



THERMAL PRINTING SOLUTIONS

OPTIBOARD CONTROLLER BOARD

for CA/CB/XA/XB Mechanism Series

USER MANUAL

Reference 3106896 Issue Z
February 2003

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EVOLUTIONS

Date	Issue	Modifications
08/02	Preliminary	
02/03	Z	Creation



INTRODUCTION

This manual describes the specifications and basic operating procedures for the "Optiboard" controller board.

Read it carefully before using your printer and board.

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1 OVERVIEW

This controller board has been designed to drive CA/CB/XA/XB printer mechanisms with integrated cutter through standard serial communication interface RS232C or USB.



2 GENERAL SPECIFICATIONS

2.1 Features

Communication Interfaces	RS232 / USB
Flash Memory Size	512kb / 1 Mb
Amount of Flash Memory accessible for user storage	192 kb on Optiboard fitted with 512kb Flash memory 704 kb on Optiboard fitted with 1 Mb Flash memory
Resident character set	PC Code Pages : 437, 850, 852, 858, 860, 862, 863, 865, 866 , 1252, Katakana
Barcode support	Code 39, UPC-A, UPC-E, JAN8 (EAN), JAN13 (EAN), Interleaved 2 of 5, Codabar, Code 128, EAN 128, PDF-417 (two-dimensional) and code 93
Print	Host-selectable 44 or 56 columns modes on 80 mm wide thermal paper
Print resolution	8 dots/mm
Speed	Up to 150 mm/second throughput
Human Interface	Configuration menu for easy configuration
Drivers available	Windows 98, 2000, XP

2.2 Compliance to legal approval

EN 60950
CE symbol class B
UL, cUL listed accessory and CSA

2.3 Operating requirements

2.3.1 General operating requirements

Conducted emission	in accordance with EN 55022 class B
Radiated emission	in accordance with EN 55022 class B
Electrostatic discharge	in accordance with EN 61000-4-2 level 4 (current discharge 8 kV, air discharge 15 kV)
Radiated susceptibility	in accordance with EN 61000-4-3 and EN 61000-4-6 with 10 V/m
Modulated susceptibility	in accordance with EN 50204 with 10 V/m
Fast transient	in accordance with EN 61000-4-4

* Contact AXIOHM for recommendations regarding integration of Optiboard to meet those EMC/ESD requirements.

2.3.2 Environmental operating requirements

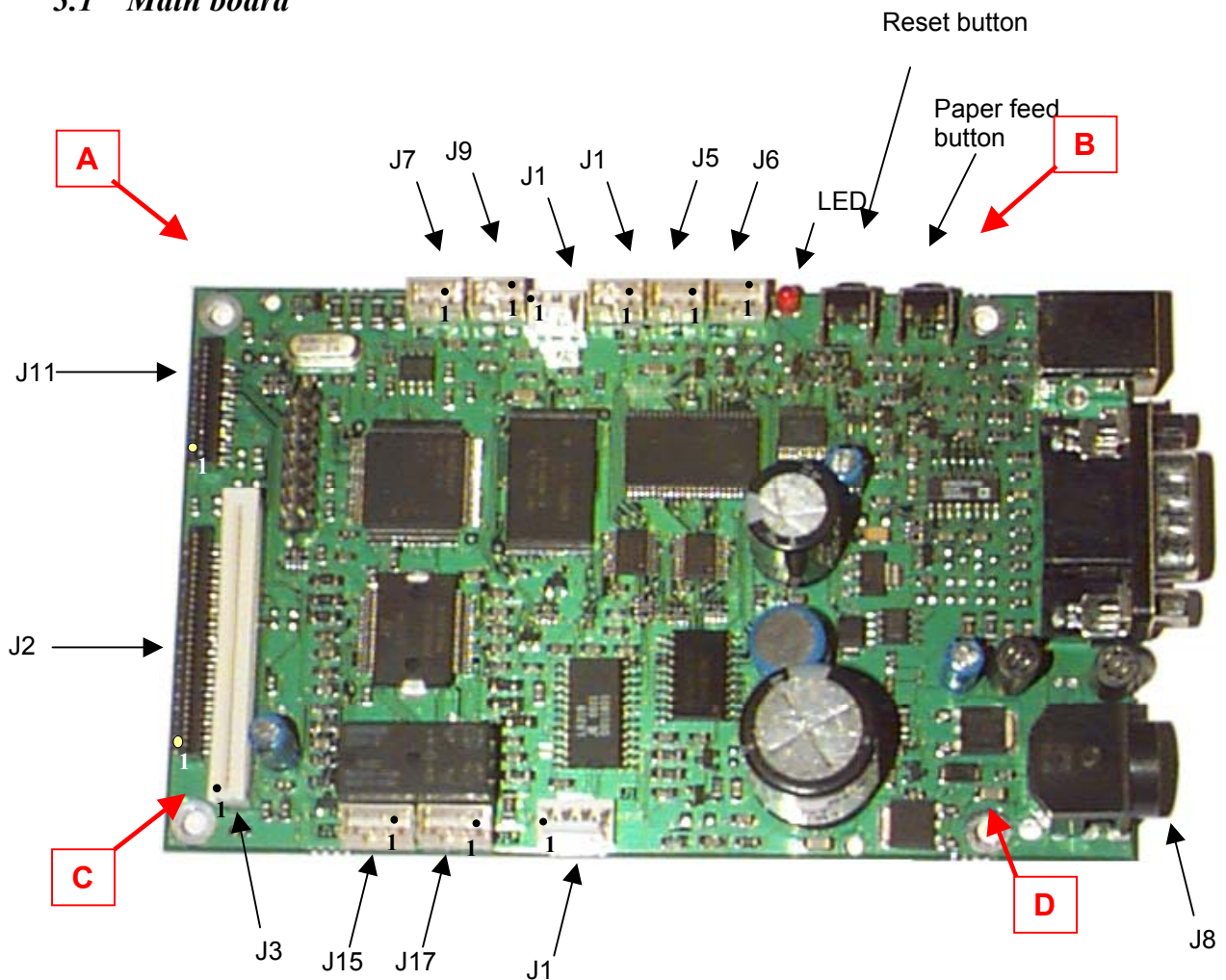
Standard Operating Temperature range :	0°C to 50°C.
Operating Humidity range :	5% to 90% relative humidity (non-condensing)
Storage/transportation temperature range :	- 40°C to 85°C.

2.3.3 Reliability

The board is designed for a MTBF of 240,000 hours

3 BOARD DESCRIPTION

3.1 Main board



PCB Dimensions :

Length : 130 mm
 Width : 80 mm
 Height above PCB level : 21 mm

Fixing holes :

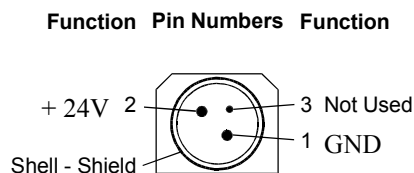
Four fixing holes (A, B, C and D) diameter 3.5 mm

Positions :

- A : 3.9 mm from top and left edges.
- B : 3.7 mm from top edge, 20.1 mm from right edge.
- C : 3.9 mm from bottom and left edges.
- D : 3.9 mm from bottom edge, 19.7 mm from right edge.

4 POWER SUPPLY

The following illustration shows the power cable connector and pin assignments.
The power cable connector J8 is a 3-pin mini DIN plug and is located at the rear of the printer.



Remote Power Supply

Voltage	24 Vdc \pm 10%		
Amps	With 55W Power supply	With 75 W Power supply	With 90 W Power supply
Short Term (under 1ms)	13A Peak 2.3 Average	13A Peak 3.2A Average	13 A Peak 3.2A Average

5 RS232 PARAMETERS

The RS-232C interface uses either XON/XOFF (software) or DTR/DSR (hardware) protocol to control the flow of information between the computer and the printer.

In XON/XOFF mode, a particular character is sent back and forth between the host and the printer to regulate the communication.

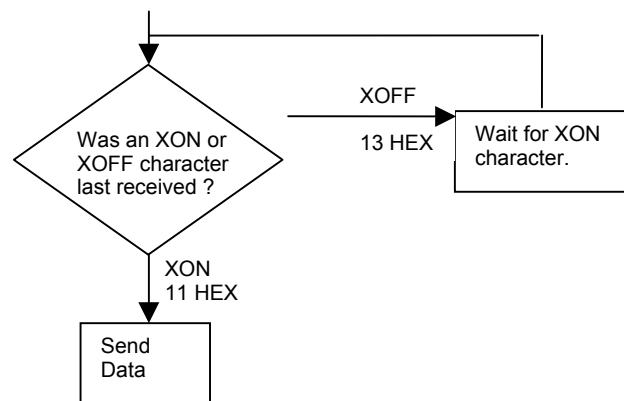
In DTR/DSR mode, changes in the DTR/DSR signal on the RS-232C interface controls the information flow.

5.1 XON/XOFF Protocol

The XON/XOFF characters controls the information transfer between the printer and the host computer.

The printer sends an XON character when it is ready to receive data and it sends an XOFF character when it cannot accept any more data. The software on the host computer must monitor the communication link as shown in the following flowchart in order to send data at the appropriate times.

If XON/XOFF has been selected, the printer also toggles the DTR signal, as described in the next section, but it does not look at the DSR signal to transmit data.

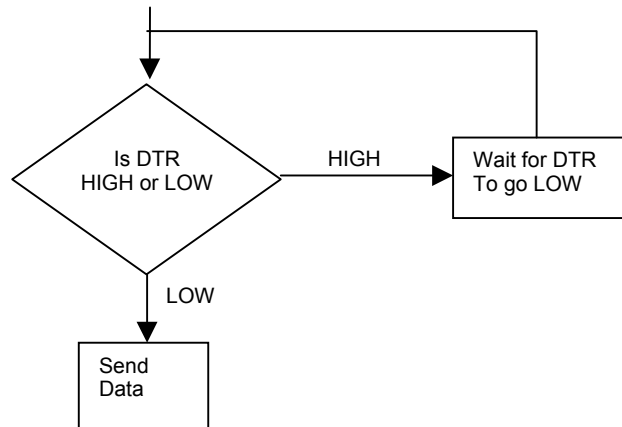


XON character = hexadecimal 11.

XOFF character = hexadecimal 13.

5.2 DTR/DSR Protocol

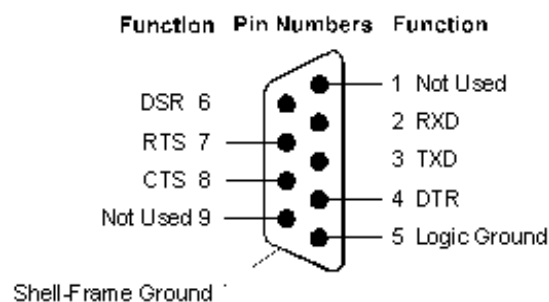
The DTR signal is used to control data transmission to the printer. It is driven low when the printer is ready to receive data and driven high when it cannot accept any more data.



5.3 Connector

The following illustration shows the RS-232C communication connector and pin assignment. The connector is located at the rear of the printer, and is specified as male, DB9, 9-pin D-shell, with RTS and CTS pins connected together.

9-pin DB-9 Connector





6 USB PARAMETERS

Axiohm's implementation of USB complies with "Universal Serial Bus Specification" revision 1.1

6.1 Capabilities

Optiboard is a device only, and doesn't provide hub capabilities.
Full speed communication (12Mbits/sec) is supported.

6.2 Connector

The connector is located at the rear of the printer, and is specified as B-type
Refer to USB specification rev 1.1 chapter 6 for more information.

6.3 Interface

The datas are exchanged between host and printer via four endpoints :

Endpoint 0x00 : CONTROL

Default endpoint

Endpoint 0x02 : BULK OUT

For transmission of all printable datas and commands from host to printer

Endpoint 0x82 : BULK IN

For return of all synchronous datas , status or other types of information except unsolicited status mode messages, from printer to host

Endpoint 0x81 : INTERRUPT IN

For return of asynchronous datas, typically unsolicited status mode messages, from printer to host

6.4 Other information

Vendor Id:

Axiohm USB Vendor Id = 0x05D9

Product Id:

Optiboard Product Id = 0xA000

7 CONNECTORS DESCRIPTION

J5 : Knife Position Switch 1 Output 2 <i>NC</i> 3 GND	J6 : Cover Open Switch 1 Output 2 <i>NC</i> 3 GND	J7 : Paper Out Sensor 1 Output 2 <i>Control</i> 3 GND	J9 : Low Paper Sensor 1 Output 2 Control 3 GND
J15 : Paper Feed Motor 1 A 1 2 B 1 3 A 2 4 B 2	J17 : Knife Motor 1 A 1 2 B 1 3 A 2 4 B 2		
J10 : Not Used	J13 : Not Used	J1 : Not Used	
J23 : Printhead 1 VCH 11 GND 21 OE2 2 VCH 12 GND 22 OE1 3 VCH 13 GND 23 Vcc 4 VCH 14 GND 24 Clock 5 Data IN 15 GND 25 Latch 6 <i>NC</i> 16 GND 26 Data Out 7 OE5 17 GND 27 VCH 8 OE4 18 GND 28 VCH 9 Therm 19 GND 29 VCH 10 Therm Gnd 20 OE3 30 VCH		J2-J11 : Not Used	

GND	= 0V	Vdd	= 3.3 V
Vcc	= 5V	VCH	= 24V

8 PRINT SPECIFICATION

8.1 Characters

8.1.1 Print Modes

- ◆ Available print modes:
- ◆ Standard
- ◆ Compressed
- ◆ Double High
- ◆ Double Wide
- ◆ Upside Down
- ◆ Rotated
- ◆ Underlined
- ◆ Bold
- ◆ Reverse
- ◆ Italic
- ◆ Scaled

8.1.2 Size

Characters sizes for the Standard ,Compressed and Large modes:

Standard

- ◆ Characters per Inch: 15.6
- ◆ Characters per Line: 44 for 80 mm Paper
- ◆ Characters per Line : 49 for 82.5 mm Paper
- ◆ Cell Size: 13 x 24 Dots

Compressed

- ◆ Characters per Inch: 20.3
- ◆ Characters per Line: 56 for 80 mm Paper
- ◆ Characters per line : 64 for 82.5 mm Paper
- ◆ Cell Size: 10 x 24 Dots

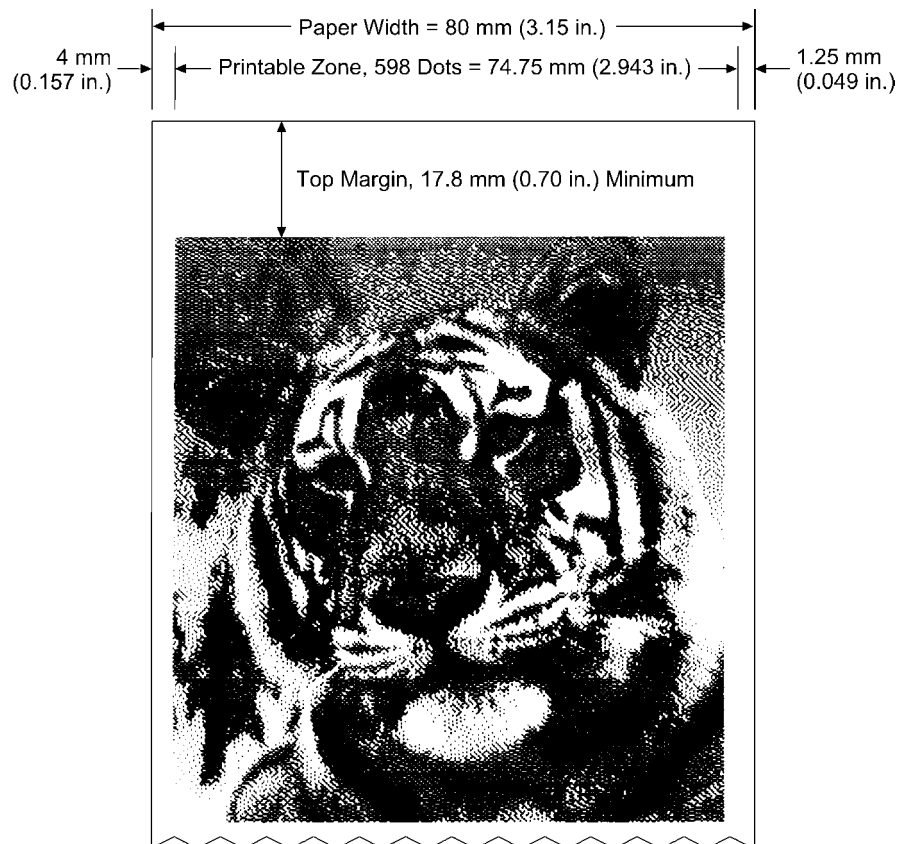
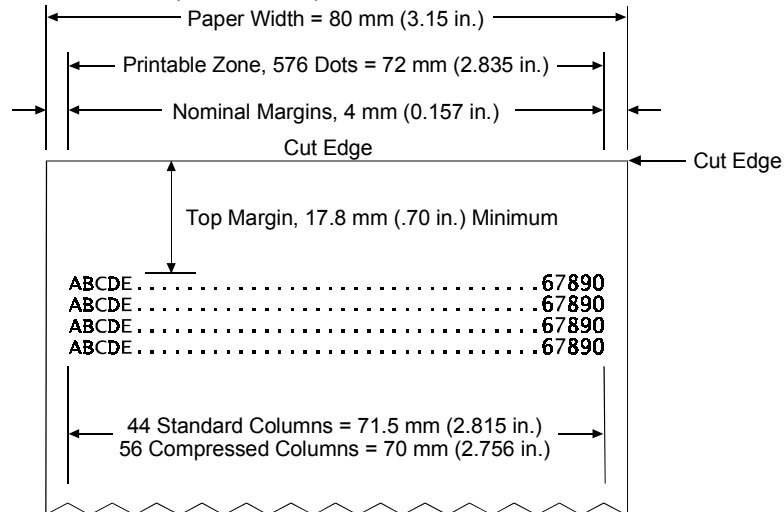
8.2 Print zone

Print Zones for 80 mm Paper

576 dots (addressable) @ 8 dots/mm, centered on 80 mm

Standard Mode: minimum margins: 2.5 mm (.098 inches)

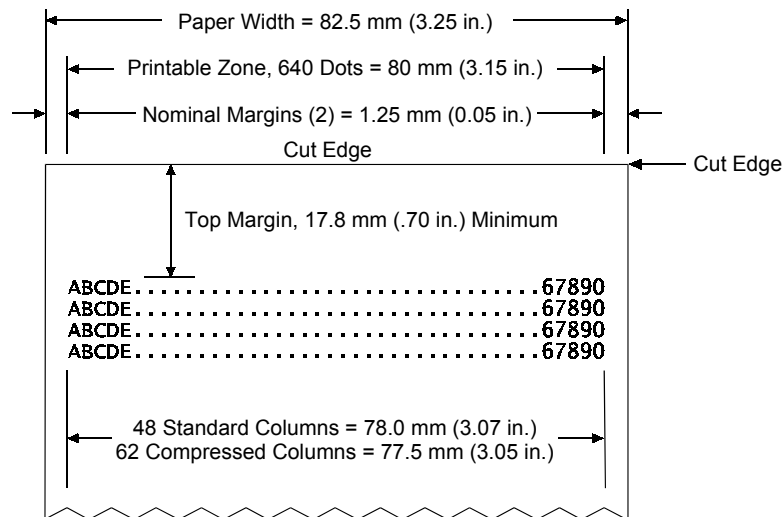
Top margin to knife cut: 17.8 mm (0.70 inches)



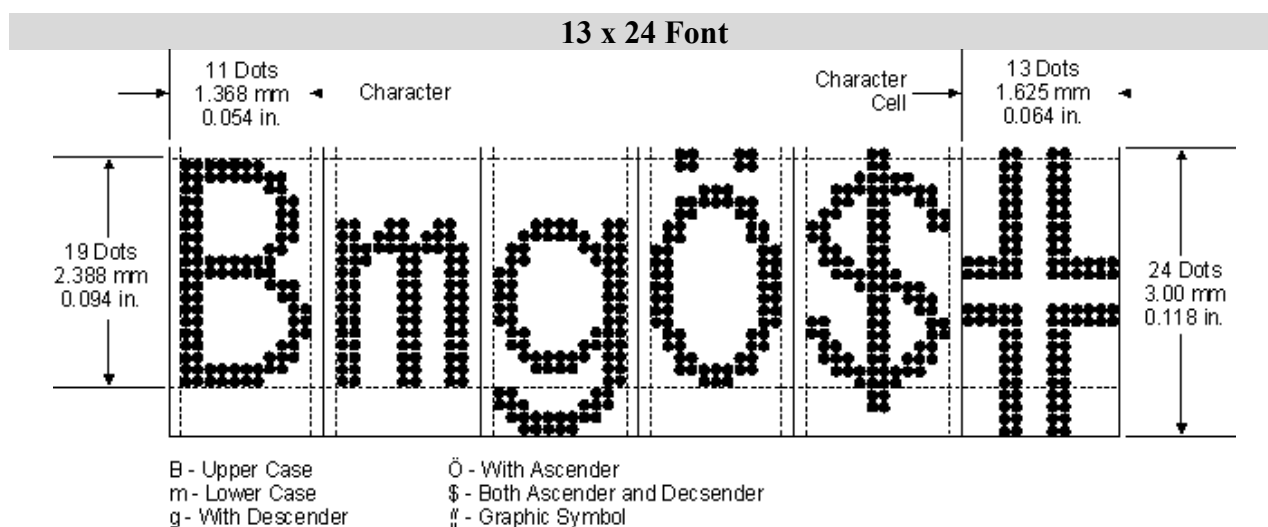
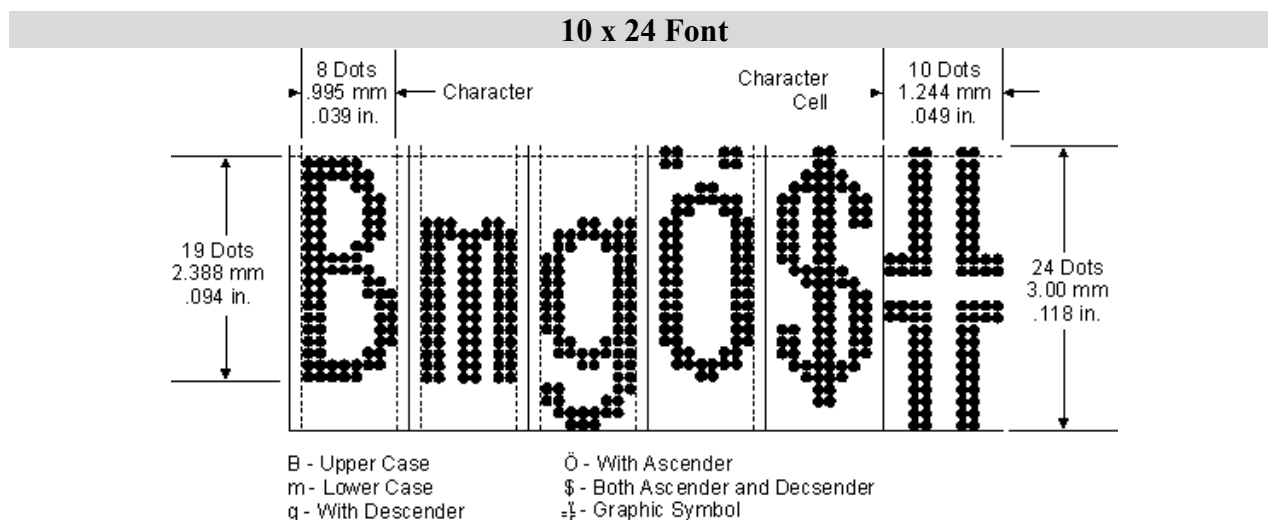


Print zone for 82.5 mm paper:

- ◆ 640 dots (addressable) @ 8 dots/mm, centered on 82.5 mm
- ◆ Standard mode: minimum margins: 1.0 mm (0.040 inches)
- ◆ Top margin to manual knife cut: 17.8 mm (0.70 inches)



8.3 Resident font dimensions





8.4 *Print density and density of receipt print lines*

This function makes it possible to adjust the energy level of the printhead to darken the printout. An adjustment should only be made when necessary. The factory setting is 100%.

Warning:

Choose an energy level no higher than necessary to achieve a dark printout.

Failure to observe this rule may result in a printer service call or voiding of the printer warranty. Consult your Axiohm technical support specialist if you have any questions.

When printing lines at high dot coverage (text or graphics), the printer automatically slows down to limit power consumption below power supply setting (55W, 75W, 90W).

To change the Print Density:

- a) Enter the Configuration Menu.
- b) Select "Set Hardware Options" from Main Menu.

"Hardware Options Menu" is printed on the receipt and the question "Set Print Density ?" asked.

- c) Answer YES (Long click).

A warning is printed, followed by:

Print Density

80%	1 Click
90%	2 Clicks
100%	3 Clicks
110%	4 Clicks
120%	5 Clicks

Enter code, then hold Button DOWN at least 1 second to validate.

3 Heating tables are preset in the firmware for recommended papers. The setting can be changed with the configuration menu.

F380 Kansaki, KP440 Kansaki, LSB 130 Ricoh, KLS36 Kansaki
--

8.5 Duty cycle restrictions (printing solid blocks)

There are restrictions on the duty cycle because of the heat generated by the receipt thermal print head when printing solid blocks (regardless of the length of the block in relation to the print line). The restrictions are ambient temperature, the percentage of time (measured against one minute) of continuous solid printing, and the amount of coverage.

Caution: When the duty cycle approaches the limits shown in the table, the receipt print head will heat up. If print head temperature exceeds 65 °C, a safety feature will shut down the print head to prevent damage.

To avoid this problem, do one or a combination of the following:

- d) Reduce the amount of coverage.
- e) Reduce the time of continuous solid printing.
- f) Reduce the ambient temperature.

Another cause for duty cycle restriction is paper feed motor temperature increase due to continuous printing.

Allowable Duty Cycle (measured over one minute of continuous printing)

Amount of Solid Coverage	Ambient Temperature		
	25°C	35° C	50° C
20%	100% during first 3 minutes of continuous printing. 50% after the 3 minutes.	50%	20%
40%	50%	25%	10%
100%	20%	10%	4%

For reference:

- ◆ A typical receipt with text (contains some blank spaces) is approximately 12% dot coverage.
- ◆ A full line of text characters (every cell on the line has a character in it) is approximately 25% dot coverage.
- ◆ Graphics are approximately 40% dot coverage.
- ◆ Barcodes are approximately 50% dot coverage.
- ◆ A solid black line is 100% dot coverage.

8.6 character sets

8.6.1 Code Page 437

00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
0	16	SP	0	@	P	,	p	Ç	É	á	⋮	⌞	⌚	∞	≡
01	11	!	1	A	Q	a	q	ü	æ	í	⋮	⌞	⌚	β	±
2	18	"	2	B	R	b	r	é	Æ	ó	⋮	⌞	⌚	Γ	≥
3	19	#	3	C	S	c	s	â	ô	ú	⋮	⌞	⌚	π	≤
4	20	\$	4	D	T	d	t	ä	ö	ñ	⋮	⌞	⌚	Σ	ƒ
5	21	%	5	E	U	e	u	à	ò	Ñ	⋮	⌞	⌚	σ	J
6	22	&	6	F	V	f	v	â	û	a	⋮	⌞	⌚	μ	÷
7	23	'	7	G	W	g	w	ç	ù	o	⋮	⌞	⌚	τ	≈
8	24	(	8	H	X	h	x	ê	ÿ	¿	⋮	⌞	⌚	φ	°
9	25	)	9	I	Y	i	y	ë	Ö	¬	⋮	⌞	⌚	⊖	•
0A	1A	*	3A	J	Z	j	z	è	Ü	¬	⋮	⌞	⌚	Ω	•
10	26	42	58	74	90	106	122	138	154	170	186	202	218	234	250
0B	1B	+	3B	K	[	k	{	ï	¢	½	⋮	⌞	⌚	δ	√
11	27	43	59	75	91	107	123	139	155	171	187	203	219	235	251
0C	1C	,	3C	L	\	l	|	î	£	¼	⋮	⌞	⌚	∞	n
12	28	44	60	76	92	108	124	140	156	172	188	204	220	236	252
0D	1D	-	3D	M	]	m	}	ì	¥	¡	⋮	⌞	⌚	∅	²
13	29	45	61	77	93	109	125	141	157	173	189	205	221	237	253
0E	1E	.	3E	N	^	n	~	Ä	Pt	«	⋮	⌞	⌚	ε	■
14	30	46	62	78	94	110	126	142	158	174	190	206	222	238	254
0F	1F	/	3F	O	_	o	△	Å	f	»	⋮	⌞	⌚	⌒	FF BLANK
15	31	47	63	79	95	111	127	143	159	175	191	207	223	239	255

8.6.2 Code Page 850

00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
0	16	32	0	@	P	`	p	Ç	É	á	⋮	⌒	ð	Ó	–
01	11	21	31	41	51	61	71	81	91	A1	B1	C1	D1	E1	F1
1	17	33	!	1	A	Q	a	q	ü	æ	í	⌞	Ð	ß	±
02	12	22	32	42	52	62	72	82	92	A2	B2	C2	D2	E2	F2
2	18	34	"	2	B	R	b	r	é	Æ	ó	⌞	Ê	Ô	—
03	13	23	33	43	53	63	73	83	93	A3	B3	C3	D3	E3	F3
3	19	35	#	3	C	S	c	s	â	ô	ú	⌞	Ë	Ò	¾
04	14	24	34	44	54	64	74	84	94	A4	B4	C4	D4	E4	F4
4	20	36	\$	4	D	T	d	t	ä	ö	ñ	⌞	È	õ	¶
05	15	25	35	45	55	65	75	85	95	A5	B5	C5	D5	E5	F5
5	21	37	%	5	E	U	e	u	à	ò	Ñ	+	É	Ö	§
06	16	26	36	46	56	66	76	86	96	A6	B6	C6	D6	E6	F6
6	22	38	&	6	F	V	f	v	å	û	ª	À	Í	µ	÷
07	17	27	37	47	57	67	77	87	97	A7	B7	C7	D7	E7	F7
7	23	39	'	7	G	W	g	w	ç	ù	º	À	Ã	Î	þ
08	18	28	38	48	58	68	78	88	98	A8	B8	C8	D8	E8	F8
8	24	40	(	8	H	X	h	x	ê	ÿ	¿	©	Ï	Þ	°
09	19	29	39	49	59	69	79	89	99	A9	B9	C9	D9	E9	F9
9	25	41	)	9	I	Y	i	y	ë	Ö	®	⌞	⌞	Ú	²
0A	1A	2A	3A	4A	5A	6A	7A	8A	9A	AA	BA	CA	DA	EA	FA
10	26	42	*	:	J	Z	j	z	è	Ü	¬	⌞	⌞	Û	·
0B	1B	2B	3B	4B	5B	6B	7B	8B	9B	AB	BB	CB	DB	EB	FB
11	27	43	+	;	K	[	k	{	ï	ø	½	⌞	⌞	Ü	¹
0C	1C	2C	3C	4C	5C	6C	7C	8C	9C	AC	BC	CC	DC	EC	FC
12	28	44	,	<	L	\	l	|	î	£	¼	⌞	⌞	Ý	³
0D	1D	2D	3D	4D	5D	6D	7D	8D	9D	AD	BD	CD	DD	ED	FD
13	29	45	-	=	M	]	m	}	ì	Ø	¡	¢	=	Ý	²
0E	1E	2E	3E	4E	5E	6E	7E	8E	9E	AE	BE	CE	DE	EE	FE
14	30	46	.	>	N	^	n	~	Ä	×	«	¥	⌞	–	■
0F	1F	2F	3F	4F	5F	6F	7F	8F	9F	AF	BF	CF	DF	EF	FF
15	31	47	/	?	O	_	o	△	Å	f	»	⌞	⌞	'	

8.6.3 Code Page 852

00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
0	16	32	0	@	P	`	p	Ç	É	á	⋮	Ł	đ	Ó	–
01	11	21	31	41	51	61	71	81	91	A1	B1	C1	D1	E1	F1
1	17	33	1	A	Q	a	q	ü	Í	í	⋮	⌞	Đ	ß	”
02	12	22	32	42	52	62	72	82	92	A2	B2	C2	D2	E2	F2
2	18	34	2	B	R	b	r	é	Í	ó	⋮	⌞	Ď	Ô	‘
03	13	23	33	43	53	63	73	83	93	A3	B3	C3	D3	E3	F3
3	19	35	3	C	S	c	s	â	ô	ú	⌞	⌞	Ě	Ň	ˇ
04	14	24	34	44	54	64	74	84	94	A4	B4	C4	D4	E4	F4
4	20	36	4	D	T	d	t	ä	ö	À	⌞	—	ď	ń	^
05	15	25	35	45	55	65	75	85	95	A5	B5	C5	D5	E5	F5
5	21	37	5	E	U	e	u	ű	Ľ	ą	À	⌞	Ń	ň	§
06	16	26	36	46	56	66	76	86	96	A6	B6	C6	D6	E6	F6
6	22	38	6	F	V	f	v	ć	İ	Ž	À	Ǻ	Í	Š	÷
07	17	27	37	47	57	67	77	87	97	A7	B7	C7	D7	E7	F7
7	23	39	7	G	W	g	w	ç	Ś	ž	Ě	ǻ	Î	š	˘
08	18	28	38	48	58	68	78	88	98	A8	B8	C8	D8	E8	F8
8	24	40	8	H	X	h	x	ı	ś	Ę	Ş	Ł	ě	Ř	°
09	19	29	39	49	59	69	79	89	99	A9	B9	C9	D9	E9	F9
9	25	41	9	I	Y	i	y	ë	Ö	ę	⌞	⌞	ǰ	Ú	˙
0A	1A	2A	3A	4A	5A	6A	7A	8A	9A	AA	BA	CA	DA	EA	FA
10	26	42	10	J	Z	j	z	ő	Ü		⌞	⌞	ǰ	ř	·
0B	1B	2B	3B	4B	5B	6B	7B	8B	9B	AB	BB	CB	DB	EB	FB
11	27	43	11	K	[k	{	ó	Ť	ž	⌞	⌞	■	Ú	ú
0C	1C	2C	3C	4C	5C	6C	7C	8C	9C	AC	BC	CC	DC	EC	FC
12	28	44	12	L	\	l		î	ť	Č	⌞	⌞	■	ý	Ř
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8.6.4 Code Page 858

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	2	18	34	50	66	82	98	114	130	146	162	178	194	210	226
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8.6.5 Code Page 860

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1	17	33	49	65	81	97	113	129	145	161	177	193	209	225	241
02	12	22	32	42	52	62	72	82	92	A2	B2	C2	D2	E2	F2
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2	18	34	50	66	82	98	114	130	146	162	178	194	210	226	242
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3	19	35	51	67	83	99	115	131	147	163	179	195	211	227	243
04	14	24	34	44	54	64	74	84	94	A4	B4	C4	D4	E4	F4
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4	20	36	52	68	84	100	116	132	148	164	180	196	212	228	244
05	15	25	35	45	55	65	75	85	95	A5	B5	C5	D5	E5	F5
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5	21	37	53	69	85	101	117	133	149	165	181	197	213	229	245
06	16	26	36	46	56	66	76	86	96	A6	B6	C6	D6	E6	F6
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6	22	38	54	70	86	103	118	134	150	166	182	198	214	230	246
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8.6.6 Code Page 862

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1	17	33	49	65	81	97	113	129	145	161	177	193	209	225	241
02	12	22	32	42	52	62	72	82	92	A2	B2	C2	D2	E2	F2
2	18	34	50	66	82	98	114	130	146	162	178	194	210	226	242
03	13	23	33	43	53	63	73	83	93	A3	B3	C3	D3	E3	F3
3	19	35	51	67	83	99	115	131	147	163	179	195	211	227	243
04	14	24	34	44	54	64	74	84	94	A4	B4	C4	D4	E4	F4
4	20	36	52	68	84	100	116	132	148	164	180	196	212	228	244
05	15	25	35	45	55	65	75	85	95	A5	B5	C5	D5	E5	F5
5	21	37	53	69	85	101	117	133	149	165	181	197	213	229	245
06	16	26	36	46	56	66	76	86	96	A6	B6	C6	D6	E6	F6
6	22	38	54	70	86	103	118	134	150	166	182	198	214	230	246
07	17	27	37	47	57	67	77	87	97	A7	B7	C7	D7	E7	F7
7	23	39	55	71	87	103	119	135	151	167	183	199	215	231	247
08	18	28	38	48	58	68	78	88	98	A8	B8	C8	D8	E8	F8
8	24	40	56	72	88	104	120	136	152	168	184	200	216	232	248
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9	25	41	57	73	89	105	121	137	153	169	185	201	217	233	249
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1	17	33	49	65	81	97	113	129	145	161	177	193	209	225	241
02	12	22	32	42	52	62	72	82	92	A2	B2	C2	D2	E2	F2
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2	18	34	50	66	82	98	114	130	146	162	178	194	210	226	242
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6	22	38	54	70	86	103	118	134	150	166	182	198	214	230	246
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7	23	39	55	71	87	103	119	135	151	167	183	199	215	231	247
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8	24	40	56	72	88	104	120	136	152	168	184	200	216	232	248
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9	25	41	57	73	89	105	121	137	153	169	185	201	217	233	249
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10	26	42	58	74	90	106	122	138	154	170	186	202	218	234	250
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8.6.8 Code Page 865

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01	11	21	31	41	51	61	71	81	91	A1	B1	C1	D1	E1	F1
1	17	33	49	65	81	97	113	129	145	161	177	193	209	225	241
02	12	22	32	42	52	62	72	82	92	A2	B2	C2	D2	E2	F2
2	18	34	50	66	82	98	114	130	146	162	178	194	210	226	242
03	13	23	33	43	53	63	73	83	93	A3	B3	C3	D3	E3	F3
3	19	35	51	67	83	99	115	131	147	163	179	195	211	227	243
04	14	24	34	44	54	64	74	84	94	A4	B4	C4	D4	E4	F4
4	20	36	52	68	84	100	116	132	148	164	180	196	212	228	244
05	15	25	35	45	55	65	75	85	95	A5	B5	C5	D5	E5	F5
5	21	37	53	69	85	101	117	133	149	165	181	197	213	229	245
06	16	26	36	46	56	66	76	86	96	A6	B6	C6	D6	E6	F6
6	22	38	54	70	86	102	118	134	150	166	182	198	214	230	246
07	17	27	37	47	57	67	77	87	97	A7	B7	C7	D7	E7	F7
7	23	39	55	71	87	103	119	135	151	167	183	199	215	231	247
08	18	28	38	48	58	68	78	88	98	A8	B8	C8	D8	E8	F8
8	24	40	56	72	88	104	120	136	152	168	184	200	216	232	248
09	19	29	39	49	59	69	79	89	99	A9	B9	C9	D9	E9	F9
9	25	41	57	73	89	105	121	137	153	169	185	201	217	233	249
0A	1A	2A	3A	4A	5A	6A	7A	8A	9A	AA	BA	CA	DA	EA	FA
10	26	42	58	74	90	106	122	138	154	170	186	202	218	234	250
0B	1B	2B	3B	4B	5B	6B	7B	8B	9B	AB	BB	CB	DB	EB	FB
11	27	43	59	75	91	107	123	139	155	171	187	203	219	235	251
0C	1C	2C	3C	4C	5C	6C	7C	8C	9C	AC	BC	CC	DC	EC	FC
12	28	44	60	76	92	108	124	140	156	172	188	204	220	236	252
0D	1D	2D	3D	4D	5D	6D	7D	8D	9D	AD	BD	CD	DD	ED	FD
13	29	45	61	77	93	109	125	141	157	173	189	205	221	237	253
0E	1E	2E	3E	4E	5E	6E	7E	8E	9E	AE	BE	CE	DE	EE	FE
14	30	46	62	78	94	110	126	142	158	174	190	206	222	238	254
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8.6.9 Code Page 866

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02	12	22	32	42	52	62	72	82	92	A2	B2	C2	D2	E2	F2
2	18	34	"	2	B	R	b	r	В	Т	в	⌌	⌌	т	€
03	13	23	33	43	53	63	73	83	93	A3	B3	C3	D3	E3	F3
3	19	35	#	3	C	S	c	s	Г	У	г	⌌	⌌	у	€
04	14	24	34	44	54	64	74	84	94	A4	B4	C4	D4	E4	F4
4	20	36	\$	4	D	T	d	t	Д	Ф	д	⌌	⌌	ф	ï
05	15	25	35	45	55	65	75	85	95	A5	B5	C5	D5	E5	F5
5	21	37	%	5	E	U	e	u	Е	Х	е	⌌	⌌	х	ï
06	16	26	36	46	56	66	76	86	96	A6	B6	C6	D6	E6	F6
6	22	38	&	6	F	V	f	v	Ж	Ц	ж	⌌	⌌	ц	ÿ
07	17	27	37	47	57	67	77	87	97	A7	B7	C7	D7	E7	F7
7	23	39	'	7	G	W	g	w	З	Ч	з	⌌	⌌	ч	ÿ
08	18	28	38	48	58	68	78	88	98	A8	B8	C8	D8	E8	F8
8	24	40	(	8	H	X	h	x	И	Ш	и	⌌	⌌	ш	°
09	19	29	39	49	59	69	79	89	99	A9	B9	C9	D9	E9	F9
9	25	41	)	9	I	Y	i	y	Й	Щ	й	⌌	⌌	щ	•
0A	1A	2A	3A	4A	5A	6A	7A	8A	9A	AA	BA	CA	DA	EA	FA
10	26	42	*	:	J	Z	j	z	К	Ъ	к	⌌	⌌	ъ	•
0B	1B	2B	3B	4B	5B	6B	7B	8B	9B	AB	BB	CB	DB	EB	FB
11	27	43	+	;	K	[	k	{	Л	Ы	л	⌌	⌌	ы	√
0C	1C	2C	3C	4C	5C	6C	7C	8C	9C	AC	BC	CC	DC	EC	FC
12	28	44	,	<	L	\	l	|	М	Ь	м	⌌	⌌	ь	№
0D	1D	2D	3D	4D	5D	6D	7D	8D	9D	AD	BD	CD	DD	ED	FD
13	29	45	-	=	M	]	m	}	Н	Э	н	⌌	⌌	э	Ɱ
0E	1E	2E	3E	4E	5E	6E	7E	8E	9E	AE	BE	CE	DE	EE	FE
14	30	46	.	>	N	^	n	~	О	Ю	о	⌌	⌌	ю	■
0F	1F	2F	3F	4F	5F	6F	7F	8F	9F	AF	BF	CF	DF	EF	FF
15	31	47	/	?	O	_	o	△	П	Я	п	⌌	⌌	я	

8.6.10 Code Page 1252

00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
0	16	32	0	@	P	`	p	€	Not Used 144	NBSP	°	À	Ð	à	ð
01	11	21	31	41	51	61	71	81	91	A1	B1	C1	D1	E1	F1
1	17	33	!	1	A	Q	a	q	Not Used 129	‘	±	Á	Ñ	á	ñ
02	12	22	32	42	52	62	72	82	92	A2	B2	C2	D2	E2	F2
2	18	34	"	2	B	R	b	r	,	‚	²	Â	Ò	â	ò
03	13	23	33	43	53	63	73	83	93	A3	B3	C3	D3	E3	F3
3	19	35	#	3	C	S	c	s	f	“	£	Ã	Ó	ã	ó
04	14	24	34	44	54	64	74	84	94	A4	B4	C4	D4	E4	F4
4	20	36	\$	4	D	T	d	t	”	¤	´	Ä	Ô	ä	ô
05	15	25	35	45	55	65	75	85	95	A5	B5	C5	D5	E5	F5
5	21	37	%	5	E	U	e	u	...	•	¥	Å	Õ	å	õ
06	16	26	36	46	56	66	76	86	96	A6	B6	C6	D6	E6	F6
6	22	38	&	6	F	V	f	v	†	–	¶	Æ	Ö	æ	ö
07	17	27	37	47	57	67	77	87	97	A7	B7	C7	D7	E7	F7
7	23	39	'	7	G	W	g	w	‡	—	·	Ç	×	ç	÷
08	18	28	38	48	58	68	78	88	98	A8	B8	C8	D8	E8	F8
8	24	40	(	8	H	X	h	x	ˆ	~	˘	È	Ø	è	ø
09	19	29	39	49	59	69	79	89	99	A9	B9	C9	D9	E9	F9
9	25	41	)	9	I	Y	i	y	‰	™	©	É	Ù	é	ù
0A	1A	2A	3A	4A	5A	6A	7A	8A	9A	AA	BA	CA	DA	EA	FA
10	26	42	*	:	J	Z	j	z	Š	š	ª	Ê	Ú	ê	ú
0B	1B	2B	3B	4B	5B	6B	7B	8B	9B	AB	BB	CB	DB	EB	FB
11	27	43	+	;	K	[	k	{	<	>	«	»	Ë	Û	ë
0C	1C	2C	3C	4C	5C	6C	7C	8C	9C	AC	BC	CC	DC	EC	FC
12	28	44	,	<	L	\	|	|	Œ	œ	¬	¼	Ì	Ü	ì
0D	1D	2D	3D	4D	5D	6D	7D	8D	9D	AD	BD	DD	ED	FD	
13	29	45	-	=	M	]	m	}	Not Used 141	Not Used 157	½	Í	Ý	í	ý
0E	1E	2E	3E	4E	5E	6E	7E	8E	9E	AE	BE	DE	EE	FE	
14	30	46	.	>	N	^	n	~	Ž	ž	¾	Î	Þ	î	þ
0F	1F	2F	3F	4F	5F	6F	7F	8F	9F	AF	BF	DF	EF	FF	
15	31	47	/	?	O	_	o	△	Not Used 143	ÿ	ı	İ	ß	ï	ÿ

9 CONFIGURATION MENU

Printers are generally shipped with all the functions and parameters pre-set at the factory. It is possible to change settings for various printer functions and to run certain tests using the configuration menu. Selecting functions or changing settings is done through the scrolling configuration menu feature. This feature prints instructions on the receipt for selecting and changing any of the functions and parameters.

Caution: Be extremely careful changing any of the printer settings to avoid inadvertently changing other settings that might affect the performance of the printer.

Note: The configuration can be changed by using software commands as described in the "Configuration Commands" chapter.

9.1 *How to enter*

- Push paper feed button
- Reset the printer and hold paper feed button until the end of diagnostics form printing.

9.2 *How to adjust parameters*

- After a self test, the printer will enter in configuration menu. Follow all the instructions on the scrolling menu.
- Press the Paper Feed Button to make the selections. The instructions indicate whether to select something with a short click, a long click, or a series of short clicks. Indicate Yes with a long click, No with a short click.
- Press and hold the Paper Feed Button for at least one second for a long click. Press the Paper Feed Button quickly for a short click.

9.3 *How to quit*

At the end of your configuration, the printer asks for a reset and your configuration will be saved in the EEPROM.

- Reset the printer

9.4 *List of parameters that can be changed*

- Communication Options
- Diagnostics Modes
- Emulation / software Options
- Hardware Options

Set Hardware Options	Set Print Options	Set Communication Options
Print density	Default LPI	Interface Type
80%	6 LPI	RS232
90%	7.52 LPI *	USB
100% *	8.13 LPI	RS232 Baud Rate
110%	CR Usage	115200 *
120%	Ignore CR	57600
Maximum Power	Print CMD *	38400
55 W *	Default Font	19200
75 W	Resident *	9600
90 W	User Defined	4800
Pre-Heating	Default Code Page	2400
Enabled	437 *	1200
Disabled *	850	RS232 Data Bits
Max Print Speed	852	8 *
100 mm/sec	858	7
130mm/sec *	860	RS232 Stop Bit(s)
150mm/sec	862	1 *
Knife Option	863	2
Enabled *	865	RS232 Parity
Disabled	866	No Parity *
Partial cut Distance	1252	Even Parity
125 Steps	Katakana	Odd Parity
130 Steps	Set Diagnostics Modes	RS232 Flow Control
135 Steps *	Off *	DTR/DSR *
140 Steps	Datascope	XON/XOFF
145 Steps	Receipt Test	I/F Mode
Paper Low Sensor		TTL
Disabled *		RS232 *
Enabled (opto)		Reception Errors
Enabled (switch)		Print '?'
Paper Type		Ignore Errors *
F380 *		
KLS36		
KP440		
LSB130		
Paper Width		
80mm *		
82.5mm		
Head resistance Setting		
A *		
B		
C		
D		
E		

Important

To optimize print quality, head setting parameter must be set to match the rank of the print head the board is connected to

*** Standard factory default settings** (for further information, please contact your distributor or Axiohm Technical Support Team at www.axiohm.biz)



10 SELF TEST TICKET DESCRIPTION

The self test ticket can be printed by pressing both Reset and Paper feed button and releasing the Reset button.

Here is the description of all the lines that you can read when you print a self test.

Model Number: This is a 8 digit number fixed by Axiohm.

Serial Number: This is a 10 digits number fixed by Axiohm.*

*Serial number will be encoded as follows :

First letter:	always D
Next two digits:	year of production
Next two digits:	week of production
Next 5 digits:	incremental number that is reset every Monday morning.

example: **D000906623**

=> Board manufactured week 9 of the year 2000, 6623 th product manufactured that week.

Boot Firmware:

Revision	4 digits revision number fixed by Axiohm.
CRC	Boot code CRC.

Flash Firmware:

Revision	4 digits revision number fixed by Axiohm.
CRC	Flash Main code CRC.

Hardware:

Flash Memory Size	Total size of the flash memory.
Flash Logos/Fonts	Flash memory allocated for logos or user defined fonts.
Flash User Storage	Flash memory allocated for user data storage (ex: electronic journal).
SRAM Size	Total size of the RAM Memory
CPU Clock Freq.	Microprocessor Clock frequency.
Max Power	Maximum average power drawn from power supply

Mechanism:

Type	Indicates the mechanism used (CA/CB/XA/XB).
Paper Type	Indicates the reference of the paper used matching with the mechanism.
Paper Width	Indicated the paper width used.
Head Setting	Printhead resistance setting (A , B, C, D or E). This letter appears on the heat sink of the mechanism.
Print Density	Percentage of the nominal heating time value for specified paper.
Pre-Heating	This mode is used to maintain printhead temperature above minimum value when enabled.
Max Speed	Printer top speed limit.
Knife	Enable Knife Operation.
Partial Cut Distance	Indicate the number of steps done to perform a partial cut.
Paper Low Sensor	Enable Paper Low sensor management.

**Communication Interface:**

RX Buffer Size	This indicates the size of the data Input buffer.
Interface Type	Indicates if RS232 or USB interface is used.
Parameters (RS232 only)	
Baud Rate	Baud rate Value.
Data Bits	Number of data bits
Stop Bit(s)	Number of stop bit(s)
Parity	Type of parity to control frame validity
Flow Control	Hardware or software handshaking.
Reception Errors	Indicates which action is to be done when a wrong data is received.

Print Options:

Diagnostics	This line indicates in which mode the board is : - Off corresponds to a standard mode - Data Scope is used to print data in ASCII and HEX format received from the host.
Default LPI	Default inter-lines spacing.
Carriage Return	Select how to process a 0DH character received from the host.
Default Font	Resident or user defined font.
Logo(s) defined	current status = YES if at least one logo is defined
User Char(s) defined	current status = YES if at least one character is defined
Revision Number:	Can be set by user through software commands.

Codes Pages:

Default	Indicates default internal code page selected upon reset.
Resident	List of internal codes pages.

User Tallies:

Receipt Lines	Indicates the number of text lines printed.
Knife Cuts	Indicates the number of cuts performed.
Hours ON	Indicates the number of hours the board has been turned ON.
Flash cycles	Indicates the number of flash memory download cycles.
Knife Jams	Indicates the number of times that a cutter jam appeared.
Cover Openings	Indicates the number of cover opening/closing cycles.
Max temp reached	Indicates the maximum temperature (in C°) reached by the print head.
Head damaged	Indicates if the print head is damaged (at least one dot) or not.

Note: Tallies are updated every 1 hour or 1000 lines printed, whichever comes first.

11 LIST OF CONTROL CODES

Code (Hexadecimal)	Command	Page
09	Horizontal Tab	46
0A	Print and Feed One Line	42
0C	Print and Return to Standard Mode	96
0D	Activate Carriage Return	42
10	Clear Printer	39
10 04 <i>n</i>	Real Time Status Transmission	90;91;92
10 05 <i>n</i>	Real Time Request to Printer	89
11 <i>n1...nl</i>	Print Raster Graphics	68
12	Select Double-Wide Characters	56
13	Select Single-Wide Characters	56
14 <i>n</i>	Feed <i>n</i> Print Lines	42
15 <i>n</i>	Feed <i>n</i> Dot Rows	43
16 <i>n</i>	Add <i>n</i> Extra Dot Rows	43
17	Print	44
18	Cancel Print Data in Page Mode	96
19	Perform Full Knife Cut	40
1A	Perform Partial Knife Cut	40
1B "BMP file"	Download BMP Logo	74
1B 0C	Print Data in Page Mode	97
1B 12	Select 90 Degree Counter-Clockwise Rotated Print	56
1B 14 <i>n</i>	Set Column	44
1B 16 <i>n</i>	Select Pitch (Column Width)	63
1B 20 <i>n</i>	Set Right-Side Character Spacing	46
1B 21 <i>n</i>	Select Print Mode	55
1B 24 <i>n1 n2</i>	Set Absolute Starting Position	47
1B 25 <i>n</i>	Select Character Set	63
1B 26 <i>s c1 c2 n1 dl...nn</i>	Define User-Defined Character Set	64
1B 27 <i>m a2 a1 a0 d1 ...</i>	Write to User Data Storage	116
1B 2A <i>m n1 n2 dl...dn</i>	Select Bit Image Mode	69;70
1B 2D <i>n</i>	Select or Cancel Underline Mode	57
1B 2E <i>m n rl rh d1 ... dn</i>	Advanced Raster Graphics	68
1B 32	Set Line Spacing to 1/6 Inch	44
1B 33 <i>n</i>	Set Line Spacing	45
1B 34 <i>m a2 a1 a0</i>	Read from User Data Storage	116
1B 3A 30 30 30	Copy Character Set from ROM to RAM	67
1B 3D <i>n</i>	Select Peripheral Device (for Multi-Drop)	117
1B 3F <i>n</i>	Cancel User-Defined Character	66
1B 40	Initialize Printer	39

Code (Hexadecimal)	Command	Page
1B 44 [n]...k NUL	Set Horizontal Tab Positions	48
1B 45 <i>n</i>	Select or Cancel Emphasized Mode	57
1B 47 <i>n</i>	Select or Cancel Double Strike	58
1B 49 <i>n</i>	Select or Cancel Italic Print	58
1B 4A <i>n</i>	Print and Feed Paper	45
1B 4B <i>n1 n2 d1...dn</i>	Select Single-Density Graphics	70
1B 4C	Select Page Mode	97
1B 52 <i>n</i>	Select International Character Set	66
1B 53	Select Standard Mode	98
1B 54 <i>n</i>	Select Print Direction in Page Mode	99
1B 56 <i>n</i>	Select or Cancel 90 Degree Clockwise Rotated Print	59
1B 57 <i>n1, n2...n8</i>	Set Print Area in Page Mode	100
1B 59 <i>n1 n2 d1...dn</i>	Select Double-Density Graphics	71
1B 5B 7D	Switch to Flash Download Mode	106
1B 5C <i>n1 n2</i>	Set Relative Print Position	49
1B 61 <i>n</i>	Select Justification	50
1B 63 34 <i>n</i>	Select Sensors to Stop Printing	76
1B 63 35 <i>n</i>	Enable or Disable Panel Button	117
1B 64 <i>n</i>	Print and Feed <i>n</i> Lines	45
1B 69	Perform Full Knife Cut	40
1B 6D	Perform Partial Knife Cut	40
1B 74 <i>n</i>	Select International Character Set	66
1B 76	Transmit Paper Sensor Status	77
1B 7B <i>n</i>	Select or Cancel Upside-Down Print Mode	59
1D 01	Return Segment Number Status of Flash Memory	107
1D 02 <i>nn</i>	Select Flash Memory Sector to Download	108
1D 03 <i>n</i>	Real Time Request to Printer	89
1D 04 <i>n</i>	Real Time Status Transmission	90
1D 05	Real Time Printer Status Transmission	92
1D 06	Get Flash Firmware CRC Status	108
1D 07	Return Boot Sector CRC	108
1D 08	Return SRAM Size	85
1D 09	Return CPU Frequency	85
1D 0E	Erase All Flash Contents Except Boot Sector	109
1D 0F	Return Main Program Flash CRC	109
1D 10 <i>n</i>	Erase Selected Flash Sector	109
1D 11 <i>al ah cl ch d1...dn</i>	Download to Active Flash Sector	110
1D 21 <i>n</i>	Select Character Size	60
1D 22 <i>n</i>	Select Memory Type (SRAM/Flash)	112
1D 22 55 <i>n1 n2</i>	Flash Memory User Sectors Allocation	114
1D 23 <i>n</i>	Select the Current Logo	72
1D 24 <i>nL nH</i>	Set Absolute Vertical Print Position in Page Mode	101

Code (Hexadecimal)	Command	Page
1D 2A <i>n1 n2 d1...dn]</i>	Define Downloaded Bit Image	73
1D 2F <i>m</i>	Print Downloaded Bit Image	74
1D 3A	Select or Cancel Macro Definition	103
1D 40 <i>n</i>	Erase User Flash Sector	115
1D 42 <i>n</i>	Select or Cancel White/Black Reverse Print Mode	60
1D 48 <i>n</i>	Select Printing Position of HRI Characters	93
1D 49 <i>n</i>	Transmit Printer ID	79
1D 49 40 <i>n</i>	Transmit Printer ID, Remote Diagnostics Extension	80
1D 4C <i>nL nH</i>	Set Left Margin	51
1D 50 <i>x y</i>	Set Horizontal and Vertical Minimum Motion Units	52
1D 56 <i>m n</i>	Select Cut Mode and Cut Paper	41
1D 57 <i>nL nH</i>	Set Printing Area Width	53
1D 5C <i>nL nH</i>	Set Relative Vertical Print Position in Page Mode	102
1D 5E <i>r t m</i>	Execute Macro	104
1D 61 <i>n</i>	Select or Cancel Unsolicited Status Mode (USM)	82
1D 66 <i>n</i>	Select Pitch of HRI Characters	93
1D 68 <i>n</i>	Select Bar Code Height	93
1D 6B <i>m d1...dk</i> NUL	Print Bar Code	94;95
1D 6B <i>m n d1...dk</i> NUL	Print Bar Code	94
1D 72 <i>n</i>	Transmit Status	84
1D 73 <i>m n</i>	Set Sensor threshold	76
1D 75 <i>d0 ...d9</i>	Store 10 characters user revision number	54
1D 77 <i>n</i>	Select Bar Code Width	95
1D 78	Transmit 10 character user revision number	54
1D FF	Reset Firmware	39
1F 01 <i>d1.. dN</i>	Erase Boot Sector + download new boot code	112
1F 02 <i>p1... p6</i>	Set Communication interface parameters	126
1F 03 00 <i>n</i>	Set Diagnostics Mode	127
1F 03 01 <i>n</i>	Set Printhead Setting	121
1F 03 02 <i>n</i>	Set Knife Option	123
1F 03 03 <i>n</i>	Set Paper Low Sensor Option	124
1F 03 04 <i>n</i>	Set Max Power Consumption	120
1F 03 08 <i>n</i>	Set Paper Width	121
1F 03 0A <i>n</i>	Set Partial Cut Distance	124
1F 03 0B <i>n</i>	Set Preheating Option	123
1F 03 0F <i>n</i>	Set Default Font	125
1F 03 80 <i>n</i>	Set Default Code Page	128
1F 03 8F <i>n</i>	Set Paper Type	120
1F 03 93 <i>n</i>	Set Carriage Return Mode	128
1F 03 94 <i>n</i>	Set Lines Per Inch Default Setting	125
1F 03 95 <i>n</i>	Set Serial Interface Mode	127
1F 05 <i>n</i>	Select Superscript or Subscript Modes	62

Code (Hexadecimal)	Command	Page
1F 06 <i>n</i>	Set New Boot Code Size	111
1F 0A <i>n</i>	Voltage and Temperature Monitoring	85
1F 0B 4E 52 4A <i>n</i>	Set Print Density	122
1F 0C 53 41 46 <i>n</i>	Set Boot Code Download Safety	111
1F 0C 53 50 46 <i>nL nH</i>	Set Max Speed	122
1F 0D 43 4C 45 <i>n</i>	Clear All EEPROM Contents	129
1F 26 <i>y c1 c2 n1 d1...nn</i>	Define user character font with variable height	65
1F 56	Send Printer Software Version	86
1F 61 <i>n</i>	Process Ticket Counter	118
1F 62	Request Ticket Counter	118
1F 63 <i>n</i>	Set Cut Tag	119
1F 64	Request Cut Tag	119
1F 65 <i>n</i>	Return Logo Checksum	75
1F 69 <i>n</i>	Active user defined font selection	65
1F 74	Print Test Form	54
1F 76 <i>n</i>	Buffered status transmission	78
1F 77 <i>n</i>	Return Memory Allocation Status	114



12 COMMAND DESCRIPTION

12.1 Command Conventions

The following information describes how each command is organized:

Command Name

A descriptive name (not the ASCII code) used to identify the command.

Description

A brief summary of the command, followed by more detailed information, if necessary.

ASCII	the ASCII control code
Hexadecimal	the Hexadecimal control code
Decimal	the Decimal control code

Value or Values a description of the command operand values

Range the upper and lower limits of the command operand

Default the command operand default after printer reset

Formulas any formulas used for this command.

Exceptions

Describes any exceptions to this command, for example, other commands that the command cannot be used with.

Related Information

This section describes any related information for this command and provides references to other sections for additional information.



12.2 Reset commands

CLEAR PRINTER

Clears the print line buffer without printing and sets the printer to the following condition:

ASCII	DLE
Hexadecimal	10
Decimal	16

Exceptions

INITIALIZE PRINTER

Clears the print line buffer and resets the printer to the default settings for the startup configuration (refer to Default settings below).

Single-Wide, Single-High, Non-Rotated, and Left-Aligned characters are set and User-defined characters or logo graphics are cleared.

ASCII	ESC @
Hexadecimal	1B 40
Decimal	27 64

Default	80 mm paper	82.5 mm paper
Character Pitch	15.6 CPI	15.6 CPI
Column Width	44 characters	49 characters
Extra Dot Rows	3	3
Character Set	Default	Default
Printing Position	ColumnOne	One

RESET FIRMWARE

Reboots the printer.

ASCII	GS (SPACE)
Hexadecimal	1D FF
Decimal	29 255



12.3 Paper Cut commands

PERFORM FULL KNIFE CUT

Cuts the receipt. Use either Hex 19 or Hex 1B 69.

There are two codes for this command. Both codes perform the same function.

ASCII	EM	ESC i
Hexadecimal	19	1B 69
Decimal	25	27 105

PERFORM PARTIAL KNIFE CUT

Partially cuts the receipt. The length of the cut can be changed through the configuration menu. The default setting leaves .20 inches (5 mm) of paper on the left edge. See Setting Partial Cut Distance in Diagnostics.

There are two codes for this command. Both codes perform the same function.

ASCII	SUB	ESC m
Hexadecimal	1A	1B 6D
Decimal	26	27 109

Formulas

The cut edge is 144 dot rows or .71 inch (18 mm) above the print station.

Exceptions

The command is valid only at the beginning of a line.

SELECT CUT MODE AND CUT PAPER

Selects a mode for cutting paper and cuts the paper. There are two formats for this command, one requiring one parameter m , the other requiring two parameters m and n . The format is indicated by the parameter m .

ASCII GS V m GS V $m n$
Hexadecimal **1D 56 m** **1D 56 $m n$**
Decimal 29 86 m 29 86 $m n$
Value of m Selects the mode as shown in the table
Value of n Determines cutting position

Operand: m = cut mode
 n = additional distance to feed prior to cut beyond the cut position

Limit: OPTION 1: OPTION 2:
 Decimal: $0 \leq m \leq 1$; $48 \leq m \leq 49$ $65 \leq m \leq 66$ $0 \leq n \leq 255$
 Hex: $00 \leq m \leq 01$; $30 \leq m \leq 31$ $41 \leq m \leq 42$ $00 \leq n \leq FF$

"GS V" OPERAND DEFINITION		
M		Cut mode
Decimal	Hex	
0, 48	00, 30	Full cut
1, 49	01, 31	Partial cut
65	41	Feeds paper n x vertical motion units beyond the cut position then executes a full cut
66	42	Feeds paper n x vertical motion units beyond the cut position then executes a partial cut

Note : Partial cuts are performed **only with specific partial cut blades**.



12.4 Vertical Positioning and Print Commands

The vertical positioning and print commands control the vertical print positions of characters on the receipt.

PRINT AND FEED ONE LINE

Prints one line from the buffer and feeds paper one line.

ASCII	LF
Hexadecimal	0A
Decimal	10

ACTIVATE CARRIAGE RETURN

Prints one line from the buffer and feeds paper one line. The printer can be set through the configuration menu to ignore or use this command. Some applications expect the command to be ignored while others use it as print command.

ASCII	CR
Hexadecimal	0D
Decimal	13

Related Information

See Ignoring/Using the Carriage Return in *Diagnostics* for more information.

FEED *n* PRINT LINES

Feeds the paper *n* lines at the current line height without printing.

ASCII	DC4 <i>n</i>
Hexadecimal	14 <i>n</i>
Decimal	20 <i>n</i>

Value of *n* The number of lines to feed at current line height setting.

Range of *n* 0-255

FEED *n* DOT ROWS

Feeds the paper *n* dot rows ($n/203$ inch, $n/8$ mm), without printing.

ASCII NAK *n*
 Hexadecimal **15 *n***
 Decimal 21 *n*

Value of *n* $n/203$ inch

Range of *n* 0-255

ADD *n* EXTRA DOT ROWS

Adds *n* extra dot rows ($n/203$ inch, $n/8$ mm) to the character height to increase space between print lines or decrease the number of lines per inch.

ASCII SYN *n*
 Hexadecimal **16 *n***
 Decimal 22 *n*

Value of *n* Number of extra dot rows

Range of *n* 0-16

Default 3 extra dot rows

Formulas

The following table shows the relationship between the number of lines per inch and each extra dot row added:

Extra Rows	Lines Per Inch	Dot Rows	Extra Rows	Lines Per Inch	Dot Rows
0	8.5	24	9	6.1	33
1	8.1	25	10	6.0	34
2	7.8	26	11	5.8	35
3	7.5	27	12	5.6	36
4	7.2	28	13	5.5	37
5	7.0	29	14	5.3	38
6	6.8	30	15	5.2	39
7	6.5	31	16	5.1	40
8	6.3	32			

PRINT

Prints one line from the buffer and feeds paper one line.

ASCII ETB
Hexadecimal **17**
Decimal 23

SET COLUMN

Prints the first character of the next print line in column n . It must be sent for each line not printed at column one. The value of n is set to one after each line.

ASCII ESC DC4 n
Hexadecimal **1B 14 n**
Decimal 27 20 n

Value of n

80 mm paper	82.5 mm paper
1-44= Standard pitch	1-49= Standard pitch
1-56= Compressed pitch	1-64= Compressed pitch

Default of n 1

Exceptions

This command cannot be used with Single- or Double-Density graphics.

SET LINE SPACING TO 1/6 INCH

Sets the default line spacing to 1/6 of an inch (4.23 mm).

ASCII ESC 2
Hexadecimal **1B 32**
Decimal 27 50

SET LINE SPACING

Sets the line spacing to $n/406$ inch ($n/16$ mm).

The minimum line spacing is 8.5 lines per inch. The line spacing equals the character height when n is too small.

If the Set Horizontal and Vertical Minimum Motion Units command (1D 50) is used to change the horizontal and vertical minimum motion unit, the parameters of this command (Set Line Spacing) will be interpreted accordingly.

ASCII	ESC 3 n	Value of n	$n/406$ inch
Hexadecimal	1B 33 n	Range of n	0-255
Decimal	27 51 n	Default	0.13 inch (3.37 mm)

Related Information

For more information, see the description of the Set Horizontal and Vertical Minimum Motion Units command in this document.

PRINT AND FEED PAPER

Prints one line from the buffer and feeds the paper $n/203$ inch ($n/8$ mm). The line height equals the character height when n is too small.

If the Set Horizontal and Vertical Minimum Motion Units command (1D 50) is used to change the horizontal and vertical minimum motion units, the parameters of this command (Print and Feed Paper) will be interpreted accordingly.

ASCII	ESC J n	Value of n	$n/203$ inch
Hexadecimal	1B 4A n	Range of n	0-255
Decimal	27 74 n		

Related Information

For more information, see the description of the Set Horizontal and Vertical Minimum Motion Units command in this document.

PRINT AND FEED N LINES

Prints one line from the buffer and feeds paper n lines at the current line height.

ASCII	ESC d n
Hexadecimal	1B 64 n
Decimal	27 100 n

Range of n 1-255 (0 is interpreted as 1)

12.5 Horizontal Positioning Commands

The horizontal positioning commands control the horizontal print positions of characters on the receipt.

HORIZONTAL TAB

Moves the print position to the next tab position set by the Set Horizontal Tab Positions (1B 44 n_1 n_2 ... 00) command. The print position is reset to column one after each line.

Tab treats the left margin as column one, therefore changes to the left margin will move the tab positions.

When no tabs are defined to the right of the current position, or if the next tab is past the right margin, Line Feed is executed. HT has no effect in Page Mode.

Print initialisation sets 32 tabs at column 9, 17, 25, ...

ASCII	HT
Hexadecimal	09
Decimal	9

SET RIGHT-SIDE CHARACTER SPACING

Sets the right side character spacing to [n x horizontal or vertical motion units]. Values for this command are set independently in standard and page mode.

The units of horizontal and vertical motion are specified by the Set Horizontal and Vertical Minimum Motion Units (GS P) command. Changes in the horizontal or vertical units do not affect the current right side character spacing. When the horizontal or vertical motion unit is changed by the Set Horizontal and Vertical Minimum Motion Units (GS P) command the value must be in even units and not less than the minimum amount of horizontal movement.

In standard mode the horizontal motion unit is used.

In page mode the horizontal or vertical motion unit differs and depends on the starting position of the printable area. When the starting printing position is the upper left or lower right of the printable area (set by Select Print Direction in Page Mode, ESC T) the horizontal motion unit (x) is used. When the starting printing position is the upper right or lower left of the printable area (set by Select Print Direction in Page Mode, ESC T) the vertical motion unit (y) is used.

ASCII	ESC SP n
Hexadecimal	1B 20 n
Decimal	27 32 n

Range of n 0 – 32

Default 0

SET ABSOLUTE STARTING POSITION

Sets the print starting position to the specified number of dots (up to the right margin) from the beginning of the line. The print starting position is reset to the first column after each line.

If the Set Horizontal and Vertical Minimum Motion Units command (1D 50) is used to change the horizontal and vertical minimum motion unit, the parameters of this command (Set Absolute Print Position) will be interpreted accordingly.

ASCII	ESC \$ <i>n1 n2</i>
Hexadecimal	1B 24 <i>n1 n2</i>
Decimal	27 36 <i>n1 n2</i>

Value of *n* *n* = Number of dots to be moved from the beginning of the line
 n1 = Remainder after dividing *n* by 256
 n2 = Integer after dividing *n* by 256

The values for *n1* and *n2* are two bytes in low byte, high byte word orientation.

Formulas

The example shows how to calculate 280 dots as the absolute starting position.

$280/256 = 1$, remainder of 24

$n1 = 24$ $n2 = 1$

Related Information

This command is also used in graphics mode. See Graphics Commands in this document for more information.

For more information, see the description of the Set Horizontal and Vertical Minimum Motion Units command (1D 50) in this document.

SET HORIZONTAL TAB POSITIONS

Sets up to 32 horizontal tab positions n columns from column one, but does not move the print position. See the Horizontal Tab command (09).

The tab positions remain unchanged if the character widths are changed after the tabs are set. The command ends with hexadecimal 00; hexadecimal 1B 44 00 clears all tabs.

ASCII ESC D [n]... k NUL
Hexadecimal **1B 44** [n]... k NUL
Decimal 27 68 [n]... k 0

Value of n Column number for tab minus one
 (n is always less than or equal to the current selected column width)
Value of k 0-32

Default Every 8 characters from column. 1 (9, 17, 25, etc.) for normal print

Formulas

Set the tab positions in ascending order and put Hex 00 at the end.

Hex 1B 44 00 (number of tabs not specified) clears all tab positions.

Exceptions

The tabs cannot be set higher than the column width of the current pitch:

80 mm paper	82.5 mm paper
1-44= Standard pitch	1-49= Standard pitch
1-56= Compressed pitch	1-64= Compressed pitch

SET RELATIVE PRINT POSITION

Moves the print starting position the specified number of dots either right (up to the right margin) or left (up to the left margin) of the current position. The print starting position is reset to the first column after each line.

ASCII	ESC \ <i>n1 n2</i>
Hexadecimal	1B 5C <i>n1 n2</i>
Decimal	27 92 <i>n1 n2</i>

Value of *n*

To Move the Relative Starting Position Right of the Current Position:

n = Number of dots to be moved right of the current position

n1 = Remainder after dividing *n* by 256

n2 = Integer after dividing *n* by 256

The values for *n1* and *n2* are two bytes in low byte, high byte word orientation.

To Move the Relative Starting Position Left of the Current Position:

n = Number of dots to be moved left of the current position

n1 = Remainder after dividing (65,536-*n*) by 256

n2 = Integer after dividing (65,536-*n*) by 256

The values for *n1* and *n2* are two bytes in low byte, high byte word orientation.

Formulas

To move to the left:

The example shows how to set the relative position 20 dots to the left of the current position.

$65,536 - 20 = 65516$

$65,516 / 256 = 255$, remainder of 236

$n1 = 236$, $n2 = 255$

To move to the right:

The example shows how to set the relative position 20 dots to the right of the current position.

$20 / 256 = 0$, remainder of 20

$n1 = 20$, $n2 = 0$

Related Information

If the Set Horizontal and Vertical Minimum Motion Units command (1D 50) is used to change the horizontal and vertical minimum motion unit, the parameters of this command (Set Relative Print Position) will be interpreted accordingly. For more information, see the description of the Set Horizontal and Vertical Minimum Motion Units command (1D 50) in this document.

SELECT JUSTIFICATION

Specifies the alignment of characters, graphics, logos, and bar codes (see the value of n table).

ASCII	ESC a n
Hexadecimal	1B 61 n
Decimal	27 97 n

Value of n	0, 48 = Left aligned
	1, 49 = Center aligned
	2, 50 = Right aligned

Range of n	0-2, 48-50
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Default	0 (Left aligned)
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Exceptions

The command is valid only at the beginning of a line.

SET LEFT MARGIN

Sets the left margin of the printing area. The left margin is set to $((nH \times 256) + nL)$ times horizontal motion unit) inches. The horizontal motion units are set by the Set Horizontal and Vertical Minimum Motion Units command (1D 50). This command is described below.

The width of the printing area is set by the Set Printing Area Width command (1D 57), which follows this command. See the Set Printing Area Width command (1D 57) in this document for a description of that command.

If the setting exceeds the printable area, the maximum value of the printable area is used. The maximum printable area is 576 dots for 80 mm paper and 640 for 82.5 mm paper. See the illustration.

ASCII *GS L nL nH*
Hexadecimal *1D 4C nL nH*
Decimal *29 76 nL nH*

Range of *nL* 0-255

Range of *nH* 0-255

Default 576 dots (the maximum printable area) for 80 mm paper.
 640 dots (the maximum printable area) for 82.5 mm paper.

Formulas

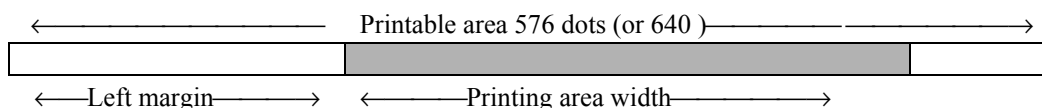
To set the left margin to one inch at the default horizontal motion unit of 1/203 inches, send the four-byte string:

GS L 203 0

Or, to set the left margin to two inches at the default horizontal motion unit of 1/203 units per inch, send the four-byte string:

GS L 150 1

Where 2 inches = 406/203, and 406 = $(1 \times 256) + 150$.





SET HORIZONTAL AND VERTICAL MINIMUM MOTION UNITS

Sets the horizontal and vertical motion units to $1/x$ inch and $1/y$ inch respectively.
When x or y is set to 0, the default setting for that motion unit is used.

ASCII	GS P $x y$
Hexadecimal	1D 50 $x y$
Decimal	29 80 $x y$
Value of x	Horizontal
Value of y	Vertical
Range of x	0 – 255
Range of y	0 - 255
Default of x:	203
Default of y:	203

SET PRINTING AREA WIDTH

Sets the width of the printing area. If the setting exceeds the printable area, the maximum value of the printable area is used. The width of the printing area is set to $((nH \times 256) + nL)$ times horizontal motion unit) inches. The horizontal motion units are set by the Set Horizontal and Vertical Minimum Motion Units command (1D 50), which is described earlier in this document.

The width of the printing area follows the Set Left Margin command (1D 4C). See the Set Left Margin command (GS L) earlier in this document for a description.

ASCII GS W *nL nH*
Hexadecimal 1D 57 *nL nH*
Decimal 29 87 *nL nH*

Range of *nL* 0-255

Range of *nH* 0-255

Default 576 dots (the maximum printable area) for 80 mm paper.
 640 dots (the maximum printable area) for 82.5 mm paper.

Formulas

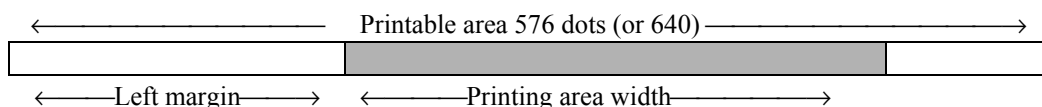
To set the width of the printing area to one inch at the default horizontal motion unit of 1/203 inches, send the four-byte string:

GS W 203 0

Or, to set the width of the printing area to two inches at the default horizontal motion unit of 1/203 units per inch, send the four-byte string:

GS W 150 1

Where 2 inches = $406/203$, and $406 = (1 \times 256) + 150$.



Exceptions

This command is effective only at the beginning of a line.

If the setting exceeds the printable area, the maximum value of the printable area is used. The maximum printable area is 576 dots for 80 mm paper and 640 dots for 82.5 mm paper. See the illustration.



12.6 Printer configuration

STORE 10 CHARACTERS USER REVISION NUMBER

This command will store a 10-character user defined revision number downloaded to the printer.

ASCII	GS u d0 d1 d2 d3 d4 d5 d6 d7 d8 d9
Hexadecimal	1D 75 d0 d1 d2 d3 d4 d5 d6 d7 d8 d9
Decimal	29 117 d0 d1 d2 d3 d4 d5 d6 d7 d8 d9

Operand :	dn = downloaded revision number
Limit :	Decimal : 32 ≤ dn ≤ 126
	Hex : 20 ≤ dn ≤ 7E
Default :	Decimal : dn = 47
	Hex : dn = 30

Note: The user defined revision number is printed on the configuration menu.

TRANSMIT 10 CHARACTERS USER REVISION NUMBER

This command will transmit the 10-character printable ASCII user defined revision number.

ASCII	GS x
Hexadecimal	1D 78
Decimal	29 120

Note: The returned revision number may contain a bit pattern that is valid for returned status. Care should be taken not to confuse this returned data with any other returned data.

PRINT TEST FORM

This command will print the configuration settings ticket.

ASCII	US t
Hexadecimal	1F 74
Decimal	31 116

Note: This command will assert busy and will ignore all input data until all tickets have been printed.

12.7 Print Characteristics Commands

These commands control what the printed information looks like, selection of character sets, definition of custom-defined characters, and setting of margins. The commands are described in order of their hexadecimal codes.

SELECT PRINT MODE

Selects the print mode: standard, compressed, emphasized, underlined, double high, or double wide.

ASCII ESC ! *n*

Hexadecimal **1B 21** *n*

Decimal 27 33 *n*

Value of *n* See table

Value of *n*

Bit ¹	Function	0	1
Bit 0	Pitch (See chart below)	Standard Pitch	Compressed Pitch
Bit 3	Emphasized Mode	Canceled	Set
Bit 4	Double High	Canceled	Set
Bit 5	Double Wide	Canceled	Set
Bit 7	Underlined Mode	Canceled	Set (bar thickness = 2)

¹ Bits 1, 2 and 6 are not used

Default 0 (for bits 0, 3, 4, 5, 7)

This command and select pitch (column width) command (1B 16 *n*) affect pitch selection.

Pitch	Columns 80 mm Paper	COLUMNS 82.5 MM PAPER	CPI
Standard	44	49	15.6
Compressed	56	64	20.3

Selects the print mode : Standard, compressed, emphasized, underlined, double high or double wide.

Exceptions

Refer to the above table for exceptions.

Related Information

See the *Print Specifications Guide* for a description of standard and compressed character pitches.

SELECT DOUBLE-WIDE CHARACTERS

Prints double-wide characters. The printer is reset to single-wide mode after a line has been printed or the Clear Printer (10) command is received. Double-wide characters may be used in the same line with single-wide characters.

ASCII	DC2
Hexadecimal	12
Decimal	18

Exceptions

Double-wide characters may not be used in the same line with single or double-density graphics.

SELECT SINGLE-WIDE CHARACTERS

Prints single-wide characters. Single-wide characters may be used in the same line with double-wide characters.

ASCII	DC3
Hexadecimal	13
Decimal	19

Exceptions

Single-wide characters may not be used in the same line with single or double-density graphics.

SELECT 90 DEGREE COUNTER-CLOCKWISE ROTATED PRINT

Rotates characters 90 degrees counter-clockwise. The command remains in effect until the printer is reset or until a Clear Printer (10) or Cancel Rotated Print (1B 56) command is received.

ASCII	ESC DC2
Hexadecimal	1B 12
Decimal	27 18

Related Information

See “Summary of Rotated Printing” in this document.

SELECT OR CANCEL UNDERLINE MODE

Turns underline mode on or off. Underlines cannot be printed for spaces set by the Horizontal Tab, Set Absolute Start Position, or Set Relative Print Position commands.

Underline mode may also be turned ON and OFF with the Select Print Mode(s) command (1B 21). However with that command the bar thickness is not selectable.

ASCII	ESC - <i>n</i>
Hexadecimal	1B 2D <i>n</i>
Decimal	27 45 <i>n</i>

Value of *n* 0, 48 = Cancel underline mode
 1- 7,49-55 = Select underline mode and bar thickness in number of dots

Default 0 (Cancel underline mode)

Exceptions

This command is ignored if *n* is out of the specified range.

SELECT OR CANCEL EMPHASIZED MODE

Starts or stops emphasized printing. The printer is reset to the standard print mode after a Clear Printer (10) command is received.

ASCII	ESC E <i>n</i>
Hexadecimal	1B 45 <i>n</i>
Decimal	27 69 <i>n</i>

Value of *n* 0 = Off
 1 = On
 (When 0 and 1 are the Least Significant Bit, LSB)

Default 0 (Off)

Exceptions

Only the lowest bit of *n* is effective.

Emphasized printing cannot be used with bit-images or downloaded bit-images.

Related Information

This command and the Select Print Mode(s) command (1B 21) function identically. They should have the same setting when used together.

SELECT OR CANCEL DOUBLE STRIKE

Turns double strike mode on or off. Identical to Emphasized mode. The printer is reset to the standard print mode after a Clear Printer (10) command is received.

ASCII ESC G *n*
Hexadecimal **1B 47** *n*
Decimal 27 71 *n*

Value of *n* 0 = Off
 1 = On
 (When 0 and 1 are the Least Significant Bit, LSB)

Default 0 (Off)

Exceptions

Only the lowest bit of *n* is effective.

Double-strike printing cannot be used with bit-images or downloaded bit-images.

SELECT OR CANCEL ITALIC PRINT

Turns Italic print mode on or off. The printer is reset to the standard print mode after a Clear Printer (10) command is received.

ASCII ESC I *n*
Hexadecimal **1B 49** *n*
Decimal 27 73 *n*

Value of *n* 0 = Off
 1 = On
 (Where 0 and 1 are the Least Significant Bit, LSB)

Default 0 (Off)

Exceptions

Only the lowest bit of *n* is valid.



SELECT OR CANCEL 90 DEGREE CLOCKWISE ROTATED PRINT

Rotates characters 90 degrees clockwise. The command remains in effect until the printer is reset or until a Clear Printer (10) or Rotated Print (1B 12) command is received. See Summary of Rotated Printing in this document.

ASCII	ESC V <i>n</i>
Hexadecimal	1B 56 <i>n</i>
Decimal	27 86 <i>n</i>

Value of <i>n</i>	0 = Cancel 1 = Set
Default	0 (Cancel)

SELECT OR CANCEL UPSIDE-DOWN PRINT MODE

Prints upside-down characters. The command may be combined with Clock Wise Rotated print (1B 56) or Counter Clock Wise Rotated print (1B 12). The character order is inverted in the buffer so text is readable. Only bit 0 is used. Bits 1-7 are not used. See Summary of Rotated Printing in this document for more information.

ASCII	ESC { <i>n</i>
Hexadecimal	1B 7B <i>n</i>
Decimal	27 123 <i>n</i>

Value of <i>n</i>	0 = Cancel 1 = Set
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Default	0 (Cancel)
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Exceptions

The command is valid only at the beginning of a line.
It cannot be used with right side up characters on the same line.

SELECT CHARACTER SIZE

Selects the character height using bits 0 to 2 and selects the character width using bits 4 to 6, as follows:

Character Width Selection			Character Height Selection		
Hex	Decimal	Width	Hex	Decimal	Height
00	0	1 (normal)	00	0	1 (normal)
10	16	2 (two times width)	01	1	2 (two times height)
20	32	3 (three times width)	02	2	3 (three times height)
30	48	4 (four times width)	03	3	4 (four times height)
40	64	5 (five times width)	04	4	5 (five times height)
50	80	6 (six times width)	05	5	6 (six times height)
60	96	7 (seven times width)	06	6	7 (seven times height)
70	112	8 (eight times width)	07	7	8 (eight times height)

This command is effective for all characters (except for HRI characters).

In standard mode (non page mode), the vertical direction is the paper feed direction, and the horizontal direction is perpendicular to the paper feed direction. However, when character orientation changes in 90 degree clockwise-rotation mode, the relationship between vertical and horizontal directions is reversed. In page mode, vertical and horizontal direction are based on the character orientation. When characters are enlarged with different sizes on one line, all the characters on the line are aligned at the baseline. The Select Print Mode (ESC !) command can also select or cancel double-width and double-height modes. However, the setting of the last received command is effective.

ASCII GS ! *n*
Hexadecimal **1D 21** *n*
Decimal 29 33 *n*

Value of *n* 1-8 = vertical number of times normal font
 1-8 = horizontal number of times normal font

Range of *n* 00-07, 10-17, ..., 70-77

Default of *n* 00 hexadecimal

Exceptions

If *n* is out of the defined range, this command is ignored.

SELECT OR CANCEL WHITE/BLACK REVERSE PRINT MODE

Turns on White/Black reverse printing mode. In White/Black reverse printing mode, print dots and non-print dots are reversed, which means that white characters are printed on a black background. When the White/Black reverse printing mode is selected it is also applied to character spacing which is set by Right-Side Character Spacing (ESC SP).

This command can be used with built-in characters and user-defined characters, but does not affect the space between lines.

White/Black Reverse Print Mode does not affect bit image, downloaded bit image, bar code, HRI characters, and spacing skipped by Horizontal Tab (HT), Set Absolute Starting Position (ESC \$), and Set Relative Print Position (ESC \).

ASCII GS B *n*

Hexadecimal **1D 42** *n*

Decimal 29 66 *n*

Value of *n* 0 = Off

1 = On

(When 0 and 1 are the Least Significant Bit, LSB)

Default 0 (Off)

Exceptions

Only the lowest bit of *n* is valid.

SELECT SUPERScript OR SUBScript MODES

Turns superscript or subscript modes on or off. This attribute may be combined with other characters size settings commands (12, 13, 1B 21 *n*, 1D 21 *n*,...)

ASCII US ENQ *n*

Hexadecimal 1F 05 *n*

Decimal 31 05 *n*

Value of *n*

- 0 = Normal character size
- 1 = Select subscript size
- 2 = Select superscript size

Default 0 (normal size)

Exceptions

This command is ignored if *n* is out of the specified range.

SUMMARY OF ROTATED PRINTING

The table shows the combinations of upside-down print, 90 degree clockwise rotated print, and 90 degree counterclockwise rotated print.

90 degree clockwise rotated and 90 degree counterclockwise rotated print commands are mutually exclusive: The setting of the last received command is effective .

The samples of the print show only the normal size characters. Double-wide and double-high characters are printed in the same orientation. They may also be mixed on the same line.

Upside Down 1B 7B <i>n</i>	Rotated CW 1B 56 <i>n</i>	Rotated CCW 1B 12	Resulting Output
Canceled	Canceled	Canceled	1 (See Below)
Canceled	Set	Canceled	2 (See Below)
Set	Canceled	Canceled	3 (See Below)
Set	Set	Canceled	4 (See Below)
Canceled	Canceled	Set	5 (See Below)
Set	Canceled	Set	6 (See Below)

1. ABC 2. A B C 3. ABC 4. A B C 5. A B C 6. A B C

Note: Right-side up and upside down print modes cannot be mixed on the same line.



12.8 Font commands

SELECT PITCH (COLUMN WIDTH)

Selects the character pitch for a print line

ASCII ESC SYN *n*
Hexadecimal **1B 16 *n***
Decimal 27 22 *n*

Value of *n* 0 = Standard pitch
1 = Compressed pitch

Default 0 (Standard pitch)

Formulas

The following table provides the print characteristics for both pitches on the receipt station.

Pitch	Columns 80 mm Paper	COLUMNS 82.5 MM PAPER	CPI
Standard	44	49	15.6
Compressed	56	64	20.3

Related Information

See *Print Specifications* for a description of both pitches.

SELECT CHARACTER SET

Selects the character set. When an undefined RAM character is selected, current active ROM Code Page character is used. See the *Printing Specification Guide* for the character sets.

ASCII ESC % *n*
Hexadecimal **1B 25 *n***
Decimal 27 37 *n*

Value of *n* 0 = Code Page 437
1 = User Defined (RAM)
2 = Code Page 850

Range of *n* 0-2

Default 0 (Code Page 437)

DEFINE USER-DEFINED CHARACTER SET

Defines and enters downloaded characters into RAM. The command may be used to overwrite single characters. User-defined characters are available until power is turned off or the Initialize Printer command (1B 40) is received.

Any invalid byte (s , $c1$, $c2$, $n1$, $n2$) aborts the command.

ASCII ESC & s $c1$ $c2$ $n1$ $d1$... nn dn

Hexadecimal 1B 26 s $c1$ $c2$ $n1$ $d1$... nn dn

Decimal 27 38 s $c1$ $c2$ $n1$ $d1$... nn dn

Values and Ranges:

$s = 3$, the number of bytes (vertically) in the character cell

c = the ASCII codes of the first ($c1$) and last ($c2$) characters respectively

$c1$ = Hex 20-FF (20 is always printed as a space)

$c2$ = Hex 20-FF (20 is always printed as a space)

To define only one character, use the same code for both $c1$ and $c2$

n = the number of dot columns for the n th character as specified by $n1$... nn

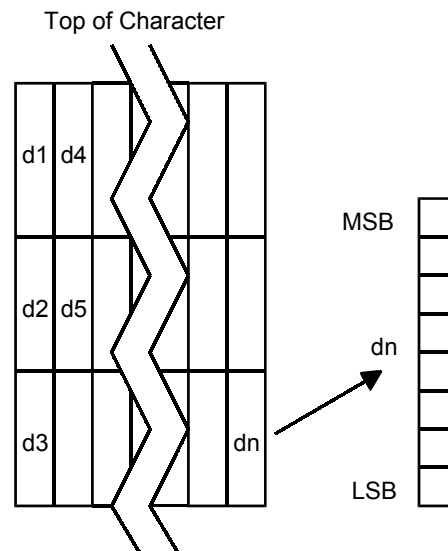
$n = 1-16$

d = the column data for the n th character as specified by $d1$... dn

The number of bytes for a character cell is $s \times n1$

The bytes are printed down and across each cell

See the illustration.



Related information

See 1D 22 n (Select memory type) to save User Defined characters.

DEFINE USER-DEFINED CHARACTER SET WITH VARIABLE HEIGHT

Command format is similar to existing command 1B 26. The only difference resides in the height encoding H indicates the height in number of dots instead of number of bytes (1B 26) to provide better resolution.

Data are still encoded vertically.

max dimensions : Hmax = 64, Wmax = 48

ASCII US & H *cn cm ln [dn1...dnk] lm [dm1...dmk]*

Hexadecimal 1F 26 H *cn cm ln [dn1...dnk] lm [dm1...dmk]*

Decimal 31 38 H *cn cm ln [dn1...dnk] lm [dm1...dmk]*

Values and Ranges:

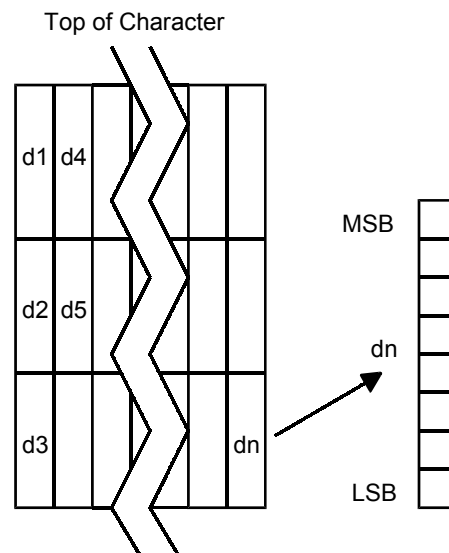
Parameter H indicates character height in number of dots, and does not have to be dividable by 8.

From 1 to 8 dots high => 1 data byte per column

From 9 to 16 dots high => 2 data bytes per column

From 17 to 24 dots high => 3 data bytes per column

Etc...



ACTIVE USER-DEFINED FONT SELECTION

ASCII US *i n*

Hexadecimal 1F 69 *n*

Decimal 31 105 *n*

0 <= n <= 255

default = 0

Selects the active user defined font used by commands 1B 26, 1F 26, 1B 25, 1B 3A, 1B 3F.

Setting remains unchanged until printer reboots, or command 1B 40 resets active user defined font to default.

CANCEL USER-DEFINED CHARACTER

Cancels the pattern defined for the character code specified by n . After the user-defined character is canceled, the corresponding pattern from current active ROM Code Page is printed.

ASCII ESC ? n
Hexadecimal **1B 3F** n
Decimal 27 63 n

Range of n 32-255

Exceptions

This command is ignored if n is out of range or if the user-defined character is not defined.

SELECT CHARACTER CODE TABLE

Selects the character set to be used. See *Print Specifications* for the character sets. There are two codes for this command. Both codes perform the same function.

ASCII: ESC R n ESC t n
Hexadecimal: **1B 52** n **1B 74** n
Decimal: 27 82 n 27 116 n

“ESC R” OPERAND DEFINITION		
N		Code Page
Decimal	Hex	
0	00	437 : US
1	01	850 : Multilingual
2	02	852 : Latin 2, Slavic
3	03	860 : Portuguese
4	04	863 : Canadian French
5	05	865 : Nordic
6	06	858 : Multilingual with Euro
7	07	866 : Cyrillic, Russian
8	08	1252 : Windows, Latin 1
9	09	862 : Hebrew
10	0A	Katakana

Default 0 (Code Page 437), selectable through configuration menu

Related Information

This command may also be known as Select International Character Set.

SELECT INTERNATIONAL CHARACTER SET

See the previous command, Select Character Code Table.

COPY CHARACTER SET FROM ROM TO RAM

Copies characters in the active ROM set to RAM. Use this command to re-initialize the User-Defined Character Set.

ASCII ESC : 0 0 0
Hexadecimal **1B 3A 30 30 30**
Decimal 27 58 0 0 0

Default current active ROM Code Page

Related Information

To modify characters in one of the character set variations, such as Rotated Print, Select one of the Rotated Print commands, copy to RAM, then use the Define User-Defined Character Set command (1B 26).

12.9 Graphics Commands

These commands are used to enter and print graphics data and are described in order of their hexadecimal codes.

PRINT RASTER GRAPHICS

Prints one row of data. $n1 \dots nl$: bytes describing the line to print.

ASCII DC1 $n1 \dots nl$
Hexadecimal 11 $n1 \dots nl$
Decimal 17 $n1 \dots nl$

Value of n $n1 \dots n72$ = Data bytes for 80 mm Paper width
 $n1 \dots n80$ = Data bytes for 82.5 mm Paper width

Range 0-255

Exceptions

Raster graphics is not available in Page Mode.

PRINT ADVANCED RASTER GRAPHICS

Prints a horizontal raster of graphics data one or multiple times. Horizontal offset and number of data bytes are variable and specified by parameters.

ASCII ESC . $m n rL rH d1 \dots dn$
Hexadecimal 1B 2E $m n rL rH d1 \dots dn$
Decimal 27 46 $m n rL rH d1 \dots dn$

Value of m : horizontal offset from left margin = $8 \times m$ dots
Value of n : number of data bytes that compose the raster
Value of r : number of times the raster has to be printed = $256 \times rH + rL$
 $d1 \dots dn$: Data bytes

Range

80 mm paper	82.5 mm paper
$0 \leq m \leq 72$	$0 \leq m \leq 80$
$0 \leq n \leq 72$	$0 \leq n \leq 80$
$0 \leq r \leq 65535$	$0 \leq r \leq 65535$
$0 \leq d1 \dots dn \leq 255$	$0 \leq d1 \dots dn \leq 255$

Exceptions

Advanced Raster graphics is not available in Page Mode.

SELECT BIT IMAGE MODE

Sets the print resolution and enters one line of graphics data into the print buffer. Excess data is accepted but ignored. Any print command is required to print the data, after which the printer returns to normal processing mode.

See the illustration for graphic representations of the bit image.

ASCII ESC * *m* *n1* *n2* *d1* ... *dn*
Hexadecimal **1B 2A** *m* *n1* *n2* *d1* ... *dn*
Decimal 27 42 *m* *n1* *n2* *d1* ... *dn*

Value of *m*

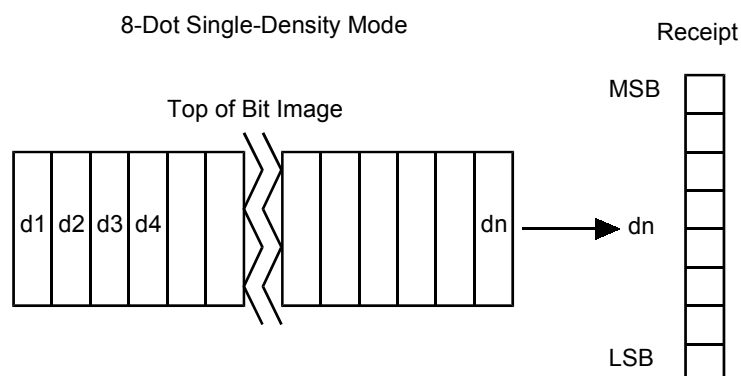
80 mm paper	Value of <i>m</i>	Mode	No. of Dots (Vertical)	No. of Dots (Horizontal)	No. of Dots/Line
	0	8 Dot Single Density	8 (68 DPI)	0-288 (101 DPI)	8 x 288
	1	8 Dot Double Density	8 (68 DPI)	0-576 (203 DPI)	8 x 576
	32	24 Dot Single Density	24 (203 DPI)	0-288 (101 DPI)	24 x 288
	33	24 Dot Double Density	24 (203 DPI)	0-576 (203 DPI)	24 x 576

82.5 mm paper	Value of <i>m</i>	Mode	No. of Dots (Vertical)	No. of Dots (Horizontal)	No. of Dots/Line
	0	8 Dot Single Density	8 (68 DPI)	0-320 (101 DPI)	8 x 320
	1	8 Dot Double Density	8 (68 DPI)	0-640 (203 DPI)	8 x 640
	32	24 Dot Single Density	24 (203 DPI)	0-320 (101 DPI)	24 x 320
	33	24 Dot Double Density	24 (203 DPI)	0-640 (203 DPI)	24 x 640

Value of *n*

Value of <i>n</i> (8-Dot Single Density Mode)	Value of <i>n</i> (24-Dot Single Density Mode)	Value of <i>d</i>
$n1 + (256 \times n2)$	$3 \times [n1 + (256 \times n2)]$	Number of Bytes of Data (Printed Down, Then Across)

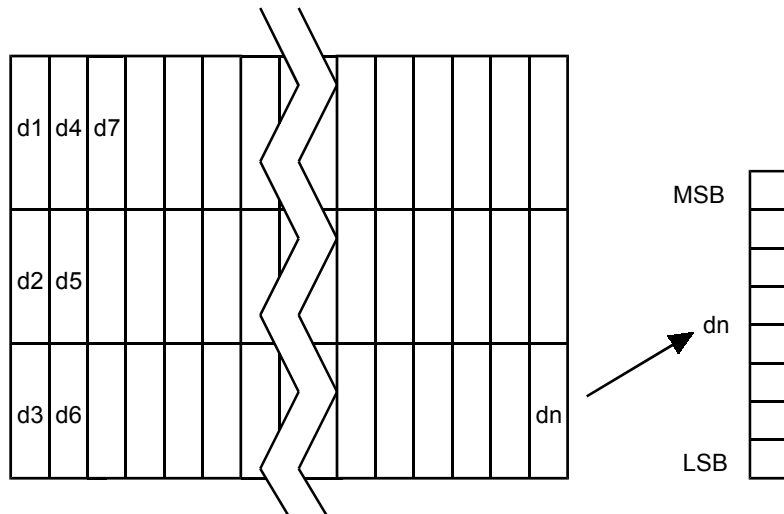
Related Information



SELECT BIT IMAGE MODE (CONTINUED)

24-Dot Single-Density Mode

Top of Bit Image



SELECT SINGLE-DENSITY GRAPHICS

Enters one line of 8-dot single-density graphics into the print buffer. Any print command is required to print the line, after which the printer returns to normal processing mode. Single-density mode allows 0-288 dot columns for 80 mm paper (0-320 for 82.5 mm paper). The number of bytes sent is represented by the formulas in table.

Each bit corresponds to two horizontal dots. Compare to Set Bit Image Mode (1B 2A, m=0) earlier in this document.

ASCII ESC K *n1 n2 d1 ... dn*
Hexadecimal **1B 4B** *n1 n2 d1 ... dn*
Decimal 27 75 *n1 n2 d1 ... dn*

Value of *n*

Value of <i>n</i> (8-Dot Single Density Mode)	Value of <i>n</i> (24-Dot Single Density Mode)	Value of <i>d</i>
$n1 + (256 \times n2)$	$3 \times [n1 + (256 \times n2)]$	Number of Bytes of Data (Printed Down, Then Across)

Formulas

See the above table.

SELECT DOUBLE-DENSITY GRAPHICS

Enters one line of 8-dot double-density graphics into the print buffer. Any print command is required to print the line, after which the printer returns to normal processing mode. Double-density mode allows 0-576 dot columns for 80 mm paper (0-640 for 82.5 mm paper). The number of bytes sent is represented by the formulas in the table. Each bit corresponds to one horizontal dot. Compare to Set Bit Image Mode (1B 2A, m=1) earlier in this document.

ASCII ESC Y *n1 n2 d1 ... dn*
Hexadecimal **1B 59** *n1 n2 d1 ... dn*
Decimal 27 89 *n1 n2 d1 ... dn*

Value of *n*

Value of <i>n</i> (8-Dot Single Density Mode)	Value of <i>n</i> (24-Dot Single Density Mode)	Value of <i>d</i>
$n1 + (256 \times n2)$	$3 \times [n1 + (256 \times n2)]$	Number of Bytes of Data (Printed Down, Then Across)

Formulas

See the above table.

12.10 Logo commands

SELECT THE CURRENT LOGO

Selects a logo to be defined or printed. The active logo n remains in use until this command is sent again with a different logo n .

When this command precedes a logo definition, that definition is stored in flash or RAM memory as logo n . If the logo is saved to flash (see command 1D 22 n), if there is already a different definition in flash memory for logo n , the first is inactivated and the new definition is used. The inactive definition is not erased from flash and continues to take up space in flash memory.

When this command precedes a logo print command and n is different from the previously active logo selected, the printer retrieves the logo definition for n from memory and prints it. If there is no definition for logo n , then no logo is printed.

In the case of a previously existing application that expects only one possible logo, the printer will not receive the Select Current Logo (1D 23 n) command. In this case, the printer assigns 0 as the active logo identifier. It automatically stores any new logo definition in memory as logo 0, inactivating any previous logo 0 definition. If the flash memory space available for logos fills up with inactive logo 0 definitions, the firmware erases the old definitions at the next power cycle. This is the only case in which the printer erases flash memory without an application command.

In the case of a new application using multiple logos, the Select Current Logo (1D 23 n) command is used. After that, the printer no longer automatically erases the logo definition flash memory page when it fills with multiple definitions. A new application using multiple logos, writing a user-defined character set into flash memory, or both, is responsible for erasing the logo and user-defined character set flash memory page when the logo area is full or before a new character set is defined.

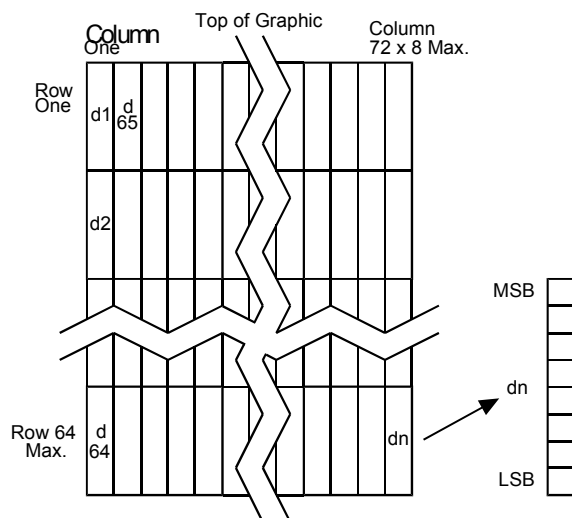
ASCII	GS # n
Hexadecimal	1D 23 n
Decimal	29 35 n
Range of n	0 – 255

DEFINE DOWNLOADED BIT IMAGE

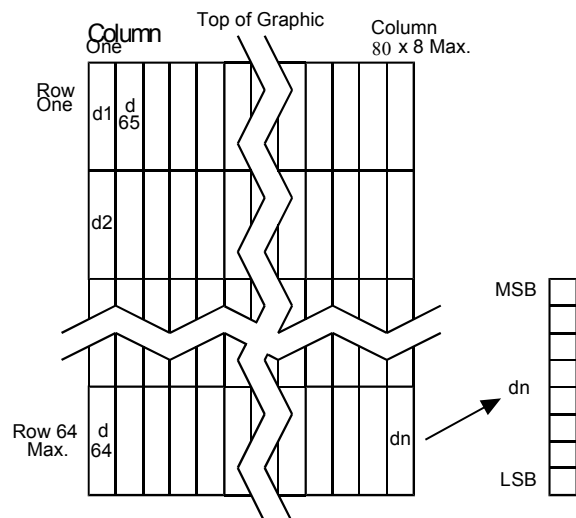
Enters a downloaded bit image (such as a logo) into RAM or Flash with the number of dots specified by $n1$ and $n2$. The downloaded bit image is available until power is turned off, another bit image is defined, or either Initialize Printer (1B 40), command is received.

See the illustration below for a graphic representation of the downloaded bit image.

80 mm paper



82.5 mm paper



ASCII GS * $n1$ $n2$ $d1$... dn
Hexadecimal 1D 2A $n1$ $n2$ $d1$... dn
Decimal 29 42 $n1$ $n2$ $d1$... dn

Value of n

80 mm paper

Value of $n1$	Value of $n2$	Value of d
1-72 (8 x $n1$ = Number of Horizontal Dot Columns)	1-64 (Number of Vertical Bytes) ¹	Bytes of Data (Printed Down, Then Across)

¹The number of bytes sent is represented by the following formula:
 $n = 8 \times n1 \times n2$ ($n1 \times n2$ must be less than or equal to 4608).

82.5 mm paper

Value of $n1$	Value of $n2$	Value of d
1-80 (8 x $n1$ = Number of Horizontal Dot Columns)	1-64 (Number of Vertical Bytes) ¹	Bytes of Data (Printed Down, Then Across)

¹The number of bytes sent is represented by the following formula:
 $n = 8 \times n1 \times n2$ ($n1 \times n2$ must be less than or equal to 5120).

Exceptions

See the illustration for the Print Downloaded Bit Image command (1D 2F) for a representation of the bit image.

DOWNLOAD BMP LOGO

Enters a downloaded BMP logo into RAM or Flash.

The downloaded BMP logo can be printed by using the Print Downloaded Image (1D 2F n) command.

To download a BMP file to save it as a logo, send the ESC (1Bh) character followed by the whole BMP file.

The printer decodes the BMP file header and will save the image data after checking important parameters, such as :

- Width
- Height
- Number of colors (only monochrome images are accepted)

ASCII	ESC	"BMP file"
Hexadecimal	1B	"BMP file"
Decimal	27	"BMP file"

Value Maximum width = 576 for 80 mm paper, 640 for 82.5 mm paper.
Maximum height = 512 for both 80 mm paper and 82.5 mm paper.

Exceptions

BMP file images that are not monochrome are ignored.

Related Information

Microsoft BMP bitmap file format.

See command "Return Logo Checksum" (1F 65 n)

PRINT DOWNLOADED BIT IMAGE

Prints the downloaded bit image in RAM or Flash at a density specified by *m*. It is ignored if any data is in the print buffer, if the downloaded bit image is undefined.

See the illustration on the previous page for a representation of the bit image.

ASCII	GS / <i>m</i>
Hexadecimal	1D 2F <i>m</i>
Decimal	29 47 <i>m</i>

Value and Range of *m*

Value of <i>m</i>	Print Mode	Vertical DPI ¹	Horizontal DPI*
0	Normal	203	203
1	Double Wide	203	101
2	Double High	101	203
3	Quadruple	101	101

¹Dot density measured in dots per inch

RETURN LOGO CHECKSUM

Returns the checksum of a logo downloaded using “download BMP logo” or with “Define Downloaded Bit Image”.

ASCII	US e n
Hexadecimal	1F 65 n
Decimal	31 101 n

Returns 4 Bytes :

Command ID + Flag + checksum of the logo specified by n.

Byte 1 = 65h

Byte 2 = 01- if logo n exists
00- if logo n doesn't exist

Byte 3 = Checksum (LSB) or 00h if logo n doesn't exist.

Byte 4 = Checksum (MSB) or 00h if logo n doesn't exist.

Checksum is two's complement of sum of all bytes in the download sequence.

Ex : Checksum = $-(0x1B + 0x42 + 0x4D + \dots)$
for BMP logos

Checksum = $-(0x1D + 0x2A + \dots)$

for the “Defined Downloaded Bit Image” command.



12.11 Sensor commands

SELECT SENSORS TO STOP PRINTING

Selects the paper sensor used to detect when the paper is out. The printer finishes printing the current line and feeds the paper before stopping.

ASCII ESC c 4 *n*
Hexadecimal **1B 63 34** *n*
Decimal 27 99 52 *n*

Value of *n* Sensor status

		Logical combination of bit1, bit 0	
Bit	Sensor	00	01 or 10 or 11
0-1	Receipt Paper Near-End	Disabled for paper out detection	Enabled for paper out detection

Bits 2- 7 are unused

Default 0

STORE SELECTED SENSOR THRESHOLD

This command will set the threshold value of the selected sensor.

ASCII GS s *m n*
Hexadecimal **1D 73** *m n*
Decimal 29 115 *m n*

Operand: *m* = sensor select
 n = threshold value

Limit: Decimal: $0 \leq m \leq 3$
 $0 \leq n \leq 255$

 Hex: $00 \leq m \leq 03$
 $00 \leq n \leq FF$

Default: Decimal: *n* = 128
 Hex: *n* = 80

"GS s" OPERAND DEFINITION		
<i>m</i>		Sensor
Decim al	Hex	
0	00	Paper out
1	01	Paper low
2	02	Reserved
3	03	Cutter exit

Note: This command will be ignored if the current printer configuration is set to use the selected sensor for printer operation.



12.12 Printer Status Commands

These commands enable the printer to communicate with the host computer. They are stored in the printer's data buffer as they are received, and are handled by the firmware in the order in which they were received. When a fault occurs, the printer will go busy at the communication interface and not respond to either of the Printer Status commands. If the fault causing the busy condition can be cleared, such as by loading paper, or letting the thermal printhead cool down, the printer will resume processing the data in its receive buffer.

Real Time commands allow the printer to function when it is busy at the communication interface. See the following section, Real Time Commands, for details about these commands.

TRANSMIT PAPER SENSOR STATUS

Sends status data to the host computer. The printer sends one byte to the host computer when it is not busy or in a fault condition. See the following table.

ASCII ESC v
Hexadecimal **1B 76**
Decimal 27 118

Values

Status Byte			
Bit	Function	0 Signifies	1 Signifies
0	Receipt Paper	Present	Low (only if paper low sensor is enabled)
1	Receipt Cover	Closed	Open
2	Receipt Paper	Present	Out
3	Knife Position	Home Position	Not Home Position
4	Not Used	Fixed to Zero	Fixed to Zero
5	Temperature	In valid range	Too hot or too cold
6	Voltage	In valid range	Too high or too low
7	Not Used	Fixed to Zero	Fixed to Zero

Related Information

See Busy Line and Fault Conditions in the Real Time Commands section of this document for details about fault condition reporting.

BUFFERED STATUS TRANSMISSION

Returns the selected status when this command is processed as normal printer data.

ASCII	US v n	Operand:	n = status select
Hexadecimal	1F 76 n	Limit:	Decimal: n = 5 or n=7
Decimal	31 118 n	Hex:	n = 05 or n= 07

“US v” RETURNED STATUS DEFINITION n = 5: PRINthead STATUS (Two bytes are returned)			
1 st byte Bit	Function	Value	
		0	1
0	Status for dots 0-63	OK	Damaged
1	Status for dots 64-127	OK	Damaged
2	Status for dots 128-191	OK	Damaged
3	Status for dots 192-255	OK	Damaged
4	Status for dots 256-319	OK	Damaged
5	Status for dots 320-383	OK	Damaged
6	Status for dots 384-447	OK	Damaged
7	Status for dots 448-511	OK	Damaged

2 nd byte Bit	Function	Value	
		0	1
0	Status for dots 512-575	OK	Damaged
1	Status for dots 576-639	OK	Damaged
2 to 7	Unused	Fixed to zero	

“US v” RETURNED STATUS DEFINITION n = 7: PRINthead STATUS (80 bytes are returned)			
1 st byte Bit	Function	Value	
		0	1
0	Status for dot 0	OK	Damaged
1	Status for dot 1	OK	Damaged
...
7	Status for dot 7	OK	Damaged

2 nd byte Bit	Function	Value	
		0	1
0	Status for dot 8	OK	Damaged
1	Status for dot 9	OK	Damaged
...
7	Status for dot 15	OK	Damaged

80 th byte Bit	Function	Value	
		0	1
0	Status for dot 632	OK	Damaged
1	Status for dot 633	OK	Damaged
...
7	Status for dot 639	OK	Damaged

TRANSMIT PRINTER ID

Transmits the printer model, type of version as defined below. This command is processed as normal printer data.

ASCII GS I *n*
Hexadecimal 1D 49 *n*
Decimal 29 73 *n*

Operand: *n* = printer ID select
 Limit: Decimal: $1 \leq n \leq 2; 49 \leq n \leq 50$
 Hex: $01 \leq n \leq 02; 31 \leq n \leq 32$

“GS I” OPERAND AND RETURNED STATUS DEFINITION				
<i>n</i>		Printer ID	Function	Value (hex)
Decimal	Hex			
1, 49	01, 31	Printer Model ID	OPTIBOARD	30
2, 50	02, 32	Type ID	See table below	
66	42	Manufacturer	AXIOHM	
67	43	Printer Name	OPTIBOARD	
68	44	Serial Number	Depends on serial number	

Bit	Function	Value	
		0	1
0	2-byte character code	Not installed	Installed
1	Knife	No knife	Installed
2	Reserved	-	-
3	Undefined		
4	Fixed	Always 0	-
5	Undefined		
6	Undefined		
7	Fixed	Always 0	-

Note: for *n* = 66 , 67, 68, the printer response is sent back in the following format :
 Header = 5F (hex)
 Data = ASCII string
 NULL = 00 (hex)

TRANSMIT PRINTER ID, REMOTE DIAGNOSTICS EXTENSION

Performs the remote diagnostic functions specified by *n*.

Each returned message is defined as: *n* + data + <CR>

ASCII GS I @ *n*

Hexadecimal 1D 49 40 *n*

Decimal 29 73 64 *n*

Values of *n* Refer to table

Value of <i>n</i>		Remote diagnostic item	Function
Hex	Dec		
20	32	Serial #, 10 digit ASCII	Write to NVRAM Example, send 14 bytes to printer: GS I @ 0x20 1234567890
21	33	Serial #	Write to NVRAM, and print on receipt to verify Example, send 14 bytes to printer: GS I @ ! 1234567890 This will print on receipt: Serial # written: 1234567890
23	35	Serial #	Return Serial #, preceded by <i>n</i> to identify Printer returns 12 bytes in above example: #1234567890<CR>
24	36	Class/model #, 15 digit ASCII	Write to NVRAM
25	37	Class/model #	Write to NVRAM, and print on receipt to verify
27	39	Class/model #	Return Class/model #, returns 17 bytes
2B	43	Boot firmware part #, 12 digit ASCII	Return Boot firmware part #, returns 14 bytes
2F	47	Boot firmware CRC, 4 digit ASCII	Return Boot firmware CRC, returns 6 bytes
33	51	Flash firmware part #, 12 digit ASCII	Return Flash firmware part #, returns 14 bytes
37	55	Flash firmware CRC, 4 digit ASCII	Return Flash firmware CRC, returns 6 bytes
80	128	Receipt lines tally, 8 digit ASCII numeric, max 99,999,999	Write to NVRAM Example, send 12 bytes to printer: GS I @ Ç00010000 To set receipt lines tally to 10,000
81	129	Receipt lines tally	Write to NVRAM, and print on receipt to verify Example, send 12 bytes to printer: GS I @ ü00010000 This will print on receipt: Receipt tally written: 10,000
82	130	Receipt lines tally	Clear receipt lines tally to 0

Value of <i>n</i>		Remote diagnostic item	Function
Hex	Dec		
83	131	Receipt lines tally	Return receipt lines tally, preceded by <i>n</i> to identify Printer returns 10 bytes in above example: â00010000<CR>
84	132	Knife cut tally, 8 digit ASCII numeric, max 99,999,999	Write to NVRAM
85	133	Knife cut tally	Write to NVRAM, and print on receipt to verify
86	134	Knife cut tally	Clear knife cut tally to 0
87	135	Knife cut tally	Return knife cut tally, returns 10 bytes
90	144	Hours on tally, 8 digit ASCII numeric, max 99,999,999	Write to NVRAM
91	145	Hours on tally	Write to NVRAM, and print on receipt to verify
92	146	Hours on tally	Clear Hours on tally to 0
93	147	Hours on tally	Return Hours on tally, returns 10 bytes
97	151	Boot firmware version	Return Boot firmware version, returns 6 bytes
A3	163	Flash firmware version	Return Flash firmware version, returns 6 bytes
A4	164	Flash cycles tally, 8 digit ASCII numeric, max 99,999,999	Write to NVRAM
A5	165	Flash cycles tally	Write to NVRAM, and print on receipt to verify
A6	166	Flash cycles tally	Clear Flash cycles cut tally to 0
A7	167	Flash cycles tally	Return Flash cycles cut tally, returns 10 bytes
A8	168	Knife jams tally, 8 digit ASCII numeric, max 99,999,999	Write to NVRAM
A9	169	Knife jams tally	Write to NVRAM, and print on receipt to verify
AA	170	Knife jams tally	Clear Knife jams tally to 0
AB	171	Knife jams tally	Return Knife jams tally, returns 10 bytes
AC	172	Cover openings tally, 8 digit ASCII numeric, max 99,999,999	Write to NVRAM
AD	173	Cover openings tally	Write to NVRAM, and print on receipt to verify
AE	174	Cover openings tally	Clear Cover openings tally to 0
AF	175	Cover openings tally	Return Cover openings tally, returns 10 bytes
B2	178	MAX Temperature tally	Set MAX temp tally to -273
B3	179	MAX Temperature tally	Return Temperature tally

SELECT OR CANCEL UNSOLICITED STATUS MODE (USM)

Selects whether the printer is to automatically return a 4 bytes status string whenever the status changes.

ASCII GS a *n*
Hexadecimal **1D 61** *n*
Decimal 29 97 *n*

Value of n : 0 turns mode off
 Any non-zero value turns mode on

Default : *n* = 0 (USM disabled)

Byte 1 = Printer information
 Byte 2 = Error information
 Byte 3 = Paper information
 Byte 4 = Paper information

This command uses the same sequence as older ASB (Auto Status Back) but has the following differences:

- The parameter *n* is an on/off switch. It does not select trigger subset
- There is no immediate return when this mode is turned on

Any change in any of the following conditions will trigger the USM response

- Receipt Cover
- Knife Error
- Out of range Printhead Temperature
- Out of range Voltage
- Paper exhaust Status
- Flow Control
- Paper Feed Button Status

"GS a" RETURNED STATUS DEFINITION			
BYTE 1: PRINTER STATUS			
Bit	Function	Value	
		0	1
0	fixed	Always 0	-
1	fixed	Always 0	-
2	reserved		
3	Printer Busy	Not Busy	Busy
4	fixed	-	Always 1
5	Cover Position	Closed	Open
6	Feed Switch	No Media Feed	Media Feeding
7	fixed	Always 0	-

“GS a” RETURNED STATUS DEFINITION BYTE 2: ERROR STATUS			
Bit	Function	Value	
		0	1
0	undefined		
1	undefined		
2	undefined		
3	Cutter Error Status	OK	Failure
4	fixed	Always 0	-
5	Reserved	-	-
6	Recoverable Error Status	OK	Failure
7	fixed	Always 0	-

“GS a” RETURNED STATUS DEFINITION BYTE 3: MEDIA SENSOR STATUS			
Bit	Function	Value	
		0	1
0	Media Low	Present	Low
1	Media Low	Present	Low
2	Media Out	Present	Out
3	Media Out	Present	Out
4	fixed	Always 0	-
5	undefined		
6	undefined		
7	fixed	Always 0	-

“GS a” RETURNED STATUS DEFINITION BYTE 4: COMMUNICATIONS STATUS			
Bit	Function	Value	
		0	1
0	undefined		
1	undefined		
2	undefined		
3	undefined		
4	fixed	Always 0	-
5	undefined		
6	undefined		
7	fixed	Always 0	-

Notes:

- All four bytes of status are always transmitted.
- Recoverable errors include cover open, paper out, temperature or voltage is out of range.
- This command is processed as normal printer data.
- When the printer is disabled by the Select Peripheral Device command (ESC =), this command is disabled. If this command was previously enabled, status will still be returned.

TRANSMIT STATUS

Transmits the status specified by n . This is a batch mode command which transmits the response after all prior data in the receive buffer has been processed. There may be a time lag between the printer receiving this command and transmitting the response, depending on the receive buffer status.

ASCII GS r n
Hexadecimal 1D 72 n
Decimal 29 114 n

Value of n 1, 49 = printer status
 2, 50 = Reserved
 4, 52 = Flash memory User Sector status

The status bytes to be transmitted are described in the following two tables.

Printer Status ($n = 1$ or $n = 49$)				
Bit	Off/On	Hex	Decimal	Status for Transmit Status
0	Off	00	0	Paper present.
	On	01	1	Paper exhausted.
1	Off	00	0	Cover closed.
	On	02	2	Cover open.
2	Off	00	0	Paper present.
	On	04	4	Paper exhausted.
3	-	-	-	Undefined
4	Off	00	0	Not used. Fixed to off.
5	-	-	-	Undefined
6	-	-	-	Undefined
7	Off	00	0	Not used. Fixed to off.

Flash memory User Sector Status ($n = 4$ or $n = 52$)				
Bit	Off/On	Hex	Decimal	Status for Transmit Status
0	-	-	-	Undefined.
1	-	-	-	Undefined.
2	Off	00	0	Not Used. Fixed to off
3	Off	00	0	Flash Logo area adequate, definition stored
	On	08	8	Flash logo area not adequate
4	Off	00	0	Not used. Fixed to off.
5	Off	00	00	No user-defined characters written to Flash
	On	20	32	User-defined characters written to Flash
6	Off	00	0	Not used. Fixed to off.
7	-	-	-	Undefined.

Exceptions

When n is out of the specified range, the command is ignored.

RETURN SRAM SIZE

Returns the size of SRAM on board

ASCII GS BS
Hexadecimal 1D 08
Decimal 29 08

The size in kbytes is returned as a zero terminated ASCII string

RETURN CPU FREQUENCY

Returns the CPU frequency in MHz

ASCII GS HT
Hexadecimal 1D 09
Decimal 29 09

The frequency is returned as a zero terminated ASCII string

VOLTAGE AND TEMPERATURE MONITORING

Returns the results of latest voltage and temperature measurements.

ASCII US LF n
Hexadecimal 1F 0A n Limit: Decimal: $132 \leq n \leq 133$
Decimal 31 10 n Hex: $84 \leq n \leq 85$

Always returns 7 Bytes :
 Command ID + zero terminated ASCII string.

RETURNED STATUS DEFINITION <i>n</i> = 0x84: Read Voltage (in Volt)		
Byte	Function	Value
0	Command Id	0x84
1-5	ASCII string	
6	End of String	0x00

RETURNED STATUS DEFINITION <i>n</i> = 0x85: Read Printhead Temperature (in °C)		
Byte	Function	Value
0	Command Id	0x85
1-5	ASCII string	
6	End of String	0x00



SEND PRINTER SOFTWARE VERSION

The printer returns 8 bytes containing the boot and flash software version.

The first 4 bytes returned are an ASCII string for the boot version.

The second 4 bytes are an ASCII string for the flash version.

Example: the printer returns 1.072.15

This means the boot version is 1.07 and the flash version is 2.15

ASCII	US V
Hexadecimal	1F 56
Decimal	31 86



12.13 Real Time Commands

The Real Time commands provide an application interface to the printer even when the printer is not handling other commands.

- ◆ Real Time Status Transmission: GS (Hex 1D) Sequence and DLE (Hex 10) Sequence
- ◆ Real Time Request to Printer: GS (Hex 1D) Sequence and DLE (Hex 10) Sequence
- ◆ Real Time Printer Status Transmission

The original Printer Status commands, Transmit Printer Status (Hex 1B 76, ASCII ESC v) are placed in the printer's data buffer as they are received and handled by the firmware in the order in which they were received. If the paper exhausts while printing data that was in the buffer ahead of the status command, the printer goes busy at the communication interface and suspends processing the data in the buffer until paper is reloaded. This is true for all error conditions: knife home error, thermal printhead overheat, etc. In addition, there is no way to restart the printer after a paper jam or other error.

The Real Time commands are provided to overcome these restrictions.

RULES FOR USING REAL TIME COMMANDS

RS232 interface

Three situations must be understood when using real time commands :

1) The printer executes the Real Time command upon receiving it and will transmit status regardless of the condition of the host being ready to receive or not.

2) The printer transmits status whenever it recognizes a Real Time Status Transmission command sequence, even if that sequence happens to occur naturally within the data of another command, such as graphics data.

In this case the sequence will be processed both ways : as a real time command and as the graphics data it is intended to be when the graphics command is executed from the buffer. The result is that the host might receive status messages it has not requested.

3) If the printer is in error condition, meaning that the communication interface is likely to be busy, the host must be able to send the real time commands regardless of this busy state at the interface. Otherwise those commands wouldn't be received and processed.

These three situations generally preclude use of standard DOS drivers for the serial communication ports when using real time commands.

Applications should not let the buffer fill up with Real Time commands when the printer is busy at the communication interface. A busy condition can be determined by bit 3 of the response to GS ENQ or GS EOT 1 or DLE EOT 1. The reason for a particular busy condition can be determined by other responses to GS EOT n or DLE EOT n.

Although the printer responds to Real Time commands when it is busy, it will place them into the buffer behind any other data there, and flush them out in the order in which they were received. When the printer is busy due simply to buffer full (that is, it can't print data as fast as it can receive it), then data continues to be processed out of the buffer at approximately print speed and the Real Time commands will eventually get flushed out.



When the printer is busy due to an error condition, then data stops being processed of the buffer until the condition clears one way or another. In either case, but more quickly in the case of an error condition, the buffer can fill with Real Time commands.

When the DLE sequences are being used, the last byte stored when the buffer fills up could be the DLE code, with no room for the subsequent EOT or ENQ. When this lone DLE byte is finally processed out of the buffer it will be interpreted as a Clear Printer command.

Similarly, when the GS sequences are being used, the last byte stored when the buffer fills up could be the GS code, with no room for the subsequent EOT or ETX or ENQ. When this lone GS byte is finally processed out of the buffer it will use the next byte, whatever it is, as the second byte in its GS sequence.

To guard against this situation, the application must determine the cause of a busy condition and take appropriate action or pace the Real Time commands to avoid filling the buffer. There is a minimum of 256 bytes available in the printer's buffer when it goes busy.

USB interface

Real time commands are sent on endpoint 0x02 (BULK OUT).

Responses to real times commands are transmitted back to the host on endpoint 0x82 (BULK IN).

BUSY LINE AND FAULT CONDITIONS

If the printer is in error condition (cover is open, paper is exhausted...), the printer will still accept data, respond to the batch mode status commands (ESC v and ESC u) and not go busy until it actually tries to execute a print command. Then it will stay busy and stop processing data out of the receive buffer until the condition clears. It will respond to the Real Time commands as described below.



REAL TIME RECOVERY FROM FAULT

This command will select the recovery mode when a fault condition is detected by the printer. Any fault condition that prevents the printer from any printing function requires one of these commands to allow printing to resume.

	<u>DLE Sequence</u>	<u>GS Sequence</u>
ASCII	DLE ENQ <i>n</i>	GS ETX <i>n</i>
Hexadecimal	10 05 <i>n</i>	1D 03 <i>n</i>
Decimal	16 5 <i>n</i>	29 3 <i>n</i>

Operand: *n* = recovery mode

Limit: Decimal: $1 \leq n \leq 2$
Hex: $01 \leq n \leq 02$

“DLE ENQ” OPERAND DEFINITION		
<i>n</i>		Fault recovery mode
Decimal	Hex	
1	01	Restarts printing from the beginning of the line where a fault occurred, after recovering from the fault. Print settings that are normally preserved from line to line, such as character height and width, are still preserved with this operand.
2	02	Recovers from a fault after clearing the receive and print buffers. Print settings that are normally preserved from line to line, such as character height and width, are still preserved with this operand.

Notes:

- This command is equivalent to the ‘GS ETX’ command.
- This command will attempt recovery from any fault that prevents printing including jams and paper out.
- Recovering from a print head over temperature condition is only accomplished by waiting until the print head has returned to its operating temperature range.
- This command will be ignored until manual intervention has occurred to clear the fault condition. The indication of manual intervention for clearing paper out, paper jams, cutter fault consists of opening and closing the clamshell.

REAL TIME STATUS TRANSMISSION

Transmits the selected one byte printer status specified by n in Real Time according to the following parameters. This command includes two sequences: GS and DLE.

	<u>GS Sequence</u>	<u>DLE Sequence</u>
ASCII	GS EOT n	DLE EOT n
Hexadecimal	1D 04 n	10 04 n
Decimal	29 4 n	16 4 n

Value of n

- 1 = Transmit printer status
- 2 = Transmit offline status
- 3 = Transmit error status
- 4 = Transmit receipt paper status

Exceptions

The command is ignored if n is out of range.

Related Information

1 = Transmit Printer Status

Bit	Status	Hex	Decimal	Function
0	Off	00	0	Fixed to Off.
1	On	02	2	Fixed to On.
2	On	04	4	Fixed to On.
3	Off	00	0	Not busy at the communication interface.
	On	08	8	Printer is Busy at the communication interface.
4	On	10	16	Fixed to On.
5				Undefined.
6				Undefined.
7	Off	00	0	Fixed to Off.

REAL TIME STATUS TRANSMISSION (CONTINUED)

2 = Transmit OffLine Status

Bit	Status	Hex	Decima l	Function
0	Off	00	0	Fixed to Off.
1	On	02	2	Fixed to On.
2	Off	00	0	Cover closed.
	On	04	4	Cover open.
3	Off	00	0	Paper feed button is not pressed.
	On	08	8	Paper feed button is pressed.
4	On	10	16	Fixed to On.
5	Off	00	0	Printing not stopped due to paper condition.
	On	20	32	Printing stopped due to paper condition.
6	Off	00	0	No error condition.
	On	40	64	Error condition exists in the printer.
7	Off	00	0	Fixed to Off.

3 = Transmit Error Status

Bit	Status	Hex	Decima l	Function
0	Off	00	0	Fixed to Off.
1	On	02	2	Fixed to On.
2	Off	00	0	Fixed to Off.
3	Off	00	0	No knife error.
	On	08	8	Knife error occurred.
4	On	10	16	Fixed to On.
5	Off	00	0	No unrecoverable error.
	On	20	32	Unrecoverable error occurred.
6	Off	00	0	Thermal printhead temp. and power supply voltage are in range.
	On	40	64	Thermal print head temp. or power supply voltage are out of range.
7	Off	00	0	Fixed to Off

REAL TIME STATUS TRANSMISSION (CONTINUED)

4 = Transmit Receipt Paper Status

Bit	Status	Hex	Decimal	Function
0	Off	00	0	Fixed to Off
1	On	02	2	Fixed to On
2	Off	00	0	Paper adequate
	On	04	4	Paper low (if paper low sensor enabled)
3	Off	00	0	Paper adequate
	On	08	8	Paper low (if paper low sensor enabled)
4	On	10	16	Fixed to On
5	Off	00	0	Paper present
	On	20	32	Paper exhausted
6	Off	00	0	Paper present
	On	40	64	Paper exhausted
7	Off	00	0	Fixed to Off

REAL TIME PRINTER STATUS TRANSMISSION

Transmits one byte status of the printer in real time.

ASCII GS ENQ
Hexadecimal 1D 05
Decimal 29 5

Value of Byte

Bit	Status	Hex	Decimal	Function
0	Off	00	0	Paper adequate.
	On	01	1	Paper low (if paper low sensor enabled).
1	Off	00	0	Paper adequate.
	On	02	2	Paper low (if paper low sensor enabled).
2	Off	00	0	Cover closed.
	On	04	4	Cover open.
3	Off	00	0	Not busy at the communication interface.
	On	08	8	Printer is busy at the communication interface.
4	On	10	16	Fixed to On.
5	Off	00	0	Fixed to Off.
6	Off	00	0	No error condition.
	On	40	64	Error condition exists in the printer.
7	On	80	128	Fixed to On.

Notes:

- Correct Voltage range is 20.8V ~ 28.5 V
- Correct Temperature range is -5°C ~ +60°C



12.14 Bar Code Commands

These commands format and print bar codes and are described in order of their hexadecimal codes.

SELECT PRINTING POSITION OF HRI CHARACTERS

Prints HRI (Human Readable Interface) characters above or below the bar code.

ASCII GS H *n*
Hexadecimal **1D 48** *n*
Decimal 29 72 *n*

Value of *n* Printing position
0 = Not printed
1 = Above the bar code
2 = Below the bar code
3 = Both above and below the bar code

Default 0 (Not printed)

SELECT PITCH OF HRI CHARACTERS

Select font used to print HRI characters.

ASCII GS f *n*
Hexadecimal **1D 66** *n*
Decimal 29 102 *n*

Value of *n* 0 = Standard Pitch at 15 CPI
1 = Compressed Pitch at 20 CPI

Default 0 (Standard Pitch at 15 CPI)

SELECT BAR CODE HEIGHT

Sets the bar code height to *n* dots or *n*/203 inch (*n*/8 mm).

ASCII GS h *n*
Hexadecimal **1D 68** *n*
Decimal 29 104 *n*

Value of *n* Number of dots
Range of *n* 1-255
Default 216

PRINT BAR CODE

Selects the bar code type and prints a bar code for the ASCII characters entered. If the width of the bar code exceeds one line, the bar code is not printed.

There are two variations to this command. The first variation uses a NULL character to terminate the string; the second uses a length byte at the beginning of the string to compensate for the Code 128 bar code that can accept a NULL character as part of the data. With the second variation the length of byte is specified at the beginning of the string.

Bar codes can be aligned left, center, or right using the Align Positions command (1B 61).

The check digit is calculated for UPC and JAN (EAN) codes if it is not sent from the host computer. Six-character zero-suppressed UPC-E tags are generated from full 11 or 12 characters sent from the host computer according to standard UPC-E rules. Start/Stop characters are added for Code 39 if they are not included.

Rotated barcodes set with small modules (select bar code width command 1D 77 n , n=2 and PDF417 barcodes in any orientation are printed at low speed, for better readability.

	<u>First Variation</u>	<u>Second Variation</u>
ASCII	GS k <i>m d1...dk</i> NUL	GS k <i>m n d1...dn</i>
Hexadecimal	1D 6B <i>m d1...dk</i> NUL	1D 6B <i>m n d1...dn</i>
Decimal	29 107 <i>m d1 dk</i> NUL	29 107 <i>m n d1...dn</i>

(0 = End of command)

Exceptions

The command is only valid at the beginning of a line.
Illegal data cancels the command.

First Variation: Data string terminated with NULL Character

<i>m</i>	Bar Code	D	<i>n</i> , Length
0	UPC-A	48- 57 (ASCII numerals)	Fixed Length: 11, 12
1	UPC-E	48- 57	Fixed Length: 11, 12
2	JAN13 (EAN)	48- 57	Fixed Length: 12, 13
3	JAN8 (EAN)	48- 57	Fixed Length: 7,8
4	Code 39	48- 57, 65- 90 (ASCII alphabet), 32, 36, 37, 43, 45, 46, 47 (ASCII special characters) d1 = dk = 42 (start/stop code is supplied by printer if necessary)	Variable Length
5	Interleaved 2 of 5	48- 57	Variable Length (Even Number)
6	Codabar	65- 68, start code 48- 57, 36, 43, 45, 46, 47, 58	Variable Length
10	PDF 417	32-255	Variable Length

PRINT BAR CODE (CONTINUED)

Second Variation Length of Byte Specified at Beginning of String

The value of m selects the bar code system as described in the table.

The variable d indicates the character code to be encoded into the specified bar code system. See the table. If character code d cannot be encoded, the printer prints the bar code data processed so far, and the following data is treated as normal data.

m	Bar Code	D	n , Length
65	UPC-A	48- 57 (ASCII numerals)	Fixed Length: 11, 12
66	UPC-E	48- 57	Fixed Length: 11, 12
67	JAN13 (EAN)	48- 57	Fixed Length: 12, 13
68	JAN8 (EAN)	48- 57	Fixed Length: 7, 8
69	CODE39	48- 57, 65- 90 (ASCII alphabet), 32, 36, 37, 43, 45, 46, 47 (ASCII special characters) $d1 = dk = 42$ (start/stop code is supplied by printer if necessary)	Variable
70	Interleaved 2 of 5 (ITF)	48- 57	Variable (Even Number)
71	CODABAR (NW-7)	65- 68, start code 48- 57, 36, 43, 45, 46, 47, 58	Variable
72	Code 93	0-127	Variable
73	Code 128	0-105 $d1 = 103-105$ (must be a Start code) $d2 = 0-102$ (data bytes) (Stop code is provided by the printer)	Variable
75	PDF 417	0-255	Variable Length

SELECT BAR CODE WIDTH

Sets the bar code module to $n/203$ inch ($n/8$ mm).

ASCII GS w n
Hexadecimal 1D 77 n
Decimal 29 119 n

Value of n 2, 3, 4, 5, 6

Default $n=3$

Formulas

$n/203$ inch ($n/8$ mm).



12.15 Page Mode Commands

Page mode is one of two modes that the Optiboard controller uses to operate. Standard mode is typical of how most printers operate by printing data as it is received and feeding paper as the various paper feed commands are received. Page mode is different in that it processes or prepares the data as a “page” in memory before it prints it. Think of this as a virtual page. The page can be any area within certain parameters that you define. The page is printed using either the FF (0C) or the ESC FF (1B 0C) command. The Select Page Mode command (1B 4C) puts the printer into page mode. Any commands that are received are interpreted as page mode commands. Several commands react differently when in standard mode and page mode. The descriptions of these individual commands in this chapter indicate the differences in how they operate in the two modes.

PRINT AND RETURN TO STANDARD MODE

When printing is completed, values for Select Print Direction in Page Mode (ESC T) and Set Print Area in Page Mode (ESC W) and the position for buffering character data are set. Buffered data is not deleted from the printer.

The processed data is printed and the printer returns to standard mode. The developed data is deleted after being printed. For more information see Page Mode in this document.

ASCII	FF
Hexadecimal	0C
Decimal	12

Exceptions

This command is enabled only in page mode.

CANCEL PRINT DATA IN PAGE MODE

Deletes all the data to be printed in the “page” area. Any data from the previously selected “page” area that is also part of the current data to be printed is deleted.

ASCII	CAN
Hexadecimal	18
Decimal	24

Exceptions

This command is only used in page mode.

PRINT DATA IN PAGE MODE

Collectively prints all buffered data in the printing area.

After printing, the printer does not clear the buffered data and sets values for Select Print Direction in Page Mode (ESC T) and Set Print Area in Page Mode (ESC W), and sets the position for buffering character data.

ASCII	ESC FF
Hexadecimal	1B 0C
Decimal	27 12

Exceptions

This command is enabled only in page mode.

SELECT PAGE MODE

Switches from standard mode to page mode. After printing has been completed either by the Print and Return to Standard Mode (FF) command or Select Standard Mode (ESC S) the printer returns to standard mode. The developed data is deleted after being printed.

This command sets the position where data is buffered to the position specified by Select Print Direction in Page Mode (ESC T) within the printing area defined by Set Print Area in Page Mode (ESC W).

This command switches the settings for the following commands (which values can be set independently in standard mode and page mode) to those for page mode.

Set Right-Side Character Spacing (ESC SP)

Select 1/6-Inch Line Spacing (ESC 2)

Set Line Spacing (ESC 3)

It is possible only to set values for the following commands in page mode. These commands are not executed.

Select or Cancel 90 Degree Clockwise Rotation (ESC V)

Set Counter Clockwise Rotation (ESC DC2)

Select Justification (ESC a)

Select or Cancel Upside-Down Printing (1B 7B).

Set Left Margin (GS L)

Set Print Area Width (GS W)

ASCII	ESC L
Hexadecimal	1B 4C
Decimal	27 76

Exceptions

The command is enabled only when input at the beginning of a line

The command has no effect if page mode has previously been selected.

SELECT STANDARD MODE

Switches from page mode to standard mode. In switching from page mode to standard mode, data buffered in page mode are cleared, the printing area set by Set Print Area in Page Mode (ESC W) is initialized and the print position is set to the beginning of the line.

This command switches the settings for the following commands (the values for these commands can be set independently in standard mode and page mode) to those for standard mode:

Set Right-Side Character Spacing (ESC SP)

Select 1/6 Inch Line Spacing (ESC 2)

Set Line Spacing (ESC 3)

Standard mode is automatically selected when power is turned on, the printer is reset, or the Initialize Printer command (ESC @) is used.

ASCII ESC S

Hexadecimal **1B 53**

Decimal 27 83

Exceptions

This command is effective only in page mode.

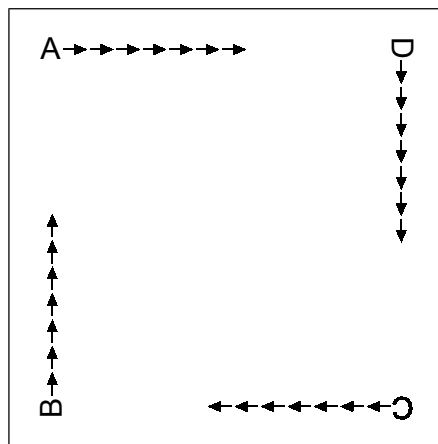
SELECT PRINT DIRECTION IN PAGE MODE

Selects the printing direction and start position in page mode. See the illustration.

The command can be sent multiple times so that several different print areas, aligned in different print directions, can be developed in the printer's page buffer before being printed using the Print Page Mode commands (FF or ESC FF).

ASCII ESC T *n*
Hexadecimal 1B 54 *n*
Decimal 27 84 *n*

Value of *n* Start position
 0 = Upper left corner proceeding across page to the right (A)
 1 = Lower left corner proceeding up the page (B)
 2 = Lower right corner proceeding across page to the left
 (upside down) (C)
 3 = Upper right corner proceeding down page (D)



Default 0

Exceptions

The command is valid only in page mode.

The command is ignored if the value of *n* is out of the specified range.

SET PRINT AREA IN PAGE MODE

Sets the position and size of the printing area in page mode.

The command can be sent multiple times so that several different print areas, aligned in different print directions, can be developed in the printer's page buffer before being printed using the Print Page Mode commands (FF or ESC FF).

ASCII ESC W *n1, n2 ...n8*
Hexadecimal **1B 57** *n1, n2 ...n8*
Decimal 27 87 *n1,n2 ...n8*

Range of *n* 0-255

Default *n1-4* = 0
 n5 = 64
 n6 = 2
 n7 = 64
 n8 = 2

Formulas

The starting position of the print area is the upper left of the area to be printed (x0, y0). The length of the area to be printed in the y direction is set to dy inches. The length of the area to be printed in the x direction is set to dx inches. Use the equations to determine the Value of x0, y0, dx, and dy.

See the illustration for a graphic representation of the printing area. For more information about the fundamental calculation pitch, see the Set Horizontal and Vertical Motion Units command (1D 50).

$x0 = [(n1 + n2 \times 256) \times (\text{horizontal direction of the fundamental calculation pitch})]$

$y0 = [(n3 + n4 \times 256) \times (\text{vertical direction of the fundamental calculation pitch})]$

$dx = [(n5 + n6 \times 256) \times (\text{horizontal direction of the fundamental calculation pitch})]$

$dy = [(n7 + n8 \times 256) \times (\text{vertical direction of the fundamental calculation pitch})]$

Keep the following notes in mind for this command.

The fundamental calculation pitch depends on the vertical or horizontal direction.

The maximum printable area in the x direction is 576/203 inches for 80 mm paper.

The maximum printable area in the x direction is 640/203 inches for 82.5 mm paper.

The maximum printable area in the y direction is 576/203 inches for 80 mm paper.

The maximum printable area in the y direction is 640/203 inches for 82.5 mm paper.

SET ABSOLUTE VERTICAL PRINT POSITION IN PAGE MODE

Sets the absolute vertical print starting position for buffer character data in page mode. The absolute print position is set to $[(nL + nH \times 256) \times (\text{vertical or horizontal motion unit})]$ inches.

The vertical or horizontal motion unit for the paper roll is used and the horizontal starting buffer position does not move.

The reference starting position is set by Select Print Direction in Page Mode (ESC T) and operates setting the absolute position in the vertical direction when the starting position is set to the upper left or lower right; and sets the absolute position in the horizontal when the starting position is set to the upper right or lower left. The horizontal and vertical motion unit are specified by the Set Horizontal and Vertical Minimum Motion Units (GS P) command.

The Set Horizontal and Vertical Minimum Motion Units (GS P) command can be used to change the horizontal and vertical motion unit. However, the value cannot be less than the minimum horizontal movement amount, and it must be in even units of the minimum horizontal movement amount.

ASCII	GS \$ <i>nL nH</i>
Hexadecimal	1D 24 <i>nL nH</i>
Decimal	29 36 <i>nL nH</i>

Formulas

$[(nL + nH \times 256) \times (\text{vertical or horizontal motion unit})]$ inches.

Exceptions

This command is effective only in page mode.

If the $[(nL + nH \times 256) \times (\text{vertical or horizontal motion unit})]$ exceeds the specified printing area, this command is ignored.

SET RELATIVE VERTICAL PRINT POSITION IN PAGE MODE

Sets the relative vertical print starting position from the current position. This command can also change the horizontal and vertical motion unit. The unit of horizontal and vertical motion is specified by this command.

This command functions as follows, depending on the print starting position set by Select Print Direction in Page Mode (ESC T):

When the starting position is set to the upper left or lower right of the printing area, the vertical motion unit (y) is used.

When the starting position is set to the upper right or lower left of the printing area, the horizontal motion unit (x) is used.

ASCII	<code>GS \ nL nH</code>
Hexadecimal	<code>1D 5C nL nH</code>
Decimal	<code>29 92 nL nH</code>

Value

The value for the horizontal and vertical movement cannot be less than the minimum horizontal movement amount, and, must be in even units of the minimum horizontal movement amount.

Formulas

The distance from the current position is set to $[(nL + nH \times 256) \times \text{vertical or horizontal motion unit}]$ inches.

For downward movement, pitch n is specified as :

$$n = nL + nH \times 256$$

For upward movement, $(nL + nH \times 256)$ is negative and pitch n is specified as :

$$n = 65536 - (nL + nH \times 256)$$

Exceptions

This command is used only in page mode, otherwise it is ignored.
Any setting that exceeds the specified printing area is ignored.



12.16 Macro Commands

These commands are used to select and perform a user-defined sequence of printer operations.

SELECT OR CANCEL MACRO DEFINITION

Starts or ends macro definition. Macro definition begins when this command is received during normal operation and ends when this command is received during macro definition. The macro definition is cleared, during definition of the macro when the Execute Macro (GS ^) command is received. Normal printing occurs while the macro is defined. When the power is turned on the macro is not defined. The defined contents of the macro are not cleared by the Initialize Printer (ESC @), thus, the Initialize Printer (ESC @) command may be used as part of the macro definition. If the printer receives a second Select or Cancel Macro Definition (GS :) command immediately after previously receiving a Select or Cancel Macro Definition (GS :) the printer remains in the macro undefined state.

ASCII	GS :
Hexadecimal	1D 3A
Decimal	29 58

Formulas

The contents of the macro can be defined up to 2048 bytes.

Exceptions

If the macro definition exceeds 2048 bytes, excess data is not stored.

EXECUTE MACRO

Executes a macro. After waiting for a specified period the printer waits for the Paper Feed Button to be pressed. After the button is pressed, the printer executes the macro once. The printer repeats this operation the number of specified times.

When the macro is executed by pressing the Paper Feed Button ($m = 1$), paper cannot be fed by using the Paper Feed Button.

ASCII $GS \wedge r t m$
Hexadecimal **1D 5E** $r t m$
Decimal $29\ 94\ r t m$

Value of r The number of times to execute the macro.

Value of t The waiting time for executing the macro.

Formulas

The waiting time is $t \times 100$ ms for every macro execution.

m specifies macro executing mode when the LSB (Least significant bit) $m = 0$

The macro executes r times continuously at the interval specified by t when the LSB (Least significant bit) of $m = 1$.

Exceptions

If this command is received while a macro is being defined, the macro definition is aborted and the definition is cleared.

If the macro is not defined or if r is 0, nothing is executed.



12.17 Flash Firmware Download Commands

These commands are used to load firmware into the printer.

There are two ways to enter the download mode.

1. While the printer is running normally, send the command, “Switch to Flash Download Mode (1B 5B 7D)” to leave normal operation and enter the download mode.
2. If the Flash is found corrupted during Level 0 diagnostics the download mode is automatically entered after the printer has reset.

The printer never goes directly from the download mode to normal printer operation. To return to normal printer operation either the operator must turn the power off and then on to reboot or the application must send a command to cancel download mode and reboot.

When each flash download command is received, the printer returns either ACK or NAK to the host computer when each command is received:

ACK (hexadecimal 06)

Sent when the printer has received a host transmission and has completed the request successfully.

NAK (hexadecimal 15)

Sent when a request is unsuccessful.

The commands are listed in numerical order according to their hexadecimal codes. Each command is described and the hexadecimal, decimal, and ASCII codes are listed.

Communicates to the printer information downloaded from applications. Data is downloaded to flash memory to query the state of the firmware, calculate the firmware CRC and other functions.



12.17.1 Firmware Download Sequence

By providing a set of low level commands, great freedom of implementation is given to customer application to customize the sequence to match its specific requirements.

Following is the description of the a typical Firmware download sequence.
Only the main steps are mentioned. Error checking and error recovery is not described :

- 1) Switch to Flash Download Mode
- 2) Check Flash Memory Size
- 3) Erase all Flash Memory sectors, except Boot Sector
- 4) Download Code to Active Flash Sector
 - 4.1) Select Flash memory sector #n (each sector contains 64kbytes)
 - 4.1.1) Program segment of N bytes
 - 4.1.2) if more segments, loop back to 4.1.1)
 - 4.2) if more sectors to program, loop back to 4.1)
- 5) Check Flash CRC
- 6) Reboot Printer

SWITCH TO FLASH DOWNLOAD MODE

Puts the printer in flash download mode in preparation to receive commands controlling the downloading of objects into flash memory. When this command is received, the printer leaves normal operation and can no longer print transactions until the Reboot the Printer command (1D FF) is received or the printer is rebooted.

This command does not affect the current communication parameters. Once the printer is in flash download mode, this command is no longer available.

ASCII	ESC [}
Hexadecimal	1B 5B 7D
Decimal	27 91 125

Related Information

See Entering Flash Download Mode elsewhere in this book to put the printer in flash download mode using the Configuration Menu.

RETURN FLASH MEMORY SIZE

Returns the size of the flash used. There may be 8 or 16 sectors (64K each) in flash memory. This command assures that the firmware to be downloaded is the appropriate size for flash memory.

ASCII	GS SOH
Hexadecimal	1D 01
Decimal	29 1

The returned value corresponds to the highest sector number that can be accepted by the Select Sector to Download (1D 02 *nn*) command. :

7 = 512 kbytes Flash

15 = 1 Mbyte Flash

Exceptions

Available only in download mode.



SELECT FLASH MEMORY SECTOR TO DOWNLOAD

Selects the flash sector (nn) for which the next download operation applies. The values of the possible sector are restricted, depending upon the flash part type. The printer transmits an ACK if the sector number is acceptable or an NAK if the sector number is not acceptable. Sector numbers start at 0

ASCII GS STX *nn*
Hexadecimal **1D 02** *nn*
Decimal 29 2 *nn*

Value and Range of *n* 0-7 = 512k bytes Flash
 0-15 = 1M bytes Flash

Exceptions

Available only in download mode.

GET FLASH FIRMWARE CRC STATUS

Causes the printer to calculate the CRC for the Flash firmware code space and transmits the result. This is performed normally after downloading completely a new firmware to verify that the downloaded firmware is valid

The printer transmits ACK if the calculated CRC is correct; NAK if the CRC is incorrect

ASCII GS ACK
Hexadecimal **1D 06**
Decimal 29 6

RETURN BOOT SECTOR CRC

Returns the CRC calculated over the boot sector code space.

ASCII GS BEL
Hexadecimal **1D 07**
Decimal 29 7

Formulas

ACK <low byte> <high byte>



ERASE ALL FLASH CONTENTS EXCEPT BOOT SECTOR

Causes the entire flash memory to be erased.

The printer returns ACK if the command is successful; NAK if it is unsuccessful.

ASCII	GS SO
Hexadecimal	1D 0E
Decimal	29 14

Exceptions

Available only in download mode.

RETURN MAIN PROGRAM FLASH CRC

Returns the CRC calculated over the flash firmware code space. The format of the response is ACK <low byte> <high byte>.

ASCII	GS SI
Hexadecimal	1D 0F
Decimal	29 15

ERASE SELECTED FLASH SECTOR

Erases the previously selected sector. The printer transmits ACK when the sector has been erased. If the previous sector is not successfully erased, or if no sector was selected, the printer transmits NAK.

ASCII	GS DLE <i>n</i>
Hexadecimal	1D 10 <i>n</i>
Decimal	29 16 <i>n</i>

Value and Range of <i>n</i>	0-7 = 512k bytes Flash
	0-15 = 1M bytes Flash

Exceptions

Available only in download mode.

DOWNLOAD TO ACTIVE FLASH SECTOR

Contains a start address ($ah \times 256 + al$) and count ($ch \times 256 + cl$) of binary bytes to load into the selected sector, followed by that many bytes. The start address is relative to the start of the sector. Addresses run from 0 to 64K.

The printer may return one of several responses. ACK means that the data was written correctly and the host should transmit the next block. NAK means that, for some reason, the data was not written correctly. This could mean that communications failed or that the write to flash failed. The alternatives seem to be to retry the block or halt loading and assume a hardware failure.

ASCII GS DC1 *al ah cl ch d1...dn*
Hexadecimal **1D 11** *al ah cl ch d1...dn*
Decimal 29 17 *al ah cl ch d1...dn*

Value of *al* = low byte of the address, must be even

Value of *ah* = high byte of the address

Value of *cl* = low byte of the count, must be even

Value of *ch* = high byte of the count

Value of *d* = data bytes, from 2 to *n* (always even)

Value of <i>n</i> (for number of data bytes)	Range of Address (<i>al ah</i>)	Range of Count (<i>cl ch</i>)
$((ch \times 256) + cl)$	0000-FFFF (hexadecimal)	0002-FFFF (hexadecimal)

Range Addresses run from 0 to 64K.

Related Information

Available only in download mode.



12.17.3 Boot Download

SET NEW BOOT CODE SIZE

Set the size for next boot code to be downloaded.

ASCII	US ACK <i>n</i>
Hexadecimal	1F 06 <i>n</i>
Decimal	31 06 <i>n</i>

Value and Range of *n* 0-2

0 = 16 kbytes

1 = 32 kbytes

2 = 24 kbytes

Default 1 (32 kbytes)

Exceptions

Available only in download mode.

SET BOOT CODE DOWNLOAD SAFETY

Enable or disable Boot signature check during boot download.

ASCII	US ACK <i>n</i>
Hexadecimal	1F 06 <i>n</i>
Decimal	31 06 <i>n</i>

Value and Range of *n* 0- disable sigature check
1- enable sigature check

Default 1

Exceptions

Available only in download mode.

ERASE BOOT SECTOR + DOWNLOAD NEW BOOT CODE

Wait for new boot code to be downloaded, then if CRC on this new boot code is valid, boot code sector is erased and reprogrammed with new code.

Printer automatically reboot after program sequence is complete.

ASCII US SOH *d1 .. dn*

Hexadecimal **1F 01** *d1 .. dn*

Decimal 31 01 *d1 .. dn*

Value and Range of *n* Size of boot code set with command 1F 06 *n*

Exceptions

Available only in download mode.

Note: During erase and download sequence, power supply must be maintained at all times and no reset sequence should be performed



12.18 User Flash Memory Commands

SELECT MEMORY TYPE (SRAM/FLASH) WHERE TO SAVE LOGOS OR USER-DEFINED FONTS

Specifies whether to load the logos or user-defined characters to flash memory or to RAM (volatile memory). The selection remains in effect until it is changed via this command or until the power cycles.

ASCII	GS " <i>n</i>
Hexadecimal	1D 22 <i>n</i>
Decimal	29 34 <i>n</i>
Value of <i>n</i>	48-51

n = 48 (ASCII *n* = 0)

Loads active logo to RAM only. This is used to print a special logo but not have it take up flash memory. A logo defined following this command is not preserved over a power cycle.

n = 49 (ASCII *n* = 1)

Loads active logo to flash memory. This is the default condition for logo flash storage. A logo defined following this command is stored in flash memory.

n = 50 (ASCII *n* = 2)

Loads user-defined characters to RAM only. This is the default condition for user-defined character storage. Any user-defined characters defined following this command are not preserved over a power cycle.

n = 51 (ASCII *n* = 3)

Loads user-defined characters to flash memory. An application must use this command to store user-defined characters in flash memory. Any user-defined characters defined following this command are stored in flash memory. A user-defined character cannot be redefined in flash memory. The flash memory page must be erased by an application before redefining user-defined characters. For more information, see the Erase User Flash Sector (1D 40 *n*) Command earlier in this section.

FLASH MEMORY USER SECTORS ALLOCATION

This command sets the allocation of flash sectors between user data storage and logos/user defined characters. This allocation is saved in the EEPROM of the printer and is therefore saved across power cycles.

ASCII GS " U n1 n2
Hexadecimal 1D 22 55 n1 n2
Decimal 29 34 85 n1 n2

Default value of n1 1 (see below)

Default value of n2 1 (see below)

n1 is the number of 64K sectors used for logos and user defined characters.

n2 is the number of 64K sectors used for user data storage.

$n1 + n2 \leq 3$ (512K flash memory)

$n1 + n2 \leq 11$ (1M flash memory)

If (n1 + n2) is greater than the maximum number of sectors available, the command is ignored.

Issuing this command with parameters different from current parameters will erase all sectors.

RETURN USER FLASH MEMORY ALLOCATION STATUS

Returns the amount of Flash memory available in user section.

ASCII US w n
Hexadecimal 1F 77 n
Decimal 31 119 n

Value of n 49

Returns the number of bytes available as a zero terminated ASCII string.

ERASE USER FLASH SECTOR

Erases a section of user flash memory and sends a carriage return when the operation is complete.

ASCII	GS @ n
Hexadecimal	1D 40 n
Decimal	29 64 n
Value of n	49-50

$n = 49$ (ASCII $n = 1$)

This command erases all 64K Flash memory sectors allocated to user-defined characters and logos storage. Those sectors should be erased in two situations: when the logo definition areas is full and an application is attempting to define new logos, and when an application wants to replace one user-defined character set with another. In both cases, all logos and character set definitions are erased and must be redefined.

$n = 50$ (ASCII $n = 2$)

This command erases all 64K Flash memory sectors allocated to user data storage.

Related Information

See command “Flash Memory User Sectors Allocation “1D 22 55 n1 n2”.

Important: While erasing flash memory, all communication is disabled. To provide feedback to the application, the printer responds to the application when the erase is complete. After sending the Erase User Flash Sector (1D 40 n) command, an application should wait for the response from the printer before sending data. Otherwise, data will be lost. If an application is unable to receive data, it should wait a minimum of five seconds after sending the Erase User Flash Sector (1D 40 n) command before sending data.

12.19 User Data Storage Commands

WRITE TO USER DATA STORAGE

Writes m bytes of data to the user data storage flash page at the address specified. The printer waits for m bytes of data following the 3-bytes address, *addr*.

ASCII	ESC ' m a2 a1 a0 d1...dm
Hexadecimal	1B 27 m a2 a1 a0 d1...dm
Decimal	27 39 m a2 a1 a0 d1...dm

Value of m : 0 – 255

Addr : $(65536 \times a2) + (256 \times a1) + a0$

If any of the memory locations addressed by this command are not currently erased, the command is not executed.

READ FROM USER DATA STORAGE

Reads m bytes of data to the user data storage flash page at the address specified.

ASCII	ESC 4 m a2 a1 a0
Hexadecimal	1B 34 m a2 a1 a0
Decimal	27 52 m a2 a1 a0

Value of m : 0 – 255

Addr : $(65536 \times a2) + (256 \times a1) + a0$

12.20 Peripheral control commands

SELECT PERIPHERAL DEVICE (FOR MULTI-DROP)

Selects the device to which the host computer sends data.

ASCII ESC = n
Hexadecimal **1B 3D n**
Decimal 27 61 n

Value of n 0 (bit 0), device not selected
 1 (bit 0), device selected

Default 1 (bit 0), device selected

Related Information

Other bits of n (1-7) are undefined and ignored.

When the printer is disabled by this command, it ignores transmitted data until the printer is re-enabled by the same command.

ENABLE OR DISABLE PANEL BUTTON

Enables or disables the paper feed button by toggling the paper feed button on and off. Only the lowest bit is used to toggle the paper feed button. If the last bit is 0, the paper feed button is enabled. If the last bit is 1, the paper feed button is disabled.

ASCII ESC c 5 n
Hexadecimal **1B 63 35 n**
Decimal 27 99 53 n

Value of n 0 = Enable
 1 = Disable

Default 0 (Enable)

Exceptions

Functions that require the panel button cannot be used when it has been disabled with this command.

12.21 Transaction Monitoring Commands

The following commands are provided as tools to monitor actual transaction completion, by providing synchronisation mechanisms with cut commands.

PROCESS TICKET COUNTER

The ticket counter is a 16-bit counter in memory that gets incremented or cleared by sending a corresponding command to the printer.

ASCII US a n
Hexadecimal **1F 61 n**
Decimal 31 97 n

Value of n 01 Clear Ticket Counter
 02 Increment Ticket Counter

Note that this command may be used to monitor actual transaction completion, as it is synchronised with cut commands.

This means that if this command is sent immediately after a cut command, it won't be processed until the cut cycle is complete.

REQUEST TICKET COUNTER

Returns the contents of 16-bit Ticket Counter.

ASCII US b
Hexadecimal **1F 62**
Decimal 31 98

Returns 3 bytes : Command ID followed by the contents of Ticket Counter

Byte 1 = 62h
 Byte 2 = Ticket Counter (LSB)
 Byte 3 = Ticket Counter (MSB)

Range:

Decimal: 0 $\leq \text{Ticket Counter} \leq 65535$
 Hex: 0000 $\leq \text{Ticket Counter} \leq \text{FFFF}$

SET CUT TAG

The cut tag is a flag stored in memory, used to monitor ticket transactions completion.

Send this command prior to a cut command, and then monitor the result with command Request Cut Tag (1F 64)

Sets the cut tag to the value specified by *n*

ASCII	US c n
Hexadecimal	1F 63 n
Decimal	31 99 n

Value of *n* Cut tag value.

Range of *n* 0-255

REQUEST CUT TAG

Returns Cut Tag status.

ASCII	US d
Hexadecimal	1F 64
Decimal	31 100

Returns 2 bytes : Command ID followed by Cut Tag Status

Byte 1 = 64h

Byte 2 = Cut Tag Status

Once the Cut tag is set with command Set Cut Tag (1F 63 n), the Cut Tag Status returned depends on the next cut cycle :

CUT TAG STATUS	
situation	Returned value
cut cycle is not complete	0
cut cycle is complete	Value set with command 1F 63 n

12.22 CONFIGURATION COMMANDS

MAXIMUM POWER CONSUMPTION

Synopsis: Set Maximum Power parameter

Syntax: ASCII: US ETX EOT *n*
 Decimal: 31 3 4 *n*
 Hex: 1F 03 04 *n*

Operand: *n* = mode selection

Limit: See table below

Description: This command will store the maximum power setting in non-volatile memory.

Note:

SELECT MAXIMUM POWER CONSUMPTION OPERAND DEFINITION		
<i>N</i>		Mode
Decimal	Hex	
55	37	55 Watt
75	4B	75 Watt
90	5A	90 Watt

PAPER TYPE

Synopsis: Select paper type

Syntax: ASCII: US ETX A *n*
 Decimal: 31 3 143 *n*
 Hex: 1F 03 8F *n*

Operand: *n* = Paper type selection

Limit: Decimal: 0 -3
 Hex: 00-03

Description: This command allow to select a paper type.

SELECT PAPER TYPE		
<i>n</i>		Paper type
Decimal	Hex	
0	00	F380
1	01	KLS36
2	02	KP440
3	03	LSB130

PAPER WIDTH

Synopsis: Set Paper Width parameter

Syntax: ASCII: US ETX BS n
 Decimal: 31 3 8 n
 Hex: 1F 03 08 n

Operand: n = width selection

Limit: Decimal: $0 \leq n \leq 1$

Hex: $00 \leq n \leq 01$

Description: This command will store the paper width setting in non-volatile memory.

Note:

PAPER WIDTH OPERAND DEFINITION		
N		Mode
Decimal	Hex	
0	00	80 mm
1	01	82.5 mm

PRINthead SETTING

Synopsis: Set Print head setting

Syntax: ASCII: US ETX SOH n
 Decimal: 31 3 1 n
 Hex: 1F 03 01 n

Operand: n = mode selection

Limit: Decimal: $0 \leq n \leq 4$

Hex: $00 \leq n \leq 04$

Description: This command will store the print head setting in non-volatile memory.

Note: Print heads are classified in five ranks.

PRINthead SETTING OPERAND DEFINITION		
N		TYPE
Decimal	Hex	
0	00	A
1	01	B
2	02	C
3	03	D
4	04	E

MAX SPEED

Synopsis:	Setting Printer max speed							
Syntax:	ASCII:	US	FF	S	P	F	nL	nH
	Decimal:	31	12	83	80	70	nL	nH
	Hex:	1F	0C	53	50	46	nL	nH

Description: Sets the maximum printer peak speed.
This maximum speed is typically reached at low dot coverage.
Actual print speed decreases when dot coverage increases.

Max Speed = 256 x nH + nL

PRINT DENSITY

Synopsis:	Setting Print density						
Syntax:	ASCII:	US	VT	N	R	J	n
	Decimal:	31	11	83	80	69	n
	Hex:	1F	0B	4E	52	4A	n

Limit:	Decimal:	$70 \leq n \leq 150$
	Hex:	$46 \leq n \leq 96$

Description: Set the print density (energy applied to paper) in percent relative to nominal energy.

WARNINGS!!

Choose a print density setting no higher than necessary to achieve acceptable print density

Failure to observe this rule may result in a printer service call

Failure to observe this rule may void the printer warranty

Consult your Axiohm technical support specialist if you have questions

PRINthead PRE-HEATING MODE

Synopsis: Set Print head pre-heating mode

Syntax: ASCII: US ETX VT *n*
 Decimal: 31 3 11 *n*
 Hex: 1F 03 0B *n*

Operand: *n* = mode selection

Limit: Decimal: $0 \leq n \leq 1$
 Hex: $00 \leq n \leq 01$

Description: This command will store the printhead pre-heating option in non-volatile memory.

Note: When this mode is enabled, the controller monitors the printhead temperature and keeps it above 35°C

PRE-HEATING OPTION OPERAND DEFINITION		
<i>N</i>		Mode
Decimal	Hex	
0	00	Disabled
1	01	Enabled

KNIFE OPTION

Synopsis: Set Knife Option

Syntax: ASCII: US ETX STX *n*
 Decimal: 31 3 2 *n*
 Hex: 1F 03 02 *n*

Operand: *n* = mode selection

Limit: Decimal: $0 \leq n \leq 1$
 Hex: $00 \leq n \leq 01$

Description: This command will store the knife option in non-volatile memory.

Note:

KNIFE OPTION OPERAND DEFINITION		
<i>N</i>		Mode
Decimal	Hex	
0	00	Disabled
1	01	Enabled

PARTIAL CUT DISTANCE

Synopsis: Set Partial Cut distance parameter

Syntax: ASCII: US ETX LF n
 Decimal: 31 3 10 n
 Hex: 1F 03 0A n

Operand: n = width selection

Limit: Decimal: $0 \leq n \leq 4$
 Hex: $00 \leq n \leq 04$

Description: This command will store the partial cut distance parameter in non-volatile memory.

Note: This setting must be set to match the mechanism connected to the board, in order to get partial cut position matching the knife notch.

This setting is used to compensate for mechanical tolerances on parts involved in knife operation.

PARTIAL CUT DISTANCE OPERAND DEFINITION		
N		Mode
Decimal	Hex	
0	00	125 knife motor steps
1	01	130 knife motor steps
2	02	135 knife motor steps
3	03	140 knife motor steps
4	04	145 knife motor steps

PAPER LOW SENSOR OPTION

Synopsis: Set Paper Low Sensor Option

Syntax: ASCII: US ETX ETX n
 Decimal: 31 3 3 n
 Hex: 1F 03 03 n

Operand: n = mode selection

Limit: Decimal: $0 \leq n \leq 2$
 Hex: $00 \leq n \leq 02$

Description: This command will store the paper low sensor option in non-volatile memory.

Note:

PAPER LOW SENSOR OPTION OPERAND DEFINITION		
N		Mode
Decimal	Hex	
0	00	Disabled
1	01	Enabled (opto)
2	02	Enabled (switch)

DEFAULT LINES PER INCH SETTING

Synopsis: Set Default LPI setting

Syntax: ASCII: US ETX ð *n*
 Decimal: 31 3 148 *n*
 Hex: 1F 03 94 *n*

Operand: *n* = mode selection

Limit: Decimal: $0 \leq n \leq 2$
 Hex: $00 \leq n \leq 02$

Description: This command will store the lines per inch setting in non-volatile memory.

Note:

DEFAULT LPI SETTING OPERAND DEFINITION		
<i>N</i>		LPI
Decimal	Hex	
0	00	6
1	01	7.52
2	02	8.13

DEFAULT FONT

Synopsis: Set Default Font

Syntax: ASCII: US ETX SI *n*
 Decimal: 31 3 15 *n*
 Hex: 1F 03 0F *n*

Operand: *n* = mode selection

Limit: Decimal: $0 \leq n \leq 1$
 Hex: $00 \leq n \leq 01$

Description: This command will store the default font option in non-volatile memory.

Note:

DEFAULT FONT OPERAND DEFINITION		
<i>N</i>		Mode
Decimal	Hex	
0	00	Resident Font
1	01	User Defined Font

SET COMMUNICATION INTERFACE PARAMETERS

Synopsis: Setting communication parameters

Syntax:	ASCII:	US	STX	<i>n1</i>	<i>n2</i>	<i>n3</i>	<i>n4</i>	<i>n5</i>	<i>n6</i>
	Decimal:	31	2	<i>n1</i>	<i>n2</i>	<i>n3</i>	<i>n4</i>	<i>n5</i>	<i>n6</i>
	Hex:	1F	02	<i>n1</i>	<i>n2</i>	<i>n3</i>	<i>n4</i>	<i>n5</i>	<i>n6</i>

Description:

<u><i>n1</i></u>	<u>Interface</u>
00h	RS232
03h	USB

<u><i>n2</i>, bit [0..2]</u>	<u>RS232 Baudrate</u>
00h	1200
01h	2400
02h	4800
03h	9600
04h	19200
05h	38400
06h	57600
07h	115200

<u><i>n2</i>, bit 4</u>	<u>RS232 Number of stop bits</u>
0	1
1	2

<u><i>n2</i>, bit 5</u>	<u>RS232 Number of data bits</u>
0	8
1	7

<u><i>n3</i></u>	<u>RS232 Parity</u>
0x00	Odd parity
0x01	Even parity

<u><i>n4</i></u>	<u>RS232 Parity mode</u>
0x00	No parity
0x01	Enabled and set using parameter described above

<u><i>n5</i></u>	<u>RS232 Handshaking</u>
0x00	Xon/Xoff
0x01	DTR/DSR

<u><i>n6</i></u>	<u>RS232 Parity Error Processing</u>
0x00	Ignore
0x01	Print '?'

Notes:

1) This command is processed only in boot mode (see section 3.6.2).
If the printer is running in normal mode, send first command “switch to Boot Mode” (1B 5B 7D).

2) This command must be followed by “Printer Reset” command (1D FF).

SERIAL INTERFACE MODE

Synopsis: Set Serial Interface Mode

Syntax: ASCII: US ETX Ò *n*
 Decimal: 31 3 149 *n*
 Hex: 1F 03 95 *n*

Operand: *n* = mode selection

Limit: Decimal: $0 \leq n \leq 1$
 Hex: $00 \leq n \leq 01$

Description: This command will store the Serial Interface option in non-volatile memory.

Note:

SERIAL INTERFACE OPERAND DEFINITION		
<i>N</i>		Mode
Decimal	Hex	
0	00	RS232 levels
1	01	TTL levels

DIAGNOSTICS MODE

Synopsis: Set diagnostics mode

Syntax: ASCII: US ETX NUL *n*
 Decimal: 31 3 0 *n*
 Hex: 1F 03 00 *n*

Operand: *n* = mode selection

Limit: Decimal: $0 \leq n \leq 2$
 Hex: $00 \leq n \leq 02$

Description: This command will store the printer diagnostics mode in non-volatile memory.

Note: This mode is used to select a test mode

DIAGNOSTICS MODE OPERAND DEFINITION		
<i>N</i>		MODE
Decimal	Hex	
0	00	Normal operation
1	01	Data scope mode
2	02	Receipt print test

CARRIAGE RETURN MODE

Synopsis: Set carriage return mode

Syntax: ASCII: US ETX ô *n*
 Decimal: 31 3 147 *n*
 Hex: 1F 03 93 *n*

Operand: *n* = mode selection

Limit: Decimal: $0 \leq n \leq 1$
 Hex: $00 \leq n \leq 01$

Description: This command will store the carriage return Mode in non-volatile memory.

Note: This mode is used to select the processing of command Carriage Return (0D), in combination with Line Feed (0A)

CARRIAGE RETURN MODE OPERAND DEFINITION		
<i>N</i>		MODE
Decimal	Hex	
0	00	Print Command
1	01	Ignored

DEFAULT CODE PAGE

Synopsis: Set default code page

Syntax: ASCII: US ETX Ç *n*
 Decimal: 31 3 128 *n*
 Hex: 1F 03 80 *n*

Operand: *n* = code page selection

Limit: See table below

Description: This command will store the default code page in non-volatile memory.

Note: The default code page selects which code page will be initially used by the printer until it is changed using the “ESC R” or “ESC t” commands.

CODE PAGE OPERAND DEFINITION		
<i>n</i>		Code Page
Decimal	Hex	
0	00	437 : US
1	01	850 : Multilingual
2	02	852 : Slavic
3	03	860 : Portuguese
4	04	863 : Canadian – French
5	05	865 : Nordic
6	06	858
7	07	866
8	08	1252
9	09	862
10	0A	Katakana

RESET EEPROM

Synopsis: Reset EEPROM

Syntax: ASCII: US CR C L E *n*
 Decimal: 31 13 67 76 69 *n*
 Hex: 1F 0D 43 4C 45 *n*

Operand: *n* = security byte

Limit: *n* = 0

Description: This command will reset the non-volatile memory configuration items to their default values.

Notes: This command must be sent while the printer is in its normal operating mode.

Once the configuration parameters are downloaded to the printer using this command, the printer must be reset before they take effect.

Disabling the knife is not an option when a presenter is selected.

RESET EEPROM OPERAND DEFINITION		
<i>n</i>		Reset
Decimal	Hex	
0	00	Reset EEPROM



13 TROUBLESHOOTING

Axiohm printers are simple and generally trouble-free, but from time to time minor problems may occur.

Follow these procedures to determine the cause and resolution of any problems the printer may be having.

If the procedures in this section do not correct the problem, contact a service representative.

13.1 LED

Problem	Possible Causes	What to Do
LED, slow continuous flashing.	Paper out.	Put in a new paper roll.
	Cover off.	Put the cover on.
	Knife unable to home.	Contact your authorized service representative.
	Paper is low (where Paper Low Sensor is installed) Print head too hot Voltages out of range	Put in a new paper roll.
Flashes LED in various combinations.	These all indicate serious problems.	Contact your authorized service representative.
Double LED Flash	SRAM Test Failure	Contact your authorized service representative.
Triple LED Flash	EEPROM Test Failure	Contact your authorized service representative.
Continuous flashing of LED	- Main Program CRC Test Failure	Contact your authorized service representative.



13.2 Printing Problems

Problem	Possible Causes	What to Do
Colored stripe on the receipt.	Paper is low.	Change the paper.
Receipt does not come out all the way.	Paper is jammed.	Open the receipt cover, inspect the knife, and clear any jammed paper.
Printer starts to print, but stops while the receipt is being printed.	Paper is jammed.	Open the receipt cover, inspect the knife, and clear any jammed paper.
Receipt is not cut.	Paper is jammed.	Open the receipt cover, inspect the knife, and clear any jammed paper.
	The printer is not configured for a knife.	Contact your authorized service representative.
Print is light or spotty.	Paper roll loaded incorrectly.	Check that the paper is loaded properly.
	Thermal print head is dirty.	Use recommended thermal receipt paper.
	Variations in paper.	Increase print density in “Set Hardware Options” of printer Configuration Menu as needed.
Vertical column of print is missing.	This indicates a serious problem with the printer electronics.	Contact your authorized service representative.
One side of receipt is missing.	This indicates a serious problem with the printer electronics.	Contact your authorized service representative.

13.3 Printer Does Not Function

Problem	Possible Causes	What to Do
Printer does not function when turned on.	Printer not plugged in.	Check that printer cables are properly connected on both ends. Check that the host or power supply is getting power.
	Receipt cover not fully closed.	Close and latch the receipt cover.

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