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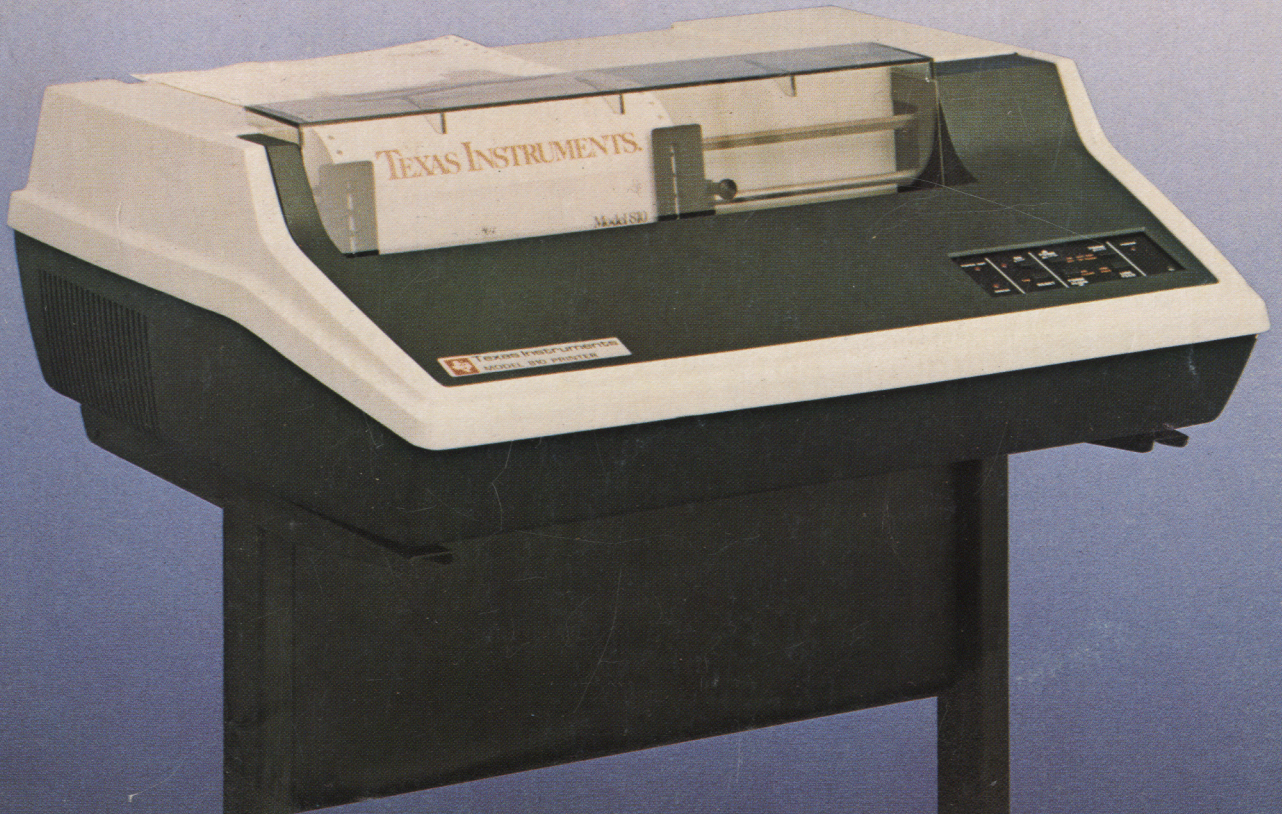
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Colin Hinson

In the village of Blunham, Bedfordshire, UK.

OMNI 800
electronic data terminals



Model 810 Printer

Operating
Instructions

TEXAS INSTRUMENTS

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Model 810 Printer Operating Instructions, TI Manual No. 994353-9701
 Original Issue: 15 March 1978

CHANGE NOTICES				
Revision Letter	Date	ECN		Description
		Number	Level	
A	1 Mar 78	432901	D	(1) Correct minor errors, (2) replen
B	15 Apr 78	432925	D	Update drawings
C	1 July 78	437113	D	Include Line Buffer option data
D	8 Oct 78	439699	D	Update manual (minor technical re
E	15 Jan 79	438989	E	Add new cable options

ck

s)

MODEL 810 PRINTER CONFIGURATION

PRINTER	Interface Option	Character Set
BSC _____	EIA _____	FUL _____ UKF _____
FLC _____	TTY _____	UKL _____ DNF _____
VFC _____	PLT _____	DNL _____ SWF _____
FCO _____	LBE _____	SWL _____ GRF _____
VCO _____	BRO _____	GRL _____ KAT _____
	DSC _____	EXP _____ KTS _____
	IRC _____	
Processor Options	DNB _____	
NDE _____	GDS _____	NOTES:
DNB _____	GED _____	
IRC _____	LBP _____	
LB _____	DSC _____	
BRO _____	GDS _____	
DCO _____	LBT _____	
	HDP _____	
	BRO _____	
	DSC _____	
	GDS _____	

DEFINITIONS OF PRINTER CONFIGURATION ()

Printers:

- BSC—basic
- FCO—forms length control, compressed print
- FLC—forms length control
- VCO—vertical format control, compressed print
- VFC—vertical format control

- GED—gated line
- GDS—gated carriage
- HDP—half-duty
- IRC—inverted carriage
- NDE—non-duty

Interfaces:

- EIA—serial data
- LB—line buffer board
- LBE—line buffer board, EIA
- LBP—line buffer board, parallel
- LBT—line buffer board, TTY current loop
- PLT—parallel interface
- TTY—20-mA current loop

Character Sets:

- DNF—Denmark 8-way full-ASCII
- DNL—Denmark 8-way limited-ASCII
- EXP—expanded 10-bit (domestic U.S.)
- FUL—U.S. full-ASCII
- GRF—German 8-bit ASCII
- GRL—German limited-ASCII
- KAT—Katakana 10-bit U.S. full-ASCII
- KTS—Katakana plus six special characters and U.S. full-ASCII
- SWF—Sweden/Finland full-ASCII
- SWL—Sweden/Finland limited-ASCII
- UKF—United Kingdom full-ASCII
- UKL—United Kingdom limited-ASCII

Strappable Options:

- BRO—baud rate option
- DNB—data terminal not busy
- DSC—decodes carriage return
- DCO—disable recognition of DC1 and DC3 characters

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1.3 SPECIFICATIONS

Standard features and specifications are listed in Table 1-1.

1.4 MODIFIABLE FEATURES

The following standard operating options are easily modified in the field on the standard Model 810 printer **without** the Line Buffer option. See Appendix E for jumper configurations.

- Enable or disable recognition of DEL character (NDE option)
- BUSY or NOT BUSY on DTR line (DNB option)
- Inverted reverse channel (IRC option) signal

- Enable or disable recognition of characters

recognition of DC1-DC3 (option).

The following standard operating options are easily modified in the field on the standard Model 810 printer **with** the Line Buffer option. See Appendix E for jumper configurations.

- BUSY or NOT BUSY on the DTR line (DNB option)
- Inverted reverse channel signal (IRC option)
- Enable or disable gated EIA data (GED option)
- Enable or disable half-duplex operation (HDP option)

rating options are easily modified in the field on the standard Model 810 printer. See Appendix E for jumper configurations.

option)

channel signal (IRC option)

gated EIA data (GED option)

half-duplex operation

TABLE 1-1. STANDARD MODEL 810 PRINTERS CHARACTERISTICS AND SPECIFICATIONS

Characteristic	Specification	Characteristic	Specification
PRINTING		COMMUNICATIONS	
Technique	Seven-wire matrix, impact	Interface	Serial (EIA RS-232-C)
Character matrix	9 × 7 (9 wide, 7 high) dot matrix	Baud rates	110, 150, 300, 1200, 2400, 4800, 9600
Character set	64-character ASCII	Parity	Odd, even or ignore
Characters per inch	10	INPUT POWER	
Characters per line	132 maximum	ac voltage	100, 120, 220, or 240Vac (+ 10% to - 15%)
Lines per inch	6 or 8 (operator - or software - selectable)	Frequency	47 to 63 hertz
THROUGHPUT		Watts	200
Print speed	150 characters per second	Power fuse	100 or 120 Vac range, 5 A, 250 V fuse
Lines per minute	64 at 132 characters per line, and up to 450 at 10 characters per line	ENVIRONMENTAL	
Line feed	33 milliseconds	Mounting	Table top
Paper slew	127 mm per second (5 inches per second)	Operating temperature	+ 5°C (+ 37°F) to - 40°C (+ 104°F)*
PAPER HANDLING		Storage temperature	- 30°C (- 22°F) to - 70°C (+ 158°F)
Paper width	Adjustable from 76 to 381 mm (3 to 15 inches)	Operating humidity	5% to 90% (no condensation)
Paper loading	Rear or bottom feed	Storage humidity	5% to 95% (no condensation)
Number of copies	One original and five copies	PHYSICAL	
CONTROL SYSTEM		Weight	25 kg (55 pounds)
Electronics	TMS 8080 microprocessor system	Height	203 mm (8 inches)
Printing method	Bidirectional	Width	654 mm (25¾ inches)
Buffer (FIFO)	256 characters	Depth	508 mm (20 inches)
Horizontal tabs	Software programmable		
Vertical format control	Software and operator programmable		
Self test	Prints ASCII characters in a rotating pattern (barber pole)		
Bell	Pulsing audible tone		

*Up to 2134 mm (7000 feet) MSL. Derate linearly to 25°C (+ 77°F) at 3048 mm (10,000 feet) MSL.

SECTION II INSTALLATION

This section provides information for selecting the installation site, unpacking and setting up the printer, and ensuring that the printer is operating properly. Communications line connections to the Model 810 printer are described in Sections V and VI of this manual.

2.1 SPACE REQUIREMENTS

The printer occupies a flat surface area 654 mm (25.75 inches) wide by 584 mm (23 inches) deep, including cable clearance of 76 mm (3 inches). See Figure 2-1 for printer outline dimensions. Approximately 50 mm (2 inches) must be provided on all sides of the printer for adequate ventilation. Particular care must be taken that the cooling fan intake and exhaust louvers on both sides of the printer are not blocked.

An unobstructed paper feed path must be provided behind or below the printer for the paper supply. A method of holding the printed output must also be provided if the paper basket accessory is not used.

The printer should be so located as to allow easy access to the operator controls. The printer should not be placed in an environment which exceeds the humidity, temperature, and other specifications listed in Section I. A sturdy table capable of adequately supporting 25 kilograms (55 pounds) is suitable if the accessory floor mounting stand is not used. Regardless of the mounting selected, care must be taken to ensure that the paper chute underneath the printer does not bear any weight of the printer and is not subjected to any pressure which could deform it.

2.2 UNPACKING AND SETTING UP

Remove the printer from the shipping carton and place the printer in its intended location as follows.

- a. Examine the printer for damage; if damage is observed, note the nature of the damage and follow local procedures for reporting damaged shipments to the carrier which delivered your terminal.
- b. Place the shipping carton on the floor and open the top flaps.
- c. Remove loose items from the shipping carton and set aside.
- d. Two persons (one to grip the printer close to the top edge, the other to grip the styrofoam printer), lift the printer from shipping carton, and place it on the terminal stand.
- e. Remove the printer from the bottom of the shipping carton.
- f. Remove the printer from the shipping carton.
- g. One person lift the right side of the printer high enough for a second person to remove the right shipping snubber screws and washers. Save for possible future use.

SETTING UP

Remove the printer from the shipping carton and place the printer in its intended location as follows.

- a. Examine the printer for damage; if damage is observed, note the nature of the damage and follow local procedures for reporting damaged shipments to the carrier which delivered your terminal.
- b. Place the shipping carton on the floor and open the top flaps.
- c. Remove loose items from the shipping carton and set aside.
- d. Two persons (one to grip the printer close to the top edge, the other to grip the styrofoam printer), lift the printer from shipping carton, and place it on the terminal stand.
- e. Remove the printer from the bottom of the shipping carton.
- f. Remove the printer from the shipping carton.
- g. One person lift the right side of the printer high enough for a second person to remove the right shipping snubber screws and washers. Save for possible future use.

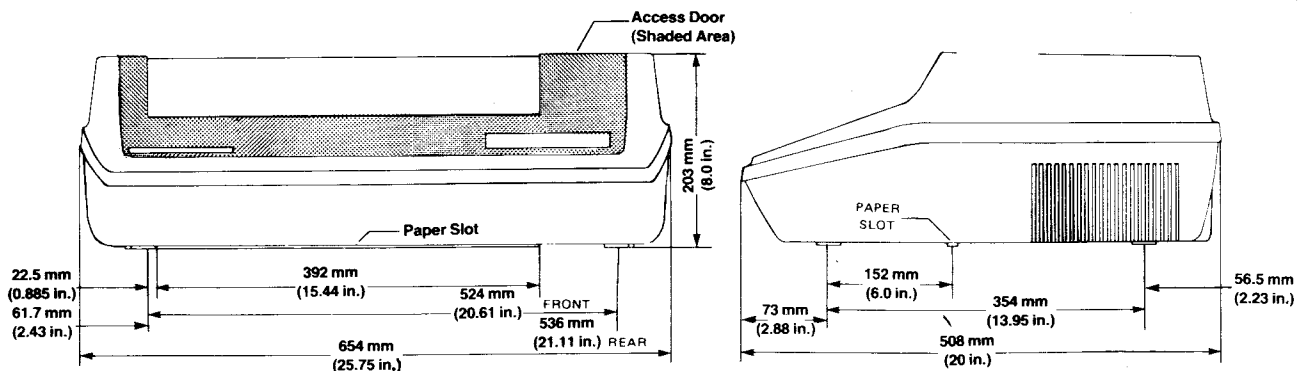


Figure 2-1. Printer Dimensions

meter check between logic/safety grounds (of the Model 810 printer and the equipment interfaces to the Model 810 printer). for large ground potential differences or faults from ac "hot" to logic/safety grounds should be made before connecting the communications cable.

- a. Check the ac line voltage at the power receptacle.
- b. At the rear of the printer, disconnect the power cord and slide the clear plastic cover up to gain access to the fuse compartment.
- c. Remove the line fuse by pulling out and upward on the FUSE PULL lever.
- d. Rotate the FUSE PULL lever fully upward and use a ball point pen or similar device to remove the small PC board.
- e. Select the operating voltage to match available power (line voltage must be within +10% to -15% of the voltage selected).

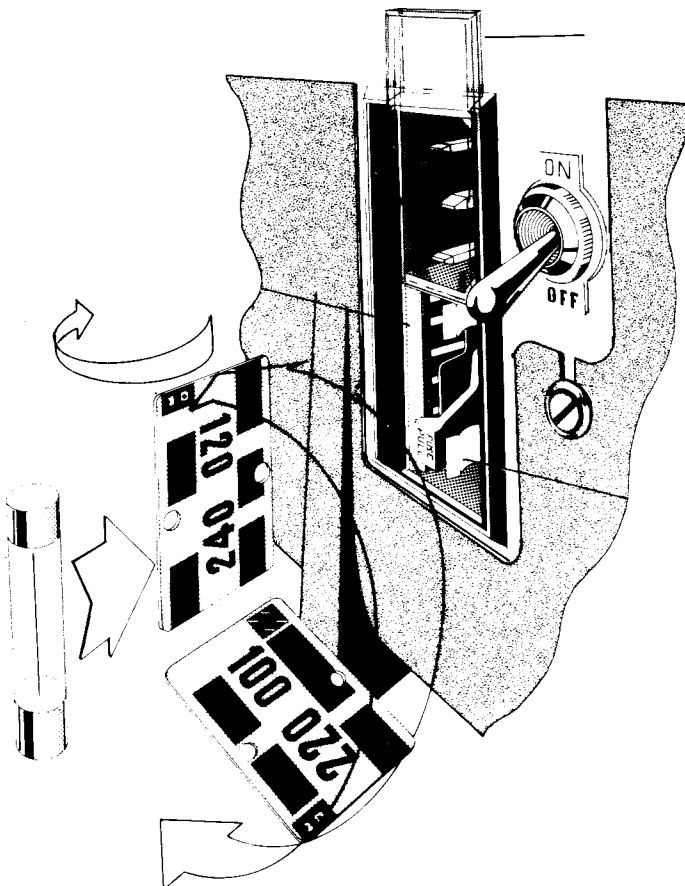


Figure 2-4. Line Voltage Selection

- f. Orient the selected voltage fuse so that the selected voltage is at the top and faces the fuse holder.
- g. Push the Fuse Pull lever down, select the correct fuse type from the following table, and place the fuse in the fuse holder.
- h. Push the Fuse Pull lever down, select the correct fuse type from the following table, and place the fuse in the fuse holder.

Voltage Range	Fuse Type	TI Part Number
100 or 120 volts	5.0A, 250V	416434-0503
220 or 240 volts	2.5A, 250V	416434-0004

ON

To prevent printer damage to the printer, be sure to use the correct fuse value for the voltage available.

- i. Slide the clear plastic cover down.
- j. Check that the ON/OFF switch is in the OFF position.
- k. Connect the power cord to the Model 810 connector receptacle.

2.5 RIBBON INSTALLATION.

The Model 810 printer uses a 13 mm (0.5 inch) wide nylon ribbon (TI Part Number 6241-0001 or equivalent) mounted on two 82.5 mm (3 1/4-inch) spools. To install the ribbon, refer to Figure 2-5 and proceed as follows:

- a. Check that the power switch (at left rear of printer) is set to OFF (down).
- b. Lift open the access door.
- c. Check that the new ribbon is attached to both spools (supply and takeup spools).
- d. If the original printhead clearance is to be maintained, note the position of the printhead adjust lever. Move the printhead adjust lever slightly to the right and fully toward the front of the printer (to move the printhead away from the platen).

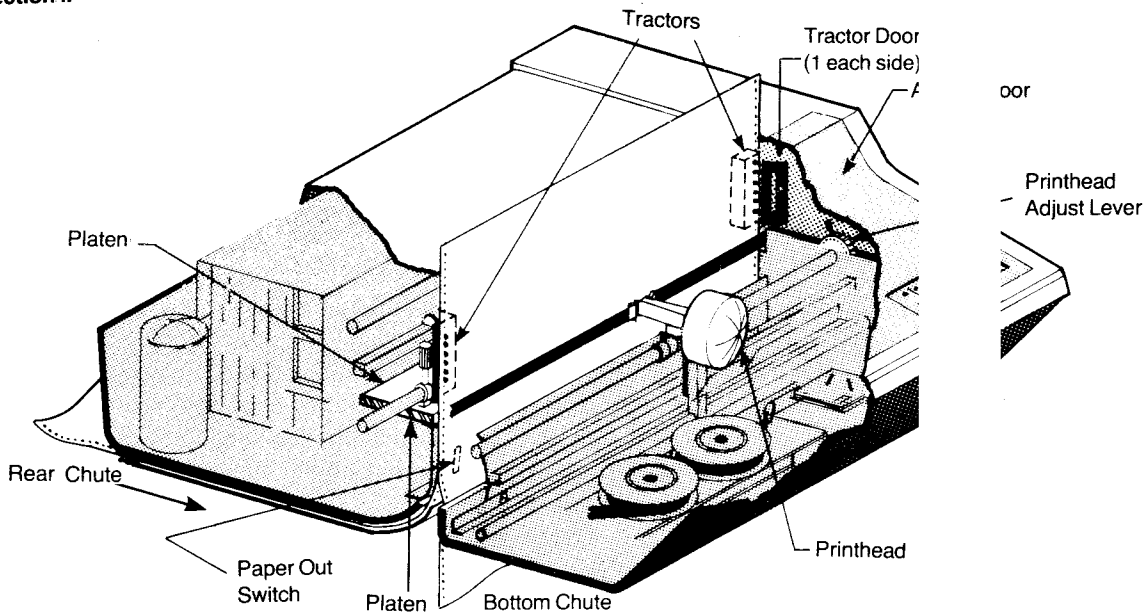


Figure 2-6. Paper Loading

NOTE

If the Model 810 printer is mounted on a table and the paper supply is placed on the floor, be sure the rear edge of the printer is located slightly past the edge of the table top so the paper can feed freely into the printer.

- (2) Feed paper, printing side down, into the paper chute at the bottom rear of the printer until paper appears at the platen.
- (3) Proceed to step g.
- f. Load paper through the **bottom chute** as follows:
 - (1) Align the Model 810 printer bottom chute with the slot in the table or stand.
 - (2) Place the paper supply under the table or stand and align the paper path so as to prevent paper edges from rubbing against the table slot or the ends of the bottom chute.
 - (3) Feed paper, printing side forward, into the bottom chute of the printer until paper appears at the platen.
- g. Loosen the lock knob on the right paper feed tractor and adjust as necessary to accommodate the paper width.

To prevent damage to the printhead, do not use paper that is too narrow or too wide. If the standard 32-column line is used, the paper must be at least 378 mm (14 7/8 inches) wide for the standard 10 character print spacing and at least 216 mm (8 1/2 inches) wide for the optional (FC) 16.5 character print spacing.

CAUTION



To prevent damage to the printhead, do not operate the Model 810 printer with a ribbon or with paper too narrow or the printed line width. If the standard 32-column line is used, the paper must be at least 378 mm (14 7/8 inches) wide for the standard 10 character print spacing and at least 216 mm (8 1/2 inches) wide for the optional (FC) 16.5 character print spacing.

- h. Place the paper in both tractors and check the paper perforations engaging in the tractor pins.
- i. Close the tractor doors. Adjust the right tractor as necessary to remove slack in the paper and tighten the lock knob.
- j. Check the paper supply is aligned with the paper path (paper must not rub the sides of the chute) and that the PAPER OUT switch (Figure 2-6) is actuated.
- k. Reset the printhead adjust lever and close the access door.



NOTE

Before placing your Model 810 printer into service, study the **Operating Instructions** in Section III of this manual.

ing the switch advances the paper to the next preset vertical tab.

3.1.5 FORM ALIGN  /TAB SET SWITCH. The normal FORM ALIGN  function of this pushbutton switch causes the paper to move up 0.355 mm (0.014 inch). If the switch is pressed and held, three small steps will occur and then to accelerate paper movement full line feeds will be executed. This switch is active when the printer is on line or off line.

The alternate TAB SET function of this switch is active only in the vertical format control mode.* When active, pressing the switch sets a vertical tab at the present line.

3.1.6 FORM ALIGN  /TAB CLEAR SWITCH. The normal FORM ALIGN  function of this pushbutton switch causes the paper to move down 0.355 mm (0.014 inch). If the switch is pressed and held, paper will continue to move down in small increments. The switch is active when the printer is on line or off line.

The alternate TAB CLEAR function of this switch is active only in the vertical format control mode.* When active, pressing the switch *clears* the vertical tab at the present line.

3.1.7 FORM FEED/SET TOP OF FORM SWITCH. The normal FORM FEED function of this pushbutton switch causes the paper to move to the preset top of the next form. Contents of the line buffer will be printed before paper motion occurs. This switch is active when the printer is off line or on line.

The alternate SET TOP OF FORM function of this switch is active only in the vertical format control mode.* When active, pressing the switch sets the top of form (or "reads" the FORM LENGTH switch setting from the auxiliary control panel, if this option is installed in your printer).

3.1.8 LINE FEED/LINE FEED SWITCH. Each time this pushbutton switch is pressed, the paper moves up one line (twelve steps for six lines per inch and nine steps for eight lines per inch). If the line buffer is not empty, its contents will be printed before paper motion occurs. This switch is active only off line. The normal and alternate functions of the switch are identical.

3.1.9 POWER INDICATOR. The POWER indicator lights when power is applied to the printer and the 5-volt supply activates.

*To operate in this mode (Vertical Format Control), set the NORMAL/TEST/VFC switch on the Auxiliary Control Panel to the TEST/VFC position.

3.2 AUXILIARY CONTROL PANEL AND INDICATORS

Model 810 printer version codes listed in this section identifies the type of auxiliary control panel installed on each printer version. This section also describes each indicator.

TABLE 3-1. AUXILIARY CONTROL PANEL CONFIGURATIONS

Printer Version	Part Number	Configuration Code
Basic	92-0001	BSC
Forms Length Control	92-0002	FLC
Vertical Format Control	92-0003	VFC
Forms Length and Compressed Print	93-0001	FCO
Vertical Format Control and Compressed Print	93-0002	VCO

3.3 OPERATING PROCEDURES

Before the Model 810 printer can be placed in service, the operator must determine the following:

- Printer configuration: BSC, FLC, VFC, FCO, or VCO. Check the access panel to identify the printer by the auxiliary control panel installed (see Figure 3-3).
- Baud rate: received serial data, or whether parallel data (optional on LBP and PLT printer) is to be received.
- Parity selection: odd, even, or ignored.

Perform the procedures in the following paragraphs that apply to your printer version and your printing requirements. The title of each paragraph identifies (in parentheses) the printer configuration to which it applies.

3.3.1 POWER-UP PROCEDURE (ALL PRINTERS).

To switch on the Model 810 printer, proceed as follows:

- Check that printing ribbon and paper are correctly installed (see subsections 2.5 and 2.6 for instructions).
- Set the power ON/OFF switch at the left rear of the printer to the ON (up) position.

- c. Observe that the control panel ON LINE indicator is **not** lit and that the printhead is at the left margin.

At this point the Model 810 printer conforms to the following initial conditions:

- The printer is OFF LINE.
- The form length is 279 mm (11 inches) for the BSC printer *and also for the FCO and FLC printers if the auxiliary control panel FORM LENGTH switch is in the PROG position*. The FCO and FLC printers are set to the form selected on the FORM LENGTH switch. The VCO and VFC printers are set to the form length of the last vertical format stored or recalled.
- The line spacing is six lines per inch for the BSC, FCO, and FLC printers. *The VCO and VFC printers are set to the line spacing of the last vertical format stored or recalled.*
- The character spacing is 10 characters per inch.
- All horizontal tabs are cleared from the working memory. (Horizontal tabs can be set only by software.)
- All vertical tabs are cleared from the working memory of the BSC, FCO, and FLC printers. *The VCO and VFC printers retain the vertical tab settings of the last vertical format stored or recalled.*
- The line counter is set to zero, causing the present line location to be the first line of the form.
- The line buffer is empty (all previous printable characters have been cleared).

This completes the power-up procedure **if**:

- From previous operation the forms (paper) are aligned as desired, and the printhead adjust lever is correctly set.
- No changes to the above initial conditions are desired.
- The pencil switches (on the auxiliary control panel) for the baud rate, parity, automatic line feed override, and automatic perforation

skip override desired.

have been previously set as

To change the printer to perform the procedure 3.3.17 as applicable. After completed, the printer placed ON LINE by the (select) ASCII character line. All software commands to the degree permitted by the sending device (see Section 3.3.17).

its initial condition status, subsections 3.3.2 through 3.3.17 as applicable procedures are ready to receive data when data is received by the printer or by receiving a DC1 character through the communications channel. Now the procedures can now be performed (to the degree permitted by the printer options) by the user (see Section 3.3.17).

3.3.2 TOP OF FORM ADJUSTMENT (ALL PRINTERS). With the printer at the top of the form, the printer performs the following:

ADJUSTMENT (ALL PRINTERS). To set the top of form as follows:

- Check that ribbon and paper are correctly installed.
- Set the auxiliary control panel switch to NORMAL/FORM FEED.
- Press the FORM FEED switch on the control panel.
- Press the FORM ALIGN switch until the printhead is at the appropriate position where the first line of the form is printed.

and paper are correctly installed. Set the auxiliary control panel switch to NORMAL/FORM FEED switch on the control panel. Press the FORM ALIGN switch until the printhead is at the appropriate position where the first line of the form is printed.

A more precise form adjustment can be made by the self-test (subsection 3.3.4) after the printer has received simple data by pressing the FORM ALIGN switch until the line printed is exactly aligned with the desired line. If the printed line appears to be off, press the other FORM ALIGN switch.

3.3.3 PRINTHEAD ADJUSTMENT (ALL PRINTERS).

The printhead adjustment controls the clearance between the platen and the printhead. This clearance must be adjusted to accommodate the thickness of the forms used. With power on, adjust the printhead for optimum print quality as follows:

- Check that ribbon and paper are correctly installed.
- Lift open the access door.
- Move the printhead adjust lever slightly to the right and completely toward the front of the printer.

TABLE 3-2. AUXILIARY CONTROL PANEL BAUD RATE SELECTIONS

Baud Rate		Pencil Switches		
Standard	BRO ¹	1	2	3
110	110	OFF	OFF	OFF
150	200	ON	OFF	OFF
300	300	OFF	ON	OFF
1200	1200	ON	ON	OFF
2400	2400	OFF	OFF	ON
4800	600	ON	OFF	ON
9600	9600	OFF	ON	ON
	parallel ²	ON	ON	ON

¹Baud rate option (BRO) is available as an extra feature.

²Self-test (barber pole printout) is inoperable when pencil switches are set for parallel input.

3.3.8 PARITY SELECTION (ALL PRINTERS). Select parity as follows:

- a. Lift open the access door.
- b. Set the auxiliary control panel pencil switches as listed in Table 3-3 (also refer to Figure 3-3).
- c. Close the access door.

3.3.9 AUTOMATIC LINE FEED OVERRIDE (ALL PRINTERS). Lift open the access door and set the auxiliary control panel pencil switch 6 to ON for automatic line feed override or to OFF for automatic line feed after carriage return. Close the access door.

3.3.10 AUTOMATIC PERFORATION SKIP OVERRIDE (ALL PRINTERS). Lift open the access door and set auxiliary control panel pencil switch 7 to ON for automatic (three-line) perforation skip override or to OFF for automatic (three-line) perforation skip. Close the access door.

3.3.11 FORM LENGTH SETTING (BSC). On the BSC printer the operator cannot set form lengths manually from the control panel. The printer is initialized during power-up with a 279 mm (11 inch) form length that can only be changed by a form length setting software command (see subsection 4.3.1).

NOTE

A form length set by software will be lost when power is removed from the printer.

TABLE 3-3. AUXILIARY CONTROL PANEL PARITY SELECTIONS

Function	Pencil Switches	
	4	5
Ignore Parity	OFF	OFF
Odd Parity	ON	ON
Even Parity	ON	OFF

3.3.12 VERTICAL TAB SETTING (ALL PRINTERS). All printers have a window which vertical tabs can be set and retained as long as printer power is applied to the printer power on, set as follows:

3.3.12 VERTICAL TAB SETTING (ALL PRINTERS). All printers have a window which vertical tabs can be set and retained as long as printer power is applied to the printer power on, set as follows:

- a. If the form is not aligned as desired, perform a top of form adjustment as outlined in subsection 3.3.1.
- b. Lift open the access door.
- c. Set the auxiliary control panel NORMAL/TEST/VFC switch to TEST/VFC.
- d. On the control panel press the SET TOP OF FORM switch.
- e. Press the auxiliary control panel LINE FEED switch until the line feed tab-set is at the printhead.
- f. Press the auxiliary control panel TAB SET switch.
- g. Repeat steps c and e as necessary to set all desired tabs.
- h. Set the auxiliary control panel NORMAL/TEST/VFC switch to NORMAL.
- i. Press the auxiliary control panel FORM FEED switch.
- j. Verify your tab settings as follows:
 - (1) Set the auxiliary control panel NORMAL/TEST/VFC switch to TEST/VFC.
 - (2) Press the control panel TAB switch and observe that your desired (tab-set) line is at the printhead. If the desired (tab-set) line is not at the printhead, press the control panel TAB CLEAR switch (this clears unwanted tabs from working memory).
 - (3) Repeat step (2) as necessary to verify that only desired tabs are finally set.

- f. Press the control panel LINE FEED switch until the top of the next form is aligned as desired (or the paper perforation is at the reference mark).
- g. Press the control panel SET TOP OF FORM switch.
- h. Set the auxiliary control panel NORMAL/TEST/VFC switch to NORMAL (this sets the form length).
- i. Close the access door.

- j. Press the control panel SET TOP OF FORM switch.
- k. Set the auxiliary control panel switch to NORMAL.
- l. Verify you have the correct format setting as follows:
 - (1) Press the auxiliary control panel TAB switch and observe that the desired (tab-set) line is at the printhead. If your desired (tab-set) is not at the printhead, press the control panel TAB CLEAR switch to clear unwanted tabs from memory.

3.3.16 STORING VERTICAL FORMAT (VFC, VCO).

The VFC and VCO printers are equipped with vertical format control which can store a different vertical format in each channel of an eight-channel memory. Vertical formats can be stored by the operator or by software. The vertical format information that can be stored consists of the form length, vertical tab locations, and lines-per-inch spacing. *The stored vertical formats are retained even when printer power is off.* With printer power on, a vertical format is first entered into working memory and then stored as follows:

- a. If the form is not aligned as desired, perform a top of form adjustment as outlined in subsection 3.3.2.
- b. Lift open the access door.
- c. Set the auxiliary control panel NORMAL/TEST/VFC switch to TEST/VFC.
- d. If eight lines per inch spacing is desired, momentarily set the auxiliary control panel 8 LPI (or 16.5 CPI/8LPI) switch to 8 LPI and observe that the 8 LPI indicator lights.
- e. Press the control panel SET TOP OF FORM switch (this sets the line counter to zero).
- f. Press the control panel LINE FEED switch until the line to be tab-set is at the printhead.
- g. Press the control panel TAB SET switch.
- h. Repeat steps f and g as necessary to set all desired tabs.
- i. Press the control panel LINE FEED switch until the next form is aligned as desired (or the paper perforation is at the reference mark).

- (2) Repeat step (1) as necessary to verify desired tabs are set.
- (3) After the first desired tab is verified, again press the control panel TAB switch to observe that the top of the next form is aligned as desired (or the paper perforation is at the reference mark). If not press the control panel TAB CLEAR switch.
- (4) Repeat step (3) as necessary to clear unwanted tabs from memory.
- m. Set the auxiliary control panel VFC rotary switch to the desired channel.
- n. Momentarily press the auxiliary control panel STORE/FRESH switch to STORE.
- o. Set the auxiliary control panel NORMAL/TEST/VFC switch to NORMAL.
- p. Close the access door.

3.3.17 RECALLING VERTICAL FORMAT (VFC, VCO).

The VFC and VCO printers are equipped with vertical format control which permits recalling previously stored vertical formats into the working memory by the operator or by software. With printer power on, a vertical format in any one of the eight channels of memory can be recalled into the working memory by the operator as follows:

- a. Lift open the access door.
- b. Set the auxiliary control panel VFC rotary switch to the desired channel (also refer to Figure 3-3c or 3-3e, as applicable).

SECTION IV OPERATING INSTRUCTIONS (SOFTWARE

CONTROL)

This section presents information and procedures required to control the Model 810 printer through the communications interface. All printer functions which can be controlled by the sending device are described in tabular form. More complex functions requiring a sequence of control codes are further described in step-by-step procedures.

4.1 COMMANDS (WITHOUT LINE BUFFER OPTION)

Table 4-1 describes the action taken by the Model 810 printer in response to various received control characters. In the second column of Table 4-1, the ASCII control code characters which are to be sent to the printer are underlined. The letter "N" represents a number which is to be sent as noted. The letter "n" represents an ASCII code character that produces the required binary equivalent from Table 4-2. The plus (+) sign in Table 4-1 indicates that the character which follows is to be sent next in the command sequence.

All characters received by the Model 810 printer are stored in a first-in-first-out (FIFO) buffer. When the printing mechanism is not busy, data characters are transferred from the FIFO to the line buffer. The contents of the line buffer are printed when any of following actions occur.

- The printer receives a carriage return (CR) character or any of the paper movement characters: line feed (LF), vertical tab (VT), form feed (FF), or tab-to-line (DC2).
- The printer receives the 133rd printable character.
- The printer receives a deselect (DC3) character.
- The operator switches the printer OFF LINE (deselecting the printer) and then presses the printer LINE FEED switch.
- The operator presses the printer FORM FEED Switch.

4.2 COMMANDS (WITH LINE BUFFER OPTION)

Table 4-3 describes the action taken by the Model 810 printer equipped with the Line Buffer option in response to various received control characters. In the second column of Table 4-3, the ASCII control code characters which are to be sent to the printer are underlined. The letter "N" represents a number which is to be sent as noted. The letter "n" represents an ASCII code character that produces the required binary equivalent from Table 4-2. The plus (+) sign in Table 4-3 indicates that the character which follows is to be sent next in the command sequence.

All characters received by the Model 810 printer are stored in a first-in-first-out (FIFO) buffer. When the printing mechanism is not busy, data characters are transferred from the FIFO to the line buffer. The contents of the line buffer are printed when any of the following actions occur.

- The printer receives a carriage return (CR) character.
- With the Line Buffer option enabled, the printer receives a carriage return (CR) character or any of the paper movement characters: line feed (LF), vertical tab (VT), form feed (FF), or tab-to-line (DC2).
- The printer receives the 132nd printable character.
- The printer receives a deselect (DC3) character.
- The operator switches the printer OFF LINE (deselecting the printer) and then presses the printer LINE FEED switch.
- The operator presses the printer FORM FEED switch.

TABLE 4-2. SOFTWARE CONTROL COLUMN OR LINE "n" NUMBER EQUIV

For Column Or Line Number	Send ASCII Code Character	For Column Or Line Number	Send ASCII Code Character	For Column Or Line Number	Send ASCII Code Character	C O N	Send ASCII Code Character
1	SOH	33	!	65	A		a
2	STX	34	"	66	B		b
3	ETX	35	#	67	C		c
4	EOT	36	\$	68	D		d
5	ENQ	37	%	69	E		e
6	ACK	38	&	70	F		f
7	BEL	39	'	71	G		g
8	BS	40	(72	H		h
9	HT	41)	73	I		i
10	LF	42	*	74	J		j
11	VT	43	+	75	K		k
12	FF	44	,	76	L		l
13	CR	45	-	77	M		m
14	SO	46	.	78	N		n
15	SI	47	/	79	O		o
16	DLE	48	0	80	P		p
17	DC1	49	1	81	Q		q
18	DC2	50	2	82	R		r
19	DC3	51	3	83	S		s
20	DC4	52	4	84	T		t
21	NAK	53	5	85	U		u
22	SYN	54	6	86	V		v
23	ETB	55	7	87	W		w
24	CAN	56	8	88	X		x
25	EM	57	9	89	Y		y
26	SUB	58	:	90	Z		z
27	ESC	59	;	91	[{
28	FS	60	<	92	\		
29	GS	61	=	93]		~
30	RS	62	>	94	^		
31	US	63	?	96	_		
32	SPACE	64	@	96	`		

4.3 SOFTWARE (REMOTE) CONTROL

Step-by-step procedures for remote control of printer functions requiring more complex sequences of control codes are outlined in the following subsection. Note that underlined characters represent ASCII code.

4.3.1 SOFTWARE FORM LENGTH SETTING. Any form length from four lines up to the maximum 112 lines may be set. If a parity is selected on the printer, a parity bit must be added to the seven-bit number "n" as the most significant (eighth) bit. When received by the printer, the following sequence causes the form length to be set at the line number represented by "n".

- a. ESC
- b. 2

- c. n (the binary equivalent of the number of lines in the d form length)

NOTE

Use Table 4-2 to select the ASCII character which codes the required binary equivalent.

- d. CR (the software form length setting command must be terminated with a carriage return if the printer is equipped with the line buffer option.)

Example

ESC+2+@ sets the form length at 64 lines. The ASCII character "@" produces a binary 100 0000 (decimal 64).

Section IV

4.3.2 SOFTWARE HORIZONTAL TAB SETTING.

When received by the printer, the following sequence causes all previous horizontal tabs to be cleared and new horizontal tabs to be set at the columns represented by "n" (where "n₁" is the first tabbed column and "n_k" is the last tabbed column). The first column "n" is designated as column zero. Horizontal tabs may be set at columns 1 through 126. If a parity is selected on the printer, a parity bit must be added to the character code (seven-bit character or binary number "n") as the most significant (eighth) bit.

- a. ESC
- b. 3
- c. n (the binary equivalents of the columns n₁ through n_k where the horizontal tabs are to be set)

NOTE

Use Table 4-2 to select the ASCII character which produces the required binary equivalent.

- d. NUL
- e. CR (the software horizontal tab setting command must be terminated with a carriage return if the printer is equipped with the line buffer option.)

Example:

ESC + 3 + SOH + 4 + T + t + NUL sets horizontal tabs at columns 1, 52, 84 and 116. The ASCII code characters SOH, 4, T, and t produce the binary numbers 000 0001 (decimal 1), 011 0100 (decimal 52), 101 0100 (decimal 84), and 111 0100 (decimal 116), respectively, where the line begins at column zero.

4.3.3 SOFTWARE LINE WIDTH SETTING. When received by the printer, the following sequence, causes the line width to be set at the number of columns represented by "n". Any line width up to the maximum 126 columns may be set. If parity is selected on the printer, a parity bit must be added to the seven-bit number "n" as the most significant (eighth) bit.

NOTE

The software line width setting command is ignored by the printer if the Line Buffer option is installed.

- a. ESC
- b. :
- c. n (the binary equivalents of the columns n₁ through n_k where the horizontal tabs are to be set)

Use Table 4-2 to select the ASCII character which produces the required binary equivalent.

Use Table 4-2 to select the ASCII character which produces the required binary equivalent.

Example:

ESC + : + P sets the line width at 80 columns. The ASCII character P produces the binary 101 0000 (decimal 80).

4.3.4 SOFTWARE VERTICAL FORMAT RECALL.

The following sequence causes the vertical format information stored in the VFC channel memory (channels 1 through 8) to be recalled into the working memory, clearing the previous vertical format information from the working memory. This command takes effect following the channel arm feed operation.

4.3.4 SOFTWARE VERTICAL FORMAT RECALL. The following sequence causes the vertical format information stored in the VFC channel memory (channels 1 through 8) to be recalled into the working memory, clearing the previous vertical format information from the working memory. This command takes effect following the channel arm feed operation.

If the VFC option is not installed, this command is ignored.

If the VFC option is not installed, this command is ignored.

- a. ESC
- b. 9
- c. N (the ASCII character for the channel number selected.)
- d. FF (form feed)
- e. CR (the software vertical format recalled command must be terminated with a carriage return if the printer is equipped with the Line Buffer option).

Example:

ESC + 9 + 7 + FF recalls into the working memory the vertical format stored in VFC channel 7.

SECTION V INTERFACE INFORMATION (PRINTERS WITHOUT LINE BUFFER OPTION)

5.1 STANDARD INTERFACE

As shown in Figure 5-1 the transmitting device sends asynchronous data to the Model 810 printer. The data consists of control and printable characters. When the printer receives the data, it stores both the control and printable characters in the first-in-first-out (FIFO) buffer. The processor determines whether each character is a control or a printable character. Printable characters are stored in the print buffer; control characters are acted upon by the processor, changing the operation of the printer.

Characters from the print buffer are printed by the Model 810 printer at a rate of 150 characters per second (CPS). Printing begins either when the processor receives a line termination character [line feed (LF), carriage return (CR), vertical tab (VT), form feed (FF), or tab-to-line (DC2)] or when the 133rd printable character is read from the FIFO after 132 printable characters have been stored in the print buffer. The average rate at which characters are read from the FIFO is slower than the print rate because of the time required to line-feed the paper. If the rate at which characters are received by the FIFO exceeds the rate at which they are read out, the FIFO will accumulate characters.

With printers using the EIA or TTY interface, a BUSY signal is sent when 253 characters are stored in the FIFO. The printer can still accept up to three more characters after the BUSY signal. With printers using the parallel (PLT) interface, a BUSY signal is sent when 256 characters are stored in the FIFO; in this case no characters can be received after the BUSY signal. A

BUSY signal also is sent when the following conditions occur: an encoder error occurs, the printer is placed off-line, or a paper-out condition occurs. The transmitting device must not send data after the printer receives the BUSY signal. The BUSY signal is not

The printer stops sending data when the print buffer is full (FIFO drops to 121 or less). Pressing the RESET button will clear the BUSY signal caused by an encoder error or paper-out condition. Placing the printer on-line will clear the BUSY signal caused by the off-line condition.

When continuous data is received at a rate of 1200 baud rate, the BUSY signal may be ignored if an average of 37 characters per line is printed per form length. This average number of characters per line is calculated by dividing the number of characters per line by the total number of lines per form length. This condition precludes the use of form control functions.

The following paragraphs contain signal interface information for the standard parallel interface (EIA) as well as for the optional parallel and TTY interfaces.

of the following conditions occur: a paper-out condition, or an encoder error. The transmitting device must not send data after the printer receives the BUSY signal. The BUSY signal is not synchronized with the data.

The BUSY signal (caused by a paper-out condition or an encoder error) will clear the BUSY signal. Pressing the RESET button will clear the BUSY signal caused by an encoder error or paper-out condition. Placing the printer on-line will clear the BUSY signal caused by the off-line condition.

When continuous data is received at a rate of 1200 baud rate, the BUSY signal may be ignored if an average of 37 characters per line is printed per form length. This average number of characters per line is calculated by dividing the number of characters per line by the total number of lines per form length. This condition precludes the use of form control functions.

The following paragraphs contain signal interface information for the standard parallel interface (EIA) as well as for the optional parallel and TTY interfaces.

TI Part N	Interface
994401-0001	PLT
994401-0008 (Field Installed)	PLT
994402-0001	TTY
994402-0008 (Field Installed)	TTY

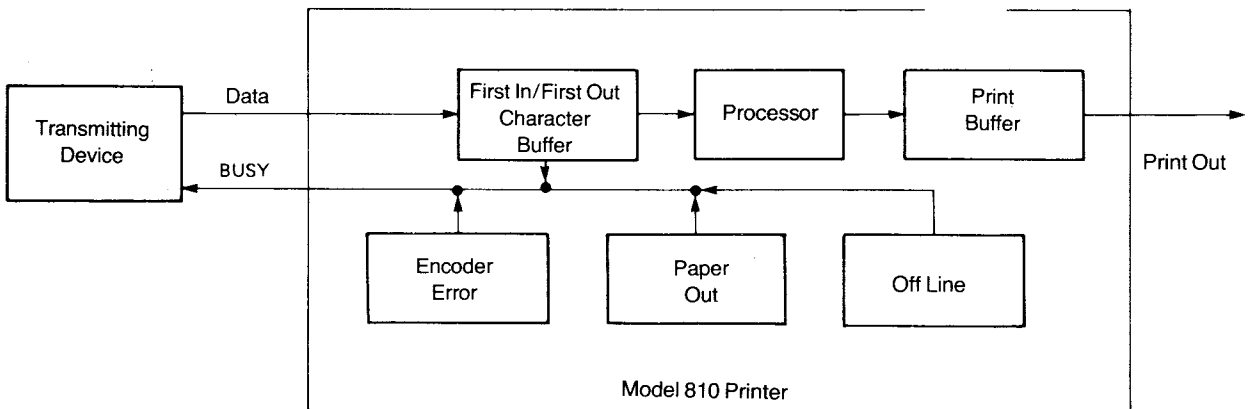


Figure 5-1. Busy Signal Generation Block Diagram (Printers Without Buffer Option)

Table 5-1. SERIAL INTERFACE CONNECTOR SIGNALS (J13)

J13 Pin No.	Signal Name	Designation		Source	Action
		EIA	C.C.I.T.T.		
1	Protective Ground	AA	101	None	Chassis ground
2	Transmitted Data	BA	103	Printer	Held to negative level
3	Received Data	BB	104	Input Device	Received
4	Request to Send	CA	105	Printer	Held to a positive level
5	Clear to Send	CB	106	Input Device	(Not Used)
6	Data Set Ready	CC	107	Input Device	Must be a positive level for printer to receive data
7	Signal Ground	AB	102	None	Return path for data and control signals
8	Carrier Detect	CF	109	Input Device	Must be a positive level for printer to receive data
9	+12 Volts	—	—	Printer	May be used as voltage for inputs to printer; source impedance is 100-ohms
10	-12 Volts	—	—	Printer	May be used as voltage for inputs to printer; source impedance is 100-ohms
11	Reverse Channel	SCA	120	Printer	Held to negative level when printer is busy; when starburst is received, these levels are inverted
20	Data Terminal Ready	CD	108.2	Printer	Held to positive level when printer is on line; EIA level for standard printer is off line, or when printer is off line or busy.

The reverse channel line is used to send printer-BUSY status to the transmitting device. The reverse channel line is held at a positive level when the printer is free to accept data; when the printer becomes BUSY, it will set the reverse channel line to the negative level. In the IRC printer these signals levels are inverted (ready = negative level; busy = positive level). The printer will accept the character which causes the busy condition (and up to three more characters) but will ignore any subsequent characters until the busy condition is cleared. The basic EIA interface timing is shown in Figure 5-5.

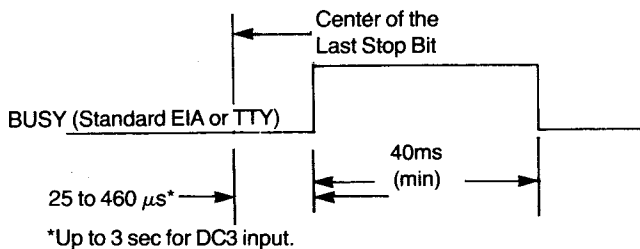


Figure 5-5. EIA or TTY Interface BUSY Timing

5.3.3.2 Parity Checking. The bit immediately before the stop bit in the asynchronous data format is the parity bit. Characters received with incorrect parity are printed as "♦", and the control panel ERROR indicator lights. A parity error in a format statement will terminate the statement.

5.4 PARALLEL INTERFACE (OPTIONAL)

The optional parallel interface signals at connector J18 are defined in Figure 5-2.

5.4.1 SIGNAL LEVELS

For a high input signal to the printer, the transmitting device must be able to source +2.4 Vdc. For a low input signal, the transmitting device must be able to sink 14 milliamperes at +0.4 Vdc. For a high output, the printer must be able to sink 14 milliamperes at +0.4 Vdc. Data lines must be terminated in the printer by 1000 ohms to +5 Vdc. The reverse channel line must be terminated in the printer by 470 ohms to 5 Vdc.

5.4.2 PARALLEL INTERFACE TIMING. The basic, parallel interface timing is shown in Figure 5-6.

5.4.3 DATA STROBE ACKNOWLEDGEMENT. A data strobe pulse following an acknowledge pulse stores the parallel data in the FIFO buffer. If the printer is BUSY, the data strobe stores the parallel data in the FIFO buffer if that the data is strobed at minimum 10.5 μs intervals.

5.5 TTY CURRENT LOOP INTERFACE (OPTIONAL)

The optional TTY current loop interface uses a four-wire, receive only, neutral current loop. The TTY current loop interface does not interfere with the standard EIA serial interface. Data can be received from either interface, provided the other interface is in a spacing condition or its connector is unplugged. The TTY current loop interface signals at connector J19 are defined in Table 5-3.

TABLE 5-3. TTY CURRENT LOOP INTERFACE SIGNALS (J19)

Pin	Signal Name	Function
1	TTY Transmitted Data	Low impedance (marking) between pins 1 and 2 when the TTY printer is ready to accept data; high impedance (spacing) when the TTY printer is busy
2	TTY Transmitted Data Return	
3	Ground	Provides chassis ground
4	TTY Received Data Return	Senses changes in current (data) through pins 4 and 5; HIGH current for marking; LOW current for spacing
5	TTY Received Data	

5.5.1 SIGNAL LEVEL

TTY current loop receives current levels from the sending device and controls EIA voltage levels. The input to the marking/spacing decision is 3 volts maximum. The TTY current supplied by the transmitter is the EIA voltage drop across 1 than 1.5 volts at 20-mA spacing leakage current. The transmitter output is ON or the TTY printer is ready for spacing (high impedance).

5.5.2 BASIC TTY INTERFACE TIMING

The asynchronous data format shown in Figure 5-4 also applies to the TTY current loop interface timing shown in Figure 5-5.

TERMINATIONS

The current levels from the receiving device are sent to the corresponding voltage drop across the receive device. The threshold is nominally 12 (± 7) mA. The transmitter switches the current supplied by the receiving device. The input to the channel (SCA) signal, IDLE or BUSY status. The transmitter terminals is less than 1.5 volts at 20-mA current. The maximum leakage current is 10 μ A at 50 Vdc. The transmitter is ON (low impedance) when it accepts data, and OFF (high impedance) when the TTY printer is busy.

INTERFACE TIMING

The asynchronous data format shown in Figure 5-4 also applies to the basic TTY interface timing shown in Figure 5-5.

Section VI

face connector is available as an option. Cables for various input devices also are available as options. Refer to Appendix D for cabling requirements to the indicated input devices.

The logic (signal) ground is connected to the safety (chassis) ground by a jumper from E6 to E7 on the motherboard (Figure 5-3): The logic ground can be isolated from the safety ground by removing this jumper. To gain access to ground jumper, remove the printer cover, the electronics cover, and the printed circuit boards as instructed in subsection 7.2.3 (**Battery Replacement**).

6.3 SERIAL INTERFACE (LBE OPTION)

The serial interface signals at connector J13 are defined in Table 6-1.

6.3.1 BAUD RATE. The selectable data transmission rates on the Model 810 printer are 110, 150, 300, 1200, 2400, 4800, or 9600 baud. The baud rate is selected by the first three of the seven pencil switches on the auxiliary control panel. See Section III for pencil switch settings. With the baud rate (BRO) option enabled, the following data transmission rates are replaced: 150 with 200 and 4800 with 600.

6.3.2 SIGNAL LEVEL interface signal level *RS-232-C* as follows:

	-25 to -	-3 to +3Vdc	+3 to -25Vdc
Data Signal	Mark	Not Defined	Space
Timing or Control Function	Off	Not Defined	On

The terminator load in to 7000 ohm dc resistance will not exceed 2!

6.3.3 ASYNCHRONOUS character sent to the printer consists of one start bit, one or two stop bits as

6.3.3.1 Timing. The when the input device *ready* and the *carrier* printer holds the *data* level when ON LINE, LINE. With the DNB

D TERMINATIONS. Serial defined by *EIA Standard*

ice is a noninductive 3000 Any open circuit driver voltage

DATA FORMAT. Each character received data line consists of one parity bit, and in Figure 6-2.

810 printer accepts data raised both the *data set* line to a positive level. The *al ready* line at a positive negative level when OFF enabled, the printer holds

TABLE 6-1. SERIAL INTERFACE CONNECTOR SIGNALS (J1

J13 Pin No.	Signal Name	Designation		Source	Function
		EIA	C.C.I.T.T.		
1	Protective Ground	AA	101	None	Chassis
2	Transmitted Data	BA	103	Printer	Held to
3	Received Data	BB	104	Input Device	Receiver
4	Request to Send	CA	105	Printer	Held to
5	Clear to Send	CB	106	Input Device	(Not Us
6	Data Set Ready	CC	107	Input Device	Must be
7	Signal Ground	AB	102	None	printer l
8	Carrier Detect	CF	109	Input Device	Return
9	+ 12 Volts	—	—	Printer	Must be a positive EIA level for the printer to receive data
10	- 12 Volts	—	—	Printer	May be used as bias voltage for inputs to (1000-ohms source impedance)
11	Reverse Channel	SCA	120	Printer	May be used as bias voltage for inputs to printer, (1000-ohms source impedance)
20	Data Terminal Ready	CD	108.2	Printer	Held to negative EIA level when <i>standard</i> printer is busy, and to positive EIA level when <i>standard</i> is not busy; these levels are inverted in IRC printer
					Held to positive EIA level when <i>standard</i> printer is on line or when the DNB printer is on line and not busy; and to negative EIA level when <i>standard</i> printer is off line, or when DNB printer is off line or busy.

*With the gated EIA (GED) option enabled the received data line is held LOW during a busy condition, preventing the printer from receiving data

must be able to sink 14 milliamperes at 0.4 Vdc. For a high output from the printer, the printer is able to source up to 0.320 milliamperes at +2.4 Vdc. For a low output, the printer is able to sink up to 14 milliamperes at +0.4 Vdc. Data lines are terminated in the printer by 1000 ohms to +5 Vdc. *Data strobe* is terminated in the printer by 470 ohms to +5 Vdc.

6.4.2 BASIC PARALLEL TIMING. The basic parallel interface timing for Line Buffer option printers is shown in Figure 6-4.

6.4.3 DATA STROBE ACKNOWLEDGEMENT. A *data strobe* pulse following an *acknowledge* pulse will store the parallel data in FIFO buffer provided the data is strobed at minimum 11.5 μ s intervals. With the gated data strobe (GDS) option enabled, the *data strobe* pulse will not store the parallel data in the FIFO buffer when the printer is BUSY and ON LINE; otherwise, it will function as stated above.

6.5 TTY CURRENT LOOP OPTION)

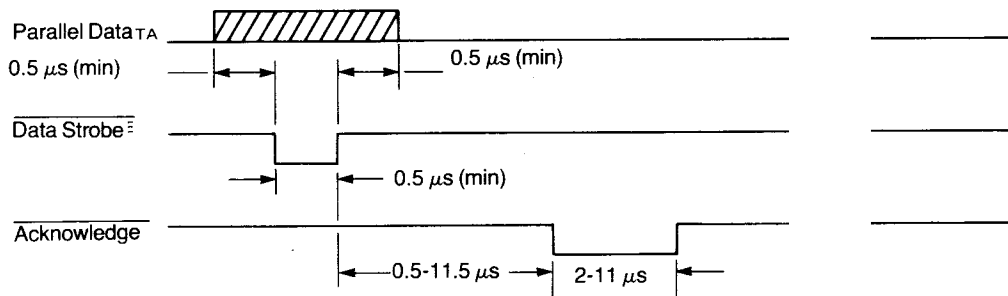
The TTY current loop only, neutral current loop interface, the EIA-422 connected from the printer signals at connector J

DP INTERFACE (LBT)

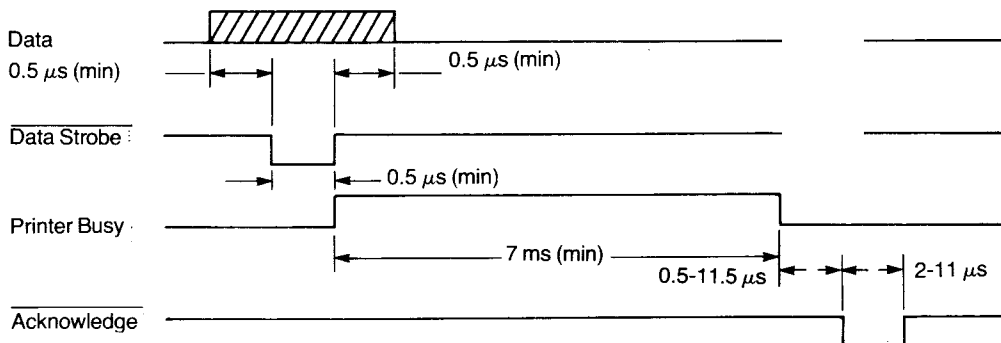
uses a four-wire, receive then using the TTY current loop interface cable must be disconnected from the printer signals at connector J defined in Table 6-3.

TABLE 6-3. TTY CURRENT LOOP SIGNALS WITH DIFFERENTIAL OPTION.

PIN	SIGNAL NAME	FUNCTION
1	TTY Transmitted Data	low impedance (marking) when pins 1 and 2 when the printer is ready to accept data; high impedance (spacing) when the TTY printer is busy
2	TTY Transmitted Data Return	
3	Ground	Printer chassis ground
4	TTY Received Data	Printer senses changes in current (marking) through pins 4 and 5; High current for marking; Low current for spacing.
5	TTY Received Data Return	



a. Parallel Interface Timing For A Character That Does Not Cause Printer Busy



b. Parallel Interface Timing For A Character That Causes Printer BUSY

Figure 6-4. Basic Parallel (LBP) Interface Busy Timing, Line Buffer Option

SECTION VII MAINTENANCE

Preventive and routine maintenance procedures may be performed by the operator. The optional battery replacement procedure should be performed by qualified technicians. If more complex maintenance or repair is required, refer qualified personnel to the *Model 810 Printer Maintenance Manual*, TI Manual No. 994386-9701. Failure to follow the scheduled procedures may void the warranty.

7.1 PREVENTIVE MAINTENANCE

To ensure satisfactory operation of the printer in normal service, the following maintenance schedule must be observed.

Procedure	Period
Vacuuming	Every month
Cleaning Ribbons Guides	Every month
Optional Battery Replacement	Every 15 months

7.2 LUBRICATION AND CLEANING

CAUTION

Do not use chlorinated solvents such as carbon tetrachloride as a cleaning agent.

Printers with printhead carriage mechanisms manufactured earlier than Revision T require monthly lubrication. Use the Model 810 Service Kit (TI part number 994472) which contains an approved cleaning agent and lubricant.

IMPORTANT NOTE

Printers with printhead carriage mechanisms designated Revision T and later do not require oiling of the carriage guide rods or the paper advance gear eyelet; doing so will defeat the self-lubrication properties of the bearings.

7.2.1 OILING PRINTHEAD CARRIAGE GUIDE RODS.

- Refer to Figure 7-1 for component locations.
- a. Clean the paper and lubricated alcohol.
 - b. Apply a few drops of lubricant* to the printhead carriage back carriage bearing.

7.2.2 OILING PAPER ADVANCE BEARING INSTALLATION HOLE.

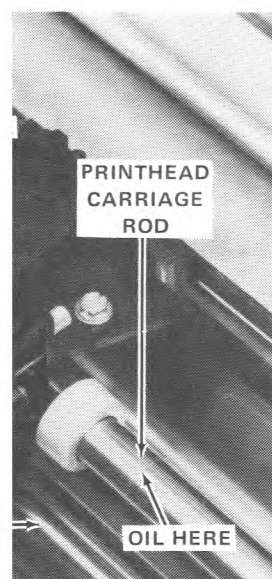
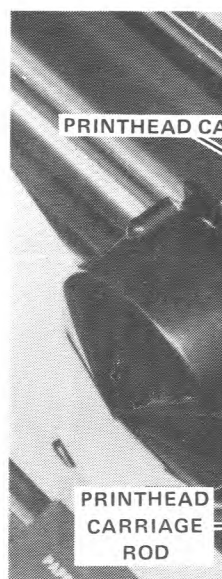


Figure 7-1. Carriage Lubrication Points

Figure 7-1. Carriage Lubrication Points

7.2.2 OILING PAPER ADVANCE BEARING INSTALLATION HOLE.

- a. Locate the paper advance bearing installation hole (outboard side of the right sideplate hole is partially obscured by the paper advance motor).
- b. Using a suitable applicator, apply no more than one drop of lubricant* through the hole onto the eyelet.

*Use TI Part No. 0199594-0001 or equivalent listed below:

1. Terristic 43 Oil (Exxon)
2. Regal Oil A - R & O (Texaco)

Section VII

- f. Install a new battery with the positive (+) side down (touching the printed circuit board) in the battery retainer.
- g. Replace the battery strap on the battery retainer; replace the screw in the battery strap and tighten the screw.
- h. Record the date of installation.
- i. Replace the processor PC board, electronics cover, and the printer cover. Tighten all cover screws.

- d. Select the appropriate fuse from the following table:

ac Line Voltage	F	Type	TI Part Number
100/120 volts	5.0 a	, 250V	416434-0503
220/240 volts	2.5 a	, 250V	416434-0004

- e. Place the fuse in the fuse holder.
- f. Slide the plastic cover down.
- g. Check that the ON/OFF switch is in the OFF position.
- h. Connect the power cord to the receptacle and to the power source.

7.4 ROUTINE MAINTENANCE AND ADJUSTMENTS

The following maintenance and adjustment procedures may be performed by the operator.

7.4.1 RIBBON GUIDE ADJUSTMENT. To align the ribbon path in the center of the right ribbon shift arm, perform the following procedure.

- a. Remove the printer cover (see subsection 7.3. a. above).
- b. Slightly loosen the screw which secures the adjustable ribbon guide to the right front of the sideplate (see Figure 2-5).
- c. Adjust the ribbon guide as necessary to align the ribbon in the center of the slot in the right ribbon shift arm.
- d. Tighten the ribbon guide screw.
- e. Replace the printer cover.

7.4.2 FUSE REPLACEMENT. To replace the power line fuse refer to Figure 7-4, and proceed as follows:

- a. At the left rear of the printer (disconnect the power cord, if installed), slide the clear plastic cover up to gain access to the fuse compartment.
- b. Remove the line fuse by pulling out and upward on the FUSE PULL lever.
- c. Push the FUSE PULL lever down.

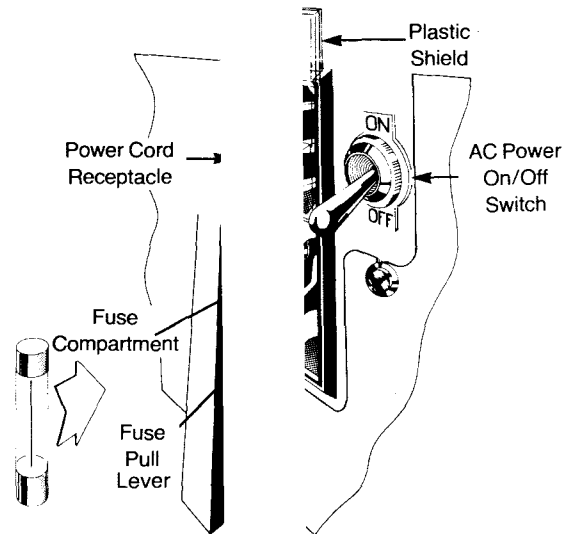


Figure 7-4. Power Cord and Fuse Compartment At Rear of Printer

7.4.3 PRINTHEAD REPLACEMENT. To remove the printhead refer to Figure 7-5 and proceed as follows:

WARNING

Disconnect the power cord to prevent possible electrical shock.

- a. Raise the access door.
- b. Manually slide the printhead to the center of the printing area.
- c. Using a 3/16-inch wrench, remove the two long hex nuts which secure the printhead to the printhead carriage.

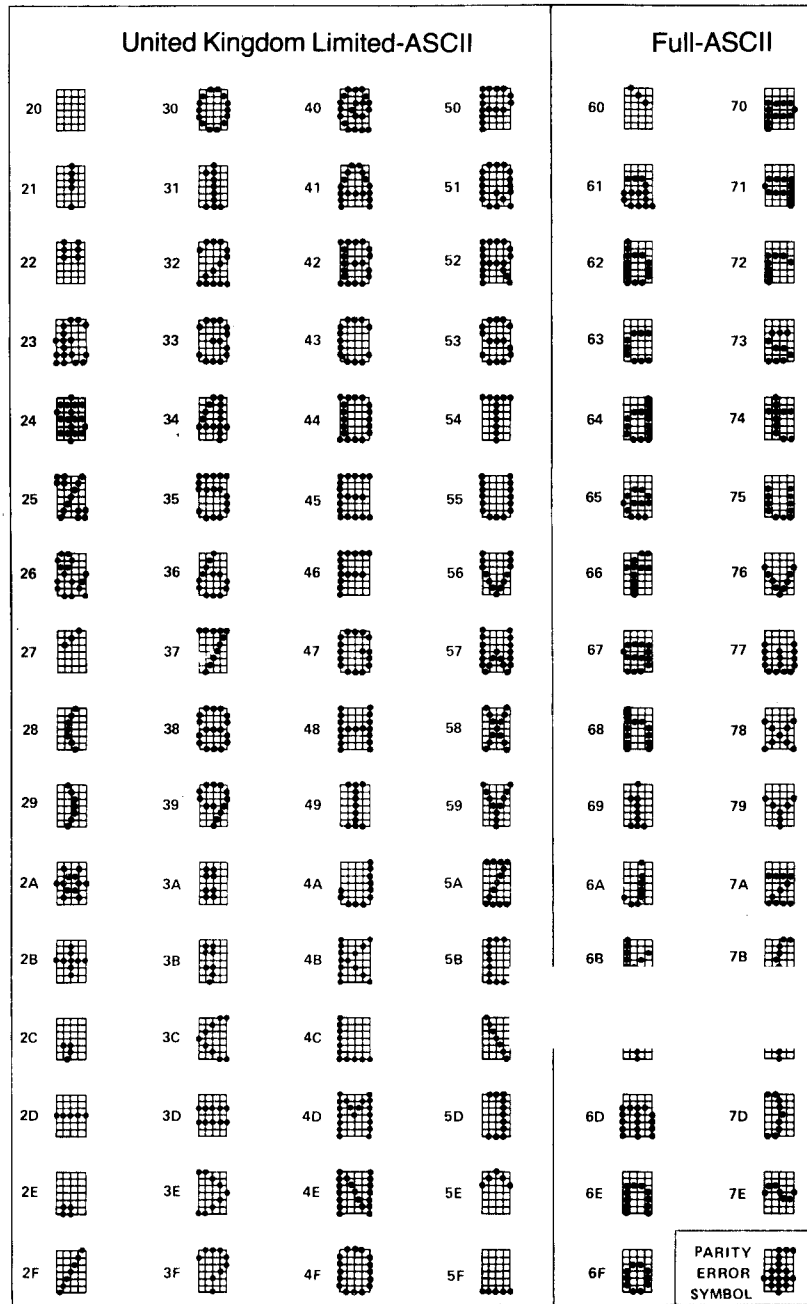


Figure A-3. United Kingdom Character Set (UKL and UKF)

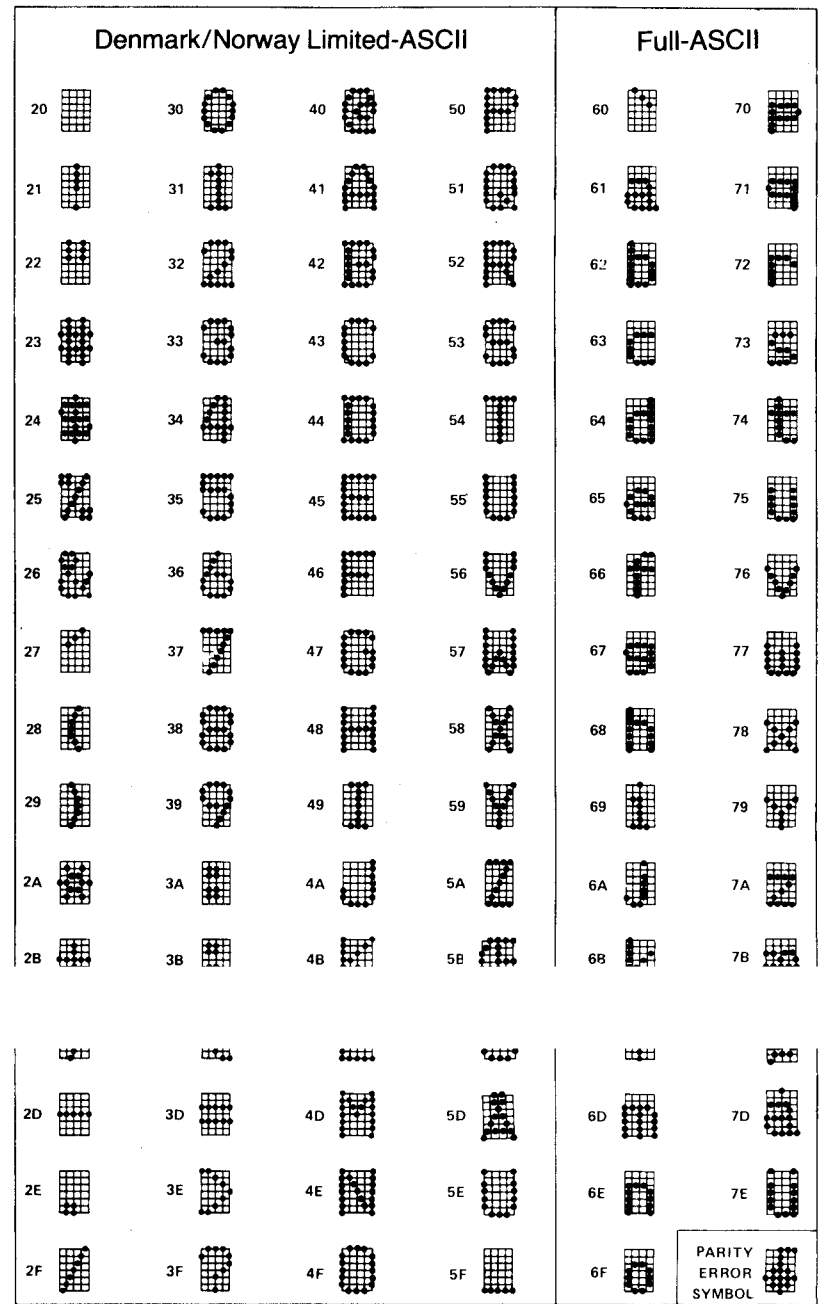


Figure A-2. Denmark/Norway Character Set (DNL and DNF)

Sweden/Finland Limited-ASCII				Full-ASCII							
20		30		40		50		60		70	
21		31		41		51		61		71	
22		32		42		52		62		72	
23		33		43		53		63		73	
24		34		44		54		64		74	
25		35		45		55		65		75	
26		36		46		56		66		76	
27		37		47		57		67		77	
28		38		48		58		68		78	
29		39		49		59		69		79	
2A		3A		4A		5A		6A		7A	
2B		3B		4B		5B		6B		7B	
2C		3C									
2D		3D		4D		5D		6D		7D	
2E		3E		4E		5E		6E		7E	
2F		3F		4F		5F		6F		PARITY ERROR SYMBOL	

Figure A-7. Sweden/Finland Limited character Set (SWL and SWF)

Germany Limited-ASCII				Full-ASCII							
20		30		40		50		60		70	
21		31		41		51		61		71	
22		32		42		52		62		72	
23		33		43		53		63		73	
24		34		44		54		64		74	
25		35		45		55		65		75	
26		36		46		56		66		76	
27		37		47		57		67		77	
28		38		48		58		68		78	
29		39		49		59		69		79	
2A		3A		4A		5A		6A		7A	
2B		3B		4B		5B		6B		7B	
2C		3C									
2D		3D		4D		5D		6D		7D	
2E		3E		4E		5E		6E		7E	
2F		3F		4F		5F		6F		PARITY ERROR SYMBOL	

Figure A-6. Germany Limited Character Set (GRL and GRF)

TABLE C-1. PARITY/CHARACTER SET SELECTION

Switch*		Bit 8	SI/SO	Parity	Charact
S4	S5				
OFF	OFF	0	Ignore	Don't Care	Normal
OFF	OFF	1	Ignore	Don't Care	Alternate
OFF	ON	Ignore	SI	Don't Care	Normal
OFF	ON	Ignore	SO	Don't Care	Alternate
ON	OFF	Parity	SI	Even	Normal
ON	OFF	Parity	SO	Even	Alternate
ON	ON	Parity	SI	Odd	Normal
ON	ON	Parity	SO	Odd	Alternate

*Switches 4 and 5 are located on the auxiliary control panel.

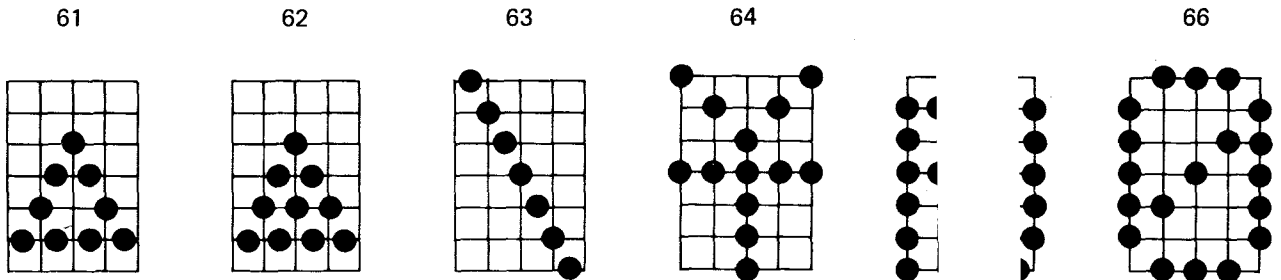


Figure C-1. Special Katakana Character Set (TI Part No. 9944²⁴-0016)

TABLE D-1. SUMMARY OF CABLE OPTIONS (Concluded)

Item	Part Number	Description	810 Connector Type	No. Wires
12	993205-0001	113A/103-202/212 Data Set Cable	25 Pin Male	12
13	993210-0001	Data Terminal Cable	25 Pin Male	12
14	993211-0001	Extension Cable, EIA	25 Pin Male	25
15	993239-0001	770 Terminal Cable	25 Pin Male	12
16	994403-0001	TTY Current Loop Cable (Included in TTY Option)		4
17	2261935-0010	990/5 EIA Cable	25 Pin Male	13
18	2263350-0001	763/765 Data Terminal Cable	25 Pin Male	12
19	2200051-0001	763/765 Data Set Cable	25 Pin Male	8
20	414127-0001	Parallel Option - Connector Only, Included In Parallel Option		
21	2263351-0001	Terminal Adapter Cable	25 Pin Female	11

Connector Type	Length	
	Meters	Feet
Male	1.8	6
Female	1.8	6
Female	1.8	6
Male	1.8	6
Female	1.8	6
Female	9.1	30
Female	1.8	6
Female	1.8	6
Female	1.8	6

TABLE D-2. 113A/103, 202/212 DATA SET CABLE (TI PART NUMBER 993205-0001)

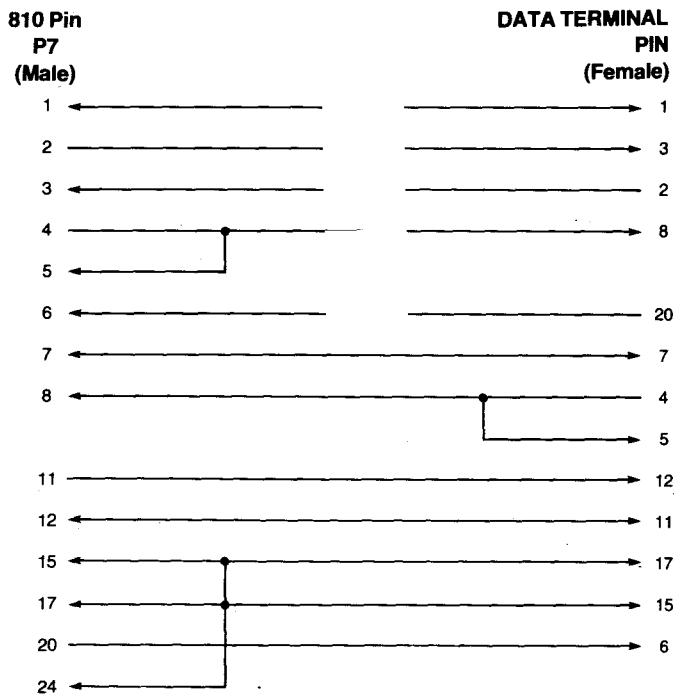
810 Pin P6-P7	202/212 Pin	RS-232-C Circuit	Function
1	1	AA	Protective Ground
2	2	BA	Transmitted Data
3	3	BB	Received Data
4	4	CA	Request to Send
5	5	CB	Clear to Send
6	6	CC	Data Set Ready
7	7	AB	Signal Ground
8	8	CF	Received Line Signal Detector
11	11	SCA	Secondary Request to Send
12	12	SCF	Secondary Received Line Signal Detector
20	20	CD	Data Terminal Ready
22	22	CE	Ring Indicator

TABLE D-3. 742 EIA CABLE (TI PART NUMBER 969626-0001)

810 Pin P13	742 P1	RS-232-C Circuit	Function
1	A	AA	Protective Ground
2	H	BA	Transmitted Data
3	10	BB	Received Data
4	F	CA	Request to Send
5	8	CB	Clear to Send
6	9	CC	Data Set Ready
7	7	AB	Signal Ground
8	K	CF	Received Line Signal Detector
11	5	SCA	Secondary Request to Send
12	4	SCF	Secondary Received Line Signal Detector
20	6	CD	Data Terminal Ready
22	J	CE	Ring Indicator

TABLE D-4. D. (TI PART NUMBER 993210-0001)

REFERENCE: (Either End)	Pin	RS-232-Circ	Function
	1	AA	Protective Ground
	2	BA	Transmitted Data
	3	BB	Received Data
	4	CA	Request to Send
	5	CB	Clear to Send
	6	CC	Data Set Ready
	7	AE	Signal Ground
	8	CF	Carrier Detect
	11	SC	Inverse Channel Transmit
	12	SC	Inverse Channel Receive
	15	DE	Transmission Signal Element
	17	DL	Receive Signal Element
	20	CE	Terminal Ready
	24	AUX1	Primary Input/Output Control



**TABLE D-7. 742 AUXILIARY CABLE
(TI PART NUMBER 973265-0001)**

810 pin P13	742 pin P2	RS-232-C Circuit	Function
3	11	BB	Received Data
4		CA	Request to Send
5		CB	Clear to Send
6		CC	Data Set Ready
7	1	AB	Signal Ground
8		CF	Received Line Signal Detector
11	12	SCA	Secondary Request to Send
12	13	SCF	Secondary Received Line Signal Detector
20		CD	Data Terminal Ready

**TABLE D-9
(TI PART NUMBER 983848-0001)**

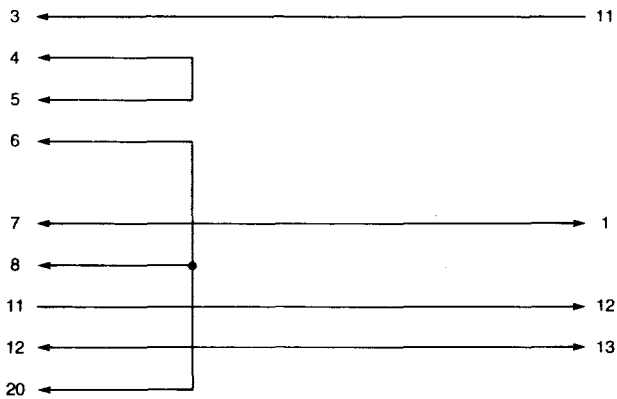
	743 Pin P1	RS-232-C Circuit	Function
1	9	A	Protective Ground
2	13	B	Transmitted Data
3	12	B	Received Data
4	10	C	Request to Send
7	1	AB	Signal Ground
8	11	C	Received Line Signal Detector
20	15	CD	Data Terminal Ready

**EIA CABLE
983848-0001)**

Function
Protective Ground
Transmitted Data
Received Data
Request to Send
Signal Ground
Received Line Signal Detector
Data Terminal Ready

810 PIN P13

742 PIN P2



**TABLE D-10. 9
(TI PART NUMBER 56-0010 & -0020)**

810 Pin P19	Retainer Clip	Function
1	E2	Transmitted Data Return
2	E1	Transmitted Data
4	E4	Received Data Return
5	E3	Received Data

**PUTER CABLE
56-0010 & -0020)**

Function
Transmitted Data Return
Transmitted Data
Received Data Return
Received Data

**TABLE D-8. 733 ASR EIA CABLE, 1200 BAUD
(TI PART NUMBER 959372-0002)**

810 Pin P13	ASR Pin P1	RS-232-C Circuit	Function
1	A	AA	Protective Ground
2	H	BA	Transmitted Data
3	10	BB	Received Data
4	C	CA	Request to Send
5	8	CB	Clear to Send
6	9	CC	Data Set Ready
7	7	AB	Signal Ground
8	K	CF	Received Line Signal Detector
20	6	CD	Data Terminal Ready

**TABLE E-3. TTY CURRENT LOOP LINE BUFFER
PC BOARD (LBT) STRAPPABLE OPTIONS**

NOTES

1. (n) indicates DESELECTED position.
2. Mandatory positions listed below MUST BE SET
3. Jumpers E11-E12 and E13-E15 located on the processor board must be strapped for processor boards Rev P and later.

Suboption	Current Loop Board (LBT) Revision		
	Rev. E And Later	Rev. D	Rev. C and Earlier
DSC (Decode Carriage Return)	E1-E2 (n) print on CR ¹ E2-E3 print on CR, LF, FF, VT ¹	E1-E2 (n) print on CR ¹ E2-E3 print on CR, LF, FF, VT ¹	E1-E2 (n) print on CR ¹ E2-E3 print on CR, LF, FF, VT ¹
BRO ² (Baud Rate Option)	E4-E5 (n) 5501 E5-E6 5504	E4-E5 (n) 5501 E5-E6 5504	E4-E5 (n) 5501 E5-E6 5504
GDS ³ (Gated Data Strobe)	E19-E20 (n) Data Strobe Ungated E20-E21 Data Strobe Gated	E19-E20 (n) Data Strobe Ungated E20-E21 Data Strobe Gated	E19-E20 (n) Data Strobe Ungated E20-E21 Data Strobe Gated
HDP (Half Duplex Mode)	E29-E30 } (n) Full Duplex E32-E33 } E13-E14 } E25-E26 } Half Duplex	E29-E30 (n) Full Duplex E13-E14 } E20-E21 } Half Duplex E25-E26 }	E29-E30 } Full Duplex E13-E14 } (n) Duplex E20-E21 } E25-E26 } Half Duplex
Mandatory Position of Other LBT Jumpers	E8-E9 E10-E11 E28-E31	E8-E9 E10-E11	E8-E9 E10-E11

¹Or 132 characters.

²This option must also be configured on the Processor PC board.

³E20-E21 when HDP is selected.

**TABLE E-4. PARALLEL INTERFACE LINE BUFFER PC BOARD
(LBP) STRAPPABLE OPTIONS**

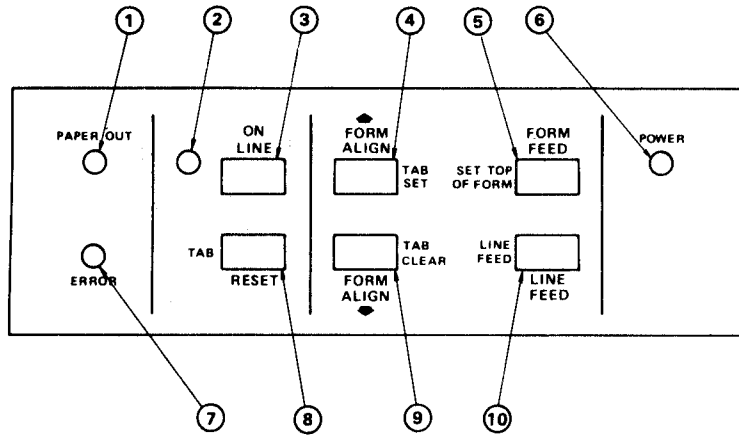
NOTES

1. (n) indicates DESELECTED position.
2. Mandatory positions listed below MUST BE SET
3. Jumpers E11-E12 and E13-E15 located on the processor board must be strapped for processor boards Rev P and later.

Suboption	Parallel Board (LBP) Revision Level		
	Rev. E And Later	Rev. D	Rev. C and Earlier
DSC (Decode Carriage Return)	E1-E2 (n) print on CR ¹ E2-E3 print on CR, LF, FF, VT ¹	E1-E2 (n) print on CR ¹ E2-E3 print on CR, LF, FF, VT ¹	E1-E2 (n) print on CR ¹ E2-E3 print on CR, LF, FF, VT ¹
GDS (Gated Data Strobe)	E19-E20 (n) Data Strobe Ungated E20-E21 Data Strobe Gated	E19-E20 (n) Data Strobe Ungated E20-E21 Data Strobe Gated	E19-E20 (n) Data Strobe Ungated E20-E21 Data Strobe Gated
Mandatory Position of Other Jumpers on LBP Board	E4-E5 E8-E9 E10-E11 E29-E30 E32-E33 E28-E31	E4-E5 E8-E9 E10-E11 E29-E30	E4-E5 E8-E9 E10-E11 E27-E28 E29-E30

¹Or 132 characters.

CONTROL PANEL (CP)



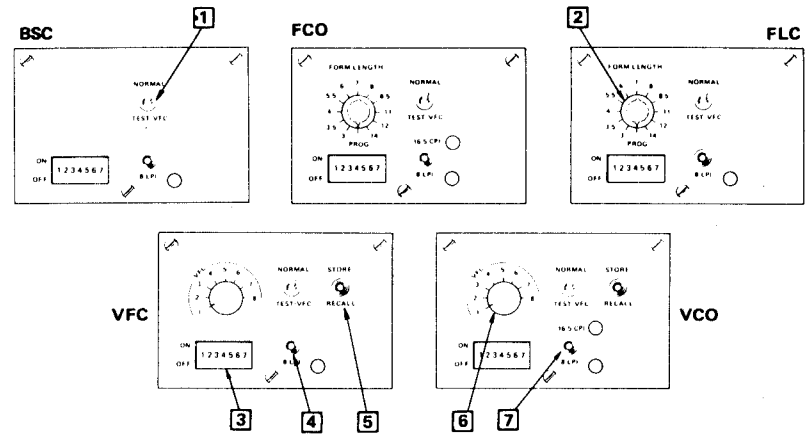
CONTROL PANEL (CP) CONTROLS AND INDICATORS

- 1 Indicator lights when PAPER OUT switch is actuated.
- 2 Indicator lights when printer is ON LINE.
- 3 Switch alternately sets ON/OFF LINE. When TEST/VFC is activated, pressing ON LINE starts barberpole printout, provided baud rate is set 3.
- 4 Switch active both ON/OFF LINE. Alternately moves paper up or sets vertical tab. SET TAB function enabled when TEST/VFC activated on ACP.
- 5 Switch active both ON/OFF LINE. Alternately moves paper to top of next form (FORM FEED) or sets TOP OF FORM. SET TOP OF FORM function when TEST/VFC activated on ACP.
- 6 Indicator lights when power is applied to printer.
- 7 Steady light indicates input parity error. Blinking light indicates carriage jam or other carriage control malfunction.
- 8 Switch alternately resets logic when error is cleared or advances paper to next vertical tab when TEST/VFC on ACP is activated.
- 9 Switch active ON/OFF LINE. Alternately moves paper down or, when TEST/VFC activated on ACP, returns tab at present position.
- 10 Active OFF LINE only. No alternate functions. Moves paper up one line.

FUNCTION	SWITCH POSITION*	
	4	5
IGNORE PARITY	OFF	OFF
ODD PARITY	ON	ON
EVEN PARITY	ON	OFF

*See 3

AUXILIARY CONTROL PANEL (ACP)



FORM LENGTH AND VERTICAL TAB SETTING

1. Press Form Feed 5.
 2. Using a convenient reference point, align top of form with Form Align ↑ 4 and ↓ 9.
 3. Set Auxiliary Control Panel Normal/Test/VFC switch 1 to TEST/VFC mode.
 4. If 8 LPI is desired, select with 4.
 5. Press Set Top of Form 5.
 6. Press Line Feed 10 until line to be tab-set is correctly positioned in reference to printhead. (Approximately 3 and 4 lines below top of ribbon guide on printhead carriage for 6 and 8 LPI respectively.)
 7. Press Tab Set 4.
 8. Repeat steps 6 and 7 as necessary to set all desired tabs.
 9. With Line Feed 10 step paper to top of next form using same reference point as in 2. Press 5. This sets form length.
- a. Repeat steps 1 to 3 above.
- b. Press tab 8. If Tab is correct, press Tab 8 for next tab. If tab setting is incorrect, press 9 to clear and reenter tab per steps 6 and 7.
12. When 8 is pressed after last tab is verified, paper will move to top of next form.
 13. Set Auxiliary Control Panel Normal/Test/VFC 1 to NORMAL.
 14. If print is not centered exactly on form ↑ 4 and ↓ 9 can be used to adjust form while printing.

AUXILIARY CONTROL PANEL (ACP) CONTROLS AND INDICATORS

- 1 NORMAL position for routine printer operation. In TEST/VFC, pressing ON LINE switch on CP starts barberpole printout. In TEST/VFC, with ON LINE switch OFF, TAB, TAB SET, TAB CLEAR, TOP OF FORM and LINE FEED are enabled on CP.
- 2 Selects one of 11 fixed form lengths. In PROG, operator can program form lengths.
- 3 Switches 1, 2, 3 select baud rate or parallel input. Switches 4 and 5 select parity. Switch 6 activates auto line feed. Switch 7 activates auto perforation skip.
- 4 Alternately selects 8 or 6 lines per inch. Light ON in 8 LPI mode.
- 5 In STORE position, stores manually programmed vertical tabs, form length and LPI in selected VFC channel. In RECALL position, activates format program stored in selected VFC channel. TEST/VFC switch must be activated.

indicator displays selected print mode. Also (see 4).

BAUD RATE		SWITCH POSITION		
STANDARD	BRO*	1	2	3
110	110	OFF	OFF	OFF
150	200	ON	OFF	OFF
300	300	OFF	ON	OFF
1200	1200	ON	ON	OFF
2400	2400	OFF	OFF	ON
4800	600	ON	OFF	ON
9600	9600	OFF	ON	ON
PARALLEL		ON	ON	ON

*Baud Rate Option

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