tputs the buffer size

ASC>) ;
] :

SCII 0-127,
ASCII 0-127,
terminators, ASCII

7.

ke Mode

<ASC>))] :
ny output command

acters, 0-54 612
ponse string of 1 to
ters; ASCII 0-127, 0

f a 16-bit immediate

Decimal Equivalents

ESC . (	27,46,40
ESC .)	27,46,41
ESC . @	27,46,64
ESC . B	27,46,66
ESC . E	27,46,69
ESC . H	27,46,72
ESC . I	27,46,73
ESC . J	27,46,74
ESC . K	27,46,75
ESC . L	27,46,76
ESC . M	27,46,77
ESC . N	27,46,78
ESC . O	27,46,79
ESC . R	27,46,82
ESC . Y	27,46,89
ESC . Z	27,46,90
ETX	3
LF	10
CR	13
:	58
;	59

RS-232-C Error Messages

These error numbers are returned by executing an ESC . E instruction.

Error Number	Meaning
0	A zero indicates there was no I/O error.
10	Output instruction received while another output instruction is executing. The original output instruction will continue normally while the one in error will be ignored.
11	Invalid byte received following the first two characters (ESC .) in a device control instruction.
12	Invalid byte received while parsing a device control instruction. Parameters are defaulted from the parameter where the invalid byte was received to the end of the instruction.
13	Parameter out of range.
14	Too many parameters received. Additional parameters beyond the proper number are ignored, and the parsing of the instruction ends when a colon (normal exit) or the first byte of another instruction is received (abnormal exit).
15	A framing error, parity error, or overrun error has been detected.
16	The input buffer memory has overflowed. As a result of the overflow, one or more bytes of data have been lost, and therefore, an HP-GL error will probably also occur.

HP 7475A

REFERENCE CARD

Device Control Instructions Summary

Plotter On Instruction

ESC . (or ESC . Y

Prepares plotter to accept other instructions. Needed only when Y/D switch set to Y.

Plotter Off Instruction

ESC .) or ESC . Z

Deactivates plotter input buffer when Y/D switch set to Y.

Set Plotter Configuration

ESC . @ [(<DEC>) ; (<DEC>)] :

Enables or disables hardwire handshake, monitor mode, or block mode. Parameters are:

<DEC> — ignored, and
<DEC> — Hardwire handshake, monitor mode, and block mode. A decimal value in the range 0-31.

Output Buffer Space

ESC . B

Outputs the number of bytes currently available for data in the buffer. Response is:

<DEC> [TERM] — 0 to 1024.

Output Extended Error

ESC . E

Output a decimal code to identify the type of RS-232-C related error that occurred. Response is:

<DEC> [TERM] — 0, no error, or 10-16.

[TERM] = Carriage return character unless changed by ESC . M command

Set Handshake Mode 1

ESC . H [(<DEC>) ; (<ASC>) ; (<ASC> (; . . . <ASC>))] :

Establishes parameters for handshake mode 1 which uses all parameters of ESC . M command when responding to enquiry character. Parameters are:

<DEC> — Block size or Xoff threshold level,
<ASC> — Enquiry character or omitted, and
<ASC> . . . <ASC> — Acknowledgment string of 1 to 10 characters or Xon trigger characters.

Set Handshake Mode 2

ESC . I [(<DEC>) ; (<ASC>) ; (<ASC> (; . . . <ASC>))] :

Establishes parameters for handshake mode 2 which uses only turnaround delay parameter of ESC . M when responding to enquiry character. Parameters are:

<DEC> — Block size or Xoff threshold level,
<ASC> — Enquiry character or omitted, and
<ASC> . . . <ASC> — Acknowledgment string of 1 to 10 characters or Xon trigger characters.

Abort Device Control

ESC . J

Aborts any partially decoded or executed device control instructions including outputs.

Abort Graphic Instruction

ESC . K

Aborts any partially decoded or executed HP-GL instruction and discards all instructions in buffer.

Output Buffer Size

ESC . L

Waits until the buffer is empty, the
in bytes; 1024.

Set Output Mode

ESC . M [(<DEC>) ; (<ASC>)
(<ASC> (; (<ASC>)) ; (<AS

Sets parameters for output where:

<DEC> — Turnaround delay, 0-5
<ASC> — Output trigger characte
<ASC> — Echo terminate charact
<ASC> . . . <ASC> — 1 or 2 ou
0-127, 0 terminates string, and
<ASC> — output initiator, ASCII

Set Extended Output and Hand

ESC . N [(<DEC>) ; (<ASC> (

Establishes extended parameters f
where:

<DEC> — Delay between output c
<ASC> . . . <ASC> — Immediate
10 characters or Xoff trigger cha
terminates string.

Output Extended Status

ESC . O

Outputs the decimal equivalent val
status word. Response is:

<DEC> [TERM] — a value ≤ 40.

Reset Handshake

ESC . R

Defaults all handshake parameters.

HP-GL Plotter Instructions Summary

Instruction	Definition
AA X[i/sd], Y[i/sd], arc angle[i] (,chord angle[i])	Arc absolute
AR X[i/sd], Y[i/sd], arc angle[i] (,chord angle[i]	Arc relative
CA n[i]	Designate alternate set n
CI radius[i/sd] (,chord angle[i])	Circle
CP spaces[d], lines[d]	Character plot
CS n[i]	Designate standard set n
DC	Digitize clear
DF	Set default values
DI run[d], rise[d]	Absolute direction
DP	Digitize point
DR run[d], rise[d]	Relative direction
DT c[c]	Define label terminator
EA X[i/sd], Y[i/sd]	Edge rectangle absolute
ER X[i/sd], Y[i/sd]	Edge rectangle relative
EW radius[i/sd], start angle[i], sweep angle[i], (,chord angle[i])	Edge wedge
FT type[i] (,spacing[sd] (,angle[i]))	Fill type
IM e[i] (,s[i] (,p[i]))	Input e, s, and p masks
IN	Initialize
IP $P1_x$[i], $P1_y$[i] (,$P2_x$[i], $P2_y$[i])	Input P1 and P2
IW X_{lo}[i], Y_{lo}[i], X_{hi}[i], Y_{hi}[i]	Input window
LB c . . . c[c]	Label ASCII string
LT t[i] (,l[d])	Designate line type and length
OA [i return]	Output actual position and pen status
OC [i/sd return]	Ouput commanded position and pen status
OD [i return]	Output digitized point and pen status
OE [i return]	Output error
OF [i return]	Output factors
OH [i return]	Output hard-clip limits
OI [c return]	Output identification
OO [i return]	Output options
OP [i return]	Output P1 and P2
OS [i return]	Output status
OW [i return]	Output window
PA X[i/sd], Y[i/sd] (, . . .)	Plot absolute
PD (X[i/sd], Y[i/sd] (, . . .))	Pen down
PR X[i/sd], Y[i/sd] (, . . .)	Plot relative
PS paper size[i]	Paper size
PT thickness[d]	Pen thickness
PU (X[i/sd], Y[i/sd] (, . . .)	Pen up
RA X[i/sd], Y[i/sd]	Shade rectangle absolute
RO n[i]	Rotate coordinate system
RR X[i/sd], Y[i/sd]	Shade rectangle relative
SA	Select alternate character set
SC X_{min}[i], X_{max}[i], Y_{min}[i], Y_{max}[i]	Scale
SI width[d], height[d]	Absolute character size
SL tanθ[d]	Absolute character slant (from vertical)
SM c[c]	Symbol mode
SP n[i]	Select pen
SR width[d], height[d]	Relative character size
SS	Select standard character set
TL tp[d] (,tn[d])	Tick length
UC (pen[i],) X[d], Y[d], pen[i] (, . . .)	User defined character
VS v[d]	Select velocity v
WG radius[i/sd], start angle[i], sweep angle[i] (,chord angle[i])	Shade wedge
XT	X-axis tick
YT	Y-axis tick

[c] = character format

[d] = decimal format, −128.0000 to +127.9999

[i] = integer format, −32 768 to +32 767

[sd] = scaled decimal format, −32 768.0000 to +32 767.9999

Plotter Default Conditions (DF)

Function	Equivalent Instruction	Condition
Plotting mode	PA;	Absolute (plotter units)
Line type	LT;	Solid line
Line pattern length	LTn,4;	4% of the diagonal distance between P1 and P2
Pen velocity	VS;	38.1 cm/s (15 in./s)
Scaling	SC;	Off (XY coordinates in plotter units)
Input window	IW;	Set to hard-clip limits
Chord angle	—	5 degrees
Symbol mode	SM;	Off
Digitize clear	DC;	Digitize mode off
Tick length	TL;	tp=tn=0.5% of ($P2_x$-$P1_x$) for Y-tick and 0.5% of ($P2_y$-$P1_y$) for X-tick
Mask value	IM233,0,0;	All errors recognized, no service request, and no parallel poll response
Fill type	FT;	Type 1 (solid bidirectional shading)
Fill spacing	FT;	1% of the diagonal distance between P1 and P2 (used only for fill type 3 or 4)
Fill angle	FT;	0 degree
Pen thickness	PT;	0.3 mm (fill spacing for solid fill types 1 and 2)
Label origin	—	Current pen location
Relative character direction	DR1,0;	Horizontal (along X-axis)
Relative character size	SR;	Width = 0.75% of ($P2_x$-$P1_x$) Height = 1.5% of ($P2_y$-$P1_y$)
Character slant	SL0;	0 degree
Label terminator	DT ETX;	ETX (ASCII decimal equivalent 3)
Character set selected	SS;	Standard
Standard character set	CS0;	Set 0
Alternate character set	CA0;	Set 0

The carriage-return point is updated to the current pen position.

Additional Conditions Set by IN but not DF

- Pen is raised
- P1 and P2 set to default values
- All errors cleared
- Rotation set to zero degrees

HP-GL Error Messages

Error Number	Meaning
0	No HP-GL error for which mask is set has occurred.
1	Instruction not recognized The plotter has received an illegal character sequence.
2	Wrong number of parameters Too many or too few parameters have been sent with an instruction.
3	Bad parameter The parameters sent to the plotter with an instruction are out of range for that instruction or include an illegal character.
4	Not used
5	Unknown character set A character set out of the range 0 through 4, 6 through 9, or 30 through 39 has been designated as either the standard or alternate character set.
6	Position overflow Numeric overflow in plotter's character generator.
7	Not used
8	Vector received while pinch wheels raised.