7. Interfacing

Parallel Interfacing

Communication with a computer is accomplished through a parallel interface based on the Centronics standard.

Specifications:

- data transfer speed: 1000 cps minimum
- synchronization: external STROBE pulse
- logic levels: TTL
- handshaking: BUSY and $\overline{ACK}$ signals
- connector type: 57-30360 (AMPHENOL) or equivalent
- cable: use a shielded cable 2 meters or less in length.

When the printer is processing data, the BUSY signal is high. The printer will not accept new data from the computer. After the processing is completed, the BUSY signal goes low. (The BUSY signal is also high when the printer is OFF LINE). When the busy signal occurs, the $\overline{ACK}$ signal goes low indicating to the computer that the data has been processed and the printer is ready to accept more data. This handshaking routine occurs each time a character is sent to the printer.

	BUSY	SLCT	PO	ERROR
ON LINE	LOW	HIGH	LOW	HIGH
OFF LINE	HIGH	LOW	LOW	LOW
PAPER OUT	HIGH	LOW	HIGH	LOW

Printer Status Signals

Note: This is not a 57-30360 connector.
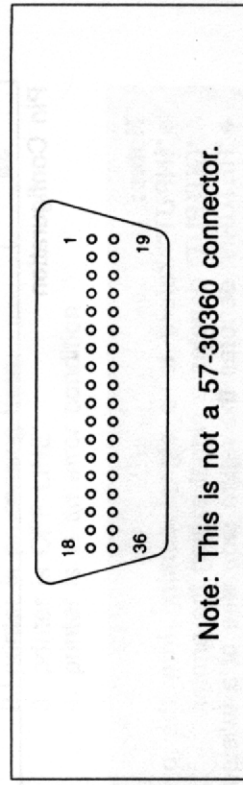
Parallel Interface Connector
(Printer side)

7-1

Pin Configuration

Signal pin	Return side pin	Signal	Directin
1	19	STB	Input
2	20	DATA 1	
3	21	DATA 2	
4	22	DATA 3	
5	23	DATA 4	Input
6	24	DATA 5	
7	25	DATA 6	
8	26	DATA 7	
9	27	DATA 8	
10	28	ACK	Output
11	29	BUSY	Output
12		PO	Output
13		SLCT	Output
14		AUTO FEED XT	Input
15			
16		SG	
17		FG	
18		+5 V	Output
31	30	PRIME	Input
32		ERROR	Output
33		SG	
34			
35			
36			

Notes:

- "INPUT" refers to a signal coming into the printer. "OUTPUT" denotes a signal exiting the printer.
- "RETURN" denotes the return side wire of a twisted pair cable and is connected to signal ground.
- All interface signals are at TTL levels.

Connector pin signals

STB...STROBE

- This is a synchronizing input signal to read data into the printer.
- This signal is normally high. Data is read in when it goes low.
- The pulse must be low for at least 1 microsecond.

DATA 1-DATA 8

- These are the input signals which carry the 8 data bits of information.
- The signal is read in synchronization with the STROBE pulse. A high level indicates a logical "1".
- The signal must be present 0.5 microsecond before and after the STROBE pulse.

ACK...ACKNOWLEDGE

- This is an output signal to the computer indicating that the printer is ready to receive the next block of data. It is sent out when the BUSY signal drops from high to low. Therefore, it can be thought of as a data request pulse.
- The signal is normally high. When the condition becomes true, the signal goes low.
- The ACK signal is automatically sent whenever the printer is switched ON LINE.

BUSY

- This output signal indicates the status of the printer. The signal is high when the printer is busy and cannot receive data.
- The signal is high under the following conditions:
  1. receive buffer full
  2. printer is processing data.
  3. printer is OFF LINE
  4. printer is in an error condition

PO...PAPER OUT

- This output signal indicates that paper out detector detects the absence of paper.
- The signal is normally low and goes high during a "Paper Out" condition.

SLCT..SELECT

- SELECT is an output signal which indicates the ON LINE or OFF LINE state of the printer. The signal is high in the ON LINE state and low when OFF LINE.
- The printer enters the ON LINE state:
  1. when the printer is turned on
  2. when PRIME is received
  3. when the RESET command is received
  4. when the ON LINE switch is pressed

- The printer enters the OFF LINE state:
  1. when the printer is out of paper
  2. when the printer is switched OFF LINE

AUTO FEED XT (AFXT)

- This input signal determines if a line feed (LF) command will be added to each carriage return (CR).
- When AFXT is low, CR+LF action occurs. When AFXT is high, only a carriage return is performed.

- DIP SW3 can alter the response by the printer to an AFXT signal. If SW3 is ON, the printer will perform a CR+LF regardless of the level of the incoming signal. When SW3 is OFF, this automatic action is disabled.

SG...SIGNAL GROUND

- The twisted pair return wires (pins 19-30) are connected to signal ground.

FG...FRAME GROUND

- Frame ground is the same as chassis ground.

+5 V

- This is for evaluation only. It should not be used to supply power for external equipment.

PRIME

- This input signal is used to initialize the printer. The signal is normally high and goes low to reset the printer. It can be received anytime during printer operation.

ERROR

- This output signal is an "error" or "fault" condition. Normally high, this signal goes low when an error occurs. An error condition can be caused by:
  1. a "Paper Out" condition
  2. the printer being OFF LINE

Timing Chart
(When normal printing code is received)

DATA1~8
STB
BUSY
ACK

T1 T2 T3   T5   T4
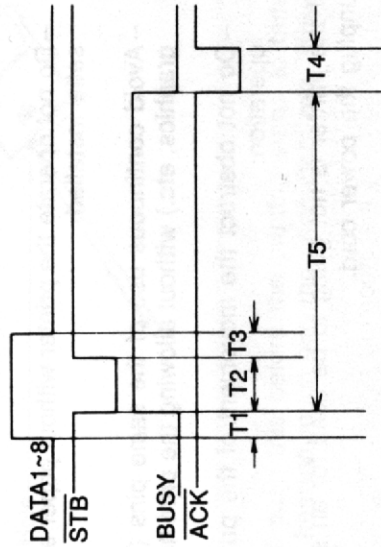
T1...0.5µs (Min)
T2...1µs (Min)
T3...0.5µs (Min)
T4...5µs (Max)
T5...1ms or less when buffer is not full
     1s or less when buffer full

Timing Diagram

8. Maintenance

The printer does not require any routine maintenance. However, reasonable care of the printer will extend its life. The following preventive and periodic measures are recommended:

Precautions

● Keep all liquids away from the printer. Accidental spillage of a liquid into the printer can cause severe damage.

● Do not block the air flow around the printer. Do not place books, paper, or other items on top of the printer.

● Special care should be taken to protect the printer if it is used in an unfriendly environment such as a machine shop, a dusty or sandy area, etc.

● The life of the printhead can be extended by observing a few simple precautions.

  – Do not operate the printer without paper and a ribbon cassette installed.

  – Avoid continuous use of the same pins (underline, semi-graphics, etc.) without allowing the print head time to cool.

  – Do not obstruct the movement of the print head while in operation.

● If the printer is not going to be used for an extended period, unplug the power cord.

Periodic Maintenance

Cleaning the unit is the most important action the user can perform. The frequency of cleaning is dependent upon the environment.

● Turn the power OFF.

● Clean the case and covers with a soft cloth. Use any mild commercial cleaner.

● Remove the top and the smoked plastic covers. Vacuum or dust the inside area of the unit. Be very careful not to damage the flex ribbon cable and the carriage drive belt.

● The platen should be cleaned with denatured alcohol only.

● The carriage guide bar can be lubricated with a very light oil.

Ribbon Cassette

A single ribbon permits the printing of about 4 million characters. When the printing starts to fade, gently push the counter spring in the ribbon cassette hole with the tip of a ballpoint pen or other object. Once the ribbon cassette is mounted onto the carriage and printing is performed for a short time, the characters become darker.

Re-ink Hole
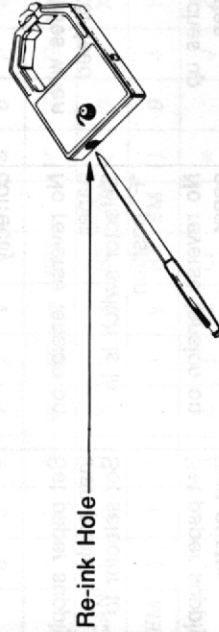
Note:

● Do not push this before the printing starts to fade. If the ribbon has too much ink, the characters may smear when printed.

● Wear and tear of the print head pins may cause serious damage of the ribbon and printing to fade. In such case the printer needs servicing.

Troubleshooting

Most problems associated with the printer can be traced to improper setup, installation, or cabling. The table on page 8-3 will assist the user in identifying and correcting some of the more common problems. If you need additional help, contact the store from which the unit was purchased.

Standard Mode Italic Character Set

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL		SP	0	@	P	`	p			SP	0	@	P	`	p
1		DC1	!	1	A	Q	a	q		DC1	!	1	A	Q	a	q
2		DC2	"	2	B	R	b	r		DC2	"	2	B	R	b	r
3		DC3	#	3	C	S	c	s		DC3	#	3	C	S	c	s
4		DC4	$	4	D	T	d	t		DC4	$	4	D	T	d	t
5			%	5	E	U	e	u			%	5	E	U	e	u
6			&	6	F	V	f	v			&	6	F	V	f	v
7	BEL		'	7	G	W	g	w	BEL		'	7	G	W	g	w
8	BS	CAN	(	8	H	X	h	x	BS	CAN	(	8	H	X	h	x
9	HT	EM	)	9	I	Y	i	y	HT	EM	)	9	I	Y	i	y
A	LF		*	:	J	Z	j	z	LF		*	:	J	Z	j	z
B	VT	ESC	+	;	K	[	k	{	VT	ESC	+	;	K	[	k	{
C	FF		,	<	L	\	l	|	FF		,	<	L	\	l	|
D	CR		-	=	M	]	m	}	CR		-	=	M	]	m	}
E	SO		.	>	N	^	n	~	SO		.	>	N	^	n	~
F	SI		/	?	O	_	o	DEL	SI		/	?	O	_	o	DEL

Maintenance

SYMPTOM	POSSIBLE CAUSE	PROBABLE SOLUTION
Printer does not power up	No AC Power / Fuse blown	Check Power Cord / Replace fuse
Power on but printer not printing	Printer not ON LINE / Interface cable not connected	Press ON LINE switch / Secure connection
Printer won't go ON LINE	Out of paper	Replace paper
Paper slips around platen	Paper feed selector in "T" position	Set selector to "F"
Head moves but does not print	Ribbon not installed correctly	Re-insert ribbon
Paper wrinkles when using tractor feed	No reverse tension on paper. / Selector switch is in "F" position	Set paper supply lower than printer / Set selector to "T"
Paper bunches up around platen	No reverse tension on paper	Set paper supply lower than printer
Cannot change form length	* Cut sheet feeder is ON	* Set CSF DIP switch as required
Printout double-spaced or no spacing	* Auto LF is ON	* Set Auto LF DIP switch as required
Cannot print ASCII characters with code above 127, italic characters printing	7 bit/8 bit switch set incorrectly on printer or interface	* Set DIP switch SW5 as required
Wrong character set printed	* Wrong character set selected	* Set DIP switch SW1, 6, 7, 8 as required
Cannot change print mode from computer	FONT and PITCH modes are set incorrectly	Set to Pgm mode / Normal condition. / Refer to Section 3.1

(* Pertains to DIP switch settings.)

Standard Mode Graphic Character Set 2

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL		SP	0	@	P	`	p	Ç	É	á	░	└	╨	α	≡
1		DC1	!	1	A	Q	a	q	ü	æ	í	▒	┴	╤	β	±
2		DC2	"	2	B	R	b	r	é	Æ	ó	▓	┬	╥	Γ	≥
3		DC3	#	3	C	S	c	s	â	ô	ú	│	├	╙	π	≤
4		DC4	$	4	D	T	d	t	ä	ö	ñ	┤	─	╘	Σ	⌠
5			%	5	E	U	e	u	à	ò	Ñ	╡	┼	╒	σ	⌡
6			&	6	F	V	f	v	å	û	ª	╢	╞	╓	µ	÷
7	BEL		'	7	G	W	g	w	ç	ù	º	╖	╟	╫	τ	≈
8	BS	CAN	(	8	H	X	h	x	ê	ÿ	¿	╕	╚	╪	Φ	°
9	HT	EM	)	9	I	Y	i	y	ë	Ö	⌐	╣	╔	┘	Θ	∙
A	LF		*	:	J	Z	j	z	è	Ü	¬	║	╩	┌	Ω	·
B	VT	ESC	+	;	K	[	k	{	ï	¢	½	╗	╦	█	δ	√
C	FF		,	<	L	\	l	|	î	£	¼	╝	╠	▄	∞	ⁿ
D	CR		-	=	M	]	m	}	ì	¥	¡	╜	═	▌	φ	²
E	SO		.	>	N	^	n	~	Ä	₧	«	╛	╬	▐	ε	■
F	SI		/	?	O	_	o	DEL	Å	ƒ	»	┐	╧	▀	∩	SP

Standard Mode Graphic Character Set 1

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL		SP	0	@	P	`	p			á	░	└	╨	α	≡
1		DC1	!	1	A	Q	a	q		DC1	í	▒	┴	╤	β	±
2		DC2	"	2	B	R	b	r		DC2	ó	▓	┬	╥	Γ	≥
3		DC3	#	3	C	S	c	s		DC3	ú	│	├	╙	π	≤
4		DC4	$	4	D	T	d	t		DC4	ñ	┤	─	╘	Σ	⌠
5			%	5	E	U	e	u			Ñ	╡	┼	╒	σ	⌡
6			&	6	F	V	f	v			ª	╢	╞	╓	µ	÷
7	BEL		'	7	G	W	g	w	BEL		º	╖	╟	╫	τ	≈
8	BS	CAN	(	8	H	X	h	x	BS	CAN	¿	╕	╚	╪	Φ	°
9	HT	EM	)	9	I	Y	i	y	HT	EM	⌐	╣	╔	┘	Θ	∙
A	LF		*	:	J	Z	j	z	LF		¬	║	╩	┌	Ω	·
B	VT	ESC	+	;	K	[	k	{	VT	ESC	½	╗	╦	█	δ	√
C	FF		,	<	L	\	l	|	FF		¼	╝	╠	▄	∞	ⁿ
D	CR		-	=	M	]	m	}	CR		¡	╜	═	▌	φ	²
E	SO		.	>	N	^	n	~	SO		«	╛	╬	▐	ε	■
F	SI		/	?	O	_	o	DEL	SI		»	┐	╧	▀	∩	SP

IBM Mode Character Set 1

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL		SP	0	@	P	`	p			á	░	└	╨	α	≡
1		DC1	!	1	A	Q	a	q		DC1	í	▒	┴	╤	β	±
2		DC2	"	2	B	R	b	r		DC2	ó	▓	┬	╥	Γ	≥
3			#	3	C	S	c	s			ú	│	├	╙	π	≤
4		DC4	$	4	D	T	d	t		DC4	ñ	┤	─	╘	Σ	⌠
5			%	5	E	U	e	u			Ñ	╡	┼	╒	σ	⌡
6			&	6	F	V	f	v			ª	╢	╞	╓	µ	÷
7			'	7	G	W	g	w	BEL		º	╖	╟	╫	τ	≈
8			(	8	H	X	h	x	BS	CAN	¿	╕	╚	╪	Φ	°
9			)	9	I	Y	i	y	HT		⌐	╣	╔	┘	Θ	∙
A			*	:	J	Z	j	z	LF		¬	║	╩	┌	Ω	·
B		ESC	+	;	K	[	k	{	VT	ESC	½	╗	╦	█	δ	√
C			,	<	L	\	l	|	FF		¼	╝	╠	▄	∞	ⁿ
D			-	=	M	]	m	}	CR		¡	╜	═	▌	φ	²
E			.	>	N	^	n	~	SO		«	╛	╬	▐	ε	■
F			/	?	O	_	o		SI		»	┐	╧	▀	∩	SP

IBM Mode Character Set 2

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL		SP	0	@	P	`	p	Ç	É	á	░	└	╨	α	≡
1		DC1	!	1	A	Q	a	q	ü	æ	í	▒	┴	╤	β	±
2		DC2	"	2	B	R	b	r	é	Æ	ó	▓	┬	╥	Γ	≥
3	♥		#	3	C	S	c	s	â	ô	ú	│	├	╙	π	≤
4	♦	DC4	$	4	D	T	d	t	ä	ö	ñ	┤	─	╘	Σ	⌠
5	♣	§	%	5	E	U	e	u	à	ò	Ñ	╡	┼	╒	σ	⌡
6	♠		&	6	F	V	f	v	å	û	ª	╢	╞	╓	µ	÷
7	BEL		'	7	G	W	g	w	ç	ù	º	╖	╟	╫	τ	≈
8	BS	CAN	(	8	H	X	h	x	ê	ÿ	¿	╕	╚	╪	Φ	°
9	HT		)	9	I	Y	i	y	ë	Ö	⌐	╣	╔	┘	Θ	∙
A	LF		*	:	J	Z	j	z	è	Ü	¬	║	╩	┌	Ω	·
B	VT	ESC	+	;	K	[	k	{	ï	¢	½	╗	╦	█	δ	√
C	FF		,	<	L	\	l	|	î	£	¼	╝	╠	▄	∞	ⁿ
D	CR		-	=	M	]	m	}	ì	¥	¡	╜	═	▌	φ	²
E	SO		.	>	N	^	n	~	Ä	₧	«	╛	╬	▐	ε	■
F	SI		/	?	O	_	o		Å	ƒ	»	┐	╧	▀	∩	SP

Note: In NLQ mode, the printer prints Pts for Pt.

IBM Mode All Character Set

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	Ø	▲	SP	0	@	P	`	p	Ç	É	á	░	└	╨	α	≡
1	☺	▼	!	1	A	Q	a	q	ü	æ	í	▒	┴	╤	β	±
2	●	↔	"	2	B	R	b	r	é	Æ	ó	▓	┬	╥	Γ	≥
3	♥	‼	#	3	C	S	c	s	â	ô	ú	│	├	╙	π	≤
4	♦	¶	$	4	D	T	d	t	ä	ö	ñ	┤	─	╘	Σ	⌠
5	♣	§	%	5	E	U	e	u	à	ò	Ñ	╡	┼	╒	σ	⌡
6	♠	▬	&	6	F	V	f	v	å	û	ª	╢	╞	╓	µ	÷
7	•	↨	'	7	G	W	g	w	ç	ù	º	╖	╟	╫	τ	≈
8	◘	↑	(	8	H	X	h	x	ê	ÿ	¿	╕	╚	╪	Φ	°
9	○	↓	)	9	I	Y	i	y	ë	Ö	⌐	╣	╔	┘	Θ	∙
A	◙	→	*	:	J	Z	j	z	è	Ü	¬	║	╩	┌	Ω	·
B	♂	←	+	;	K	[	k	{	ï	¢	½	╗	╦	█	δ	√
C	♀	∟	,	<	L	\	l	|	î	£	¼	╝	╠	▄	∞	ⁿ
D	♪	↕	-	=	M	]	m	}	ì	¥	¡	╜	═	▌	φ	²
E	♫	◄	.	>	N	^	n	~	Ä	₧	«	╛	╬	▐	ε	■
F	☼	►	/	?	O	_	o	⌂	Å	ƒ	»	┐	┴	▀	∩	SP

Note: In NLQ mode, the printer prints Pts for Pt.

International Character Set

	n	35D 23H	36D 24H	64D 40H	91D 5BH	92D 5CH	93D 5DH	94D 5EH	96D 60H	123D 7BH	124D 7CH	125D 7DH	126D 7EH
USA	0	#	$	@	[	\	]	^	`	{	|	}	~
FRANCE	1	#	$	à	°	ç	§	^	`	é	ù	è	¨
GERMANY	2	#	$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß
ENGLAND	3	£	$	@	[	\	]	^	`	{	|	}	~
DENMARK I	4	#	$	@	Æ	Ø	Å	^	`	æ	ø	å	~
SWEDEN	5	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
ITALY	6	#	$	@	°	\	é	^	ù	à	ò	è	ì
SPAIN I	7	Pt	$	@	¡	Ñ	¿	^	`	¨	ñ	}	~
JAPAN	8	#	$	@	[	¥	]	^	`	{	|	}	~
NORWAY	9	#	$	@	Æ	Ø	Å	Ü	é	æ	ø	å	ü
DENMARK II	10	#	$	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
SPAIN II	11	#	$	á	¡	Ñ	¿	é	`	í	ñ	ó	ú
LATIN AMERICA	12	#	$	á	¡	Ñ	¿	é	ü	í	ñ	ó	ú

Proportional Spacing Tables

ASCII Characters
Standard Mode Characters

ASCII code	Char.	Width Normal	Width Italic
0	á	12	11
1	é	12	11
2	ú	11	11
3	ó	11	11
4	ñ	10	8
5	ö	8	8
6	Ł	8	8
7	—	12	12
8	¿	12	10
9	Ñ	12	11
10	¤	11	12
11	Pt	12	12
12	Á	12	12
13	à	12	12
14	ç	12	12
15	§	11	11
16	ß	11	12
17	Æ	12	12
18	æ	12	12
19	Ø	12	12
20	ø	12	12
21	¨	8	9
22	Ä	12	12
23	Ö	12	12
24	Ü	12	12
25	è	12	12
26	ù	12	11
27	È	10	11
28	é	11	11
29	¥	12	12
30	¥	12	12
31	—	12	12
32	SPACE	12	12
33	!	5	5
34	"	8	10
35	#	12	10
36	$	12	11
37	%	12	12
38	&	12	12
39	.	5	5
40	(	6	8
41	)	6	8
42	*	12	12
43	+	12	12
44	,	7	8
45	-	12	12
46	.	6	7
47	/	10	10
48	0	10	12
49	1	8	9
50	2	12	12
51	3	12	12
52	4	12	12
53	5	12	12
54	6	12	12
55	7	12	12
56	8	12	12
57	9	12	12
58	:	6	6
59	;	6	8
60	<	10	9
61	=	12	10
62	>	10	9
63	?	12	11
64	@	12	12
65	A	12	12
66	B	12	12
67	C	12	12
68	D	12	12
69	E	12	12
70	F	12	12
71	G	12	12
72	H	12	12
73	I	8	10
74	J	11	12
75	K	12	12
76	L	12	12
77	M	12	12
78	N	12	12
79	O	12	12
80	P	12	12
81	Q	12	12
82	R	12	12
83	S	12	12
84	T	12	12
85	U	12	12
86	V	11	11
87	W	12	12
88	X	10	12
89	Y	12	12
90	Z	10	12
91	[	8	11
92	\	10	7
93	]	8	11
94	^	12	10
95	_	8	5
96	`	12	11
97	a	12	12
98	b	12	12
99	c	11	11
100	d	12	12
101	e	11	11
102	f	10	10
103	g	11	11
104	h	11	11
105	i	8	9
106	j	9	10
107	k	10	11
108	l	8	9
109	m	12	12
110	n	11	11
111	o	11	11
112	p	11	11
113	q	11	11
114	r	12	10
115	s	12	11
116	t	10	10
117	u	11	11
118	v	12	12
119	w	12	12
120	x	10	12
121	y	10	10
122	z	9	9
123	{	9	10
124	|	5	10
125	}	9	12
126	~	12	12
127	⌂	12	12

Unit: 1/120 inch (0.21 mm)

IBM Mode Characters

ASCII code	Char.	Width
0	á	12
1	é	12
2	ú	12
3	ó	11
4	ñ	8
5	ö	12
6	Ł	12
7	—	12
8	¿	12
9	Ñ	12
10	¤	12
12	Pt	12
13	Á	12
14	à	12
15	ç	12
16	§	12
18	Æ	12
19	æ	12
23	Ä	12
24	Ö	11
25	Ü	12
26	à	12
27	ô	12
28	û	12
29	È	11
30	¥	12
31	SPACE	12
32	SPACE	12
33	!	5
34	"	8
35	#	12
36	$	12
37	%	12
38	&	12
39	.	6
40	(	6
41	)	6
42	*	12
43	+	6
44	,	6
45	-	6
46	.	12
47	/	10
48	0	12
49	1	8
50	2	12
51	3	12
52	4	12
53	5	12
54	6	12
55	7	12
56	8	12
57	9	12
58	:	6
59	;	6
60	<	10
61	=	10
62	>	10
63	?	12
64	@	12
65	A	12
66	B	12
67	C	12
68	D	12
69	E	12
70	F	12
71	G	12
72	H	12
73	I	8
74	J	12
75	K	12
76	L	12
77	M	12
78	N	12
79	O	12
80	P	12
81	Q	12
82	R	12
83	S	12
84	T	12
85	U	12
86	V	12
87	W	12
88	X	12
89	Y	12
90	Z	12
91	[	8
92	\	10
93	]	8
94	^	12
95	_	12
96	`	6
97	a	12
98	b	11
99	c	11
100	d	12
101	e	11
102	f	11
103	g	12
104	h	12
105	i	11
106	j	11
107	k	11
108	l	12
109	m	12
110	n	12
111	o	12
112	p	12
113	q	12
114	r	11
115	s	12
116	t	10
117	u	12
118	v	12
119	w	12
120	x	12
121	y	12
122	z	9
123	{	9
124	|	4
125	}	9
126	~	10
127	⌂	12

Unit: 1/120 inch (0.21 mm)

IBM Mode Characters

ASCII code	Char.	Width
0		12
1	☺	12
2	●	12
3	♦	10
4	♦	12
5	♣	12
6	♠	12
7	•	12
8	◘	12
9	○	12
10	◙	12
11	♂	12
12	♀	12
13	♪	12
14	♫	12
15	☼	12
16	►	12
17	◄	12
18	↕	12
19	‼	12
20	¶	12
22	▬	12
23	↨	12
24	↑	12
25	↓	12
26	→	12
27	←	12
28	∟	12
29	↔	12
30	▲	12
31	▼	12
127	⌂	12
128	Ç	12
131	â	12
136	ê	12
139	ï	9
140	î	10
147	ô	11
150	û	12
152	ÿ	12
155	¢	12
159	ƒ	12
160	á	12
161	í	12

ASCII code	Char.	Width
162	ó	12
163	ú	12
166	ª	12
167	º	12
169	⌐	12
170	¬	12
171	½	12
172	¼	12
174	«	12
175	»	12
224	α	12
225	β	11
226	Γ	12
227	π	12
228	Σ	12
229	σ	11
230	µ	12
231	τ	11
232	Φ	12
233	Θ	12
234	Ω	12
235	δ	12
236	∞	12
237	φ	12
238	ε	10
239	∩	12
240	≡	12
241	±	12
242	≥	10
243	≤	12
246	÷	12
247	≈	11
248	°	8
249	•	6
250	·	6
251	√	12
252	ⁿ	10
253	²	8
254	■	8

Unit: 1/120 inch (0.21 mm)

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IBM Graphic Characters
Standard Mode Characters

ASCII code	Char.	Width Normal	Width Italic
21	§	10	12
128	Ç	12	12
129	ü	11	12
130	é	12	11
131	â	12	11
132	ä	12	11
133	à	12	11
134	å	11	11
135	ç	12	11
136	ê	12	11
137	ë	12	11
138	è	11	11
139	ï	8	8
140	î	10	11
141	ì	8	8
142	Ä	12	12
143	Å	12	12
144	É	12	12
145	æ	12	12
146	Æ	12	12
147	ô	10	10
148	ö	12	11
149	ò	10	11
150	û	11	11
151	ù	11	11
152	ÿ	12	12
153	Ö	12	12
154	Ü	11	12
155	¢	12	12
156	£	12	11
157	¥	8	10
158	Pt	10	11
159	ƒ	11	11
160	á	12	12
161	í	8	11
162	ó	10	11
163	ú	11	12
164	ñ	12	12
165	Ñ	12	11
166	ª	11	11
167	º	12	12
168	¿	12	12
169	⌐	12	11
170	¬	12	12

ASCII code	Char.	Width Normal	Width Italic
171	½	12	12
172	¼	12	12
173	¡	5	10
174	«	12	12
175	»	12	12
224	α	11	11
225	β	10	12
226	Γ	11	12
227	π	10	12
228	Σ	11	12
229	σ	12	12
230	µ	10	12
231	τ	12	12
232	Φ	12	12
233	Θ	12	12
234	Ω	10	10
235	δ	12	12
236	∞	12	12
237	φ	12	12
238	ε	12	12
239	∩	12	12
240	≡	12	12
241	±	12	12
242	≥	12	12
243	≤	12	12
246	÷	12	12
247	≈	12	12
248	°	8	8
249	•	6	6
250	·	6	6
251	√	12	12
252	ⁿ	8	8
253	²	8	8
254	■	8	8
255	SP	12	12

Unit: 1/120 inch (0.21 mm)

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Paper

1. Continuous paper

A list of the paper which may be used with this unit is provided below.

Width: 4~10 inches (102~254 mm).

Quality and number of sheets: * only for the last sheet

Type of paper	Sheets	Weight			
		in lbs		in g/m²	
		rear	bottom	rear	bottom
Fine-quality paper	1	16~24	16~22	60~90	60~83
Non-carbon	2~4	11~14 (17*)	16~22	41~53 (64*)	60~83
Multi-layered with carbon	2	11~14 (17*)		41~53 (64*)	

Notes:
- For optimum paper handling, when using some types of thicker multi-part continuous paper, we suggest the use of the bottom feed paper path.
- When using multi-part continuous paper in environments which have very high or low temperature and/or humidity, we recommend the use of the bottom feed to optimize paper handling and print quality.
- In multi-layered paper with carbon, the carbon is equivalent to a sheet of paper.
- "Weight in pounds" represents the weight of 500 [17×22 inches (432×559 mm)] sheets.

2. Single Sheet

Width: 4~11.7 inches (102~297 mm)
Height: 5~14.3 inches (127~363 mm)
Weight in pounds (g/m²): 14~24 (53~90 g/m²)

Notes:
- The printer will handle multi-part papers up to 0.013 inch (0.32 mm) thick. Up to 4 copies of 14 lb. chemical release paper can be used.
- Paper should be within operating temperature and humidity ranges at least 24 hours prior to use.

3. Envelope

#10 size envelope is recommended. Since envelopes vary in size, paper weight and construction, we cannot guarantee print quality and paper handling for all types.

Download Character Matrix Blanks: Draft

11×9
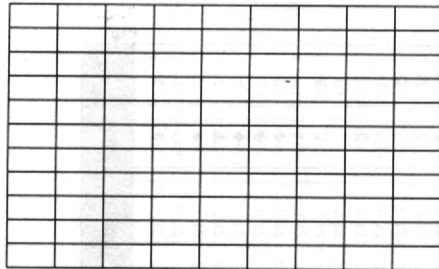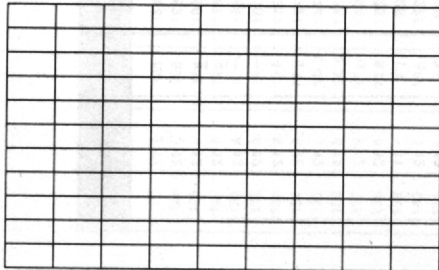
Download Character Matrix Blanks: NLQ

18×23
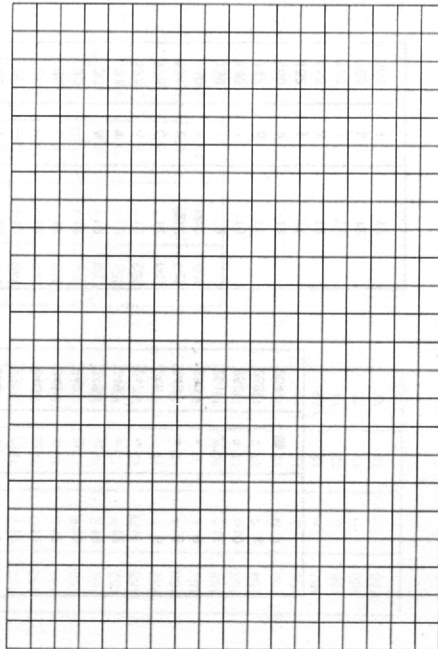
Make copies of this page first.
Then use blank matrices to design your down line load characters.

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Appendix E

Printing Area

1. Continuous paper

	Rear	Bottom
A	1" (25.4 mm)	
B	0.76" (19.4 mm)	
C	0.80" (20.3 mm)	3.6" (91.5 mm)
D	1.5" (38.1 mm)	0.95" (24.1 mm)
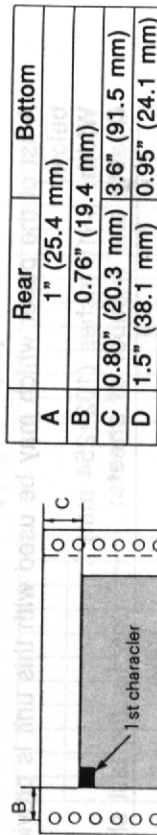
A: Value A indicates the positions near the paper perforations where the printing quality may not be optimum.
B: Value B indicates the position where the first character is printed. (When the left tractor is set on the left end.)
C: Value C indicates the area from the top of the paper to the position where the first character is printed.
D: Value D indicates the position where paper out is detected.

2. Single Sheet

B	1.85" (47 mm)
C	0.80" (20.3mm)
D	1" (25.4 mm)
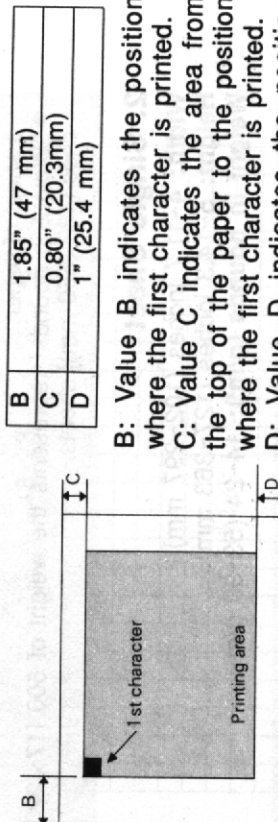
B: Value B indicates the position where the first character is printed.
C: Value C indicates the area from the top of the paper to the position where the first character is printed.
D: Value D indicates the position where paper out is detected.

Envelope

B	1" (25.4 mm)
C	0.80" (20.3mm)
D	1" (25.4 mm)

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TECHNICAL SUPPORT

Call the office nearest to you between 8:30 a.m. and 5:00 p.m.

Vancouver:	(604) 273-4453
Toronto:	(416) 890-7568
Montreal:	(514) 332-6371

OPTIONS and SUPPLIES

KX-P19	RS-232C/Current Loop Serial Interface Board
KX-P37	Auto Cut Sheet Feeder (Single bin)
KX-P43	32K Buffer Chip
KX-P115	Ribbon Cassette (Black)