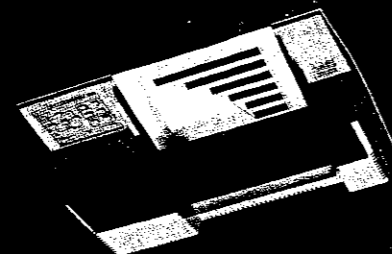


Device Control Instructions Summary		Decimal Equivalents	RS-232-C Error Messages
<p>Plotter On Instruction ESC, (or ESC, Y Prepares plotter to accept other instructions. Needed only when y/o switch set to y.</p> <p>Plotter Off Instruction ESC,) or ESC, Z Deactivates plotter input buffer when y/o switch set to y.</p> <p>Set Plotter Configuration ESC, @ [(<DEC>); (<ASC>)] ; Enables or disables hardware handshake or monitor mode. Parameters are: <DEC> — ignored, and <ASC> — Data Terminal Ready line control. ASCII decimal equivalent of 4-bit word (0 to 15).</p> <p>Output Buffer Space ESC, B Outputs the number of bytes currently available for data in the buffer. Response is: <DEC> [TERM] — 0 to 255.</p> <p>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</p> <p>[TERM] = Carriage return character unless changed by ESC, M command.</p>	<p>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 the 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.</p> <p>Set Handshake Mode 2 ESC, I [(<DEC>); (<ASC>); (<ASC>)] ; Establishes parameters for handshake mode 2 which uses only the turnaround delay parameter of ESC, M when responding to the 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.</p> <p>Set Extended Output and Handshake Mode ESC, N [(<DEC>); (<ASC>); (<ASC>); (<ASC>)] ; Establishes extended parameters for any output command where: <DEC> — Delay between output characters, 0-54 612 <ASC> ... <ASC> — Immediate response string of 1 to 10 characters or Xoff trigger characters; ASCII 0-127, 0 <ASC> — output initiator, ASCII 0-127.</p> <p>Set Output Mode ESC, L Waits until the buffer is empty, then outputs the buffer size in bytes: 255</p> <p>Set Output Mode ESC, M [(<DEC>); (<ASC>); (<ASC>)] ; Sets parameters for output where: <DEC> — Turnaround delay, 0-54 612 <ASC> — Output trigger character, ASCII 0-127 <ASC> — Echo terminate character, ASCII 0-127 <ASC> ... <ASC> — 1 or 2 output terminators, ASCII 0-127, 0 terminates string, and <ASC> — output initiator, ASCII 0-127.</p> <p>Set Extended Output and Handshake Mode ESC, O Establishes extended parameters for any output command where: <DEC> — Delay between output characters, 0-54 612 <ASC> ... <ASC> — Immediate response string of 1 to 10 characters or Xoff trigger characters; ASCII 0-127, 0 terminates string.</p> <p>Output Extended Status ESC, O Outputs the decimal equivalent value of a 16-bit immediate status word. Response is: <DEC> [TERM] — a value ≤ 40</p> <p>Reset Handshake ESC, R Defaults all handshake parameters.</p>	<p>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 ETX 3 LF 10 CR 13 ESC, R 27,46,82 ESC, O 27,46,79 ESC, N 27,46,78 ESC, M 27,46,77 ESC, L 27,46,76 ESC, K 27,46,75 ESC, J 27,46,74 ESC, I 27,46,73 ESC, H 27,46,72 ESC, G 27,46,71 ESC, F 27,46,70 ESC, E 27,46,69 ESC, D 27,46,68 ESC, C 27,46,67 ESC, B 27,46,66 ESC, A 27,46,65 ESC, Z 27,46,64 ESC, Y 27,46,63 ESC, X 27,46,62 ESC, W 27,46,61 ESC, V 27,46,60 ESC, U 27,46,59 ESC, T 27,46,58 ESC, S 27,46,57 ESC, R 27,46,56 ESC, Q 27,46,55 ESC, P 27,46,54 ESC, O 27,46,53 ESC, N 27,46,52 ESC, M 27,46,51 ESC, L 27,46,50 ESC, K 27,46,49 ESC, J 27,46,48 ESC, I 27,46,47 ESC, H 27,46,46 ESC, G 27,46,45 ESC, F 27,46,44 ESC, E 27,46,43 ESC, D 27,46,42 ESC, C 27,46,41 ESC, B 27,46,40 ESC, A 27,46,39 ESC, Z 27,46,38 ESC, Y 27,46,37 ESC, X 27,46,36 ESC, W 27,46,35 ESC, V 27,46,34 ESC, U 27,46,33 ESC, T 27,46,32 ESC, S 27,46,31 ESC, R 27,46,30 ESC, Q 27,46,29 ESC, P 27,46,28 ESC, O 27,46,27 ESC, N 27,46,26 ESC, M 27,46,25 ESC, L 27,46,24 ESC, K 27,46,23 ESC, J 27,46,22 ESC, I 27,46,21 ESC, H 27,46,20 ESC, G 27,46,19 ESC, F 27,46,18 ESC, E 27,46,17 ESC, D 27,46,16 ESC, C 27,46,15 ESC, B 27,46,14 ESC, A 27,46,13 ESC, Z 27,46,12 ESC, Y 27,46,11 ESC, X 27,46,10 ESC, W 27,46,09 ESC, V 27,46,08 ESC, U 27,46,07 ESC, T 27,46,06 ESC, S 27,46,05 ESC, R 27,46,04 ESC, Q 27,46,03 ESC, P 27,46,02 ESC, O 27,46,01 ESC, N 27,46,00</p>	<p>These error numbers are returned by executing an ESC, E instruction.</p> <p>Error Number</p> <p>Meaning</p> <p>0 A zero indicates there was no I/O error.</p> <p>10 Output instruction received while another output instruction is executing. The original output instruction will be ignored.</p> <p>11 Invalid byte received following the first two characters (ESC,) in a device control instruction.</p> <p>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.</p> <p>13 Parameter out of range.</p> <p>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).</p> <p>15 A framing error, parity error, or overrun error has been detected.</p> <p>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.</p>



0 7 4 7 0 8 9 0 0 0 4

REFERENCE CARD

HP-GL Plotter Instructions Summary		
Instruction	Definition	Instruction
*AA x, y, arc angle (, chord angle)	Arc absolute (i)	OI
*AR x, y, arc angle (, chord angle)	Arc relative (i)	OP
CA n (, chord angle)	Designate alternate set n (i)	OS
CA n (, chord angle)	Circle (i)	OW
CP spaces, lines	Character plot (d)	PA x,Y,(...)
CS n	Designate standard set n (i)	PD (x,Y,(...))
DC	Digitize clear	PR x,Y,(...)
DF	Set default values	PU (x,Y,(...))
DI run, rise	Absolute direction (d)	SA
DP	Digitize point	SC Xmin,Xmax,Ymin,Ymax
DR run, rise	Relative direction (d)	SI width, height
DT c	Define label terminator (c)	SL tan θ
IM e,(s,p))	Input e, s, and p masks (i)	SM c
IN	Initialize	SP n
IP P1,P1Y,(P2,P2Y)	Input P1 and P2 (i)	SR width, height
IW Xio,Xio,Xni,Yni	Input window (i)	SS
LB c, : c	Label ASCII string (c)	TL tp,(in)
LT t(i)	Designate line type (i) and length (d)	**UC (pen),x,y,pen(...)
OA	Output actual position and pen status (i return)	VS v
OC	Output commanded position and pen status (i return)	XT
OD	Output digitized point and pen status (i return)	YT
OE	Output error (i return)	
OF	Output factors (i return)	

Plotter Default Conditions		
Equivalent Instruction	Function	Conditions
PA: DR 1.0;	Plotting mode	Absolute
LT: Horizontal	Relative character direction	Horizontal
LT n,4;	Line pattern length	4% of the diagonal distance from P1 to P2
IW: Mechanical limits of plotter	Input window	Mechanical limits of plotter
SR: Height = 1.5% of (P2y - P1y)	Relative character size	Height = 1.5% of (P2y - P1y)
SM: Off	Symbol mode	Off
TL 5.5;	Tick length	tp = tn - 0.5% of (P2x - P1x) for Y-tick and 0.5% of (P2y - P1y) for X-tick
CSO: Set 0	Standard character set	Set 0
CA0: Set 0	Alternate character set	Set 0
SS: Standard	Character set selected	Standard
SLO: 0 degrees	Character slant	0 degrees
IM 223, 0, 0;	Select pen n (i)	223, 0, 0
DC: On	Digitize clear	On
VS: 38.1 cm/s (15 in./s) velocity; 2 g acceleration	Pen velocity	38.1 cm/s (15 in./s) velocity; 2 g acceleration
DT 5.5;	Label terminator	ETX (ASCII decimal equivalent 3)

HP-GL Error Messages		
Error Number	Meaning	
0	No HP-GL error for which mask is set has occurred.	
1	The plotter has received an instruction not recognized as 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	No used	
5	Unknown character set. A character set out of the range 0 through 4 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.	

Additional Conditions Set by IN but not DF

- Pen is raised
- P1 set to 250, P2 set to 10 250, 7479
- All errors cleared
- Setting of paper switch, us/A, read

* Available only with Option 001.
 ** Not available with Option 003.
 (c) ASCII character
 (i) truncates parameter to integer
 (d) uses decimal portion of parameter

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