamically entered text must be less than or equal to *L*.

DIR;[UC;] = Optional Direction parameter. Rotates characters if entered (not required for horizontal print). *DIR* = CW for 90º clockwise rotation, CCW for 90º counterclockwise rotation, or INV for 180º (inverted) rotation.
CW, CCW or INV may be followed by UC to force all lower case characters to upper case. The E (Elongated) and C*n* (Compressed Print) options are not allowed with rotated characters.

SR = Specifies the starting row position of the alphanumeric data (static or dynamic). *SR* = 1 to one less than the length of the form. Character row or dot row is determined by the Scale command or the *CP*.*DP* format.

SC = Specifies the starting column position of the alphanumeric data (static or dynamic). *SC* = 1 to one less than the width of the form). Character column or dot column is determined by the Scale command or the *CP*.*DP* format.

VE = Specifies the vertical expansion factor. *VE* = 0 to 113. Zero specifies the standard font (no expansion). *VE* and *HE* must both be zero or non-zero. Characters cannot be enlarged in one direction only. *VE* and *HE* may contain different non-zero factors. The E (Elongated) and C*n* (Compressed Print) parameters cannot be used with a non-zero vertical expansion.

HE = Specifies the horizontal expansion factor. *HE* = 0 to 113. Zero specifies the standard font (no expansion). *VE* and *HE* must both be zero or non-zero. Characters cannot be enlarged in one direction only. *VE* and *HE* may contain different non-zero factors.

ASCII Text = Represents the alphanumeric string to be printed. Enter any of the standard ASCII printable characters (except the character used as the delimiter). This static or "fixed" data is positioned on the form as specified by the *SR* and *SC* parameters. Unlike dynamic data, this data can be changed only by redefining the form with the Alpha command in the Create Form mode.

STOP = Terminates this command and causes the ImagerPlus to wait for a new command. If STOP is not entered, the ImagerPlus will wait for another set of Alpha command parameters.

Incrementing Alphanumeric (or Bar Code) Data — STEPMASK / STARTDATA

This feature is useful for automatic incrementing of data fields, such as item numbers on invoice forms, boxes or carton labels. This updating function is generally referred to as the incremental field feature. Whether the data is actually incremented or decremented depends on the sign (+/-) entered as the direction parameter.

The incremental field feature can be used with either fixed (static) or dynamic data. As with the ALPHA (or bar code) command used in the Create Form mode, additional Execute Form command parameters are required to use this feature with dynamically entered data (see EXECUTE command). The ImagerPlus allows a maximum of 255 incremental static (fixed) alphanumeric fields per form (up to 65,535 forms).

Before presenting the required ALPHA command format, the *STEPMASK* and *STARTDATA* parameters that control incrementing need to be explained. These parameters can be part of either or both the Incremental Alphanumeric Fixed Data command and the EXECUTE command when using Incremental Alphanumeric Dynamic Data.

The equivalent bar code commands, Incremental Bar Code Fixed Data and Incremental Bar Code Dynamic Data, will be covered in the "Bar Codes" section of this manual. The incremental parameter functions are the same, but the bar code command syntax is quite different from the ALPHA command. The following *STEPMASK* and *STARTDATA* explanation, however, applies to both ALPHA and bar code commands. Any differences relevant to bar code usage will be noted here.

The *STEPMASK* parameter performs three functions:

1. Specifies the increment value (step).
2. Specifies the number of characters allowed in the data field (*STARTDATA*).
3. Provides a mask to control incrementing of linked or unlinked parts (subfields) of the data field.

The *STARTDATA* parameter contains the starting value of the data field. The number of characters must be equal to or less than the number of characters in the *STEPMASK* parameter. Where the number of alphanumeric characters is less, the data will be right justified and preceded by spaces.

These characters are allowed in *STARTDATA* fields to be incremented:

Numerics, 0 - 9

Alpha, A - Z (uppercase only).

Any printable character is allowed in non-incrementing fields.

Bar code *STARTDATA* values are determined by the type of bar code being used. Refer to the "Bar Codes" chapter for individual bar code specifications.

For example: A *STEPMASK* of 000001 will increment a 7-character *STARTDATA* value by one with each printing. In other words, a *STARTDATA* of "ABCD123" will become ABCD124, ABCD125, etc. A *STARTDATA* of "123ABCD" will become 123ABCE, 123ABCF, etc.

The following table shows the effect of particular *STEPMASK* values on specific *STARTDATA* values.

STEPMASK	***STARTDATA***	**Effect**
0 - 9	0 - 9	Increment the *STARTDATA* number by the corresponding *STEPMASK* amount.
0 - 9	A - Z	Increment the alpha character by corresponding *STEPMASK* (ASCII value) amount.
0 - 9	Space	Will become same character type (alpha or numeric) as the character immediately to the right (linked increment position). Will become numeric if in the least significant position.

STEPMASK	***STARTDATA***	**Effect**
0 - 9	Not 0 – 9 or A - Z	Results in error condition.
L	Any Character	Linked, non-incrementing alphanumeric character.
Anything Other Character (e.g. X)	Any Character	Non-incrementing alphanumeric character.

Subfields within the *STARTDATA* field can be "linked" or "unlinked" depending on the existence of one or more L's in *STEPMASK*. For example, consider the *STARTDATA* data field of 123ABC456 as three separate subfields of three characters each.

A *STEPMASK* of 000LLL001 links the subfields on either side of the ABC and will produce the following results:

123ABC457, 123ABC458, 123ABC459, … 123ABC998, 123ABC999, 124ABC000, 124ABC001

A *STEPMASK* of 001XXX001 specifies two unlinked, incrementing fields which will produce the following results:

124ABC457, 125ABC458, 126ABC459, … 665ABC998, 666ABC999, 667ABC000, 668ABC001

A *STEPMASK* of • L01 with *STARTDATA* of • A00 (where • represents a Space character) specifies two linked fields which will produce the following results:

•A01, •A02, •A03, … •A98, •A99, AA00, AA01, … AA98, AA99, BA00, BA01

Incremental Alphanumeric Fixed Data Fields

This is a modified version of the standard ALPHA command. It should be used only when you need to automatically increment fixed data alphanumeric fields. Refer to the standard ALPHA command instructions for parameters not covered below. Also, refer to Incrementing Alphanumeric Data for a detailed explanation of *STEPMASK* and *STARTDATA*.

ALPHA<LF>

[R[D];][E;][C*n*;]I;[*DIR*;]*SR*;*SC*;*VE*;*HE*;[*idir*]<LF>

***STEPMASK*;[RPT*n*;][RST*n*;]*(D)STARTDATA(D)*<LF>**

STOP<LF>

where:

I = Identifies the ALPHA command as the Incremental Alphanumeric Fixed Data Fields command.

idir = Optional parameter used to specify whether to increment or decrement the data field. Enter "+" (or leave blank) to increment (add step amount to), or "-" to decrement (subtract step amount from) the data field.

STEPMASK = Specifies the increment amount (step), data field length, and mask to control incrementing. (Refer to “Incrementing Alphanumeric (or Bar Code) Data — STEPMASK / STARTDATA” on page 22 for details).

RPT*n* = An optional parameter used to specify the number of times to repeat a field value before incrementing it. This feature is useful for printing multiple copies of a form (such as a label) before changing the data field. *n* = 1 – 65535 (default = 1).

RST*n* = An optional parameter used to specify the number of times to print an incremented field (on one or more forms) before resetting it to its starting value. *n* = 1 – 65,535 (default is 0 to indicate "no reset").

STARTDATA = The starting value of alphanumeric data field to be incremented. The number of *STARTDATA* characters must be equal to or less than the number of characters in the *STEPMASK*. Refer to the Incrementing Alphanumeric Data for details.

Incremental Alphanumeric Dynamic Data Fields

This is a modified version of the standard ALPHA command. It should be used only when you need to automatically increment alphanumeric dynamic data fields. Refer to the standard ALPHA command instructions for parameters not covered below.

Use this ALPHA command to specify the position and size of the incremental dynamic data field in the Create Form mode. The *STEPMASK* and *STARTDATA* parameters are entered in the EXECUTE command in the Execute Forms mode. The starting data for both standard and incremental dynamic data fields can be changed without changing the form definition program. You can also change the incremental parameters with each new print job without changing the form definition program.

ALPHA<LF>

[R[D];][E;][C*n*;][IAF*n*;*L*;[*DIR*;]*SR*;*SC*;*VE*;*HE*;<LF>

STOP<LF>

where: IAF*n* = Identifies the Alpha command as the Incremental Alphanumeric Dynamic Data Field command. *n* represents the number of the data field for form location. *n* = 1 to 255. *SR* (Starting Row) and *SC* (Starting Column) entered in the standard ALPHA command specify the exact location of this data field on the form.

L = Specifies the field length for *STARTDATA*. *L* = 1 to 226. The number of characters dynamically entered for *STARTDATA* must be less than or equal to the value entered for *L*. Refer to the 'Execute Incremental Dynamic Data" on page 36 for details.

Duplicating Incremental Alphanumeric (or Bar Code) Fields

The Horizontal Duplication (HDUP) and Vertical Duplication (VDUP) commands (explained later in this chapter) can be used to duplicate incremental alphanumerics or bar codes. When these commands are used to duplicate fixed or dynamic data, fields are incremented in a left-to-right, top-to-bottom order. Spacing is also specified by the HDUP and VDUP commands.

For example, a *STARTDATA* of 001 with a *STEPMASK* of 001, and an HDUP of 5 and VDUP of 3 would produce the following result.

001	002	003	004	005
006	007	008	009	010
011	012	013	014	015

BOX COMMAND — BOX

Boxes can be created using the BOX command with parameters which define the starting row and column (upper left corner) and ending row and column (lower right corner) positions. Line thickness, size, and position are also user defined. Single, multiple, and overlapping boxes may be printed.

BOX<LF>

***LT*;*SR*;*SC*;*ER*;*EC*<LF>**

STOP<LF>

where:
- BOX = The Box command. Boxes extend down and to the right from the starting row and column position.
- *LT* = This parameter specifies the line thickness measured in dots. *LT* = 1 or greater.
- *SR* = Specifies the starting row of the box. *SR* = 1 to one less than the length of the form. Character row or dot row is determined by the Scale command or the *CP.DP* format.
- *SC* = Specifies the starting column of the box. *SC* = 1 to one less than the width of the form. Character column or dot column is determined by the Scale command or the *CP.DP* format.
- *ER* = Specifies the ending row of the box. *ER* = 2 through the last row of the form. *ER* must be greater than *SR*. Character row or dot row is determined by the Scale command or the *CP.DP* format.
- *EC* = Specifies the ending column of the box. *EC* = 2 through the last column of the form. *EC* must be greater than *SC*. Character column or dot column is determined by the Scale command or the *CP.DP* format.
- STOP = Terminates this command and causes the ImagerPlus to wait for a new command. If STOP is not entered, the ImagerPlus will wait for another set of BOX command parameters.

CORNER COMMAND — CORNER

Corners are created using the Corner command with parameters defining the starting row and column (upper left corner) and ending row and column (lower right corner) positions. Line thickness and arm length are also user-defined. The four corners are printed in vertical/horizontal orientation. Variable rotation of corners is not provided.

CORNER<LF>

***LT*;*SR*;*SC*;*ER*;*EC*;*VL*;*HL*<LF>**

STOP<LF>

where:
- CORNER = The Corner command. Corners will be extended down and to the right from the starting row and column.
- *LT* = Specifies the line thickness measured in dots. *LT* = 1 or greater.
- *SR* = Specifies the starting row of the corner. *SR* = 1 to one less than the length of the form. Character row or dot row is determined by the Scale command or the *CP.DP* format.
- *SC* = Specifies the starting column of the corner. *SC* = 1 to one less than the width of the form. Character column or dot column is determined by the Scale command or the *CP.DP* format.
- *ER* = Specifies the ending row of the corner. *ER* = 2 through the last row of the form. *ER* must be greater than *SR*. Character row or dot row is determined by the Scale command or the *CP.DP* format.

EC = Specifies the ending column of the corner. *EC* = 2 through the last column of the form. *EC* must be greater than *SC*. Character column or dot column is determined by the Scale command or the *CP*.*DP* format.

VL = Specifies the length of the vertical arm of each of the four corners. *VL* = 1 or greater. Character or dot column format is determined by the Scale command or the *CP*.*DP* format.

HL = Specifies the length of the horizontal arm of each corner in the set. *HL* = 1 or greater. Character or dot column format is determined by the Scale command or the *CP*.*DP* format.

STOP = Terminates this command and causes the ImagerPlus to wait for a new command. If STOP is not entered, the ImagerPlus will wait for another set of Corner command parameters.

END COMMAND — END

The END command is used to terminate the current mode of operation. It must be used before entering a new mode command (Normal, Create, Logo, or Execute). In addition to terminating the current mode, the END command initiates the following ImagerPlus functions:

- Program errors are cleared out
- Error-free sections of the current form program are stored
- The ImagerPlus returns to the Normal (default) mode.

The debug slash (/), if included in the Create command will result in printing any applicable error messages.

END<LF>

where: END = The End command. Use to terminate the current mode of operation before issuing a new mode command.

FORM LENGTH — LFORM6 / LFORM8

Two commands are provided for setting the form length to a specified number of lines allowed per form. Form length can be set in 6 or 8 lpi (lines per inch) values. These commands affect ImagerPlus text only, not the printer emulation setting for lpi.

The two Form Length commands are:

LFORM6;*n*<LF> or LFORM8;*n*<LF>

where: LFORM6 = The Form Length command for 6 lpi forms.
LFORM8 = The Form Length command for 8 lpi forms.
n = Specifies the forms length in total number of lines allowed per form. Replace *n* with the desired the number of lines:
1 - 5461 lines for 6 lpi forms;
1 - 7281 lines for 8 lpi forms.
Any value that exceeds the maximum number of lines will result in an error message.

HORIZONTAL DUPLICATION COMMAND — HDUP

This command is used to duplicate, or repeat, form elements. It specifies the number of times the elements are to be duplicated horizontally, as well as the spacing between each duplication. The command for the elements to be duplicated is placed after the HDUP command.

The HDUP command can also be used to modify incremental data output (refer to "Duplicating Incremental Alphanumeric (or Bar Code) Fields" on page 24).

HDUP;*DN*;*OF*<LF>

(Elements to be Duplicated)

HDUP;OFF<LF>

where:

HDUP	=	The Horizontal Duplication command.
DN	=	Specifies the number of times the entered form elements will be repeated horizontally. *DN* = 1 to 255.
OF	=	Specifies the horizontal spacing between each duplication of the form elements. *OF* = a number based on dot or character columns as determined by the Scale command or the *CP.DP* format.
HDUP;OFF	=	Terminates the Horizontal Duplication command. If not entered, the ImagerPlus waits for another form element to be specified. A variety of element types can be specified for duplication within one duplication command.

HORIZONTAL LINE COMMAND — HORZ

This command is used to create a horizontal line. Line thickness, position, and length are user specified.

HORZ<LF>

***LT*;*R*;*SC*;*EC*<LF>**

STOP<LF>

where:

HORZ	=	The Horizontal Line command.
LT	=	Specifies the line thickness in terms of dots. *LT* = 1 or greater. Line thickness extends downward from the starting row.
R	=	Specifies the row where the horizontal line will be drawn. *R* = 1 to one less than the length of the form. Character row or dot row is determined by the Scale command or the *CP.DP* format.
SC	=	Specifies the starting column of the horizontal line. *SC* = 1 to one less than the width of the form. Character column or dot column is determined by the Scale command or the *CP.DP* format.
EC	=	Specifies the ending column of the horizontal line. *EC* = 2 to the last column of the form. *EC* must be greater than *SC*. Character column or dot column is determined by the Scale command or the *CP.DP* format.
STOP	=	Terminates this command and causes the ImagerPlus to wait for a new command. If STOP is not entered, the ImagerPlus will wait for another set of Horizontal Line command parameters.

LOGO CALL COMMAND — LOGO

A logo is actually is created in the Create Logo mode command. The Logo Call command calls, or selects, a previously defined logo and locates it on the form.

LOGO<LF>

***SR*;*SC*;*LOGONAME*<LF>**

STOP<LF>

where:	LOGO	=	The Logo Call command.
	SR	=	Specifies the starting row of the logo (based on the upper left corner of the logo grid). *SR* = 1 to one less than the length of the form. Character row or dot row is determined by the Scale command or the *CP.DP* format.
	SC	=	Specifies the starting column of the logo (based on the upper left corner of the logo grid). *SC* = 1 to one less than the width of the form. Character column or dot column is determined by the Scale command or the *CP.DP* format.
	LOGONAME	=	Name given the logo when created.
	STOP	=	Terminates this command and causes the ImagerPlus to wait for a new command. If STOP is not entered, the ImagerPlus will wait for another set of Logo Call command parameters.

PAGE NUMBER COMMAND — PAGE

This command specifies the positioning of the page number on the form. In order for the ImagerPlus to automatically increment page numbers on separate copies of the form, the starting page number must be defined during the EXECUTE command.

PAGE;*SR*;*SC*<LF>

where:	PAGE	=	The Page Number command.
	SR	=	Specifies the starting row of the page number. *SR* = 1 to one less than the length of the form. Character row or dot row is determined by the Scale command or the *CP.DP* format.
	SC	=	Specifies the starting column of the page number. *SC* = 1 to one less than the width of the form. Character column or dot column is determined by the Scale command or the *CP.DP* format.

REVERSE PRINT COMMAND — REVERSE

This command specifies an area of the form for reverse printing (white on black). Two densities of black background are available. The standard density background uses odd dot plotting; the higher density background uses both odd and even dot plotting. Use the denser background when more contrast is desired.

Form elements within the reverse print field are printed white on black. Reverse print can be used for the following:

- Standard (10 cpi) and expanded characters
- Rotated standard (10 cpi) and expanded characters
- Logos and all form elements (lines, boxes, etc.).

Reverse Print is not provided for bar codes and compressed print.

REVERSE<LF>

[DARK;]*SR*;*SC*;*ER*;*EC*<LF>

STOP<LF>

where:
- REVERSE = The Reverse Printing command.
- DARK = An optional parameter used to designate denser black. The default is lighter background.
- *SR* = Specifies the starting row of the reverse print field. *SR* = 1 to one less than the length of the form. Character row or dot row is determined by the Scale command or the *CP*.*DP* format.
- *SC* = Specifies the starting column of the reverse print field. *SC* = 1 to one less than the width of the form. Character column or dot column is determined by the Scale command or the *CP*.*DP* format.
- *ER* = Specifies the ending row of the reverse print field. *ER* = 2 through the last row of the form. *ER* must be greater than *SR*. Character row or dot row is determined by the Scale command or the *CP*.*DP* format.
- *EC* = Specifies the ending column of the reverse print field. *EC* = 2 through the last column of the form. *EC* must be greater than *SC*. Character column or dot column is determined by the Scale command or the *CP*.*DP* format.
- STOP = Terminates this command and causes the ImagerPlus to wait for a new command. If STOP is not entered, the ImagerPlus will wait for another set of Reverse Print command parameters.

SCALE COMMAND — SCALE

The Scale command specifies whether data is positioned in terms of characters or dots. This affects certain commands which position data by parameters that specify starting row and column (*SR* and *SC*) and ending row and column (*ER* and *EC*).

A standard 8 1/2 x 11 inch form (at the default setting, 6 lpi and 10 cpi) contains the following number of rows and columns:

Scale	Rows	Columns
Character	66	80
Dot	792	720

Either of the Scale commands can be issued at any time during forms creation. Scale commands become active at the point of insertion. Prior elements are printed at the former scale. Elements that follow a change will be printed at the new scale.

The Scale command does not affect the size of the printed data itself. Text printed at 6 lpi and 10 cpi will continue to be printed at 6 lpi and 10 cpi after a Scale change. However, the position of the data will be affected.

SCALE;DOT<LF>

or

SCALE;CHAR[;*LPI*;*CPI*]<LF>

where:
- SCALE = The Scale command.
- DOT = Specifies the dot scale.
- CHAR = Specifies the character scale.

LPI = An optional vertical line spacing parameter for character scaling. *LPI* = 6, 8, 9 or 10 (default = 6).

CPI = An optional horizontal pitch parameter for character scaling. *CPI* = 10, 13, 15, or 17 (default = 10).

SCALE AND CHARACTER/DOT POSITION FORMAT COMMAND — CP.DP

The *CP.DP* format is most commonly used to adjust starting and ending print positions. When printing alphanumeric data (text) on a form, it is normal to have a line or box occupying the same position as the intended text. To avoid overprinting, *CP.DP* format values are entered to immediately precede the starting row (*SR*) and/or starting column (*SC*) parameters, thus offsetting the text.

The *CP* value indicates the cell position; the *DP* value indicates the dot position with that cell. When printing at 6 lpi and 10 cpi, each character position or cell is 12 dot rows high by 6 dot columns wide. A *CP.DP* format preceding a *SC* (starting column) dictates the starting dot position down in the cell. A *CP.DP* value preceding a *SR* (starting row) dictates the starting dot position to the right within the cell.

Scale has no effect on the *CP.DP* Format command; each command is independent of the other.

VERTICAL DUPLICATION COMMAND — VDUP

This command is used to duplicate, or repeat, form elements. It specifies the number of times the elements are to be duplicated vertically, as well as the spacing between each duplication. The elements to be duplicated are placed after the VDUP command. The VDUP command can also be used to modify incremental data output (refer to "Duplicating Incremental Alphanumeric (or Bar Code) Fields" on page 24).

VDUP;*DN*;*OF*<LF>

(elements to be duplicated)

VDUP;OFF<LF>

where:

VDUP = The Vertical Duplication command.

DN = Specifies the number of times the entered form elements will be repeated vertically. *DN* = 1 to 255.

OF = Specifies the vertical spacing between each duplication of the form elements (starting column to starting column). *OF* = a number based on dot or character columns as determined by the Scale command or the *CP.DP* format.

VDUP;OFF = Terminates the Vertical Duplication command. If not entered, the ImagerPlus waits for another form element to be specified. A variety of element types can be specified for duplication within one duplication command.

VERTICAL LINE COMMAND — VERT

This command is used to create a vertical line. Line thickness, position, and length are user specified.

VERT<LF>

***LT*;*C*;*SR*;*ER*<LF>**

STOP<LF>

where:
- VERT = The Vertical Line command.
- *LT* = Specifies the line thickness in terms of dots. *LT* = 1 or greater. Line thickness extends to the right from the starting column.
- *C* = Specifies the column at which the vertical line will be drawn. *C* = 1 to one less than the width of the form. Character row or dot row is determined by the Scale command or the *CP.DP* format.
- *SR* = Specifies the starting row of the vertical line. *SR* = 1 to one less than the length of the form. Character column or dot column is determined by the Scale command or the *CP.DP* format.
- *ER* = Specifies the ending row of the vertical line. *ER* = 2 to the last row of the form. *ER* must be greater than *SR*. Character column or dot column is determined by the Scale command or the *CP.DP* format.
- STOP = Terminates this command and causes the ImagerPlus to wait for a new command. If STOP is not entered, the ImagerPlus will wait for another set of Vertical Line command parameters.

CREATE LOGO MODE — LOGO

This command is used to design and create a logo. You must define the overall grid size (in terms of dots), and then indicate the specific dot and/or series of dots to be printed in each grid row. The upper left corner of the logo grid is considered the starting row (*SR*) and starting column (*SC*) parameters for the Logo Call command.

A logo grid contains 72 dots per inch vertically and 60 dots per inch horizontally. The largest logo allowed is 252 dot rows high (3.5 inches) and 240 dot columns wide (4 inches). A maximum of 16 logos can be created and stored in memory.

Do not specify grid dimensions substantially larger than required by the logo; you will only waste ImagerPlus memory space.

<SFCC>LOGO;*LOGONAME*;*VL*;*HL*<LF>

***RN*;*D*;*D1-D2*;*D*<LF>**

END<LF>

where:
- LOGO = The Logo command.
- *LOGONAME* = Defines the name of the logo being created. The logo name may contain a maximum of eight alphanumeric characters. No spaces, semicolons, slashes or the SFCC are allowed. An existing logo with the same name will be overwritten and replaced by the new logo. Any future references to the logo (Delete Logo or Logo Call) must be done using the same name. A maximum of 16 logos can be stored in ImagerPlus memory.
- *VL* = Specifies the overall vertical length of the logo grid in dot rows. *VL* = 1 to 252.

HL	=	Specifies the overall horizontal length of the logo grid in dot rows. *HL* = 1 to 240.
RN	=	Specifies the row number for this row of dots in the logo grid. Use a separate command line for each row number. *RN* = 1 to 252 (numbered from the top down).
D	=	Specifies a single dot position to be printed within a row. More than one entry per line is allowed. Enter each dot number desired, separating each entry with a semicolon. *D* = 1 to 240 (numbered from left to right).
D1-D2	=	Specifies a range or series of dot positions (left to right) to be printed within the row. The starting (D1) and the ending (D2) positions will also be printed. Single dots and a series of dots can be combined in the same command line. Enter the desired series (1-240, minimum and maximum), separating each series with a semicolon.
END	=	Terminates the Create Logo mode.

EXECUTE FORM MODE COMMAND — EXECUTE

The Execute Form mode command is used to print a form. This command can be used only after the form has been created in the Create Form mode.

The EXECUTE command provides:

- Optional page numbering
- Optional form count for printing multiple copies
- Print format commands (e.g., lpi, elongation, and plot mode)
- Compressed and expanded print commands
- Vertical spacing commands
- Alternate character set selection

Forms can be printed with static (fixed) and/or variable data entry. The following data can be input during the Execute Form mode:

- Page numbers
- Alphanumeric dynamic and overlay data fields
- Bar code dynamic data fields

Variable data entry must have been established by the ALPHA and BARCODE command parameters during the Create Form mode. Additional Execute parameters are provided for printing such alphanumeric and bar code data on the form.

With respect to incremental data, there are two formats of the EXECUTE command. The first is a standard version that executes non-incremental or fixed incremental data. The second is used to execute incremental dynamic data (refer to Execute Incremental Data).

<SFCC>EXECUTE;*FORMNAME*[;PAGE *n*][;*FC*]<LF>

[*Overlay Data*<LF>]

[<SFCC>AF*n*;*(D)ASCII TEXT(D)*<LF>]

[<SFCC>BF*n*;*(D)DATA FIELD(D)*<LF>]

<SFCC>NORMAL<LF>

where:	EXECUTE	=	The Execute Form mode command.
	FORMNAME	=	Name given the form when created.
	PAGE *n*	=	Optional pagination command. Enter PAGE, a space, and then the starting page number. n = 0 to 99999999. The page number print position is determined by the Page Number command in the Create Form mode.
	FC	=	Specifies the number of copies of the form to be printed. *FC* = 1 or greater (default = 1). The ImagerPlus automatically returns to the Normal mode after the last page is printed; therefore, do not use *FC* if dynamic or overlay data is to be entered.
	Overlay Data	=	Overlay data can be entered as part of the EXECUTE command. If used, this line can be replaced with multiple lines of overlay data. Refer to Execute Overlay Data, below.
	AF*n*;*(D)ASCII TEXT(D)*	=	The Execute Dynamic Alphanumeric Data command. Refer to Execute Dynamic Alphanumeric Data, below.
	BF*n*;*(D)ASCII TEXT(D)*	=	The Execute Dynamic Bar Code Data command. Refer to Execute Dynamic Bar Code Data, below.
	NORMAL	=	The Normal mode command (not required if the *FC* parameter was used). Enter the SFCC character and NORMAL to return to the Normal mode. This command must follow all other EXECUTE commands to allow for variable data entry. A blank line (<LF>) must precede the Normal command.

Execute Overlay Data

Overlay data is a type of variable alphanumeric data that can be entered during the Execute Form mode. Imagine a form designed with blank areas yet to be filled in, and the overlay data as a transparency. The overlay text is entered in the exact position that fills in the blank areas when "overlaid" on the form.

The positioning of overlay data is accomplished with physical line feeds and spaces. For example, if the blank form area reserved for the customer name field begins at character row 12, column 20, you can enter 12 line feeds, press the space bar 20 times, and type the company name as the overlay data. Using this method, you can create an entire form as a page of overlay data.

You must enter a Form Feed to separate each new page of overlay data.

Execute Dynamic Alphanumeric Data

Dynamic alphanumeric data is a type of variable data that can be entered during the Execute Form mode. Unlike overlay data that is manually positioned when entered, dynamic data is located by specifying the actual data and location on the form.

Dynamic data position is established using the AF*n*;*L* parameters of the Alpha command in the Create Form mode (refer to “Alphanumerics Command” on page 20). The data is input dynamically in the identified location each time the form is printed in the EXECUTE command.

You must enter a Form Feed to separate each new page (i.e., the EXECUTE command, the dynamic fields and data, and the Normal command) of dynamic data.

Depending on the current mode status, all or part the following command syntax is required.

<SFCC>EXECUTE;*FORMNAME*[;PAGE *n*]<LF>

<SFCC>AF*n*;*(D)ASCII Text(D)*<LF>

<SFCC>NORMAL<LF>

where:

EXECUTE; *FORMNAME*[;PAGE *n*]	=	The Execute Form mode command and form name as previously explained. This command line is not required if you are already in the Execute Form mode and the form has been called. The Form Count (*FC*) parameter cannot by used for dynamic data entry.
AF*n*	=	Alpha Field Identifier. The AF parameter identifies the dynamic data field being entered. *n* = the same number entered for *n* in the AF*n*;*L* parameter in the Alpha command during the Create Form mode.
ASCII Text	=	The alphanumeric string (group of ASCII characters) to be printed. Enter any of the standard ASCII printable characters (except the character used as the delimiter or D parameter). The data is printed on the form at the location dictated by the n parameter reference (print position is defined by the SR and SC parameters entered in the Alpha command during the Create Form mode).
NORMAL	=	The Normal mode command. After the last dynamic data command, enter the SFCC and NORMAL to return to the Normal mode. Enter an <LF> (line terminator) to insert a blank line before the Normal command is entered.

You can repeat the <SFCC>AF*n*;*(D)ASCII TEXT(D)* sequence for every data field defined in the Create Form mode. The Execute Dynamic Bar Code Data command can also be combined in the same EXECUTE command sequence. Be sure to separate each page of dynamic data with a Form Feed.

Execute Dynamic Bar Code Data

Dynamic bar code data is a type of variable data that can be entered during the Execute Form mode. A command sequence defines the actual bar code data and its location on the form.

Bar code data position is established using the BF*n* parameter of the BARCODE command in the Create Form mode. The bar code data is input dynamically in the identified location each time the form is printed with the EXECUTE command.

You must enter a Form Feed to separate each new page (i.e., the EXECUTE command, the dynamic fields and data, and the Normal command) of bar code data.

Depending on the current mode status, all or part the following command syntax is required.

<SFCC>EXECUTE;*FORMNAME*[;PAGE *n*]<LF>

<SFCC>BF*n*;*(D)DATA FIELD(D)*<LF>

<SFCC>NORMAL<LF>

where:

EXECUTE; *FORMNAME* [;PAGE *n*]	=	The Execute Form mode command and form name as previously explained. This command line is not required if you are already in the Execute Form mode and the form has been called. The Form Count (*FC*) parameter cannot by used for dynamic data entry.

BF*n*	=	Bar Code Field Identifier. The BF parameter specifies a dynamic bar code field and identifies the field being supplied with data. *n* = the same number entered for the BF*n* parameter in the BARCODE command during the Create Form mode.
DATA FIELD	=	Enter the characters for the bar code data. The type of characters allowed depends on the type of bar code used. Refer to the "Bar Codes" chapter.
NORMAL	=	After the last dynamic data command, enter the SFCC and NORMAL to return to the Normal mode. A blank line (<LF>) is required before the Normal command.

You can repeat the <SFCC>BF*n*;*(D)DATA FIELD(D)* sequence for every bar code field defined in the Create Form mode. The Execute Dynamic Alphanumeric Data command can also be combined in the same EXECUTE command sequence. Be sure to separate each page of dynamic data with a Form Feed.

Supplying Incremental Dynamic Data

Incremental dynamic data fields are defined in the Create Form mode (refer to applicable Incremental Alpha or Bar Code commands). The incremental data itself is "dynamically" entered during the Execute Form mode. Corresponding incremental data fields must be supplied with the EXECUTE command; otherwise, dynamic data fields specified in the Create Form mode will not be printed on the form.

Incremental dynamic data (either alphanumeric or bar code data) is supplied at the top of the form prior to any overlay data. It can be changed with each new batch of forms. The command formats for supplying incremental alphanumeric and bar code dynamic data are basically the same.

Incremental dynamic alphanumeric data:

<SFCC>IAF*n*;[*idir*]*STEPMASK*;[RPT*n*;][RST*n*;]*(D)STARTDATA(D)*

Incremental dynamic bar code data:

<SFCC>IBF*n*;[*idir*]*STEPMASK*;[RPT*n*;][RST*n*;]*(D)STARTDATA(D)*

where:			
	IAF	=	Incremental Alphanumeric Dynamic Data parameter.
	IBF	=	Incremental Bar Code Dynamic Data parameter.
	n	=	Replace *n* with the same number entered for this field in the AF or BF parameter in the Create Form mode (refer to applicable ALPHA or BARCODE command).
	idir	=	Specifies whether to increment (default) or decrement the data field. Enter "+" (or leave blank) to increment (add step amount to) or enter "-" to decrement (subtract step amount from) the data field.
	STEPMASK	=	Specifies the increment amount (step), data field length, and mask to control incrementing. (Refer to Incrementing Alphanumeric Data or Incremental Bar Code Data for details.)
	RPT*n*	=	Specifies the number of times to repeat a field value before incrementing it. This feature is useful for printing multiple copies of a form (such as a label) before changing the data field. *n* = 1 to 65535 (default = 1).
	RST*n*	=	Optional parameter used to specify the number of times to print an incremented field (on one or more forms) before resetting it to its starting value. *n* = 1 to 65,535 (default is zero, no reset).

STARTDATA = The starting value of the alphanumeric data field to be incremented. The number of *STARTDATA* characters must be equal to or less than the number of characters in the *STEPMASK* parameter. If the number is less, the data will be right justified with leading spaces (leading spaces are not provided for bar code data). Refer to "Incrementing Alphanumeric (or Bar Code) Data — STEPMASK / STARTDATA" on page 22 for details. The type and quantity of characters allowed for bar code data depends on the type of bar code used. Refer to the applicable bar code Data Field instructions for allowable types.

Execute Incremental Dynamic Data

The previously described standard EXECUTE command format is used to execute non-incremental as well as incremental fixed data that is formatted in the Create Form mode. The following Execute format is required for executing incremental dynamic data (alphanumeric or bar code). It should be noted that the command parameters differ from those required by the EXECUTE command for non-incremental dynamic data. Therefore, you cannot issue both incremental and non-incremental dynamic data parameters in the same EXECUTE command.

The Execute Incremental Dynamic Data command is a modified version of the standard EXECUTE command.

<SFCC>EXECUTE;*FORMNAME*[;PAGE *n*];ICNT*n* [;IRST*n*]

where: ICNT*n* = Specifies the number of forms to be produced with the incremental fields automatically updated. *n* = 1 to 65,535.

IRST*n* = Specifies the number of forms to produce before all incremental fields are reset to their starting values. The IRST parameter can be used to separate the total number of forms produced into multiple groups of identical copies. *n* = 1 to 65,535. IRST*n* must be less than ICNT*n*.

VERTICAL PAPER MOTION

Paper movement is controlled either by the active printer emulation or by the ImagerPlus. The emulation is used during Normal mode. The ImagerPlus is used during the Execute Form mode. Error messages or a drifting top of form can be prevented by observing the following procedures:

- The Form Length setting in the printer's setup menu must match the actual, physical length of the form being printed. If not, the Form Feed character used between forms will not advance the form to the proper position (the top-of-form will appear to drift).
- Use a Form Feed character between forms as compared to "counting lines" to issue the proper number of Line Feeds per form. Graphic images are often not an exact number of lines high. Also, switching between 6 lpi and 8 lpi can cause a misalignment at the bottom of a form when just counting lines. A Form Feed will always align exactly at the next form boundary.
- Be careful not to automatically issue a Carriage Return and/or Line Feed automatically after a Form Feed. This will usually cause the first form printed to be aligned differently than successive forms. This will also defeat the Auto Scroll feature of the printer, since Auto Scroll only occurs when printing pauses *and* the paper is positioned exactly at a form boundary.

FIXED RECORD LENGTH UTILITY MODES

Certain computers utilize "fixed record length" conventions. That is, paper movement commands (Carriage Returns, Line Feeds, Form Feeds, etc.) are inserted to separate long data streams, and pad characters are inserted to extend short data streams.

If the ImagerPlus is used with a such a host computer, it may be necessary to ignore these paper movement commands and pad characters. Two commands, Select Format and Ignore Sequence, are provided for this purpose. (You can also use the Quiet command to pass all data unchanged to the printer.)

Select Format Command — SFON / SFOFF

Use this command as needed to ignore all host-generated paper movement commands (hex 00-0F) during the Normal, Create Form, or Execute Form modes. The SFON and SFOFF commands cannot be used while Ignore Sequence is active.

<SFCC>SFON<LF>

or

<SFCC>SFOFF<LF>

where: SFON = The Select Format On command.
SFOFF = Exits Select Format.

The following paper movement commands can only be used while in the Select Format mode. Use of these commands at any other time may result in errors.

<SFCC>CR<LF>

where: CR = Send ASCII Carriage Return (0Dh) to printer.

<SFCC>LF<LF>

where: LF = Send ASCII Line Feed (0Ah) to printer.

<SFCC>FF<LF>

where: FF = Send ASCII Form Feed (0Ch) to printer.

Ignore Sequence Command — IGON / IGOFF

This command may be used to ignore host-originated pad characters or other data as needed. It may be used during the Normal, Create Form, or Execute Form modes. Once the IGON command is issued, the ImagerPlus will ignore all characters until the IGOFF command is detected.

<SFCC>IGON<LF>

or

<SFCC>IGOFF<LF>

where: IGON = Ignore Sequence On command.
IGOFF = Ignore Sequence Off command.

Bar Codes

The ImagerPlus supports many of the various types of bar code formats recognized as industry standards. The type or style used is determined by the application (e.g., publications, retail outlet, postal service, etc.) or the scanning device that ultimately reads the bar code. Those supported by the ImagerPlus are shown in the following table.

Bar Code Type	Command Type Parameter
Code 3/9	C3/9
Code 128 - Subset B	C128B
Code 128 - Subset C	C128C
EAN 8	EAN8
EAN 13	EAN13
Interleaved 2 of 5	I-2/5
Universal Product Code - Version A	UPC-A
Universal Product Code - Version E	UPC-E
MSI	MSI
POSTNET	POSTNET

Bar codes may be produced by issuing the appropriate BARCODE command in the Create Form mode. Depending on the selected bar code type, parameters may include optional darker print, horizontal or vertical orientation, magnification, variable height, and alphanumeric data field printing.

The remainder of this chapter is organized as follows:

- Common Bar Code Terminology
- Summary of Bar Code Types
- Common Bar Code Parameters
- Details for Each Bar Code Type

COMMON BAR CODE TERMINOLOGY

The following is an explanation of some common bar code terms. Specific requirements for these items will be defined with each BARCODE command syntax explanation.

Quiet Zone

Quiet zones are blank, nonprint areas required at both ends of a bar code. These nonprint zones are large enough to ensure that nearby symbols, lines, etc. will not be misinterpreted as part of the bar code. The quiet zone is to be a minimum dimension as specified by the bar code type. Similar nonprint areas, referred to as guard bands, are located above and below the bar code. Be sure your forms design provides adequate space for these nonprint areas.

Start/Stop Code

The Start/Stop Code (called "framing bars" in POSTNET codes) is a unique character automatically created by the ImagerPlus. It specifies the leading and trailing end of the bar code to permit bidirectional scanning. Some bar code types require a Center Code, as well.

Data Field

This refers to the bars that represent the alphanumeric characters of the bar code. The number of bars and the bar ratio (narrow to wide, dark to light) required for these characters depends upon the bar code type.

Code Set

The code set is a list of the characters which may be included in the data field. Some allow alphanumeric characters while others allow only numeric characters.

Readable Data

Some bar codes allow an optional human-readable data field for bar code interpretation. If allowed by the bar code type, the print location with respect to the bar code (above or below, below only) will be specified with the individual command syntax.

Check Digit

The check digit is a value used to verify scanning accuracy. Some BARCODE commands provide a check digit (CD) option for automatic check digit generation and insertion. Others insert the check digit automatically, or no check digit is required. When reading the bar code, the scanner generates its own check digit, which it compares against the embedded check digit.

SUMMARY OF BAR CODE TYPES

Each code is followed by an abbreviated list of characteristics and options provided by that BARCODE command.

Code 3/9

- Variable length alphanumeric data field
- Modulo-43 check digit field provided
- Vertical positioning of the bar code symbol
- Data can print above or below symbol
- OCR-A and OCR-B font selection for human-readable data
- Horizontal and vertical magnification

Code 128B

- Variable length alphanumeric data field
- Modulo-103 check digit field provided
- Vertical positioning of the bar code symbol
- Data printing above or below symbol
- Automatic symbol compaction
- Horizontal and vertical magnification

Code 128C

- Variable length numeric data field
- Modulo-103 check digit field provided
- Vertical positioning of the bar code symbol
- Data printing above or below symbol
- Horizontal and vertical magnification
- Nonnumeric or nonpaired numerics replaced with Code 128B symbols

EAN 8

- Fixed length (7 digits) numeric data field
- Modulo-10 check digit field provided
- No magnification option is allowed
- Automatic printing of data in OCR-B
- Height option from 0.4 to 9.9 inches
- Suppress printable data field option
- Optional 2-5 digit add-on data field

EAN 13

- Fixed length (12 digits) numeric data field
- Modulo-10 check digit field provide
- No magnification option is allowed
- Automatic printing of data in OCR-B
- Height option from 0.4 to 9.9 inches
- Suppress printable data field option
- Optional 2-5 digit add-on data field

Interleaved 2/5

- Variable length numeric data field
- Modulo-10 check digit field provided
- Vertical positioning of the bar code symbol
- Data printed above or below symbol
- Horizontal and vertical magnification
- OCR-A and OCR-B font selection for human-readable data field

UPC-A or UPC-E

- Fixed length (11 digits) numeric data field
- Modulo-10 check digit field provided
- Vertical positioning of the bar code symbol
- Automatic printing of data in OCR-B
- No magnification allowed
- Height option from 0.4 to 9.9 inches
- Suppress printable data field option
- Optional 2-5 digit add-on data field

MSI

- Variable length numeric data field
- Modulo 10, 11, or combination check digit provided
- Vertical positioning of the bar code symbol
- Data printed above or below symbol
- Height option from 0.4 to 9.9 inches
- Variable magnification option

POSTNET

- Fixed length (10 digits) numeric data field
- Specific POSTNET bar code requirements can be obtained from Publication 25: "A Guide to Business Mail Preparation" published by the U.S. Postal Service.

COMMON BAR CODE PARAMETERS — BARCODE

Bar code command sequences contain a number of parameters, some of which are required, and some of which are optional.

The following syntax definition describes items which are common to most of the bar code types. Specific requirements for these items, and items not described here, will be discussed later as each bar code type is explained.

BARCODE<LF>

***(type)*[;VSCAN][;*MAG*][;H*n*][;BF*n*;*L*][;DARK];*SR*;*SC*<LF>**

[*(D)(data field contents)(D)*]<LF>

[*(readable data and font options)*]<LF>

STOP<LF>

where:

BARCODE	=	The Bar Code Command: This is the initial command that precedes any bar code command sequence.
(type)	=	Specifies the specific type of bar code (C3/9, C128B, C128C, etc.) to be created.
VSCAN	=	An optional parameter used to position the bar code vertically rather than horizontally. VSCAN is not allowed for POSTNET bar codes.

H*n* = An optional parameter used to specify the height of the bar code symbol in tenths of an inch (0.1"). *n* = 4 to 99 (0.4" to 9.9", default = 9 (0.9")). The height includes the upper and lower 0.1" guard bands and any human-readable data. The H*n* option is not allowed for POSTNET bar codes

BF*n;L* = An optional parameter provided by all bar code types which is used to identify the form location and length of a dynamic bar code data field (similar to the Alpha AF*n;L* parameter). If used, the actual bar code data field cannot be entered during the Create Form mode (therefore, do not use the DATA FIELD parameter). Dynamic bar code data is entered during the Execute Form mode, so it can be changed without redefining or recreating the bar code (refer to Execute Dynamic Bar Code Data). The *SR* and *SC* parameters will specify the precise starting row and column for *n*. *n* = 1 to 255. *L* = the total number of characters to allow for the data field. The number of characters of dynamically entered text must be less than or equal to *L*. Refer to Execute Dynamic Alphanumeric Data. The *DATA FIELD* parameter description specifies the valid characters available for each bar code type.

DARK = An optional parameter used to specify that the bar code be printed using the Dark Plot Mode. This creates a darker appearance by adding additional dots horizontally to the wide bars which will improve the light to dark contrast ratio of bars and spaces. The higher the contrast ratio, the more likely the bar code is to be read accurately by the scanning device. However, due to the printing of extra dots, print speed will be decreased. DARK is not available for POSTNET bar codes.

SR = Specifies the Starting Row position for the bar code. *SR* = 1 to one less than the length of the form. Character row or dot row is determined by the Scale command or the *CP.DP* format. All bar code commands require an *SR* value.

SC = Specifies the Starting Column position for the bar code print. *SC* = 1 to one less than the width of the form. Character column or dot column is determined by the Scale command or the *CP.DP* format. All bar code commands require an *SC* value.

STOP = Terminates the bar code command sequence. (The ImagerPlus will remain in the Create Form mode.) Omission of the STOP parameter will result in an error message.

CODE 3/9 BAR CODE STRUCTURE

Quiet Zone	0.25 inch minimum.
Data Field	Variable length alphanumeric marked by Start/Stop Code. Each wide or narrow bar is one element; one character is made up of 9 elements. The number of bars per character is 5 dark bars and 4 light bars for a total of 9 bars, where 3 of the bars are wide and the other 6 bars are narrow. Both light and dark bars are coded to define the character. Additionally, this style has an Intercharacter Gap.
Readable Data	Optional. Can be printed above or below bar code symbol.
Check Digit	Optional. Modulo-43.

Refer to Common Bar Code Parameters earlier in this chapter for items not covered below.

BARCODE<LF>

C3/9[CD][;VSCAN][;*MAG*][;H*n*][;BF*n*;*L*][;DARK];*SR*;*SC*<LF>

[*(D)DATA FIELD(D)*]<LF>

[PDF[;*LOC*][;*FONT*]]<LF>

STOP<LF>

where:

C3/9 = Bar code type.

CD = Specifies that optional check digit to be included.

MAG = Optional parameter used to expand the bar code size. *MAG* = X1, X1A, X1B, X2, X3, or X4 to expand the bar code vertically or horizontally as described in the table below (default is X1). ANE = Average Narrow Element width in millimeters, cpi = density in characters per inch.

	Horizontal (60 dpi)			Vertical (72 dpi)		
MAG	ANE	Ratio	cpi	ANE	Ratio	cpi
X1	16.7	3:1	3.75	20.7	2.3:1	3.45
X1A	16.7	2:1	4.6	13.8	3:1	4.5
X1B	16.7	2.5:1	4.2	20.7	3:1	3.0
X2	37.5	2.3:1	1.9	27.7	2.8:1	2.4
X3	54.2	2.5:1	1.3	41.4	2.7:1	1.6
X4	70.8	2.4:1	1.0	55.2	2.8:1	1.3

DATA FIELD = Variable length (usually limited to 32 characters to reduce read errors). *DATA FIELD* may include 0 – 9 (30h – 39h), A – Z (4ah – 5Ah), Space (20h), $ (24h), % (25h), + (2Bh), - (2Dh) . (2Eh), or / (2Fh). The data field may not include the <SFCC> character.

PDF = Specifies that the Printable Data Field (human readable text) should automatically be printed. PDF is not permitted if a null *DATA FIELD* has been specified.

LOC = Optional parameter used to place the PDF above or below the bar code symbol. *LOC* = A for above, or B for below (default is B). The height of the bars will be reduced 0.1 inch to allow for printing the 0.1 inch high PDF.

FONT = An optional parameter used to specify the PDF font. *FONT* = N for Normal ASCII 10 cpi (default), O for OCR-A 10 cpi, or X for OCR-B 10 cpi. The OCR-A and OCR-B fonts are not permitted with vertical bar codes. If vertical and PDF options are selected, the readable data will be printed in Normal 10 cpi regardless of the font specification.

CODE 128B BAR CODE STRUCTURE

Quiet Zone	0.25 inch minimum.
Data Field	Variable length alphanumeric marked by Start/Stop Code. This bar code symbol provides an extensive character set (96 ASCII characters, plus 7 control characters). Bars and spaces vary in width from 1 to 4 modules. A character consists of 6 bars: 3 dark bars and 3 light bars that total 11 modules. (Exception: CODE 128 STOP character bar pattern contains 13 modules yielding 4 dark bars and 3 light bars for a total of 7 bars.)
Readable Data	Optional. Can be printed above or below bar code symbol.
Check Digit	The checksum is automatically calculated and inserted into the symbol immediately preceding the STOP character. The check character is a modulus 103 checksum that

is calculated by summing the start code value plus the products of each character position (most significant character position=1) and the character value of that position. The sum of the start code value and the products is then divided by 103. The remainder of the answer is the check digit.

Refer to Common Bar Code Parameters earlier in this chapter for items not covered below.

BARCODE<LF>

C128B[;VSCAN][;*MAG*][;H*n*][;BF*n*;*L*][;DARK];*SR*;*SC*<LF>

[*(D)DATA FIELD(D)*]<LF>

[PDF[;*LOC*]]<LF>

STOP<LF>

where: C128B = Bar code type.

MAG = Optional parameter used to expand the bar code size as described in the table below. The default value is X1. ANE = Average Narrow Element width in millimeters, cpi = density in characters per inch.

	Horizontal (60 dpi)			Vertical (72 dpi)		
MAG	ANE	Ratio	cpi	ANE	Ratio	cpi
X1	16.7	4:3:2:1	5.4	13.8	4:3:2:1	6.5
X1.5	25.0	4:3:2:1	4.1	20.7	4:3:2:1	4.3
X2	33.0	4:3:2:1	2.7	27.6	4:3:2:1	3.3
X3	50.0	4:3:2:1	1.8	41.4	4:3:2:1	2.2
X4	66.7	4:3:2:1	1.4	55.2	4:3:2:1	1.6

DATA FIELD = Variable length (usually limited to 32 characters to reduce read errors). *DATA FIELD* may include the ASCII characters 20h through 7Fh. It may also include the control characters FNC 1 (21h), FNC 2 (22h), FNC 3 (23h), FUNC 4 (24h), CODE A (25h), CODE C (27h), and SHIFT (28h). (The control character set is activated and deactivated by SO (Shift Out, 0E) and SI (Shift In, hex 0F). Use SO to identify subsequent characters as control function characters. Use SI to return to the standard character set. A null data field (no characters) is allowed. Other than the SFCC, any characters listed in the following table can be entered.
The ImagerPlus inserts a "CODE C" designator at the start of a string of 6 or more contiguous numerics. Digit pairs are then packed and output as single bar code characters. Broken strings (nonnumerics or an unpaired numerics), identified by an inserted "CODE B", are represented by normal C128B symbols.
Do not use the DATA FIELD parameter if bar code data will be dynamically entered (refer to BF*n*;*L* parameter).

PDF = Specifies that the Printable Data Field (human readable text) should automatically be printed. PDF is not permitted if a null *DATA FIELD* has been specified.

LOC = Optional parameter used to place the PDF above or below the bar code symbol. *LOC* = A for above, or B for below (default is B). The height of the bars will be reduced 0.1 inch to allow for printing the 0.1 inch high PDF.

CODE 128C BAR CODE STRUCTURE

Quiet Zone	0.25 inch minimum.
Data Field	Variable length numeric marked by Start/Stop Code. This bar code symbol provides 100 pairs of numeric digits (00 through 99) and 3 control characters. A series of bars and spaces vary in width from 1 to 4 modules. A character consists of 6 bars: 3 dark bars and 3 light bars that total 11 modules. (Exception: CODE 128 STOP character bar pattern contains 13 modules yielding 4 dark bars and 3 light bars for a total of 7 bars.)
Readable Data	Optional. Can be printed above or below bar code symbol.
Check Digit	The checksum is automatically calculated and inserted into the symbol immediately preceding the STOP character. The check character is a modulus 103 checksum that is calculated by summing the start code value plus the products of each character position (most significant character position=1) and the character value of that position. The sum of the start code value and the products is then divided by 103. The remainder of the answer is the check digit.

Refer to Common Bar Code Parameters earlier in this chapter for items not covered below.

BARCODE<LF>

C128C[;VSCAN][;*MAG*][;H*n*][;BF*n*;*L*][;DARK];*SR*;*SC*<LF>

[*(D)DATA FIELD(D)*]<LF>

[PDF[;*LOC*]]<LF>

STOP<LF>

where: C128C = Bar code type.

MAG = Optional parameter used to expand the bar code size as described in the table below. The default value is X1. ANE = Average Narrow Element width in millimeters, cpi = density in characters per inch.

	Horizontal (60 dpi)			Vertical (72 dpi)		
MAG	ANE	Ratio	cpi	ANE	Ratio	cpi
X1	16.7	4:3:2:1	10.9	13.8	4:3:2:1	13.2
X1.5	25.0	4:3:2:1	8.2	20.7	4:3:2:1	8.8
X2	33.0	4:3:2:1	5.4	27.6	4:3:2:1	6.6
X3	50.0	4:3:2:1	3.6	41.4	4:3:2:1	4.4
X4	66.7	4:3:2:1	2.7	55.2	4:3:2:1	3.3

DATA FIELD = Variable length (usually limited to 32 characters to reduce read errors). *DATA FIELD* may include the ASCII character pairs 00 (30h, 30h) through 99 (39h, 39h). It may also include the control characters FNC 1 (21h), CODE A (25h), and CODE B (26h). (The control character set is activated and deactivated by SO (Shift Out, 0E) and SI (Shift In, hex 0F). Use SO to identify subsequent characters as control function characters. Use SI to return to the standard character set. A null data field (no characters) is allowed. Other than the SFCC, any characters listed in the following table can be entered. The ImagerPlus inserts a "CODE C" designator at the start of a string of 6 or more contiguous numerics. Digit pairs are then packed and output as single bar code characters. Broken strings (nonnumerics or an unpaired numeric), identified by an inserted "CODE B", are represented by normal C128B symbols. Do not use the DATA FIELD parameter if bar code data will be dynamically entered (refer to BF*n*;*L* parameter).

PDF = Specifies that the Printable Data Field (human readable text) should automatically be printed. PDF is not permitted if a null *DATA FIELD* has been specified.

LOC = Optional parameter used to place the PDF above or below the bar code symbol. *LOC* = A for above, or B for below (default is B). The height of the bars will be reduced 0.1 inch to allow for printing the 0.1 inch high PDF.

EAN 8 BAR CODE STRUCTURE

Quiet Zone	0.25 inch minimum.
Data Field	Fixed (7 digit) numeric marked by Start/Center/Stop Codes. This bar code symbol provides a limited character set (numerics 0-9 and Special Characters Start, Center, and Stop). A series of bars and spaces vary in width from 1 to 4 modules. A character consists of 4 bars: 2 dark bars and 2 light bars that total 7 modules. (Exceptions: The Start/Stop code bar patterns have 2 dark bars and 1 light bar for a total of 3 bars; the Center code bar pattern has 2 dark bars and 3 light bars for a total of 5 bars.)
Add-On Data	Optional. Add-On data (2-5 digits) can be placed at the end of the bar code. The Add-On code identifies either a 2-digit periodical issue number or 5-digit price data. Enter "+2" or "+5" as the optional parameter. A 9-module separation will exist between the first bar code of the Add-On data and the last bar of the EAN symbol and a left guard pattern. There is no center or right guard pattern.
Readable Data	Optional. Can be printed below the bar code symbol.
Check Digit	Modulo-10 check digit automatically inserted.

Refer to Common Bar Code Parameters earlier in this chapter for items not covered below.

BARCODE<LF>

EAN8[+*n*][;VSCAN][;H*n*][;BF*n*;*L*][;DARK];*SR*;*SC*<LF>

[*(D)DATA FIELD(D)*]<LF>

[PDF[;*FONT*]]<LF>

STOP<LF>

where:

EAN8 = Bar code type.

+n = Optional Add-On Data Field. Enter "+2" or "+5" to designate an additional 2 or 5 digit data field.

DATA FIELD = Enter 7 digits (no more or no less) for the bar code data, plus the 2 or 5 digit Add-On data, as indicated by the *+n* parameter. DATA FIELD may include only the digits 0 – 9 (30h – 39h). Refer to the Bar Code Add-On (UPC and EAN styles) in this chapter for Add-On data specifications. Do not use the DATA FIELD parameter if bar code data will be dynamically entered (refer to BFn;L parameter).

PDF = Specifies that the Printable Data Field (human readable text) should automatically be printed. PDF is not permitted if a null *DATA FIELD* has been specified. The text will be printed below the bar code symbol unless suppressed by the FONT S parameter.

FONT = An optional parameter used to specify the PDF font. *FONT* = N for Normal ASCII 10 cpi (default), O for OCR-A 10 cpi, or X for OCR-B 10 cpi, or S to suppress the PDF and lower portions of the bar code. The OCR-A and OCR-B fonts are not permitted with vertical bar codes. If vertical and PDF options are selected, the readable data will be printed in Normal 10 cpi regardless of the font specification.

EAN 13 BAR CODE STRUCTURE

Quiet Zone	11-module quiet zone automatically provided; user's form must provide space for a minimum of a 7-module right quiet zone. The number system character is printed in the left quiet zone.
Number System Character	This number is taken from the first character in the data field. It is used to apply a code to a class or type of item.
Data Field	Fixed (12 digit) numeric marked by Start/Center/Stop Codes. This bar code symbol provides a limited character set (numerics 0-9 and Special Characters Start, Center, and Stop). Bars and spaces vary in width from 1 to 4 modules. Each character consists of 4 bars: 2 dark bars and 2 light bars that total 7 modules. (Exceptions: The Start/Stop code bar patterns have 2 dark bars and 1 light bar for a total of 3 bars; the Center code bar pattern has 2 dark bars and 3 light bars for a total of 5 bars.)
Add-On Data	Optional. Add-On data (2-5 digits) can be placed at the end of the bar code. The Add-On code identifies either a 2-digit periodical issue number or 5-digit price data. A 9-module separation will exist between the first bar code of the Add-On data and the last bar of the EAN symbol and a left guard pattern. There is no center or right guard pattern.
Readable Data	Optional. Can be printed below the bar code symbol.
Check Digit	Modulo-10 check digit automatically inserted.

Refer to Common Bar Code Parameters earlier in this chapter for items not covered below.

BARCODE<LF>

EAN13[+*n*][;VSCAN][;H*n*][;BF*n*;*L*][;DARK];*SR*;*SC*<LF>

[*(D)DATA FIELD(D)*]<LF>

[PDF[;*FONT*]]<LF>

STOP<LF>

where EAN8 = Bar code type; enter EAN8.

+n = Optional Add-On Data Field. Enter "+2" or "+5" to designate an additional 2 or 5 digit data field.

DATA FIELD = 12 digits for the bar code data, plus the 2 or 5 digit Add-On data, as indicated by the *+n* parameter. The first character becomes the number system character. *DATA FIELD* may include the digits 0 – 9 (30h – 39h). Refer to the Bar Code Add-On Data (UPC and EAN styles) for Add-On Data specifications.

The number system character value dictates the encoding format (A or B) of the left side (left six digits) of the data field. The right side and check digit are always encoded in format C. No bar code character is created for the number system character, which is derived from the left side data field encoding. The table below defines the left side data field format based on the number system character. Refer to the Bar Code Add-On Data, page 4-54, for additional details.

Number System	Format for Left Six Digits					
Character Value	Dig 12	Dig 11	Dig 10	Dig 9	Dig 8	Dig 7
0	A	A	A	A	A	A
1	A	A	B	A	B	B
2	A	A	B	B	A	B
3	A	A	B	B	B	A
4	A	B	A	A	B	B
5	A	B	B	A	A	B
6	A	B	B	B	A	A
7	A	B	A	B	B	B
8	A	B	A	B	B	A
9	A	B	B	A	B	A

PDF = Specifies that the Printable Data Field (human readable text) should automatically be printed. PDF is not permitted if a null *DATA FIELD* has been specified. The text will be printed below the bar code symbol unless suppressed by the FONT S parameter.

FONT = An optional parameter used to specify the PDF font. *FONT* = N for Normal ASCII 10 cpi (default), O for OCR-A 10 cpi, or X for OCR-B 10 cpi, or S to suppress the PDF and lower portions of the bar code. The OCR-A and OCR-B fonts are not permitted with vertical bar codes. If vertical and PDF options are selected, the readable data will be printed in Normal 10 cpi regardless of the font specification.

INTERLEAVED 2/5 BAR CODE STRUCTURE

Quiet Zone	0.25 inch minimum.
Data Field	Variable length numeric marked by Start/Stop Code. Bars exist in 10-bar "units" that represent two characters. The first is coded by 5 dark bars, the second coded by 5 light bars. (Exception: The Start character bar pattern has 2 dark bars and 2 light bars for a total of 4 bars; the Stop character bar pattern has 2 dark bars and 1 light bar for a total of 3 bars.)
Readable Data	Optional. Can be printed above or below bar code symbol.
Check Digit	Optional. Modulo-10.

Refer to Common Bar Code Parameters earlier in this chapter for items not covered below.

BARCODE<LF>

I-2/5[CD][;VSCAN][;*MAG*][;H*n*][;BF*n*;*L*][;DARK];*SR*;*SC*<LF>

[*(D)DATA FIELD(D)*]<LF>

[PDF[;*LOC*][;*FONT*]]<LF>

STOP<LF>

where
I-2/5 = Bar code type.
[CD] = Specifies that the optional modulo-10 check digit should be generated and included.
MAG = Optional parameter used to expand the bar code size as described in the table below. The default value is X1. ANE = Average Narrow Element width in millimeters, cpi = density in characters per inch.

	Horizontal (60 dpi)			Vertical (72 dpi)		
MAG	ANE	Ratio	cpi	ANE	Ratio	cpi
X1	16.7	3:1	6.7	20.7	2.3:1	6.4
X1A	16.7	2.6:1	5.7	13.8	3:1	8.0
X1B	16.7	2:1	8.5	20.7	3:1	6.0
X2	37.5	2.3:1	3.5	27.7	2.8:1	4.2
X2A	33.5	2.1	4.3	27.7	2:1	5.2
X3	54.2	2.5:1	2.3	41.4	2.7:1	2.9
X4	70.8	2.4:1	1.8	55.2	2.8:1	2.1

DATA FIELD = Variable length (usually limited to 32 characters to reduce read errors). DATA FIELD may include only the digits 0 – 9 (30h – 39h). Interleaving requires an even number of characters; therefore, a leading zero will automatically be added to a field containing an odd number of characters. Do not use the DATA FIELD parameter if bar code data will be dynamically entered (refer to BFn;L parameter).
PDF = Specifies that the Printable Data Field (human readable text) should automatically be printed. PDF is not permitted if a null *DATA FIELD* has been specified.
LOC = Optional parameter used to place the PDF above or below the bar code symbol. *LOC* = A for above, or B for below (default is B). The height of the bars will be reduced 0.1 inch to allow for printing the 0.1 inch high PDF.

FONT = An optional parameter used to specify the PDF font. *FONT* = N for Normal ASCII 10 cpi (default), O for OCR-A 10 cpi, or X for OCR-B 10 cpi, or S to suppress the PDF and lower portions of the bar code. The OCR-A and OCR-B fonts are not permitted with vertical bar codes. If vertical and PDF options are selected, the readable data will be printed in Normal 10 cpi regardless of the font specification.

UPC-A BAR CODE STRUCTURE

Quiet Zone	11-module quiet zone automatically provided; user's form must provide space for a minimum of a 7-module right quiet zone. The number system character is printed in the left quiet zone.
Number System Character	This number is taken from the first character in the data field. It is used to apply a code to a class or type of item.
Data Field	Fixed (11 digits) numeric marked by Start/Center/Stop Codes. This bar code symbol provides a limited character set (numerics 0-9 and Special Characters Start, Center and Stop). Bars and spaces vary in width from 1 to 4 modules. Each character consists of 4 bars: 2 dark bars and 2 light bars that total 7 modules. (Exceptions: The Start/Stop code bar patterns have 2 dark bars and 1 light bar for a total of 3 bars; the Center code bar pattern has 2 dark bars and 3 light bars for a total of 5 bars.)
Add-On Data	Optional. Add-On data (2-5 digits) can be placed at the end of the bar code. The Add-On code identifies either a 2-digit periodical issue number or 5-digit price data. Enter "+2" or "+5" as the optional parameter. A 9-module separation will exist between the first bar code of the Add-On data and the last bar of the UPC symbol and a left guard pattern. There is no center or right guard pattern.
Readable Data	Optional. Can be printed below the bar code symbol.
Check Digit	Modulo-10 check digit automatically inserted. Check digit formula includes the number system character.

Refer to Common Bar Code Parameters earlier in this chapter for items not covered below.

BARCODE<LF>

UPC-A[+*n*][;VSCAN][;H*n*][;BF*n*;*L*][;DARK];*SR*;*SC*<LF>

[*(D)DATA FIELD(D)*]<LF>

[PDF[;*FONT*]]<LF>

STOP<LF>

where: UPC-A = Bar code type.
+*n* = Optional Add-On Data Field. Enter "+2" or "+5" to designate an additional 2 or 5 digit data field.

DATA FIELD = Enter 11 digits (no more or no less) for the bar code data, plus the 2 or 5 digit Add-On data, as indicated by the *+n* parameter. DATA FIELD may include only the digits 0 – 9 (30h – 39h). Refer to the Bar Code Add-On (UPC and EAN styles) in this chapter for Add-On data specifications.

PDF = Specifies that the Printable Data Field (human readable text) should automatically be printed. PDF is not permitted if a null *DATA FIELD* has been specified.

FONT = An optional parameter used to specify the PDF font. *FONT* = N for Normal ASCII 10 cpi (default), O for OCR-A 10 cpi, or X for OCR-B 10 cpi, or S to suppress the PDF and lower portions of the bar code. The OCR-A and OCR-B fonts are not permitted with vertical bar codes. If vertical and PDF options are selected, the readable data will be printed in Normal 10 cpi regardless of the font specification.

UPC-E BAR CODE STRUCTURE

Quiet Zone	11-module quiet zone automatically provided; user's form must provide space for a minimum of a 7-module right quiet zone. The number system character is printed in the left quiet zone.
Number System Character	This number is taken from the first character in the data field. It is used to apply a code to a class or type of item.
Data Field	Fixed (11 digit) numeric marked by Start/Stop Codes. This bar code symbol provides a limited character set (numerics 0-9 and Special Characters Start, Center and Stop). Bars and spaces vary in width from 1 to 4 modules. Each character consists of 4 bars: 2 dark bars and 2 light bars that total 7 modules. (Exceptions: The Start/Stop code bar patterns have 2 dark bars and 1 light bar for a total of 3 bars; the Center code bar pattern has 2 dark bars and 3 light bars for a total of 5 bars.) The 11 digits are compressed into 6 encoded UPC-E symbols.
Add-On Data	Optional. Add-On data (2-5 digits) can be placed at the end of the bar code. The Add-On code identifies either a 2-digit periodical issue number or 5-digit price data. Enter "+2" or "+5" as the optional parameter. A 9-module separation will exist between the first bar code of the Add-On data and the last bar of the UPC symbol and a left guard pattern. There is no center or right guard pattern.
Readable Data	Optional. Can be printed below the bar code symbol.
Check Digit	Modulo-10 check digit automatically inserted. Check digit formula includes the number system character.

Refer to Common Bar Code Parameters earlier in this chapter for items not covered below.

BARCODE<LF>

UPC-E[+*n*][;VSCAN][;H*n*][;BF*n*;*L*][;DARK];*SR*;*SC*<LF>

[*(D)DATA FIELD(D)*]<LF>

[PDF[;*FONT*]]<LF>

STOP<LF>

where: UPC-E = Bar code type.

+n = Optional Add-On Data Field. Enter "+2" or "+5" to designate an additional 2 or 5 digit data field.

DATA FIELD = Enter 11 digits (no more or no less). The expected 11-digit entry consists of a 0 (as the number system character), followed by the 5-digit Manufacturer Number; followed by the 5-digit Item Number. The entry sequence must conform to one of the number pattern sequences shown in the table below. The ImagerPlus will compress these 11 characters down to the 6 encoded UPC-E symbol characters. Refer to the Bar Code Add-On (UPC and EAN styles) in this chapter for Add-On data specifications.

The following table shows the UPC-E number pattern sequences:

Manufacturer Number	Item Number	Encoded UPC-E Bar Code
x x 0 0 0	0 0 0 0 0	x x 0 0 0 0
x x 1 0 0	…	x x … 1
x x 2 0 0	0 0 9 9 9	x x 9 9 9 2
x x 3 0 0	0 0 0 0 0	x x 3 0 0 3
…	…	x x … 3
x x 9 0 0	0 0 0 9 9	x x 9 9 9 3
x x x 1 0	0 0 0 0 0	x x x 1 0 4
…	…	x x x … 4
x x x 9 0	0 0 0 0 9	x x x 9 9 4
x x x x 1	0 0 0 0 5	x x x x 1 5
…	…	x x x x …
x x x x 9	0 0 0 0 9	x x x x 9 9

x = 0 - 9

PDF = Specifies that the Printable Data Field (human readable text) should automatically be printed. PDF is not permitted if a null *DATA FIELD* has been specified.

FONT = An optional parameter used to specify the PDF font. *FONT* = N for Normal ASCII 10 cpi (default), O for OCR-A 10 cpi, or X for OCR-B 10 cpi, or S to suppress the PDF and lower portions of the bar code. The OCR-A and OCR-B fonts are not permitted with vertical bar codes. If vertical and PDF options are selected, the readable data will be printed in Normal 10 cpi regardless of the font specification.

MSI BAR CODE STRUCTURE

Quiet Zone	0.25 inch minimum.
Data Field	Variable length numeric marked by Start/Stop Code. The structure consists of 4 wide and 4 narrow bars and spaces. Each character consists of 4 data bits. Each zero bit is a narrow/wide space configuration; each 1 bit is a wide bar/narrow space configuration.
Readable Data	Optional. Can be printed above or below bar code symbol.
Check Digit	The checksum is automatically calculated and inserted into the symbol immediately preceding the STOP character. The check character is a modulus 103 checksum that is calculated by summing the start code value plus the products of each character position (most significant character position=1) and the character value of that position. The sum of the start code value and the products is then divided by 103. The remainder of the answer is the check digit.

Check Digit — Modulo-10 or modulo-11 (or combination) specified by command parameter. The check digit formula includes the number system character.

Refer to Common Bar Code Parameters earlier in this chapter for items not covered below.

BARCODE<LF>

MSI*X*[;VSCAN][;*MAG*][;H*n*][;BF*n;L*][;DARK];*SR;SC*<LF>

[*(D)DATA FIELD(D)*]<LF>

[PDF[;*LOC*][;*FONT*]]<LF>

STOP<LF>

where:

MSI = Bar code type.

X = Check Digit Designator. Replace X with one of the following codes based on the desired check digit type:
- A = Single digit modulo-10 followed by a second modulo-10 digit
- B = Single digit modulo-11 followed by a single modulo-11 digit
- C = Single digit modulo-10
- D = Single digit modulo-11

MAG = Optional parameter is used to expand the bar code size horizontally. *MAG* = X1 through X10 (default is X1). The number of dots in each element type is shown for each magnification in the following table.

	1/160 Centers Horizontal	1/144 Centers Vertical	1/160 Centers Horizontal	1/144 Centers Vertical
	Bar Type		Space Type	
MAG	Narrow	Wide	Narrow	Wide
X1	1	3	3	5
X2	2	5	4	7
X3	3	7	5	9
X4	4	9	6	11
X5	5	11	7	13
X6	6	13	8	15
X7	7	15	9	17
X8	8	17	10	19
X9	9	19	11	21
X10	10	21	12	23

DATA FIELD = Variable length numeric (14 digits maximum if 1-character check digit specified; 13 digits maximum if 2-character check digit specified). *DATA FIELD* may include only the digits 0 – 9 (30h – 39h). A null data field (no characters) is allowed. Do not use the DATA FIELD parameter if bar code data will be dynamically entered (refer to BFn;L parameter).

PDF = Specifies that the Printable Data Field (human readable text) should automatically be printed. PDF is not permitted if a null *DATA FIELD* has been specified.

LOC = Optional parameter used to place the PDF above or below the bar code symbol. *LOC* = A for above, or B for below (default is B). The height of the bars will be reduced 0.1 inch to allow for printing the 0.1 inch high PDF.

FONT = An optional parameter used to specify the PDF font. *FONT* = N for Normal ASCII 10 cpi (default), O for OCR-A 10 cpi, or X for OCR-B 10 cpi, or S to suppress the PDF and lower portions of the bar code. The OCR-A and OCR-B fonts are not permitted with vertical bar codes. If vertical and PDF options are selected, the readable data will be printed in Normal 10 cpi regardless of the font specification.

POSTNET BAR CODE STRUCTURE

POSTNET bar code requirements can be obtained from Publication 25 - "A Guide to Business Mail Preparation" published by the U.S. Postal Service.

Clear Zone	Like the Quiet Zone required by other bar code structures, the POSTNET code must be bordered on all sides by a blank Clear Zone to ensure accurate reading.
Start/Stop Code	The start and stop codes, referred to as "framing bars" in POSTNET, is one tall bar identifying the leading and trailing ends of the bar code. The ImagerPlus automatically produces the start/stop code with each bar code.
Data Field	Fixed (10 digit) numeric. The bar code data produces a single field of 50 bars, grouped in sets of five. Each set of five bars (comprised of 2 tall bars and 3 short bars) represents each of the digits in the zip code, plus the 4-digit zip code extension; the tenth digit represents the automatic check digit character.
Check Digit	The check digit is added automatically to verify accurate scanning.

Refer to Common Bar Code Parameters earlier in this chapter for items not covered below.

BARCODE<LF>

POSTNET[;BF*n*;*L*];*SR*;*SC*<LF>

[*(D)DATA FIELD(D)*]<LF>

STOP<LF>

where: POSTNET = Bar code type.
DATA FIELD = The numeric characters for the bar code. Refer to the U.S. Postal Service's Publication 25 and enter up to the maximum number of digits allowed. *DATA FIELD* may include only the digits 0 – 9 (30h – 39h).

BAR CODE ADD-ON DATA (UPC AND EAN STYLES)

The ImagerPlus can add extended data fields (including the optional human-readable data field) to the UPC and EAN bar codes. This Add-On data is useful for representing UPC periodical issue number or EAN price data.

The syntax for the Add-On data field is specified with the individual UPC and EAN bar codes commands covered earlier in this chapter. The parity patterns required by the +2 and +5 parameters are shown in the following tables.

2 Digit Add-On Parity Pattern

Add-On	Parity	Add-On	Parity	Add-On	Parity	Add-On	Parity
00	00	25	0E	50	E0	75	EE
01	0E	26	E0	51	EE	76	00
02	E0	27	EE	52	00	77	0E
03	EE	28	00	53	0E	78	E0
04	00	29	0E	54	E0	79	EE
05	0E	30	E0	55	EE	80	00
06	E0	31	EE	56	00	81	0E
07	EE	32	00	57	0E	82	E0
08	00	33	0E	58	E0	83	EE
09	0E	34	E0	59	EE	84	00
10	E0	35	EE	60	00	85	0E
11	EE	36	00	61	0E	86	E0
12	00	37	0E	62	E0	87	EE
13	0E	38	E0	63	EE	88	00
14	E0	39	EE	64	00	89	0E
15	EE	40	00	65	0E	90	E0
16	00	41	0E	66	E0	91	EE
17	0E	42	E0	67	EE	92	00
18	E0	43	EE	68	00	93	0E
19	EE	44	00	69	0E	94	E0
20	00	45	0E	70	E0	95	EE
21	0E	46	E0	71	EE	96	00
22	E0	47	EE	72	00	97	0E
23	EE	48	0E	73	0E	98	E0
24	00	49	E0	74	E0	99	EE

5-digit Add-On Parity Patterns

Do the following calculations on your Add-on numbers to compute the 5-digit parity pattern (*X*).

1. Add together the first, third, and fifth numbers, and then multiply that sum by 3.
2. Add together the second and fourth numbers, and then multiply that sum by 9.
3. Add together the step 1 and 2 results (products). *X* is the units value (i.e., the least significant digit).
4. Select the corresponding parity value for *X* from the following table.

X	Parity Pattern
0	EE000
1	E0E00
2	E00E0
3	E000E
4	0EE00
5	00EE0
6	000EE
7	0E0E0
8	0E00E
9	00E0E

Example: If your Add-On number is 54321…

1. 5 + 3 + 1 = 9; 9 x 3 = 27
2. 4 + 2 = 6; 6 x 9 = 54
3. 27 + 54 = 81 (X = 1)
4. The parity pattern for 1 is E0E00.

INCREMENTAL BAR CODE FIXED DATA FIELDS

This bar code command is the equivalent of the "Incremental Alphanumeric Fixed Data Fields" explained on page 23. Like the Alpha command, it is a modified version of the standard bar code command. It should be used only when automatic incrementing of fixed bar code data field is required.

The format for the incremental bar code fixed data fields command is shown below. Only parameters unique to this version of the BARCODE command are explained here. Refer to the individual BARCODE command for other parameter specifications. Refer also to "Incrementing Alphanumeric (or Bar Code) Data — STEPMASK / STARTDATA" on page 22 for examples of the *STEPMASK* and *STARTDATA* parameters.

BARCODE<LF>

***type*;[VSCAN;][*MAG*;][H*n*;]I;[DARK;]*SR*;*SC*<LF>**

[*idir*]*STEPMASK*;[RPT*n*;][RST*n*;]*(D)STARTDATA(D)*<LF>

[PDF[;*LOC*][;*FONT*]]

STOP<LF>

where:

I	=	Identifies the bar code command as the Incremental Bar Code Fixed Data Fields command.
idir	=	An optional parameter used to specify whether to increment or decrement the value in the data field. Enter "+" (or leave blank) to increment (add step amount to) or enter "-" to decrement (subtract step amount from) the data field.
STEPMASK	=	Specifies the increment amount (step), data field length, and mask to control incrementing. (Refer to "Incrementing Alphanumeric (or Bar Code) Data — STEPMASK / STARTDATA" on page 22 for details.)
RPT*n*	=	An optional parameter used to specify the number of times to repeat a field value before incrementing it. This feature is useful for printing multiple copies of a form (such as a label) before changing the data field. *n* = 1 to 65535 (default = 1).
RST*n*	=	An optional parameter used to specify the number of times to print an incremented field on one or more forms before resetting it to its starting value. *n* = 1 to 65,535 (default = 0, no reset).
STARTDATA	=	Specifies the starting value of the data field. The number of *STARTDATA* characters must be equal to or less than the number of characters in the *STEPMASK*. The bar code type dictates the allowable characters. (Refer to "Incrementing Alphanumeric (or Bar Code) Data — STEPMASK / STARTDATA" on page 22 for details.)

INCREMENTAL BAR CODE DYNAMIC DATA FIELDS

This is a modified version of the standard bar code command and is the equivalent of the "Incremental Alphanumeric Dynamic Data Fields" command explained on page 24.

Use this bar code command to specify the position and size of the incremental dynamic data field in the Create Form mode. The *STEPMASK* and *STARTDATA* parameters are entered in the EXECUTE command in the Execute Forms mode. The starting data and incrementing values for both standard and incremental dynamic data fields can be changed without changing the form definition program.

The format for the incremental bar code dynamic data fields command is shown below. Only parameters unique to this version of the BARCODE command are explained here. Refer to the individual BARCODE command for other parameter specifications. Refer also to "Incrementing Alphanumeric (or Bar Code) Data — STEPMASK / STARTDATA" on page 22 for examples of the *STEPMASK* and *STARTDATA* parameters.

BARCODE<LF>

***type*;[VSCAN;][*MAG*;][H*n*;]IBF*n*;*L*;*SR*;*SC*<LF>**

[PDF[;*LOC*][;*FONT*]]<LF>

STOP<LF>

where:

IBF*n* = Identifies the command as the Incremental Bar Code Dynamic Data Field command. *n* numbers the data field for form location. *n* = 1 to 255. The *SR* (Starting Row) and *SC* (Starting Column) parameters entered in the standard BARCODE command specify the exact location of this data field number on the form.

L = Specifies the field length for *STARTDATA*. The number of characters dynamically entered for *STARTDATA* must be less than or equal to *L*. The bar code type used dictates the number and type of characters allowed. *L* = 1 to 226.

DUPLICATING INCREMENTAL BAR CODE FIELDS

The Horizontal Duplication (HDUP) and Vertical Duplication (VDUP) commands can be used to duplicate incremental bar codes (or alphanumerics). When these commands are used to duplicate fixed or dynamic data, fields are incremented in a left-to-right, top-to-bottom order. Spacing is also specified by the HDUP and VDUP commands.

For example, a *STARTDATA* of 001 with a *STEPMASK* of 001, and an HDUP of 5 and VDUP of 3 would produce the following result.

001	002	003	004	005
006	007	008	009	010
011	012	013	014	015

Character Sets and Fonts

The ImagerPlus supports 32 character sets. You can configure the ImagerPlus to automatically select one of the standard character sets at power up (refer to "ImagerPlus Setup" on page 7). You can also select a particular character set while in operation through the ISET (International Character Set) or USET (User-Defined Character Set) command.

ISET provides access to the any of the 32 possible character sets; USET provides the ability to custom design your own character set.

As seen in previous chapters, other command parameters can be used to select desired size or font for text printing. These commands and functions are addressed again in this chapter.

FONT TYPES

Unless otherwise configured, the ImagerPlus will default to the standard ASCII character set (10 cpi) when the printer is powered on. The following font types are available and can be selected by command:

10 cpi ASCII	10 cpi international
12 cpi ASCII	12 cpi international
15 cpi ASCII	15 cpi international
17 cpi ASCII	
Expanded ASCII	Expanded international
10 cpi ASCII rotated	10 cpi international rotated
OCR-A ASCII	
OCR-B ASCII	

OCR CHARACTER SET SELECTION

The OCR-A and OCR-B fonts can be selected in the Create, Normal and Execute modes. In the Create mode, OCR fonts are accessed using the Alpha command. (Refer to the "Alphanumerics Command — ALPHA"on page 20 for more details.)

The format for the standard Alpha command is:

ALPHA<LF>

[R[D][L];][E;][C*n*;][AF*n*;*L*][*DIR*;][UC;]]*SR*;*SC*;*VE*;*HE*;

***(D)ASCII Text(D)*<LF>**

STOP<LF>

C*n*, the optional horizontal compressed print parameter, is used to access the OCR (and other) fonts. If used, C must be followed by an *n* value of 10, 12, 13, 15, or 17 to specify cpi (characters per inch), 10A for 10 cpi OCR-A, or 10B for

10 cpi OCR-B (OCR fonts are available only in 10 cpi.). If C*n* is used to select a font, the *VE* and *HE* parameters must be set to 0. The C*n* option is not allowed with rotated alphanumerics.

In the Normal and Execute modes, OCR fonts are accessed using the Compressed Print (DENSITY) command, by the following syntax:

<SFCC>DENSITY;*n*<LF>

n specifies the density in cpi, OCR-A, or OCR-B. The values allowed for *n* are the same as explained for the ALPHA command above.

BAR CODE FONT (PRINTABLE DATA FIELD)

With the exception of the POSTNET bar code, all bar code commands provide a PDF parameter for selecting the Printable Data Field font type. This font type is used for the human-readable text that is provided above or below the bar code for interpretation.

The typical format of a BARCODE command syntax is as follows:

BARCODE

(type)*[;VSCAN][*(magnify)*][;H*n*][;BF*n*;*L*][;DARK];*SR*;*SC

[*(D)(data field contents)(D)*]

[PDF[;*LOC*][;*FONT*]]

STOP

Font selection parameters (also covered for each bar code type in the "Bar Codes" chapter are as follows:

PDF	An optional parameter that specifies that the Printable Data Field (human-readable text) should be automatically printed. This optional parameter is not permitted if a null data field has been specified.
LOC	An optional parameter used to place the PDF either above or below the bar code as allowed by the specific bar code type.
FONT	An optional parameter used to specify the PDF font. N = Normal ASCII 10 cpi (default), O = OCR-A 10 cpi, or X = OCR-B 10 cpi.

The FONT parameter is not allowed by all BARCODE commands. Where applicable, OCR-A and OCR-B fonts are not permitted with vertically oriented bar codes. If vertical and PDF options are selected, the readable data will be printed in normal 10 cpi regardless of the font specification. Also, most bar code types default to ASCII 10 cpi, however UPC and EAN bar codes default to the OCR-B font.

MULTINATIONAL CHARACTER SETS

The Multinational Character Sets actually consist of 32 language character sets (96 characters each). The primary character set is ASCII plus 11 alternate language characters sets, 12 sets are reserved for future use, and 8 sets can be user-defined.

Because these 32 character sets include alternate languages, they are collectively referred to as the "Multinational Character Sets." “Character Set Tables” section contains the charts that give the hexadecimal values for the characters in these character sets. There is also an alternate character set referred to as the "Multinational Extended Character Set" which includes character values above 7Fh. This is a relative substitution chart (a reference for user-defined character sets) that will be covered by the USET command instructions.

Access to any character set is by the default set selected in Setup or by using the ISET command. Individual characters can also be accessed as explained later in this chapter.

ACCESSING CHARACTERS AND CHARACTER SETS

Resident character sets are accessed by the ISET command; individual characters can be accessed by data bit 8 addressing.

International Character Set Command — ISET

Unless changed in Setup (see “ImagerPlus Setup” on page 7), ASCII is the default character set selected at power up or reset. The ISET command can be issued in the Normal, Create or Execute modes to select one of the 32 multinational character sets.

The ISET command can be used as many times as required in a form. A character set remains active until replaced by a new ISET command. An ISET command issued in the Execute mode selects the character set for dynamically entered data only (fixed data defined in the Create mode will be unaffected).

<SFCC>ISET;*n*<LF>

where: ISET = International Character Set Command

n = Specifies the desired character set. *n* = 0 to 31 as described in the following table. If *n* specifies one of the reserved values (12-23) or a nonexistent user-defined set (24-31), the default ASCII (0) set will be selected.

Character Set	Value	Character Set	Value
ASCII	0	Dutch	7
German	1	French	8
Swedish	2	Spanish	9
Danish	3	Italian	10
Norwegian	4	Turkish	11
Finnish	5	Reserved	12 – 23
English	6	User-Defined	24 – 31

Accessing Characters — Data Bit 8

Data bit 8 addressing can be used for direct access to individual characters within the Multinational Extended Character Set. The primary ASCII characters occupy addresses 20h to 7Fh. The ; Multinational Extended characters occupy addresses 80h to FFh (refer to "Character Set Tables").

USER-DEFINED CHARACTER SET COMMAND — USET

The USET command is used to create a character set by substituting up to 16 characters from the Multinational Extended Character Set. Once defined by the USET command, the character set can be called by issuing the ISET command. All sixteen substitutions are not required, however C*a*;F*a* should not be issued more than 16 times in one USET command.

A close comparison of the ASCII and alternate language character charts (excluding OCR-A, OCR-B, and the Multinational Extended Character Set) in the "Character Set Tables" section will indicate that only sixteen character values actually produce different characters among the various sets. For example, 41h produces a capital A regardless of the character set used, whereas the character produced by 7Bh differs among the various sets.

The sixteen values which produce different characters are 21h, 22h, 23h, 24h, 25h, 26h, 40h, 5Bh, 5Ch, 5Dh, 5Eh, 60h, 7Bh, 7Ch, 7Dh, and 7Eh.

To visualize how the USET command works, assume that the characters that correspond to these hex values are removed from the ASCII table, leaving 16 open spaces. The USET command allows you to substitute hex values from the Multinational Extended Character Set in those 16 spaces, thus creating a new character set. You can create up to eight user defined sets. You do not have to use all 16 spaces within any set. (OCR characters are not available for substitution.)

The USET character sets are identified as USET1 through USET8, and they are accessed as ISET24 through ISET31. The following table shows this USET/ISET correlation:

USET1	=	ISET24
USET2	=	ISET25
USET3	=	ISET26
USET4	=	ISET27
USET5	=	ISET28
USET6	=	ISET29
USET7	=	ISET30
USET8	=	ISET31

The USET command can be used only in the Normal mode.

<SFCC>USET;*n*<LF>

C*a*;F*a*<LF>

…

END<LF>

where:

USET	=	User-defined Character Set Command
n	=	Specifies the user-defined character set number. *n* = 1 to 8.
C*a*	=	Specifies the hex value of the ASCII character position to be replaced by the substitute font address (F*a*) character. *a* = 21, 22, 23, 24, 25, 26, 40, 5B, 5C, 5D, 5E, 60, 7B, 7C, 7D, or 7E.
F*a*	=	Specifies the hex value of the font address of the character to be substituted for C*a*. *a* = 20 to FF (from the Multinational Extended Character Set).
END	=	Ends the USET command.

Command Summary

The following is a summary of ImagerPlus IGP commands grouped according to mode of operation. Unless changed by strapping option, the Special Function Command Character (SFCC) default is a tilde (~). The <LF> denotes the required Line Feed terminator.

NORMAL MODE COMMANDS

<SFCC>CREATE;[/]*FORMNAME*[;*FL*]<LF>

<SFCC>DELETE FORM;*FORMNAME*<LF>

<SFCC>DELETE LOGO;*LOGONAME*<LF>

<SFCC>DENSITY;*n*<LF>

<SFCC>DIRECTORY<LF>

<SFCC>EXECUTE;*FORMNAME*[;PAGE *n*][;*FC*]<LF>

<SFCC>EXPAND;*VE*;*HE*<LF>

<SFCC>ISET;*n*<LF>

<SFCC>LISTEN<LF>

<SFCC>LPI;*n*<LF>

[<LF>]<SFCC>NORMAL<LF>

<SFCC>QUIET<LF>

<SFCC>RESET<LF>

<SFCC>SCALE;DOT<LF>

<SFCC>SCALE;CHAR[;*LPI*;*CPI*]<LF>

<SFCC>USET;*n*<LF>

CREATE FORM MODE COMMANDS

ALPHA<LF>
[R[D][L];][E;][C*n*;][AF*n*;*L*;][*DIR*;[UC;]]*SR*;*SC*;*VE*;*HE*;
(D)ASCII Text(D)<LF>
STOP<LF>

ALPHA<LF>
[R[D];][E;][C*n*;]I;[*DIR*;]*SR*;*SC*;*VE*;*HE*;[*idir*]<LF>
STEPMASK;[RPT*n*;][RST*n*;]*(D)STARTDATA(D)*<LF>
STOP<LF>

ALPHA<LF>
[R[D];][E;][C*n*;][IAF*n*;*L*;[*DIR*;]*SR*;*SC*;*VE*;*HE*;<LF>
STOP<LF>

BARCODE
(See Bar Code Commands)

BOX<LF>
LT;*SR*;*SC*;*ER*;*EC*<LF>
STOP<LF>

CORNER<LF>
LT;*SR*;*SC*;*ER*;*EC*;*VL*;*HL*<LF>
STOP<LF>

END

LFORM6;*n*<LF>

LFORM8;*n*<LF>

HDUP;*DN*;*OF*<LF>
(Elements to be duplicated)
HDUP;OFF<LF>

HORZ<LF>
LT;*R*;*SC*;*EC*<LF>
STOP<LF>.

LOGO<LF>
SR;*SC*;*LOGONAME*<LF>
STOP<LF>

[<LF>]<SFCC>NORMAL<LF>

PAGE;*SR*;*SC*<LF>

REVERSE<LF>
[DARK;]*SR*;*SC*;*ER*;*EC*<LF>
STOP<LF>

SCALE;DOT<LF>

SCALE;CHAR[;*LPI*;*CPI*]<LF>

VDUP;*DN*;*OF*<LF>
(elements to be duplicated)
VDUP;OFF<LF>

VERT<LF>
LT;*C*;*SR*;*ER*<LF>
STOP<LF>

CREATE LOGO MODE COMMANDS

<SFCC>LOGO;*LOGONAME*;*VL*;*HL*<LF>
RN;*D*;*D1-D2*;*D*<LF>
END<LF>

EXECUTE FORM MODE COMMANDS

<SFCC>DENSITY;*n*<LF>

<SFCC>EXECUTE;*FORMNAME*[;PAGE *n*][;*FC*]<LF>

<SFCC>EXECUTE;*FORMNAME*[;PAGE *n*];ICNT*n*[;IRST*n*]<LF>

... [AF*n*;*L*;] ... <LF>

(D)ASCII Text(D)<LF>

... [;BF*n*;*L*] ... <LF>

[*(D)DATA FIELD(D)*]<LF>

<SFCC>EXPAND;*VE*;*HE*<LF>

<SFCC>LPI;*n*<LF>

<SFCC>NORMAL<LF>

BAR CODE COMMANDS

Basic format – refer to the “Bar Codes” chapter for details of each specific bar code type.

BARCODE<LF>
(type)[+*n*][CD][;VSCAN][;*MAG*][;H*n*][;BF*n*;*L*][;DARK];*SR*;*SC*<LF>
[*(D)DATA FIELD(D)*]<LF>
[PDF[;*LOC*][;*FONT*]]<LF>
STOP<LF>

INCREMENTAL BAR CODE COMMANDS

(See individual Bar Code command for valid non-incremental parameters.)

BARCODE<LF>
(type);[VSCAN;][*MAG*;][H*n*;]I;[DARK;]*SR*;*SC*<LF>
[*idir*]*STEPMASK*;[RPT*n*;][RST*n*;]*(D)STARTDATA(D)*<LF>
[PDF[;*LOC*][;*FONT*]]
STOP<LF>

BARCODE<LF>
(type);[VSCAN;][*MAG*;][H*n*;]IBF*n*;*L*;*SR*;*SC*<LF>
[PDF[;*LOC*][;*FONT*]]<LF>
STOP<LF>

FIXED LENGTH UTILITY COMMANDS

<SFCC>IGON<LF>

<SFCC>IGOFF<LF>

<SFCC>SFON<LF>

<SFCC>SFOFF<LF>

MULTINATIONAL CHARACTER SET COMMANDS

Create Mode

<SFCC>ISET;*n*<LF>

Normal or Execute Mode

<LFCC>USET*n*<LF>
C*a*;F*a*<LF>
…
…
END<LF>

Character Set Tables

The tables in this section present the character sets and hexadecimal values of each character accessible in the ImagerPlus. The default character set may be selected in Setup.

ASCII (ISET;0)

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

German (ISET;1)

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

Swedish (ISET;2)

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

Danish (ISET;3)

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

Norwegian (ISET;4)

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

Finnish (ISET;5)

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

English (ISET;6)

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

Dutch (ISET;7)

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

French (ISET;8)

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

Spanish (ISET;9)

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

Italian (ISET;10)

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

Turkish (ISET;11)

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

OCR-A Character Set

	0	1	2	3	4	5	6	7
0				0	@	P	^{0}	$_0$
1			!	1	A	Q	^{1}	$_1$
2			"	2	B	R	^{2}	$_2$
3			#	3	C	S	^{3}	$_3$
4			$	4	D	T	^{4}	$_4$
5			%	5	E	U	^{5}	$_5$
6			&	6	F	V	^{6}	$_6$
7			'	7	G	W	^{7}	$_7$
8			(	8	H	X	^{8}	$_8$
9			)	9	I	Y	^{9}	$_9$
A			*	:	J	Z	÷	_
B			+	;	K	[	→	
C			,	<	L	\	↑	
D			-	=	M	]	↓	
E			.	>	N	^	©	¢
F			/	?	O	←	®	

OCR-B Character Set

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

Multinational Extended Character Set

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p	U			°	À	_	à	_
1			!	1	A	Q	a	q	ü		¡	±	Á	Ñ	á	ñ
2			“	2	B	R	b	r	Ꝑ		¢	_	Â	Ò	â	ò
3			#	3	C	S	c	s	|		£	_	Ã	Ó	ã	ó
4			$	4	D	T	d	t			¤	'	Ä	Ô	ä	ô
5			%	5	E	U	e	u			¥	µ	Å	Õ	å	õ
6			&	6	F	V	f	v			|	¶	Æ	Ö	æ	ö
7			'	7	G	W	g	w			§	.	Ç	x	ç	÷
8			(	8	H	X	h	x			"	,	È	Ø	è	ø
9			)	9	I	Y	i	y			©		É	Ù	é	ù
A			*	:	J	Z	j	z			ª	º	Ê	Ú	ê	ú
B			+	;	K	[	k	{	¨		«	»	Ë	Û	ë	û
C			,	<	L	\	l	|		¬	_	Ì	Ü	ì	ü
D			-	=	M	]	m	}			ÿ	_	Í	_	í	_
E			.	>	N	^	n	~			®	_	Î	_	î	_
F			/	?	O	_	o				¯	¿	Ï	ß	ï	

Error Codes

INTRODUCTION

This section defines the coded error messages that can result from improper command usage. Error codes and messages are presented in numeric order (from 01 to 155) and grouped by command or function, as follows (Some of these error codes may have not been implemented as of this printing.):

Error Code	Related Command or Function
01-09	Horizontal Line
10-19	Vertical Line
20-29	Box
30-39	Corner
40-49	Alpha
50-51	Logo
60-69	Create
70-79	Execute
80-89	Miscellaneous
90-110	Bar Codes
111-119	Reverse Print
120-129	ImagerPlus Mode
130-139	Incremental Fields
140-149	Scaling
150-155	Multinational Character Set

Debug Mode

In order for the ImagerPlus to produce an error message, you must initiate the Debug Mode by entering a "/" in the CREATE command sequence as follows:

<SFCC>CREATE;/*FORMNAME*<LF>

The form will not be printed in the Debug Mode. Instead, the ImagerPlus will print the program and identify error conditions by printing a code and message on any line that contains an error. Only the correct command lines will be stored in memory. Therefore, once the errors have been corrected, you should remove the "/" from the CREATE command and run the program again to produce the form and store it in memory.

Errors detected in the Execute mode (codes 70 through 79) and miscellaneous errors (codes 80 and 81) will cause the ImagerPlus to switch to Normal mode processing.

MESSAGES

Horizontal Line Command Errors

01 Row Position is Out of Bounds

The *R* (Row) parameter value exceeds the form length.

02 Left Column is Out of Bounds

The *SC* (Starting Column) parameter value specifies a position outside the left form boundary.

03 Right Column is Out of Bounds

The *EC* (Ending Column) parameter value exceeds the form width.

04 Format or Delimiter Error

One or more of the following format or delimiter error conditions may exist in the command:

a. semicolon (;) missing
b. semicolon (;) replaced by colon (:)
c. Invalid number of parameters
d. Invalid parameter value (i.e., nonnumeric).

05 Memory Overflow

The ImagerPlus memory lacks sufficient space for another horizontal line. Remaining HORZ commands will be flushed until the STOP command is detected. Afterwards, normal processing will continue. Delete any unused forms containing horizontal line elements to free up memory space.

06 Column Positions Are Out of Order

The *SC* (Starting Column) parameter value is greater than or equal to the *EC* (Ending Column) parameter value.

07 Improper Line Thickness

The *LT* (Line Thickness) parameter value is invalid (e.g., zero); *LT* must be 1 or greater.

08 Unassigned

09 Unassigned

Vertical Line Command Errors

10 Column Position is Out of Bounds

The *C* (Column) parameter value exceeds the form width.

11 Upper Row is Out of Bounds

The *SR* (Starting Row) parameter value specifies a position outside the top of form boundary.

12 Lower Row is Out of Bounds

The *ER* (Ending Row) parameter value exceeds form length.

13 Format or Delimiter Error

One or more of the following syntax error conditions may exist in the command:
a. Semicolon (;) missing
b. Semicolon (;) replaced by colon (:)
c. Invalid number of parameters
d. Invalid parameter value (i.e., nonnumeric).

14 Memory Overflow

The ImagerPlus memory lacks sufficient space for another vertical line. Remaining VERT commands will be flushed until the STOP command is detected; afterwards, normal processing will continue. Delete any unused forms containing vertical line elements to free up memory space.

15 Row Positions Are Out of Order

The *SR* (Starting Row) parameter value is greater than or equal to the *ER* (Ending Row) parameter value.

16 Improper Line Thickness

The *LT* (Line Thickness) parameter value is invalid (e.g., zero); *LT* must be 1 or greater.

17 Unassigned

18 Unassigned

19 Unassigned

Box Command Errors

20 Left Column Position is Out of Bounds

The *SC* (Starting Column) parameter value specifies a position outside the right or left form boundary.

21 Upper Row is Out of Bounds

The *SR* (Starting Row) parameter value specifies a position outside the form boundaries.

22 Right Column Position is Out of Bounds

The *EC* (Ending Column) parameter value specifies a position outside the right or left form boundary.

23 Lower Row is Out of Bounds

The *ER* (Ending Row) parameter value specifies a position outside the form boundaries.

24 Format or Delimiter Error

One or more of the following syntax error conditions may exist in the command:
a. Semicolon (;) missing
b. Semicolon (;) replaced by colon (:)
c. Invalid number of parameters
d. Invalid parameter value (i.e., nonnumeric).

25 Memory Overflow

The ImagerPlus memory lacks sufficient space for another box. Remaining BOX commands will be flushed until the STOP command is detected; afterwards, normal processing will continue. Delete any unused forms containing box elements to free up memory space.

26 Column Positions Are Out of Order

The *SC* (Starting Column) parameter value is greater than or equal to the *EC* (Ending Column) parameter value.

27 Row Positions Are Out of Order

The *SR* (Starting Row) parameter value is greater than or equal to the *ER* (Ending Row) parameter value.

28 Improper Line Thickness

The *LT* (Line Thickness) parameter value is invalid (e.g., zero); *LT* must be 1 or greater.

29 Unassigned

Corner Command Errors

30 Left Column Position is Out of Bounds

The *SC* (Starting Column) parameter value specifies a position outside the right or left form boundary.

31 Upper Row is Out of Bounds

The *SR* (Starting Row) parameter value specifies a position outside the form boundaries.

32 Right Column Position is Out of Bounds

The *EC* (Ending Column) parameter value specifies a position outside the right or left form boundary.

33 Lower Row is Out of Bounds

The *ER* (Ending Row) parameter value specifies a position outside the form boundaries.

34 Horizontal Corner Length is Out of Bounds

The *HL* (Horizontal Length) parameter value specifies an extension beyond the left or right form boundary.

35 Vertical Corner Length is Out of Bounds

The *VL* (Vertical Length) parameter value specifies an extension beyond the form boundaries.

36 Format or Delimiter Error

One or more of the following syntax error conditions may exist in the command:

a. Semicolon (;) missing
b. Semicolon (;) replaced by colon (:)
c. Invalid number of parameters
d. Invalid parameter value (i.e., nonnumeric).

37 Memory Overflow

The ImagerPlus memory lacks sufficient space for another corner. Remaining CORNER commands will be flushed until the STOP command is detected; afterwards, normal processing will continue. Delete any unused forms containing corner elements to free up memory space.

38 Column Positions Are Out of Order

The *SC* (Starting Column) parameter value is greater than or equal to the *EC* (Ending Column) parameter value.

39 Row Positions Are Out of Order

The *SR* (Starting Row) parameter value is greater than or equal to the *ER* (Ending Row) parameter value.

Alpha Command Errors

40 Unmatched Leading and Ending Delimiters

The text string was not properly delimited by matching printable characters before an <LF> was detected.

41 Character Row is Out of Bounds

The *SR* (Starting Row) parameter value calls for the text string to be printed outside the form limits.

Note: The *VE* (Vertical Expansion) parameter expands text upward from the specified row which can result in an error 41.

42 Column Plus String Length is Out of Bounds

The *SR* (Starting Column) parameter is causing the alpha string to exceed the left form margin, or *SR* plus the alpha string exceeds the right margin of the page.

43 Too Many Characters in the Alpha String

The string may contain a maximum of 226 characters.

44 Format or Delimiter Error

One or more of the following syntax error conditions may exist in the command:

a. Semicolon (;) missing
b. Semicolon (;) replaced by colon (:)
c. Invalid number of parameters
d. Invalid parameter value (i.e., nonnumeric).

45 Memory Overflow

The ImagerPlus memory lacks sufficient space for another alpha string. Remaining ALPHA commands will be flushed until the STOP command is detected; afterwards, normal processing will continue. Delete any unused forms containing alpha string elements to free up memory space.

46 Expanded Characters Have Been Specified as Elongated or Compressed

The *VE* (Vertical Expansion) or *HE* (Horizontal Expansion) parameters cannot be used in the ALPHA command sequence with the E (Elongated) and/or C*n* (Compressed Print) parameters.

47 (X) Scale Factor is Out of Bounds

The *HE* (Horizontal Expansion) parameter value exceeds 113.

48 (Y) Scale Factor is Out of Bounds

The *VE* (Vertical Expansion) parameter value exceeds 113.

49 Error in the Optional Compression Factor

The C*n* (Compressed Print) parameter value is invalid; i.e., it specifies other than 10, 12, 13, 15 or 17 cpi.

Create Logo Command Errors

50 Horizontal Length of the Logo or Specified Dot Position in the Logo is Out of Bounds

Two conditions can cause this error:

a. The *HL* (Horizontal Length) parameter value is zero or it exceeds the 240 maximum. (This condition causes the ImagerPlus to revert to the Normal mode.)
b. A *D* or *D1-D2* (dot position) value exceeds the horizontal logo grid width. This condition causes the ImagerPlus to flush the buffer until an <LF> line terminator is detected. The ImagerPlus then continues with normal logo creation.

51 Vertical Length of the Logo or Specified Dot Row in the Logo is Out of Bounds

Two conditions can cause this error:

a. The *VL* (Vertical Length) parameter value is zero or it exceeds the 252 maximum. (This condition causes the ImagerPlus to revert to the Normal mode.)
b. A *D* or *D1-D2* (Dot position) parameter value exceeds the vertical logo grid length. This condition causes the ImagerPlus to flush the buffer until an <LF> line terminator is detected. The ImagerPlus then continues with normal logo creation.

52 Invalid Use of the Hyphen

The *D1-D2* (Dot series) parameter values are reversed (out of order) or one of the values is missing. This condition causes the ImagerPlus to flush the buffer until an <LF> line terminator is detected. The ImagerPlus then continues with normal logo creation.

53 Insufficient Memory to Create Logo

The ImagerPlus memory lacks sufficient space for the logo size specified. The ImagerPlus will revert to the Normal mode. Delete any unused logos or forms containing logo elements to free up memory space.

54 Format or Delimiter Error

One or more format or delimiter error conditions may exist in the command. If an invalid size or name is defined the ImagerPlus reverts to the Normal mode. If the error occurs during creation, the ImagerPlus will flush the buffer until an <LF> line terminator is detected. The ImagerPlus then continues with normal logo creation.

55 No Logo by That Name is Defined

An undefined logo has been called for during the Create Form mode. (This error is not generated during the Create Logo mode.) This error causes the ImagerPlus to flush the buffer until an <LF> line terminator is detected. The ImagerPlus then continues with normal logo creation.

56 Memory Overflow

The ImagerPlus memory lacks sufficient space for another logo call. Delete any unused logos or forms containing logo elements to free up memory space.

57 Logo Row is Out of Bounds (Logo Call)

The *SR* (Starting Row) parameter value specifies a position that exceeds the top or bottom form margins. This error causes the ImagerPlus to flush the buffer until an <LF> line terminator is detected. The ImagerPlus then continues with normal logo creation.

58 Logo Column is Out of Bounds (Logo Call)

The *SC* (Starting Column) parameter value specifies a position that exceeds the right or left form margins. This error causes the ImagerPlus to flush the buffer until an <LF> line terminator is detected. The ImagerPlus then continues with normal logo creation.

59 Unassigned

Create Errors

60 Directory is Full

You must delete an unused form or logo before you can create and add a new one to the directory. This error causes the ImagerPlus to revert to the Normal mode.

61 No Such Create Function

An invalid command has been issued in the Create Form mode. This error causes the ImagerPlus to flush the buffer until a STOP command is detected. The ImagerPlus then continues processing.

62 Error in the Horizontal Duplication Parameters

An HDUP syntax error has been detected or a parameter value has been exceeded. The *DN* (Duplication Number) parameter value must be not exceed 255; the *OF* (Offset) parameter value must not exceed 792 (dot scale). This error causes the HDUP command to be ignored; forms processing continues.

63 Error in the Vertical Duplication Factory

An VDUP syntax error has been detected or a parameter value has been exceeded. The *DN* (Duplication Number) parameter value must be not exceed 255; the *OF* (Offset) parameter value must not exceed form length. This error causes the HDUP command to be ignored; forms processing continues.

64 Error in the Scale Factors

A syntax error has been detected or a parameter value is invalid. The LPI (Lines Per Inch) vertical parameter value must be 6, 8, 9, or 10. The CPI (Characters Per Inch) horizontal parameter must be 10, 13, 15, or 17. This error causes the SCALE command to be ignored; forms processing continues.

65 Page Row Position is Out of Bounds

The *SR* (Starting Row) parameter value exceeds the upper or lower form boundary. This PAGE command error causes the ImagerPlus to revert to the Normal mode.

66 Page Column Position is Out of Bounds

The *SC* (Starting Column) parameter value exceeds the right or left form boundary. This PAGE command error causes the ImagerPlus to revert to the Normal mode.

67 Missing Stop Command

A new function command, End command, or mode command has been issued without first terminating the previous command with STOP. Subsequent commands will be processed correctly.

68 Alpha Compressed/Elongated Rotation

A rotated alphanumeric string command contains the compressed or elongated characters option. Rotated alphanumerics cannot be compressed or elongated.

69 Memory Overflow

The ImagerPlus memory lacks sufficient space for another form. Delete any unused forms to free up memory space.

Execute Errors

70 Error in Specifying the Number of Forms in the Execute Command

The *FC* (Form Count) parameter value is invalid. This error causes the ImagerPlus to revert to the Normal mode.

71 No Such Form in the Directory

An EXECUTE or DELETE command has been issued for a form that does not exist in the forms directory. This error causes the ImagerPlus to revert to the Normal mode.

72 Unassigned

73 Unassigned

74 Unassigned

75 Unassigned

76 Error in Page Number

The PAGE *n* (Pagination) parameter value is invalid, possibly due to incorrect syntax or a page number that is too large. This error causes the ImagerPlus to revert to the Normal mode because the page number is part of the EXECUTE command.

77 Format or Delimiter Error in the Execute Command

One or more of the following syntax error conditions may exist in the command:

a. Semicolon (;) missing
b. Semicolon (;) replaced by colon (:)
c. Invalid number of parameters
d. Invalid parameter value (i.e., nonnumeric)
e. Page command misspelled.

The ImagerPlus will revert to the Normal mode.

78 Insufficient Memory Available to Execute the Form.

The ImagerPlus memory lacks sufficient space to recall and execute a form. Delete any unused forms to free up memory space. This error causes the ImagerPlus to revert to the Normal mode.

79 Unassigned

Miscellaneous Errors

80 Function Must be Called From Normal Mode

This special function cannot be issued in the Create Form or Execute Form mode; it must be issued from the Normal mode. This error will occur if there is a missing END command in the Create Form mode. For example, the ImagerPlus will automatically revert to the Normal mode if you attempt to enter the Create Form mode while executing a form.

81 No Such Special Function

An unrecognizable special function call was issued. This error causes the ImagerPlus to revert to the Normal mode.

82 Numeric Character Input Expected

Alpha characters were detected where numeric digits (0-9) were expected.

83 Error in Decimal Input

The parameter value expected was a decimal number. The number was either omitted or too large or an alpha character.

84 Error in Delimiter

The semicolon (;) delimiter was expected; the delimiter is either incorrect or missing.

85 Unassigned

86 Error in the DENSITY command

The DENSITY command parameter must specify 10, 10A, 10B, 12, 13, 15, or 17 cpi. The command is ignored.

87 Error in the LPI command

The LPI command parameter must specify 6, 8, 9, or 10 lpi. The command is ignored and processing continues.

88 Serial Input Buffer Overflow

The host computer is ignoring protocol and characters have been lost. Subsequent print will probably be garbled.

89 Error in the EXPAND Command

The *VE* (Vertical Expansion) or *HE* (Horizontal Expansion) parameter values are not within the 0-113 range, or there is a syntax error. The command is ignored and processing continues.

Bar Code Errors

90 Memory Overflow

The ImagerPlus memory lacks sufficient space for another bar code. This error causes the ImagerPlus to flush the remaining BARCODE commands until a STOP command is detected. The ImagerPlus then continues normal processing.

91 Syntax Error in Command String

One or more of the following syntax error conditions may exist in the command:

a. Misspelled keyword
b. Use of lowercase
c. Semicolon (;) missing
d. Semicolon (;) replaced by colon (:)
e. Invalid number of parameters
f. Invalid parameter value (i.e., nonnumeric)
g. No ending delimiter for data field.

This error causes the ImagerPlus to flush the remaining command lines until a STOP command is detected. The ImagerPlus then continues normal processing.

92 Magnification Factor Out of Bounds

The *MAG* (Magnification) parameter factor is not within specifications. Refer to the applicable BARCODE command for details.

93 Starting Row Out of Bounds

The *SR* (Starting Row) parameter value exceeds the upper or lower form boundary.

94 Starting Column Out of Bounds

The *SR* (Starting Column) parameter exceeds the left or right form margin.

95 Height is Out of Bounds

The H*n* (Height) parameter value does not fall within the specified range (4 through 99).

96 Illegal Character in Data Field

A missing end delimiter can cause this error. Otherwise, refer to the applicable BARCODE command for the acceptable data field characters.

97 Data Field is too Short or too Long

Refer to the applicable BARCODE command for the acceptable number of data field characters.

98 Bar Code (or Vertically Duplicated Bar Codes) Exceeds Form Length

The VDUP command parameter values cause the bar code symbol print to exceed the lower form limit.

99 Bar Code (or Horizontally Duplicated Bar Codes) Exceeds Right Margin

The HDUP command parameter values cause the bar code symbol print to exceed the right margin.

100 Bar Code is too Wide (Exceeds 720 Dots in Length)

The designated bar code symbol exceeds 720 dot columns (if horizontally oriented) or 1440 dot rows (if vertically oriented). You must enter a lower magnification factor or decrease the number of data field characters.

101 Invalid Font Selection in the PDF (Print Data Field) Parameter

The PDF parameter value must be N, O, X, or S. Refer to the applicable BARCODE command for details.

102 Dynamic Data Field is Too Long

An attempt was made to supply a dynamic data field that is longer than specified in the Create Form mode.

103 Must Be Inserted At Top of Form

The attempt was made to supply dynamic data after form printing was initiated.

104 Dynamic Data Field Not Previously Defined in the Form

An attempt was made to specify a dynamic data field in the Execute Form mode that was not defined in the Create Form mode.

105 Dynamic Field Number is Out of Bounds

The AF*n* (Dynamic Alpha Field Number) parameter value is not within 1-255 range.

106 Dynamic Bar Code Exceeds Form Width

The maximum form width was exceeded by the dynamic bar code symbol.

107 Dynamic Alpha Data Field Undefined

The specified dynamic alpha field number was not previously defined in the Create Form mode.

108 Check Digit is Out of Bounds

The UPC-A bar code is positioned so close to the edge of the page that the check digit print will exceed the margin.

109 Unassigned

110 Unassigned

Reverse Print Errors

Verify the command syntax and make necessary entries to correct the following errors:

111 Format Error in Input Parameters

112 Starting Row or Ending Row Out of Bounds

113 Starting Column or Ending Column is Out of Bounds

114 Memory Overflow

115 Unassigned

116 Unassigned

117 Unassigned

118 Unassigned

119 Unassigned

ImagerPlus Mode Errors

120 Not First Function Called

121 SR is Out of Bounds

122 Illegal Move

123 Too Many Modes

124 Syntax Error

An illegal character or delimiter has caused a syntax error.

125 Memory Overflow

There is not enough room in the memory for the command.

126 Bad Form Length Parameter

LFORM parameter values must be 6 or 8. Total number of lines per form range from 1 to 5461 (6 lpi), or from 1 to 7281 (8 lpi).

127 Unassigned

128 Unassigned

129 Unassigned

Incremental Field Errors

130 Incremental Create Command Syntax Error

131 Incremental STEPMASK Parameter Error

132 Incremental Repeat or Reset Count Parameter Error

133 Incremental STEPMASK/STARTDATA Length Error

The dynamic *STEPMASK* exceeds created field length or *STARTDATA* exceeds *STEPMASK*.

134 Incremental Execute Command Syntax Error

135 Incremental STARTDATA Parameter Error

136 Incremental STEPMASK/STARTDATA Mismatch

137 Unassigned

138 Unassigned

139 Unassigned

Scaling Command Errors

140 Not the First Command in the Create Form Mode

This condition is not applicable when SCALE is used in the Normal mode; it applies only to Create Form mode.

141 Syntax Error

One or more of the following syntax error conditions may exist in the command:

a. Misspelled keyword
b. Use of lowercase
c. Semicolon (;) missing
d. Semicolon (;) replaced by colon (:)
e. Invalid number of parameters
f. Invalid parameter value (i.e., nonnumeric)
g. Improper command terminator.

142 Unassigned

143 Unassigned

144 Unassigned

145 Bad Decimal Input

Alpha input has been detected where a numeric was expected, or the numeric input was too large.

146 Unassigned

147 Unassigned

148 Unassigned

149 Unassigned

Multinational Character Set Errors

150 Bad ISET Parameter

An invalid ISET value (outside the allowable range, 0 to 31) was specified, or alpha was detected where a numeric was expected.

151 Decimal Input Error in USET Command

USET requires a numeric parameter value. The ImagerPlus either found no entry or alpha instead.

152 Bad USET Parameter

An invalid USET character set value (outside the allowable range, 1 to 8) was specified, or alpha was detected where a numeric was expected.

153 Illegal Character Substitution

An invalid C*a* character substitution has been specified in the USET command. The following 16 hex cell addresses are allowed for the C*a* parameter: 21, 22, 23, 24, 25, 26, 40, 5B, 5C, 5D, 5E, 60, 7B, 7C, 7D, or 7E.

154 Illegal Character Defined

An invalid F*a* character value has been specified in the USET command. The allowable character entries for the F*a* parameter are between 20 and FF hex.

155 Syntax Error

Possibly the END command has been omitted from the USET command sequence.