LG31 Printer
Installation/Operator's Manual

Order Number EK-LG31E-IN-002

Digital Equipment Corporation

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Preface

Purpose

This manual provides information on the installation and operation of the LG31 300 LPM Line Matrix Printer. It contains instructions and procedures to help a user install, power-up, set/load, operate, and maintain the LG31 printer.

NOTE

The LG31 printer is installed, maintained, and supported by Digital Equipment Corporation.

Manual Organization

This manual is organized as follows:

- **Chapter 1 General Information**—Contains a product overview, operational/programming features, options, and printer specifications.

- **Chapter 2 Installation and Checkout** – Provides step-by-step instructions for proper unpacking/installation of the LG31 printer and ac power cord connection.

- **Chapter 3 Controls and Indicators** – Describes the LG31 printer controls and indicators.

- **Chapter 4 Setting Communications and Print Parameters** – Describes the parameters that may be set on the LG31 printer.

- **Chapter 5 Printer Diagnostics** – Describes the LG31 self-tests and alignments test.

- **Chapter 6 Printer Operation** – Describes user operation procedures.

- **Chapter 7 Operator Maintenance** – Describes operator troubleshooting tools and maintenance procedures.

- **Appendix A LED Display List** – Contains a complete list of LG31 printer readouts.

- **Appendix B Parameter Selection** – Contains the program mode parameters and the function mode options.

- **Appendix C LG31 Country Kits** – Contains the country kit information.

Related Documentation

This manual is one in a series of documents listed, as follows, describing the LG31 printer.

Title	Document No.
LG31 Printer Pocket Service Guide	EK-LG31E-PS
LG31 Printer User's Guide	*
LG31 Printer Installation/Operator's Manual	*
LG31 Printer Technical Manual	EK-LG31E-TM
LG31 Printer Illustrated Parts Breakdown	EK-LG31A-IP

* These two books are ordered as a kit: EK-OLG31-DK.

Conventions

In writing this manual, the following conventions have been adopted for the mechanical objects listed below

- Control Panel Keys = Capitalized key legend

  Example: OFF LINE

- LED Three-Character Display = Bracketed three characters including flashing printer mode dots

  Example: [.8.8.8]

- Number Designated Keys = Parenthesis enclosed number designation

  Example: (4)

Notes, Cautions, and Warnings

Throughout this manual Notes, Cautions, and Warnings have the following meanings:

NOTE: The information is important to the understanding of the process being described.

CAUTION: The information describes a process that can damage the equipment or software.

WARNING: The information describes a process that can harm the user.

Assistance

If you have a problem with the LG31 printer, carry out the following steps:

1. Confirm that the problem can be repeated by recreating the identical conditions leading up to the problem. A vital step may have been overlooked which is causing the problem.

2. Identify the problem using the "Troubleshooting" section in Chapter 7 and the list of LED display messages in Appendix A to determine if the problem can be resolved in-house. If not, the local Digital Equipment Corporation Customer Service organization should be contacted.

3. If required, report the problem to Digital Equipment Corporation Customer Service. Consult your service contract for the information required to process your call.

WARNING

Dangerous voltages exist in the LG31 printer. There are no internal user serviceable parts. Refer servicing to qualified service personnel.

FCC Statement (A)

Notice

This equipment generates, uses, and may emit radio frequency energy. The equipment has been type tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such radio frequency interference. Operation of this equipment in a residential area may cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

Chapter 1

GENERAL INFORMATION

1.1 Overview

This chapter contains an overview of the LG31 300 LPM Line Matrix
Printer (hereafter referred to as the LG31 printer). It includes a brief
description of the printer and listings of the electrical, mechanical, and
operational specifications.

1.2 General Description

The LG31 printer is a line matrix printer incorporating a serial I/O (see
Figure 1–1). The LG31 printer uses fan-folded, tractor-fed paper stock,
and operates at 100-240 volts, 50-60 Hertz (Hz). The printer is primarily
used in data processing and office environments, and can be operated by
non-technical users. The LG31 must be installed by a trained Field
Service engineer. It is maintained and supported by Digital Equipment
Corporation.

The hardware environment for the printer consists of all the electrical
and mechanical interfaces. The electrical interfaces are the host com-
munication port, and the ac power inlet. The mechanical interfaces are
the platen gap, paper thickness adjuster, the paper path/tractors, ribbon
cartridge, and the outer/inner control panels. The printer is compatible
with low to mid-range PDP and VAX systems.

No specialized software is required. For data exchange with the host
computer, the LG31 has an RS-232-C port.

The firmware resident in the printer interprets and executes commands (control sequences) sent from the host computer or entered by an operator at the printer's outer or inner control panels. There are self-test diagnostics integrated in the printer firmware to verify operational integrity and identify hardware faults.

The printer is capable of printing at a speed of 300 Lines Per Minute (LPM) in upper case characters, in a data processing font, at 10 Characters Per Inch (CPI), and at 6 Lines Per Inch (LPI). At this speed, a projected workload of 15-20K pages per month at 50 percent duty cycle (assuming an eight-hour day) is attainable.

1.3 Major Components

The major components of the LG31 printer are as follows:

- Control panels

- Printer mechanism

- Control electronics

- Serial interface

- Power supply

1.3.1 Control Panels

There are two control panels on the LG31 printer: an Outer Control Panel keypad for common operations, and an Inner Control Panel keypad for more complex printing operations. The inner control panel has a three-character LED display, which indicates printer status and operator-correctable faults. The display panel is visible above the outer control panel through a window in the top cover. An operator can key in commands (see Chapter 5) on the inner control panel to invoke diagnostic self-tests, modify printer parameters, or initiate specified printer functions.

Also included is an audio operator-alerting alarm for power-up/fault detection, and an initialization switch, which erases current configuration settings and restores the printer to factory settings. Refer to Chapter 3 for configuration menu selection/modification, Chapter 4 for programming printer functions, and Chapter 5 for operator-selected keypad functions. Appendix A lists all the display codes.

Figure 1–1:   LG31 Printer

DISPLAY
WINDOW

TOP
ENCLOSURE

OUTER
CONTROL
PANEL

FRONT
DOOR

LEFT
COVER

PAPER
RACK

POWER
SWITCH
(CIRCUIT
BREAKER)

RIGHT
COVER

PAPER
STACKING
GUIDES

REAR
COVER

PAPER
SHELF

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GENERAL INFORMATION   1–3
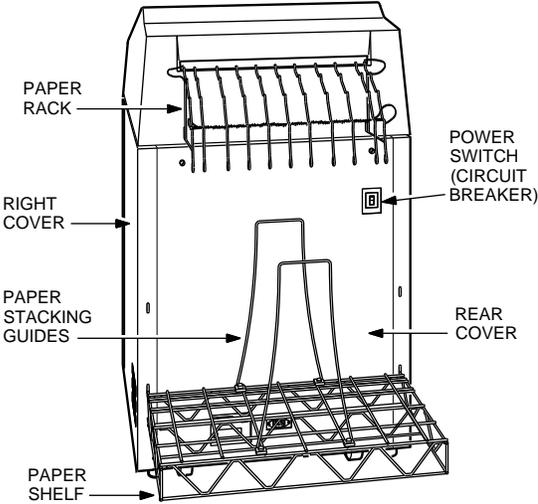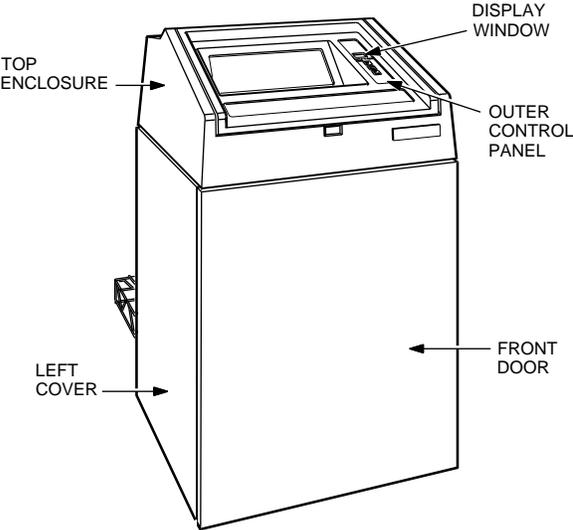
Configuration of the printer is accomplished with the use of the control panel and printed menus. The printer is capable of operating in either 7 or 8 bit modes and with the Digital serial I/O protocol.

1.3.2 Printer Mechanism

The LG31 printer mechanism consists of mechanical and electromechanical hardware. The printer mechanism performs ribbon/paper motion and translates the binary print data to printed characters on paper by means of the print shuttle.

1.3.3 Control Electronics

The control electronics of the LG31 printer coordinates the functions and operations of the serial interface, control panel, and printer mechanism.

1.3.4 Serial Interface

The EIA RS-232-C serial interface provides the bidirectional communications link between the host and the printer. Bidirectional communications allow print data to be sent to the printer and various types of data (XON/XOFF protocol, status reports, printer identification, and so on) to be sent to the host from the printer. The ASCII/ISO 7-bit code and alphanumeric characters are used for information interchange between the printer and the host (data source).

1.3.5 Power Supply

The LG31 printer's power supply provides regulated dc power to the control electronics and printer mechanisms. The ac power is rectified and regulated to assure reliable printer operation. The power supply automatically adjusts to ac input voltages in the range of 100 to 240V ac at 50 to 60 Hz and constantly monitors the dc output voltages.

1.4 Printed Circuit Boards

The LG31 printer printed circuit boards are listed in Table 1–1.

Table 1–1: LG31 Printed Circuit Boards

Board	Description	Part No.	Location
SCPI	Shuttle Control Panel Interface	29-26721-00	On access door between outer and inner control panels.
SHAD	Shuttle Head Actuator Driver	29-26729-00	Vertically mounted in top rear of printer.
SMDP	Shuttle Matrix Display Panel	29-26720-00	On inner control panel.
SMMB	Shuttle Matrix Mother Board	29-27261-01	Inside rear access door (left side).
SMIH	Shuttle Matrix Image Hardware	29-26731-00-00	In logic card cage (right side).
SMIM	Shuttle Matrix Imaging Microprocessor	29-26730-00	In logic card cage(right-side).
SMMC	Shuttle Matrix Motor Control	29-26735-00	In logic card cage (right side).
SMSI	Shuttle Matrix Serial Interface	29-26723-00	Piggyback on SMSM.
SMSM	Shuttle Matrix System Microprocessor	29-26733-00	In logic card cage (right side).
SPSD	Shuttle Power Supply Discharge	29-26724-00	Inside rear access door below the capacitor.
SPSM	Shuttle Power Supply Master	29-26734-00	In power supply card cage (left side).
SPSR	Shuttle Power Supply Regulator	29-26732-00	In power supply card cage (left side).
SPSX	Shuttle Power Supply Filter	29-26722-00	In ac switch box, rear of printer, near power ON/OFF switch.

1.5 Printer Feature Summary

The LG31 printer provides the following features:

- Bolding
- Underlining text
- Single, double-width characters

- Single, double, or triple-height characters

- Autowrap

- Line feed/new line mode

- Hex dumping

- Digital multinational 8-bit character set (U.S. ASCII)

- National Replacement Character (NRC) sets (see Section 1.6.5).

1.6 Specifications

1.6.1 LG31 Printer Specifications

Table 1–2: LG31 Printer Specifications

Printer Dimensions

Unpacked

Width	737.5 cm (29.0 in)
Depth	63.5 cm (25.0 in)
(with Paper Tray)	104.1 cm (41.0 in)
Height	123 cm (48.4 in)
Net Weight	131 kg (287 lbs)

Packaged

Width	77.5 cm (30.5 in)
Depth	88.9 cm (35 in)
Height	156.2 cm (61.5 in)
Weight	171 kg (376 lbs) (includes 16 kg (35.2 lbs) of accessories consisting of paper shelf, upper paper rack, and ribbon cartridge)

Installation Area Requirements

Width	137 cm (54 in) (To allow air flow clearance for printer side vents)
Depth	206.5 cm (104 in) (To allow free access to front and rear paper handling areas, the ON/OFF switch, and the power cables)

Electrical

Voltage Range	100 to 240 V ac

Table 1–2 (Cont.):   LG31 Printer Specifications

NOTE
The printer's universal power supply automatically
accepts international voltage and frequency variations.

Input Frequency Range	50 Hz to 60 Hz
Harmonic Distortion	5% maximum allowable
Power Rating	
Standby	50 W
Printing	400 W
Shuttle Frequency	20 Hz
Dissipated Power	
Standby	171 BTU/hr
Printing	1368 BTU/hr
Radio Frequency Interference	Tested/certified to RFI standards FCC 15, Subpart J, Class A; VDE 0871 Class B
Acoustic Noise	LNPA 6.7 bels
	LPA 55 dBA
Operating	
Altitude	2.4 km (0 to 8,000 ft)
Temperature	10°C to 40°C (50°F to 104°F)
	Maximum allowable reduced by factor 1.8°C/1000 m (1°F/1000 ft)
Relative humidity	10% to 90% non-condensing with a maximum wet bulb temperature of 28°C (82.4°F) a minimum dew point 2°C (35.6°F)
Non-operating	
Altitude	4.9 km (0 to 17,700 ft)
Temperature	-40°C to 66°C (-40°F to 150.8°F)
	Maximum allowable reduced by factor 1.8°C/1000 m (1°F/1000 ft)
Relative Humidity	5% to 95% non-condensing
Printing	
Line Length	33.5 cm (13.2 in)
Lines Per Inch (LPI) Spacing	6, 8, 10
Characters Per Inch (CPI)	5, 10, 12, 13.3, 15, 16.7 (plus horizontal and vertical expansion of each)
Paper Slew	50.0 cm/sec (20 in/sec)
Line Feed	12.5 msec at 6 lines/inch
Horizontal Tabs	198 positions
Vertical Tabs	66 positions

Table 1–2 (Cont.):   LG31 Printer Specifications

Paper/Forms

Paper Width	76.2 mm (3 in) to 420.1 mm (16.54 in)
Form Length	8.4 mm (0.33 in) to 559 mm (22 in)
Fan Folds	152 mm (6 in) to 305 mm (12 in)
Paper Weight	90 g/m² (24 lbs) for single ply paper
Form Thickness	Less than 0.63 mm (0.025 in)
Card Stock	Up to 163 g/m² (100 lbs) can be used

1.6.2 Resident Fonts

Table 1–3:   Resident Fonts

Font	Horizontal Pitch (CPI)					
	5	10	12	13.3	15	16.7
Data processing	Yes	Yes	Yes	Yes	Yes	Yes
NLQ	Yes	Yes	Yes	Yes	Yes	Yes
OCR-A	NLQ	Yes	NLQ	NLQ	NLQ	NLQ
OCR-B	NLQ	Yes	NLQ	NLQ	NLQ	NLQ

"Yes" indicates that the horizontal pitch is available in the current font.

"NLQ" indicates that when either OCR-A or OCR-B font is selected, and a horizontal pitch other than 10 CPI is selected, the NLQ font is substituted automatically. If the horizontal pitch is subsequently changed to 10 CPI, the printer will return to the selected OCR font.

1.6.3 Recommended Paper Weights

Table 1–4:   Recommended Paper Weights

Number of Parts	Recommended Paper Weight	Carbon Insert Sheet Weight
1	56 g/m² (15 lbs)	—
2, 3 or 4	50 g/m² (13.5 lbs)	19 g/m² (8 lbs)
5 or 6	45 g/m² (12 lbs)	19 g/m² (8 lbs)

1.6.4 Print Speeds

Print speeds are quoted in lines per minute (LPM) with the printer set at 6 LPI, for each available combination of font and horizontal pitch in characters per inch.

Table 1–5: Print Speeds

Font	Horizontal Pitch (CPI)					
	5	10	12	13.3	15	16.7
DP Upper-case Only	300	300	300	300	300	147
DP Upper- and Lower-case	240	240	240	240	240	105
NLQ Upper-case Only	82	82	82	82	82	147
NLQ Upper- and Lower-case	65	65	65	65	65	105
OCR-A Upper-case Only†	–	65	–	–	–	–
OCR-B Upper-case Only†	–	65	–	–	–	–

†The OCR-A and -B fonts are available in upper-case only.

1.6.5 Resident Character Sets

The resident character sets are:

Digital Supplemental
U.S. ASCII
ISO Great Britain
Digital Holland
Digital Finland
ISO France
Digital Technical
VT100 Special Graphics
Digital French Canada
ISO Germany
ISO Italy
JIS Roman (Japan)
Digital Norway/Denmark
ISO Spain
Digital Sweden
Digital Switzerland
ISO Norway/Denmark
Digital Portugal

The complete character sets are given in Appendix A of the *LG31 User's Guide.*

Chapter 2

INSTALLATION AND CHECKOUT

2.1 Overview

This chapter contains the unpacking, checkout and installation procedures for the LG31 printer. This printer must be installedby trained personell only. Installation time is approximately one hour. The following tasks must be performed before the LG31 printer is operational.

- Remove all packaging

- Position the printer

- Remove all transit items

- Install the ribbon, paper, and paper rack/tray/guides

- Install electrical connections (ac power, host interface)

- Set the host interface parameters (for example, baud rate)

- Set the printer parameters (for example, autowrap mode)

2.2 Unpacking

2.2.1 Inspection

There are two cartons for each printer:

1. Country Kit carton (OPEN FIRST label) containing:

    - AC power cord (country specific, see Appendix D)

    - 100 sheets of fanfold paper

    - BC22D-25 null-modem cable

    - User information (EK-OLG31-DK) which contains:

        — *LG31 Printer User's Guide EK-LG31E-UG*

        — *LG31 Printer Installation/Operator's Manual EK-LG31E-IN*

    - Strapped skid-crate containing:

        - LG31 printer

        - Paper rack

        - Paper shelf

        - Paper stacking guides (2)

        - Ribbon cartridge

WARNING

Do not attempt to move the 174 kg (374 lbs) skid-crated printer alone. Two people are required for unpacking and installation after the printer has been site-positioned.

Inspect the exterior shipping container for punctures, crushed corners or sides. If any shipping or handling damage is found, notify the carrier immediately requesting the proper claim forms and procedures. In the event any equipment is missing or in error, notify the distributor from whom it was purchased.

2–2 INSTALLATION AND CHECKOUT

2.2.2 Unpacking Procedure

Use the following procedure and illustrations when unpacking the LG31 printer. Save the red shipping screws, blocks, and brackets for reshipment.

1. Cut and remove the four shipping straps from shipping pack (see Figure 2–1).

2. Remove the country kit from the top of the printer carton.

3. Remove the screws holding the two tabs from the side of the carton using a 7/16" AF Wrench (see Figure 2–1).

Figure 2–1:   Cut Straps and Remove

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INSTALLATION AND CHECKOUT   2–3
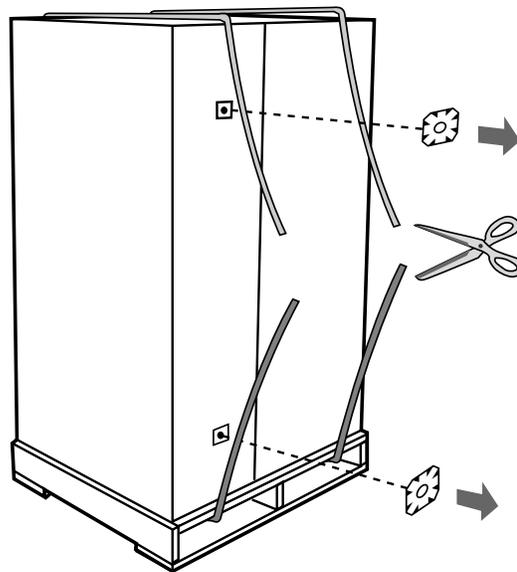
4. Open the carton and lift out the package containing the ramps from the top of the packing material (see Figure 2–2).

Figure 2–2: Opening Carton
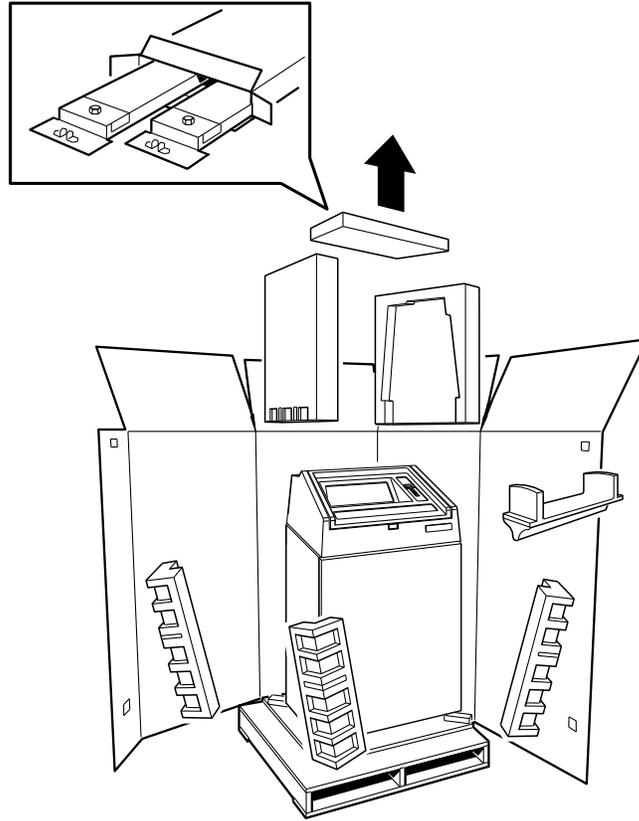
RE_UK00960A_89

5. Remove the packing material around the printer.

6. Remove the four metal brackets holding the printer to the wooden skid using a 9/16" AF Wrench (see Figure 2–3).

Figure 2–3: Removing Metal Brackets
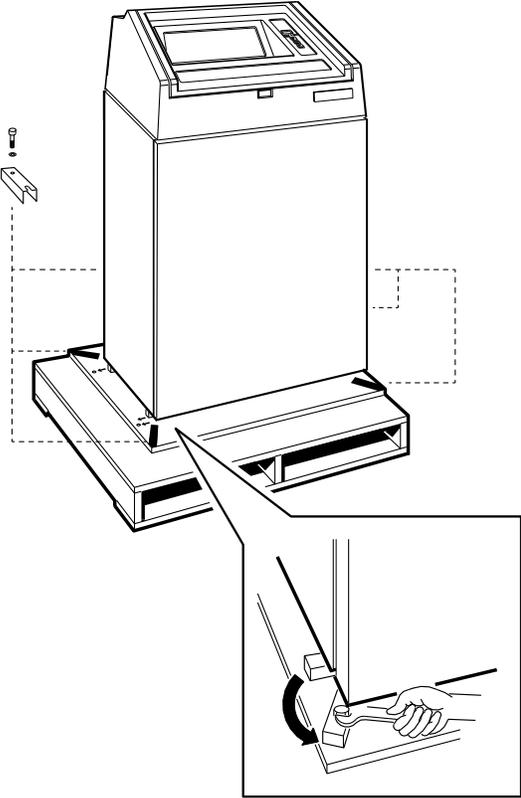
RE_UK00961A_89

7. Open the carton containing the ramps and remove them.

8. Position the ramps as shown in Figure 2–4 and force the teeth into the top level of the skid.

Figure 2–4: Positioning Ramps
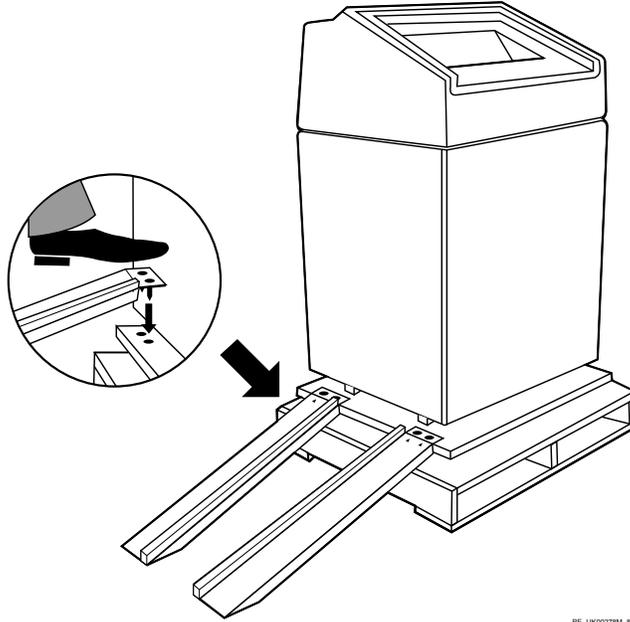
RE_UK00278M_89

Note

Align ramp with one arrow to single arrow on skid and ramp with two arrows to two arrows on skid.

9. Carefully roll the printer down the ramp (see Figure 2–5).

Figure 2–5: Removing Printer from Pallet

RE_UK00962A_89

10. Pull open printer front door (hinged at left side). Remove printer accessories paper rack, paper tray, paper guides, and ribbon cartridge (3 boxes).

11. Using an 8 mm socket wrench, remove four M5 x 30 red hex-head cap screws, M5 lock washers, and M5 plain washers securing the shuttle shipping blocks in place. These screws are accessible by the front door, which allows access to the bottom of the paper handling assembly (see Figure 2–6). The rear screws are behind the paper handling assembly, but easily removable by socket wrench.

Figure 2–6: Top of Lower Front Interior
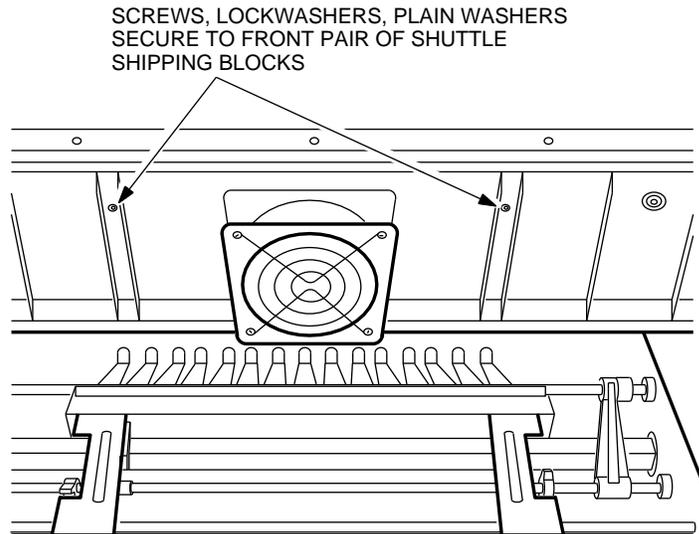
RE_UK00307A_89

12. Remove the two red rear shipping blocks by reaching up behind the paper handling assembly and removing the blocks through the front door.

13. Open printer top cover and shuttle access door (not shown) which is below the location where the ribbon cartridge will be installed (see Figure 2–7).

Figure 2–7:   Top View - Shuttle Area

M5 CAP SCREWS (RED) SECURING STRIKER BAR SUPPORT DURING SHIPPING

RED SHUTTLE SHIPPING BLOCKS
(REAR PAIR)

SCREW (RED),
LOCKWASHER,
PLAIN WASHER,
& SHIPPING BRKT.
SECURING SHUTTLE

RED SHUTTLE SHIPPING BLOCKS
(FRONT PAIR)
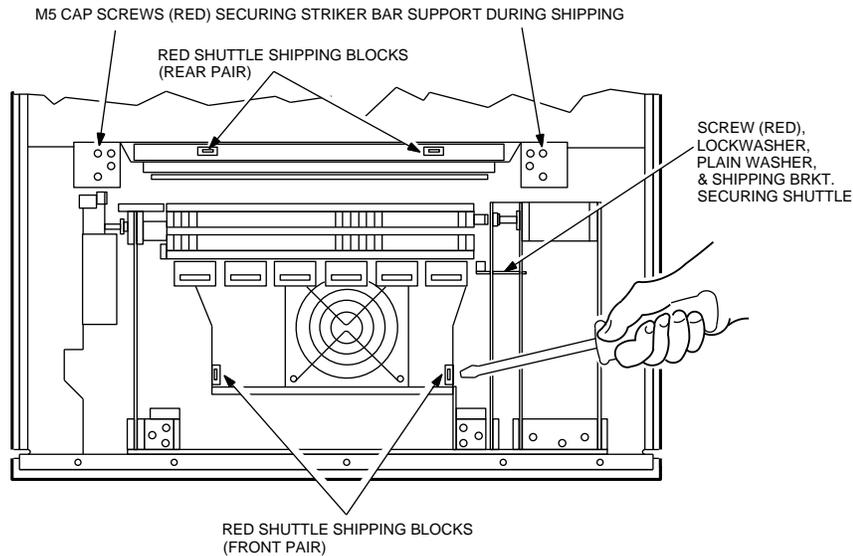
RE_UK00752A_89

14. Remove the two red front shipping blocks through the shuttle access door. Use a screwdriver to pry the front shipping blocks from under the shuttle.

15. Remove the sample print out sheet. Retain for future test comparison (see Section 2.5). It is useful to move tractors to give more room for instruction 16. Care must be taken to avoid injury.

16. Remove two M5 x 28 red hex-head cap screws and plain washers securing the striker bar support blocks during shipping by using an 8 mm socket wrench (see Figure 2–7).

17. Remove the M5 x 16 red hex-head cap screw, M5 plain washer, turn shipping bracket used as shuttle horizontal constraint during shipping through 90° and slide out (see Figure 2–7).

18. Adjust printer leveling feet, if the printer is not level.

19. Install paper rack on back of printer as shown in Figure 2–8. Secure four grounding cables to stubs on paper rack. The other end of each grounding cable is secured inside the printer at the corners of the paper chute.

INSTALLATION AND CHECKOUT   2–9

20. Secure clip end of static strap to paper tray. The stub end at the interface connector plate will be connected as shown in Figure 2–8.

21. Install paper stacking guides on paper shelf using thin screw attachments (see Figure 2–8).

Figure 2–8:   Paper Handling Hardware

RE_UK00248A_89
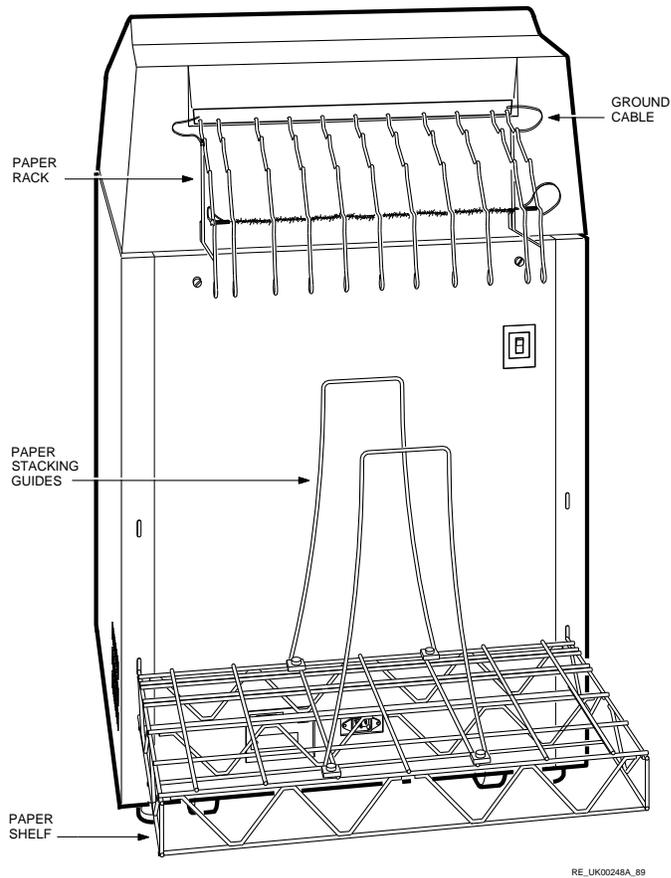
2.3 Installation

An installation area of 137 cm wide by 107 cm deep (54 inches wide x 42 inches deep) is required. This provides free access and clearance to the printer's rear mounted paper rack, ON/OFF switch, paper tray, ac power cord, and serial interface cable for operating and maintenance purposes.

A power source of 100 to 240 volts, single phase, 50-60 Hertz (Hz) must be within 10 feet for connecting the ac power cord. Before inserting the plug into an ac wall outlet, be certain the ON/OFF power switch located at rear of the printer is set to OFF (0). The printer power supply is self-adjusting. There is no need to adjust the printer power supply to suit the mains source when this source is within the specifications.

The proper site environment requirements for LG31 printer installation are under "Specifications" in Chapter 1. Environmental conditions such as excessive humidity can cause paper sticking, while low humidity can cause static build-up.

It is recommended that the leveling feet be adjusted to make the printer level, if this has not already been done.

The procedure for setting/modifying printer parameters (speed (baud rate), autowrap, and so on) are described in Chapter 4. Chapter 4 contains initialization, and Chapter 5 contains power-up, and other operator-implemented procedures. Procedures for loading the paper and installing the ribbon cartridge are in Chapter 6.

2.3.1 Print Ribbon Cartridge

Refer to Section 6.3 on installing/replacing the print ribbon cartridge.

2.4 Apply Power to the LG31

The LG31 printer contains a universal power supply that works, without modification or adjustment, with any input in the specified range of voltage and frequency. To power up the LG31 printer, carry out the following:

1. Make sure the power switch (see Figure 2–9) is in the OFF position.

2. Take the power cord supplied in the country kit, and plug the female connector into the back of the LG31 printer (see Figure 2–9).

3. Plug the power cord male connector into the source power outlet.

The LG31 printer is now ready to be switched on.

Figure 2–9:   Power Connection
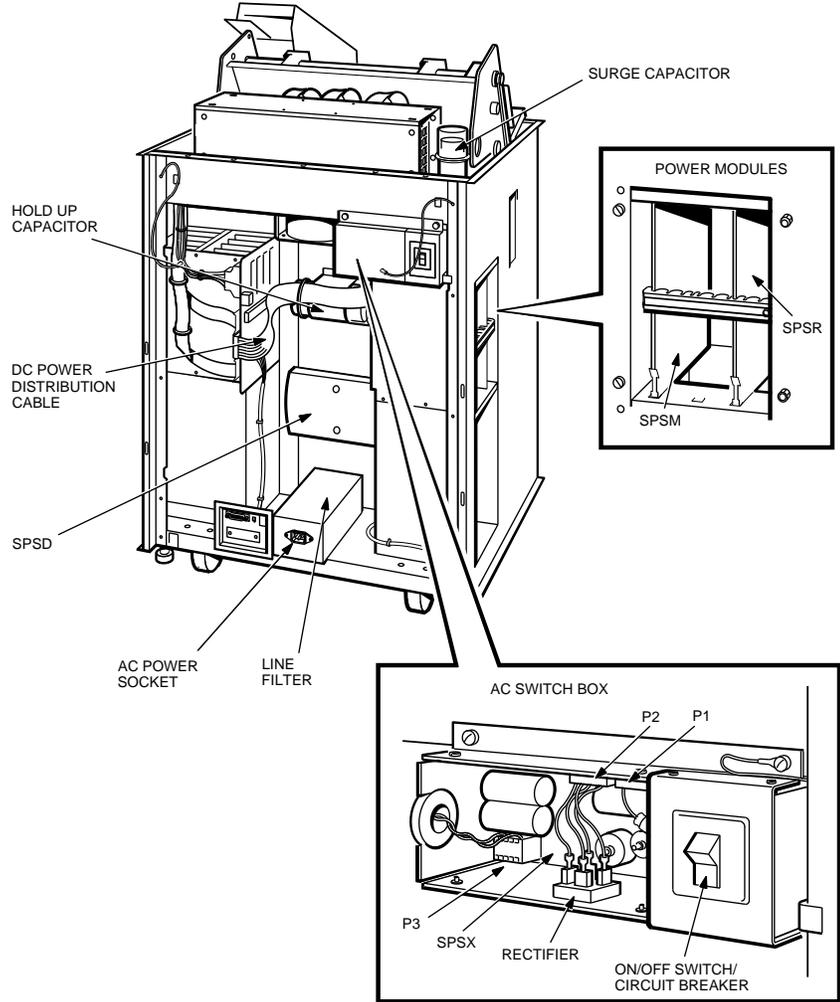
RE_UK00222A_89

2.5 Powering and Testing the LG31 Printer

LG31 printer testing includes a self-test and a print test. The self-test is performed:

- Every time the printer power is switched on.

- After each print test.

- During normal operation.

Before turning the power on, load the printer with paper (see Chapter 6, Section 6.2). To turn the power on and run the print test, perform the following steps.

1. Turn the LG31 printer on by pressing the top section of the power switch (see Figure 2–9). The printer performs a series of self-tests (see Chapter 5, Section 5.2) and when completed, displays [O F L].

2. Press the (3) ON LINE key if [O n L] is displayed.

3. Press the (0) TEST CLR key until the LG31 begins to print. The LG31 will print the test pattern until you press the (0) TEST CLR key again.

4. Compare the printout from this test with the sample printout supplied with the printer.

5. If the printout is comparable, continue by running a configuration printout (see Section 4.3.1).

6. If the quality of the printout is unsatisfactory, perform the printer adjustments in chapter 5 of the Technical Manual.

The configuration menu contains the state of the printer as shipped. You should print a copy of this menu and retain it for future reference. To print a copy of the configuration menu, perform the following steps.

NOTE

The factory settings for the printer parameters are contained in Chapter 7, Section 7.3 (Table 7–3). The setting of parameters at power-up and at reset are also listed in Chapter 7 (Table 7–4).

1. Make sure the LG31 is in the off-line mode ([O F L] is displayed). Press the (3) ON LINE key if [O n L] is displayed.

Figure 2–10: Cover Interlock Switch

TOP COVER
INTERLOCK
SWITCH

TOP
ENCLOSURE
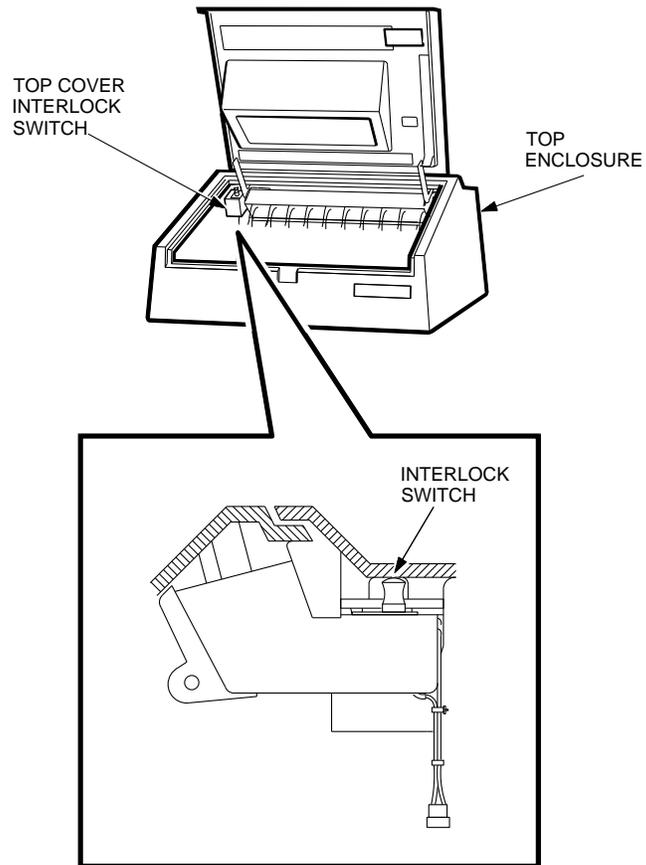
INTERLOCK
SWITCH

RE_UK00963A_89

2. Open the top cover and pull the interlock switch (see Figure 2–10) out until it clicks. Do this within two seconds of opening the top cover.

3. Press the (1) PRG key to enter the initialization mode [P r o] is displayed. The LG31 will print the configuration menu.

4. Press the (0) TEST CLR key to return to the off-line mode ([O F L] is displayed).

When you reach this point, you have verified that the print quality is acceptable, and have a copy of the configuration of the LG31 as shipped. The printer is now ready for use.

2.6 Host To LG31 Printer Set-up Procedure

2.6.1 Interface Control Strap Settings

Figure 3-14 of the *LG31 PRINTER User's Guide* states that parity is disabled at interface strap B2. This is the factory setting and the recommended setting. This means that the serial interface must be set-up with no parity.

2.6.2 Serial Interface Settings for VAX/VMS

Before using the printer, the serial interface must be set-up correctly. The system manager must issue the following commands for the VAX/VMS operating system.

1. If the terminal line that will support the LG31 has not been set-up to support a spooled device then, go to instruction 3, otherwise, issue a DCL command such as the following:

    ```
    $ stop/que que_name
    ```

    where que_name is the name of the queue.

2. Stop the spooling on the terminal by issuing the DCL command:

    ```
    $ set dev/nospool txa1:
    ```

    where **txa1** is the name of the terminal in this case.

3. Set up the terminal line to have the following characteristics as shown below:

    Terminal: _TXA1:
    Device_Type: Unknown
    Owner: SYMBIONT_0001
    Username: SYSTEM

Input: 9600	LFfill: 0	Width: 300	Parity: None
Output: 9600	CRfill: 0	Page: 66	

Terminal Characteristics

Interactive	Echo	Type_ahead	No Escape
No Hostsync	TTsync	Lowercase	Tab
Wrap	Scope	No Remote	Eightbit
No Broadcast	No Readsync	Form	Fulldup
No Modem	No Local_echo	No Autobaud	No Hangup
No Brdcstmbx	No DMA	No Altypeahd	Set_speed
Line Editing	Overstrike editing	No Fallback	No Dialup
No Secure server	No Disconnect	Pasthru	No Syspassword
No SIXEL Graphics	No Soft Characters	No Printer Port	Numeric Keypad
No ANSI_CRT	No Regis	No Block_mode	No Advanced_ video
No Edit_mode	No DEC_CRT	No DEC_CRT2	No DEC_CRT3

This can be accomplished by the DCL command:

```
$ set term txa1: /pasthru/speed=9600/etc
```

Note

PASTHRU SHOULD ALWAYS BE SET.

4. Set the terminal line to support a spooled device by issuing the DCL command:

```
$ set dev/spool=(queue_name) txa1:
```

where queue_name is the name of the queue.

5. Start the queue by issuing the DCL command:

```
$ ini/que/start/terminal queue_name/on=txa1:
```

The LG31 can now be used.

2.6.3 RSX Settings

The terminal characteristic PASTHRU should be set.

2.6.4 RT-11 Settings

A command of the form ASSIGN TT1: LP: should be issued. This assumes a multi-terminal system. Refer to the RT-11 System User's Guide.

2.6.5 RSTS/E Settings

Refer to the RSTS/E System Manuals.

Note

* Indicates that the current setting is not affected by the terminal type.

Table 2–1:   Default Characteristics

Name	Set	Name	Set
ADVANCED_VIDEO	no	INSERT/ OVERSTRIKE	*
ALTYPEAHD	no	INTERACTIVE/ PASSALL	*
ANSI_CRT	no	LFFILL	0
APPLICATION_KEYPAD/		LINE EDITING	*
NUMERIC_KEYPAD	*		
AUTOBAUD	no	LOCAL_ECHO	*
BLOCK_MODE	no	LOWERCASE/	
		UPPERCASE	low
BRDCSTMBX	no	MODEM	no
BROADCAST	no	PAGE	66
CRFILL	0	PARITY	no
DEC_CRT	no	PASTHRU	yes
DEC_CRT2	no	PRINTER_PORT	no
DIALUP	no	READSYNC	*
DISCONNECT	*	REGIS	no
DMA	*	REMOTE	*
ECHO	*	SECURE_SERVER	*
EDIT_MODE	no	SET_SPEED	no
EIGHT_BIT	yes	SIXEL_GRAPHICS	no
ESCAPE	*	SOFT_CHARACTERS	no
FALLBACK	*	SPEED	9600
FRAME	*	SYSPASSWORD	no
FORM	yes	TAB	yes
FULLDUP/ HALFDUP	*	TTSYNC	*
HANGUP	no	TYPE_AHEAD	*
HARDCOPY/ SCOPE	scope	WIDTH	220
HOSTSYNC	*	WRAP	*

2.7 Connecting the Host to the LG31 Printer

The LG31 printer contains an EIA RS-232-C serial 25-pin interface connector. The cable from the host to the printer is in the country kit. Connect the cable from the host to the LG31 printer.

Chapter 3

CONTROLS AND INDICATORS

3.1 Introduction

This chapter describes all the operating controls and indicators available on the LG31 printer.

3.2 Power Switch ON/OFF

The power switch is located on the rear of the LG31 printer (see Figure 3–1). This is a two-position rocker switch/circuit breaker. In the ON position, top half pressed in, power is applied to the printer.

Figure 3–1: Power Switch

POWER
SWITCH
(CIRCUIT
BREAKER)

POWER
CABLE

INTERFACE
CABLE
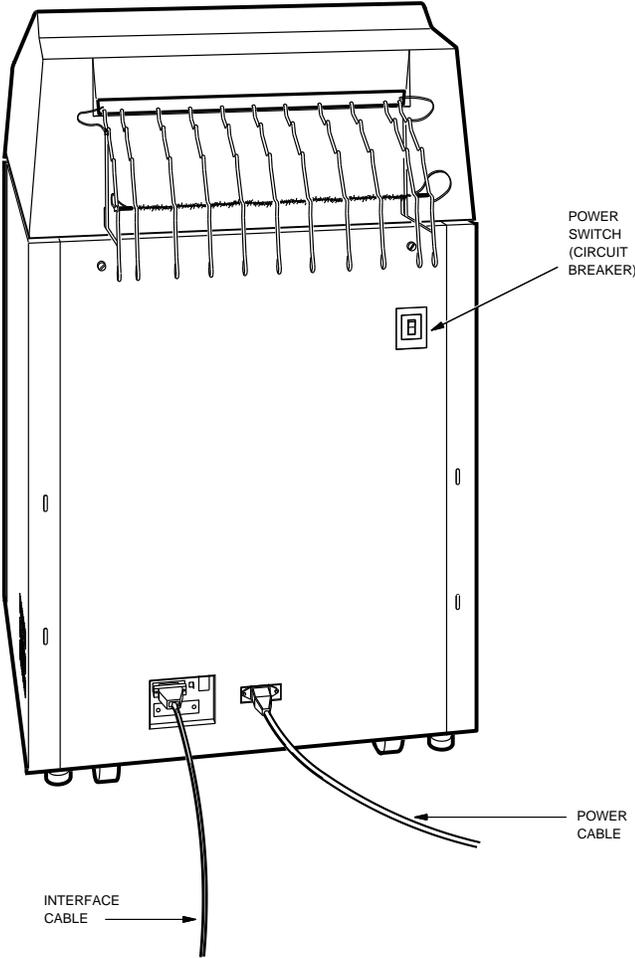
RE_UK00247A_89

3–2   CONTROLS AND INDICATORS

3.3 Outer Control Panel

Figure 3–2: Location of the Outer Control Panel

DISPLAY
WINDOW
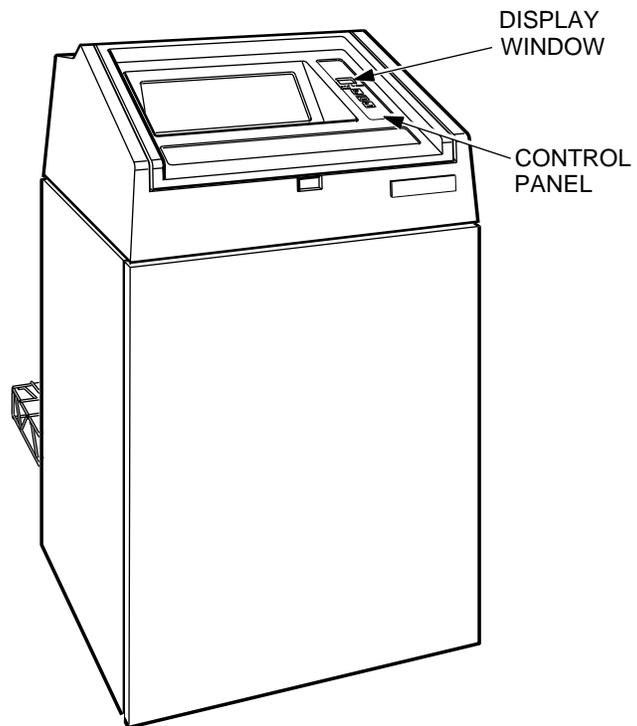
CONTROL
PANEL

RE_UK00964A_89

The outer control panel, which is located on top of the LG31 (see
Figure 3–2), contains the keys that let the operator perform routine
functions:

- Run the print test and the self-test.

- Switch the printer between the on-line and off-line modes of operation.

- Perform form feed operations.

3.3.1 Outer Control Panel Components

The outer control panel (see Figure 3–3) includes:

- A view window through which you can observe the three-digit display on the inner control panel.

- A three-key keypad. The key markings are:

  — TEST/CLR

  — FORM FEED

  — ON LINE

Figure 3–3:   Outer Control Panel

FORM
LOADED   READY

TEST
CLR

FORM
FEED

ON
LINE

OUTER CONTROL PANEL
RE_UK00710M_89

3–4   CONTROLS AND INDICATORS
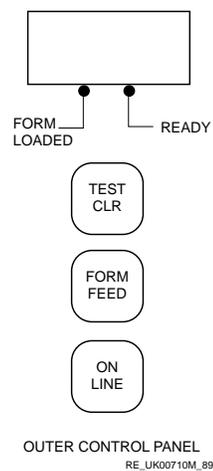
NOTE

There is an audio alarm mounted on the inner control panel, which sounds when you power up the printer, and each time you press one of the control panel keys.

3.3.2 Outer Control Panel Keys

The function of the keys on the outer control panel (see Figure 3–3) are:

TEST CLR

When this key is pressed for more than 0.5 seconds in off-line mode, the LG31 starts the print test (a rolling pattern of all ASCII characters). The next time you press the TEST CLR key, the LG31 stops the print test and performs the self-test.

When this key is pressed for less than 0.5 seconds after clearing a fault or error condition, the LG31 resumes normal operation.

FORM FEED

When this key is pressed the LG31 advances the paper to top of the next form.

When the LG31 is on-line, the form feed operation is dependent upon the setting of printer control strap 26.

When the LG31 is off-line, the form feed operation is not dependent upon the setting of printer control strap 26.

ON LINE

When this key is pressed, the printer toggles from off-line to on-line, the display changes from [O F L] to [O n L].

3.4 Top Cover Interlock Switch

The interlock (see Figure 3–4) is set to on when the top cover is opened, and in the on position, places the LG31 in standby mode. To override the interlock, turn the switch off, and pull the switch plunger up to its highest position.

Figure 3–4:   Cover Interlock Switch

TOP COVER
INTERLOCK
SWITCH

TOP
ENCLOSURE

INTERLOCK
SWITCH
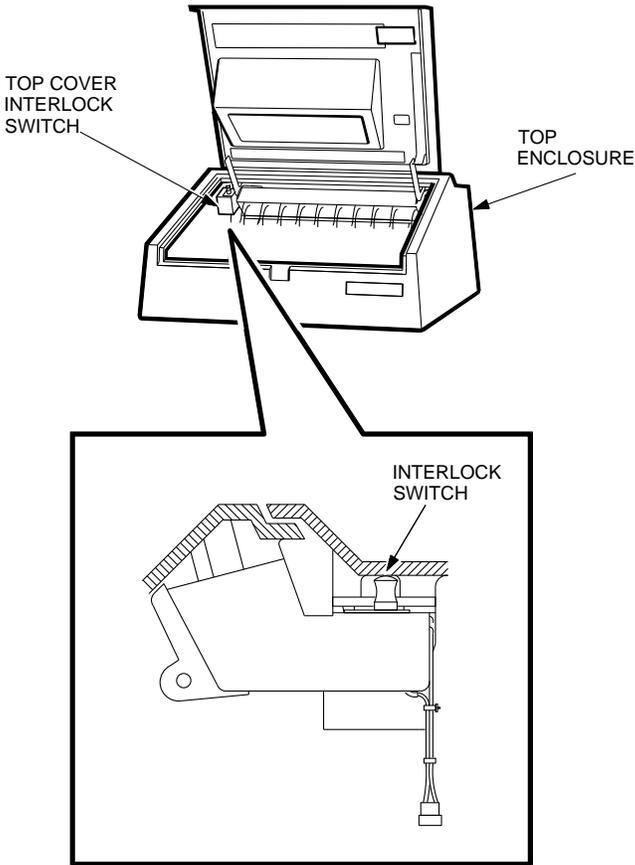
RE_UK00963A_89

3.5 Inner Control Panel

Figure 3–5: Location of the Inner Control Panel

INNER
CONTROL
PANEL

RE_UK00965A_89
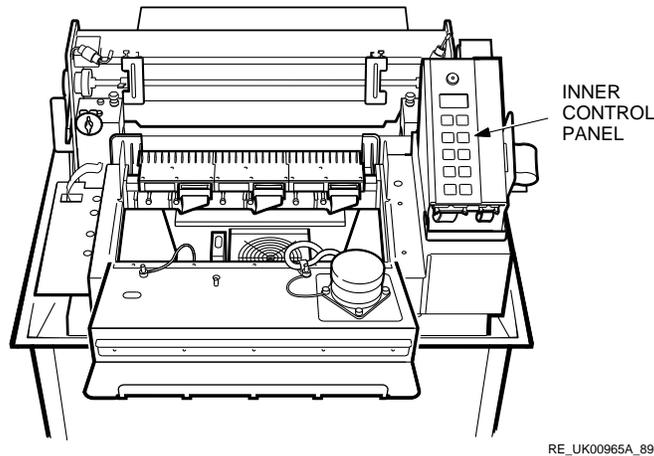
The inner control panel, which is located inside the top cover (see Figure 3–5), contains the keys that let you control all operational functions of the LG31. These include:

- Performing the same functions as the outer control panel.

- Modifying print parameters.

- Modifying serial interface parameters.

- Performing diagnostics.

The inner control panel (see Figure 3–6) includes:

- A three-digit (seven segments each) three-dot display.

- An audio alarm.

- An initialization switch.

- A ten-key keypad; the keypad markings are:
  - (0) TEST CLR
  - (1) PRG

— (2) FORM FEED

— (3) ON LINE

— (4) LINE FEED

— (5) CPI LPI

— (6) PAPER REV

— (7) FONT

— (8) SET TOF

— (9) FCT

Figure 3–6:   The Inner Control Panel

RE_UK00711M_89
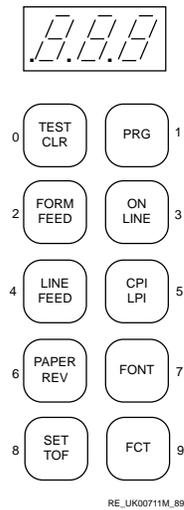
In off-line mode, the keys may be regarded as soft pushbuttons and perform the functions indicated by their respective legends. However, once Program (PRG) mode is entered, the 10 keys are assigned new functions, which are automatically printed to guide the operator (see Appendix C for a complete listing). The pushbuttons may also be regarded as soft pushbuttons in Function (FCT) Select mode (see Appendix C for a complete listing).

All the available selections of print parameters and serial interface parameters are shown in Figure 3–7.

Figure 3–7:   Configuration Menu

```
THE PRESENT CONFIGURATION IS:  (44A511526 SY - 44A511527 IM)
FIRMWARE REVISION LEVEL  V2.3
1.  Font:
    Style - 44A511527 Dataprocessing
    CPI - 10 CPI
    Country - US ASCII
    Mode - Normal
    Horizontal Expansion - X1
    Vertical Expansion   - X1
2.  LPI - 6 lpi
3.  Forms Control (lines):
    Form Length   - 66
    Top Margin    - 01
    Bottom Margin - 66
4.  Interface Control:
    Interface Type - Serial
    Input buffer length 2304
    Interface Straps A:
    0         1         2         3
    1234567890123456789012345678 9012
    000010000000010000000101000001000
    Interface Straps B:
    0         1         2         3
    1234567890123456789012345678 9012
    010001000000000000000000000000000
    Speed - 9600
    Parity - Even
5.  Margin Settings (columns):
    Left Margin  - None
    Right Martin - 132
6.  Horizontal Tabs (columns):
    009  017  025  033  041  049  057  065  073  081
    089  097  105  113  121  129  137  145  153  161
    169  177  185  193  201  209  217
7.  Vertical Tab stops:
8.  Printer Control Straps:
    Printer Straps A:
    0         1         2         3
    1234567890123456789012345678 9012
    000000000000000000000000001110010
    Printer Straps B:
    0         1         2         3
    1234567890123456789012345678 9012
    000000000000000000000000000000000
Press the number '0' to return to normal operation.
To continue modification select (1-8).
```

3.5.1 Three-Character LED Display

The three-character/three-dot LED display (see Figure 3–8) is multifunctional and indicates the following.

- Printer modes, for example:

  [O n L] ON LINE

  [O F L] OFF LINE

  [F c t] FUNCTION

- Configuration Menu settings, such as top/bottom margins, right/left margins, Characters Per Inch (CPI), Lines Per Inch (LPI) print spacing, that are used when changing the printer configuration.

- Fault codes (see Table 5-2 for a listing of the diagnostic codes) that are used with the printer self-test at power-up, after printing the test pattern, and during printer operation.

The three-dot indicators in the three-character LED display are display illuminated during self-tests. When illuminated, the dots indicate:

- Left dot   FCT MODE—Printer is in Function Selection state. Press (9) FCT key to enter. Display reads [.F n c].

- Middle dot   FORM LOADED - Electronic Vertical Format Unit (EVFU) form table has been downline loaded. See the *LG31 Printer User's Guide*.

- Right dot   READY—Illuminated by the signal CTS received from the host computer (see Chapter 4, Section 4.2).

Refer to Appendix A for a complete listing of display readouts.

3.5.2 Audio Alarm

The audio alarm (see Figure 3–8) located at the top of the Inner Control Panel momentarily emits a sound at power-up, when a key is pressed, when a <BEL> code is received in on-line mode, and under any alarm condition, as follows:

- When a fault is detected (includes EVFU loading fault).

- When Paper Low condition is detected.

Figure 3–8: The Inner Control Panel Showing Display, Audio Alarm, Initialization Switch

INITIALIZATION SWITCH

AUDIO ALARM

DISPLAY

FCT MODE   FORM LOADED   READY

0	TEST CLR	PRG	1
2	FORM FEED	ON LINE	3
4	LINE FEED	CPI LPI	5
6	PAPER REV	FONT	7
8	SET TOF	FCT	9

INNER CONTROL PANEL

RE_UK00709M_89
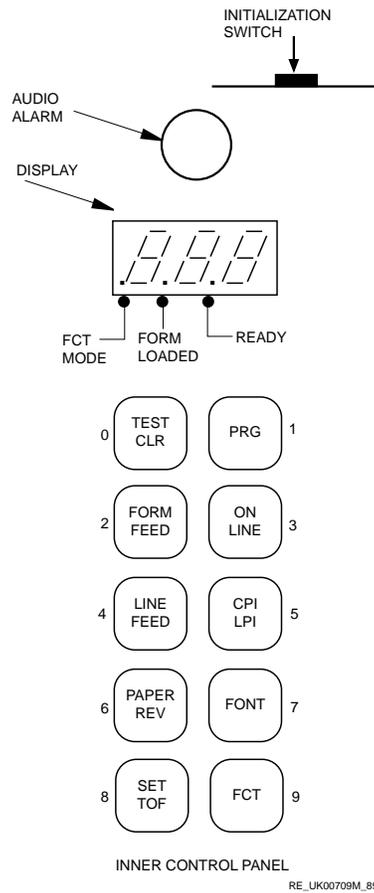
3.5.3 Initialization Switch

The initialization switch (see Figure 3–8) is a slide switch located at the top of the inner control panel that lets you initialize the printer after it is locked up. You can initialize it using the procedure detailed in Chapter 4, Section 4.5.1. In normal operation, the switch is in the leftmost position.

3.5.4 Key Functions

The three types of key functions are:

1. Initial key function (ON LINE, TEST CLR, PAPER REV). Refer to Table 3-1 for list.

2. Function select — Enter by pressing (9) FCT key. In this state, the left dot on the three-character LED display is illuminated. This state includes the printer initialization to default configuration, alignment patterns, top of form adjust, reverse form feed, buffer clear, forms setup, and margin setup. Return to off-line printer operation from any of these operations by pressing (0) TEST CLR key. See Figure 3–9 for a map of the function select combinations.

3. Program — Pressing the (1) PRG key causes the current configuration to be printed and places the printer in the programming state. In the programming state, the keys assume functions represented by adjacent numbers. See Chapter 4 for additional information.

Figure 3–9: Function Mode Key Operations
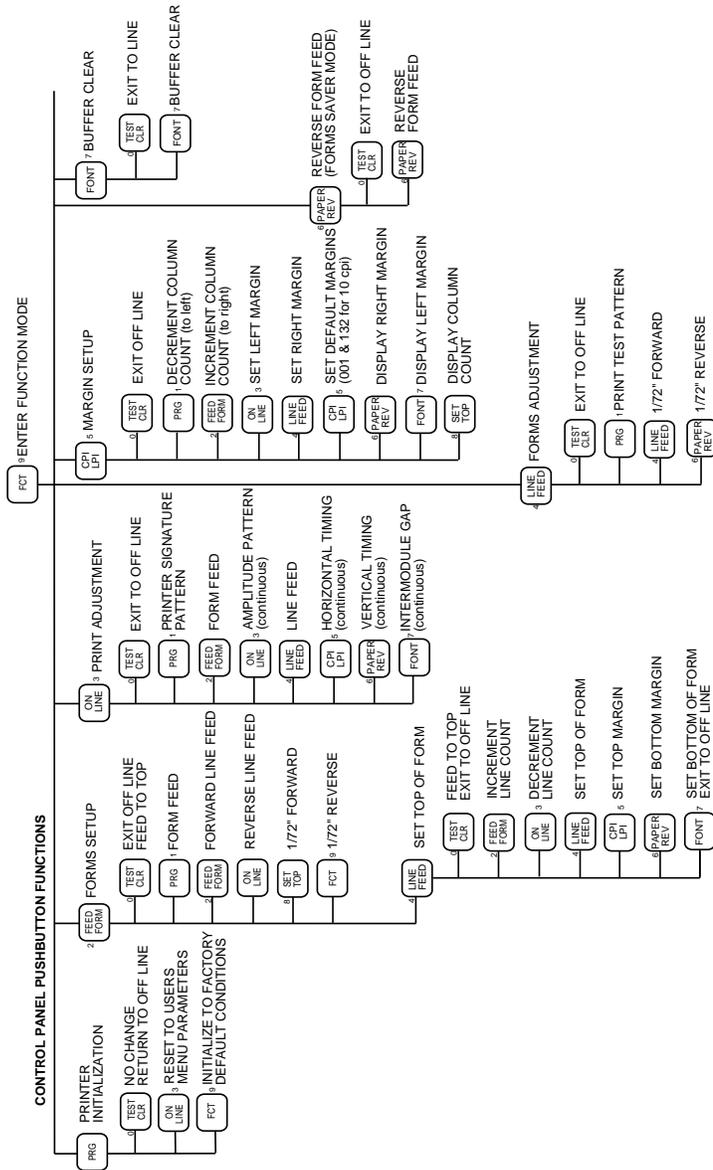
RE_UK00283M_89

Table 3–1: Initial Key Functions

Key	Key Function in OFF LINE Mode	Key Function in ON LINE Mode
(3) ON LINE	U = ON LINE selected. Toggles state to on-line mode.	Toggles state to off-line mode.
(0) TEST CLR	When pressed for more than 0.5 of a second, a rolling test pattern is printed in the DP font at 10 CPI. Pressing (0) TEST CLR again stops the test pattern.	No operation.
(1) PRG	Prints any data in the buffer, then prints current configuration and enters Programming state. See Chapter 4.	No operation.
(2) FORM FEED	Advances paper to the next top of form setting, once for each time key is pressed.	If printer strap 16 is set, functions the same as off-line. Otherwise, no operation.
(4) LINE FEED	Advances paper one line based on current LPI setting. When pressed and held down for one second, consecutive line feeds are performed at the rate of approximately three steps per second.	If printer strap 16 is set, functions the same as off-line. Otherwise, no operation.
(5) CPI LPI	Alternately displays CPI and LPI each time key is pressed. Holding key down causes settings available for the active font to be displayed on a rotating basis. The setting displayed when the key is released becomes the active selection. The CPI/LPI key displays the current submenu - that is, only the CPI values for the current font are displayed.	No operation. Displays are:

CPI(DP)	CPI (& NLQ)	CPI (& OCR-A)	CPI (& OCR-B)	LPI

Table 3–1 (Cont.):   Initial Key Functions

Key	Key Function in OFF LINE Mode					Key Function in ON LINE Mode
	[05]	[05]	[n05]	[n05]		
	[10]	[10]	[OcA]	[Ocb]		
	[12]	[12]	[n12]	[n12]		
	[13]	[13]	[n13]	[n13]	[06L]	
	[15]	[15]	[n15]	[n15]	[08L]	
	[16E]	[16E]	[16E]	[16E]	[10L]	
(6) PAPER REV	Moves paper in reverse direction 0.06 mm (1/72 in) each time the key is pressed. When pressed and held down for one second, consecutive 1/72 inch paper reverse feed steps occur at the rate of approximately three steps per second. Inoperative during Low Paper Print mode.					If printer strap A26 is set, functions same as off-line. Otherwise, no operation.
(7) FONT	Displays current font style when pressed. Holding key down causes available font styles CPI to be displayed on a rotating basis. The setting displayed when the key is released becomes the active selection. When a new font is selected, the horizontal spacing is initially set to the default spacing for the particular font. Displays for standard draft and Near Letter Quality (NLQ) are displayed only once:					No operation.
	[F o n][1 0][1 2][1 3][1 5][1 6 E]					
	[c h r][n 0][n 2][n 3][n 5]					
(8) SET TOF	Set Top of Form to current position of paper. TOF is calculated upon form length in effect. It is assumed that the top printable dot row (±3 rows) of the form is aligned with notches in upper tractors before key is pressed. The form is then moved forward automatically to place the first line at the point on the following form.					No operation.

CONTROLS AND INDICATORS   3–15

Table 3–1 (Cont.):   Initial Key Functions

Key	Key Function in OFF LINE Mode	Key Function in ON LINE Mode
(9) FCT	Enters Function Selection state (refer to function procedures: Printer Initialization, Forms Setup, and Margin Setup). This key is also used to achieve Reverse Form Feed as follows: Press key (9) to enter Function Mode, then press key (6) for Reverse Form Feed (paper moves back one form length). Also used by service personnel in aligning printer.	No operation.

Function Mode Summary

State	Key
INITIALIZATION	Press (1)
FORM SETUP	Press (2)
PRINT REVIEW	Press (3)
FORMS ADJUST	Press (4)
MARGIN SETUP	Press (5)
REVERSE FORM FEED	Press (6)
BUFFER CLEAR	Press (7)

Refer to Chapter 4 for the above function mode procedures.

3.6 Paper Tension Lever

The paper tension lever adjusts the pressure that the paper tensioning fingers apply to the paper (see Figure 3–10). There is a PAPER THICK-NESS scale, from 1 to 6, located next to the paper tension lever. The higher the number (the heavier the paper), the less the tension. A "1" is equivalent to 15-pound one-part paper. Adjust for the maximum tension without smearing the print.

3.7 Print Gap Control

The print gap control is a rotary adjustment that adjusts the distance between the paper and the print heads (see Figure 3–10). It has a scale from less than one to more than six, and should be nominally set to the same point on the scale as the PAPER THICKNESS scale. Adjust this and the paper tension lever to obtain the best print quality.

Figure 3–10:   Paper Tension Lever, Print Gap Control, Margin Adjust
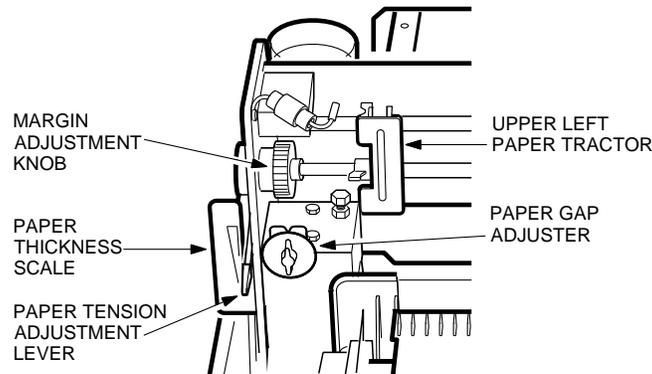
RE_UK00966A_89

3.8 Margin Adjust Knob

The margin adjust knob adjusts the horizontal position of the paper in the printer (see Figure 3–10).

Chapter 4

SETTING COMMUNICATIONS AND PRINT PARAMETERS

4.1 Introduction

This chapter defines the user settable parameters of the LG31 printer. There are two ways for setting parameters in the LG31. Some of the parameters can be set by either method.

There are eight categories of parameters in the LG31 printer listed in the configuration menu that are settable when you enter the program mode:

- Font - this contains six subcategories

- Lines Per Inch

- Forms Control

- Interface Control - this contains four subcategories

- Margin Settings

- Horizontal Tabs

- Vertical Tab Stops

- Printer Control Straps

When entering the program mode, you can select one or more of the categories for modification before exiting back to off-line.

There are two parameters and two sets of adjustments that can be made in the function mode. In the function mode, you can perform operations in one of the categories, and then you must exit to off-line. You can then begin the process again to perform operations in another category.

The process for listing the parameters in these categories and making changes to them is given in the following sections.

4.2 Interface Control—Host to Printer Interface

The LG31 printer contains an EIA RS-232-C 25-pin connector as a serial interface to the host. The connector is located on the lower back of the printer (see Figure 4–2). A BC22D-25 cable is supplied to connect the host to the LG31 printer.

The RS-232-C signals and the associated pins on the interface connector are given in Table 4–1. The DIGITAL serial protocol is XON/XOFF (for a description of the XON/XOFF protocol, see the *LG31 Printer User's Guide EK-LG31E-UG*).

Figure 4–1: Serial Interface Connector
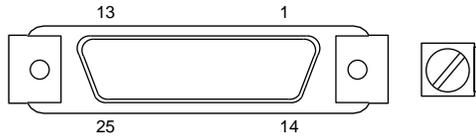
RE_UK00969A_89

Figure 4–2:   Location of the Serial Interface Connector

POWER
SWITCH
(CIRCUIT
BREAKER)

POWER
CABLE

INTERFACE
CABLE

RE_UK00247A_89

SETTING COMMUNICATIONS AND PRINT PARAMETERS   4–3
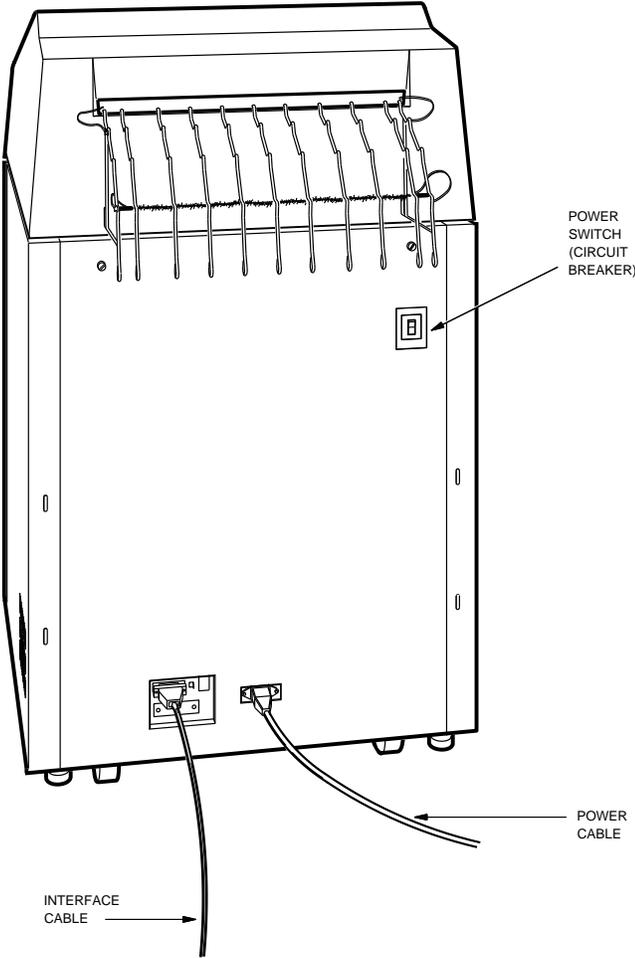
Table 4–1:   Pin Assignments

Pin	Signal	Signal Direction	Description
1	AA Chassis Gnd	–	Frame (Protective) Ground
2	BA (TX) (See Note 2)	From Printer	Printer transmits coded Ready/Busy (DC1/DC3) or BREAK status (strap A5 IN). ETX/ACK — Up to 1500 characters will be accepted. ETX terminates the string. The printer sends an ACK to the host when transmission can resume.
3	BB (RX) (See Note 1)	To Printer	Printer can receive serial data from Data Source when ON LINE.
4	CA (RTS)	From Printer	Request to Send. If so strapped (A8 IN), printer is ON LINE when CA is ON. Straps affect use of CA signal: A8, A16, A24, A32.
5	CB (CTS) (See Notes 3 and 4)	To Printer	Clear to Send. Set by printer. Transmission is not inhibited and it can operate with the host. Printer is capable of transmitting if DC1/DC3 or BREAK protocol is used. If Serial Interface strap B4 is IN, the host may use CC to inhibit printer transmit.
6	CC (DSR) (See Note 3)	To Printer	Data Set Ready. When enabled by serial interface strap B4 IN), the lead may be used to inhibit printer transmitting, although it can still receive data.
7	OV (AB)	–	Printer Signal Ground.
11	SCA-1	From Printer	Secondary Request to Send. Permits printer status to be reflected in same manner as CA lead.
19	SCA-2	From Printer	Secondary Request to Send. Same as pin 11.

Table 4–1 (Cont.):   Pin Assignments

Pin	Signal	Signal Direction	Description
20	CD (DTR)	From Printer	Data Terminal Ready. If so strapped (A7 IN), data terminal is turned ON by printer when a positive voltage level is applied to the pin 20 line, to indicate printer is ready to accept data. Straps affect use of CD signal: A7, A15, A23, A28. See Note 4.

NOTES

1. BB (RX) is the primary data input line. It is the line that carries the serial data from the data source to the printer. Data is accepted from this line as long as the printer is ON LINE, and for one second after the printer has gone to OFF LINE, to allow for line delays during satellite communication. A negative level is a mark, and a positive level is a space. When released, this line should be in "Mark" condition.

2. When using XON/XOFF, parity must be set to match the host.

3. CC is strap dependent, CB is not strap dependent. Regardless of how the printer is strapped, the host may always use CB to inhibit transmit.

4. CB must be positive or the lead open-circuit for DC1/DC3 protocol. For this protocol, CA or CD cannot be tied to CB.

4.3 Configuration Menu

4.3.1 Listing the Parameters

You can get a list of and change all of the user settable parameters by using the keys on the inner control panel. The nine categories of parameters are contained in the configuration menu. The subcategories are listed after you select the category. To get a copy of the configuration menu, perform the following:

SETTING COMMUNICATIONS AND PRINT PARAMETERS   4–5

1. Turn the printer power on. Open the top cover and pull the interlock switch plunger up to its highest point. This activates the inner control panel.

2. When the self-test completes and the display reads [O F L], press the (1) PRG key. The LG31 printer will print the configuration menu (see Figure 4-2).

3. To select a category of parameters, push the key with the category number shown on the configuration menu. To see the form control parameters, press (2). The LG31 will print a list of the form control parameters.

4. To select a parameter, press the key number shown next to the parameter.

5. To exit from the category back to the program mode, press the (0) key.

6. Press the (0) key to return to the configuration menu.

7. To return the printer to the off-line mode, press the (0) TEST CLR key.

Figure 4–3:   Configuration Menu

```
THE PRESENT CONFIGURATION IS:  (44A511526 SY - 44A511527 IM)
FIRMWARE REVISION LEVEL  V2.3
1.  Font:
    Style - 44A511572 Dataprocessing
    CPI - 10 CPI
    Country - US ASCII
    Mode - Normal
    Horizontal Expansion - X1
    Vertical Expansion   - X1
2.  LPI - 6 lpi
3.  Forms Control (lines):
    Form Length   - 66
    Top Margin    - 01
    Bottom Margin - 66
4.  Interface Control:
    Interface Type - Serial
    Input buffer length 2304
    Interface Straps A:
    0         1         2         3
    123456789012345678901234567890 12
    00001000000010000000101000001000
    Interface Straps B:
    0         1         2         3
    123456789012345678901234567890 12
    01000100000000000000000000000000
    Speed - 9600
    Parity - Even
5.  Margin Settings (columns):
    Left Margin  - None
    Right Martin - 132
6.  Horizontal Tabs (columns):
    009  017  025  033  041  049  057  065  073  081
    089  097  105  113  121  129  137  145  153  161
    169  177  185  193  201  209  217
7.  Vertical Tab stops:
8.  Printer Control Straps:
    Printer Straps A:
    0         1         2         3
    123456789012345678901234567890 12
    00000000000000000000010001110010
    Printer Straps B:
    0         1         2         3
    123456789012345678901234567890 12
    00000000000000000000000000000000
Press the number '0' to return to normal operation.
To continue modification select (1-8).
```

4.3.2 Communications Parameters

Under the Interface Control category in the function mode, there are five subcategories:

1. Interface type — There is one interface type available (serial).

2. Interface A straps — There are 32 software straps that you can define as in or out. The straps and the parameters they enable/inhibit are listed in Table 4-2. The LG31 printer is shipped with four interface A straps enabled.

   When you enter the interface strap A subcategory, the strap number is displayed in the left two digits (1-32) of the display panel. The right digit indicates whether the strap is in (i) or out (o). These straps control the RS-232-C signals.

3. Interface B straps — There are 32 software straps that you can define as in or out. The straps and the parameters they enable/inhibit are listed in Table 4-2.

   When you enter the interface strap B subcategory, the strap number is displayed in the left two digits (33-64) of the display. The right digit indicates whether the strap is in (i) or out (o). These straps control the response of the LG31 to the host data.

4. Speed (baud rate) — There are nine baud rates to select from.

5. Parity — There are four parity options.

To select the interface control category of parameters (see Figure 4-2):

1. Place the printer off-line ([O F L] is displayed). If the printer is on-line ([O n L] is displayed), press the ON LINE key.

2. Press the PRG key ([P r o] is displayed). The LG31 printer prints the configuration menu.

3. Press key (4). The LG31 printer will print the interface control options available (see Figure 4-3).

4. To change one of the interface straps, press key (2). The printer will list the options available (see Figure 4-3). The interface straps and their present condition are listed in the configuration menu.

   — Press the (3) key until the number of the desired strap shows in the first two digits of the display.

— Press (1) to enable the strap (an "i" in the third digit on the display).

— Press (2) to remove the strap (an "o" in the third digit on the display).

— Press the (0) key and the printer will return to the configuration menu level ([P r o] is displayed).

5. Press key (4). The LG31 printer will print the interface control options available (see Figure 4-3).

6. To change the speed (baud rate), press (4). The printer will list the available baud rates. The current baud rate is listed in the configuration menu.

— Press the key which corresponds to the number of the baud rate in the list. Having selected the baud rate, the printer returns to the configuration menu ([P r o] is displayed).

— Press the (0) key, and the printer will return to the configuration menu level ([P r o] is displayed).

7. Press key (4). The LG31 printer will print the interface control options available (see Figure 4-4).

8. To change the parity, press the (5) key. The LG31 printer will list the parity options (see Figure 4-5).

— Press the key which corresponds to the number of the desired parity option. Having selected the baud rate, the printer returns to the configuration menu ([P r o] is displayed).

— Press the (0) key, and the printer will return to the configuration menu level ([P r o] is displayed).

9. Press the (0) key to exit the program mode.

There are no options available for interface type. The response of the LG31 printer to selecting interface is shown in Figure 4–6.

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Figure 4–4:   Interface Control Straps

```
Interface Control

0.   Exit
1.   Interface Type
2.   Interface Straps A
3.   Interface Straps B
4.   Speed
5.   Parity


Straps:

0.   Exit
1.   Strap 'IN'
2.   Strap 'OUT'
3.   Forward Without change
4.   Reverse Without change


     Interface Straps A:
     0         1         2         3
     1234567890123456789012345678901 2
     0000100000001000000101000000000
     Interface Straps B:
     0         1         2         3
     1234567890123456789012345678901 2
     1100010000000000000000000000000

Press the number '0' to return to normal operation.
To continue modification select (1-8).
```

Figure 4–5:   Interface Control Speed

```
Interface Control

0.   Exit
1.   Interface Type
2.   Interface Straps A
3.   Interface Straps B
4.   Speed
5.   Parity


Speed -

0.   Exit
1.   110
2.   300
3.   600
4.   1200
5.   1800
6.   2400
7.   4800
8.   9600
9.   19200



     Speed - 9600

Press the number '0' to return to normal operation.
To continue modification select (1-8).
```

SETTING COMMUNICATIONS AND PRINT PARAMETERS   4–11

Figure 4–6: Interface Control Parity

```
Interface Control

0.   Exit
1.   Interface Type
2.   Interface Straps A
3.   Interface Straps B
4.   Speed
5.   Parity

Parity -

0.   Exit
1.   Even
2.   Odd
3.   Space
4.   Mark


     Parity - Even

Press the number '0' to return to normal operation.
To continue modification select (1-8).
```

Note

The space and mark options are available in 7-bit mode only. In
8-bit mode, these options are not selectable and are not printed.

Figure 4–7: Interface Control Type

```
Interface Control

0.   Exit
1.   Interface Type
2.   Interface Straps A
3.   Interface Straps B
4.   Speed
5.   Parity


Interface Type

0.   Exit
1.   Serial


     Interface Type - Serial

Press the number '0' to return to normal operation.
To continue modification select (1-8).
```

Table 4–2:   Serial Interface Strapping Options

Strap Number	Action When In (In = 1; Out = 0)
READ/BUSY CONTROL	
A1	Not assigned
A2	Not assigned
A3	Not assigned
A4	Enable READY/BUSY status by means of SCA (pins 11 and 19)
A5	Enable READY/BUSY to cause transmission of XON/XOFF codes
A6	Enable READY/BUSY to cause transmission of a 200 msec BREAK
A7	Enable READY/BUSY to turn circuit CD (interface pin 20) ON or OFF
A8	Enable READY/BUSY to turn circuit CA (interface pin 4) ON or OFF
FAULT CONTROL	
A9	Not assigned
A10	Not assigned
A11	Not assigned
A12	Enable NO FAULT/FAULT status by means of SCA (pins 11 and 19)
A13	Enable NO FAULT/FAULT to cause transmission of XON/XOFF codes
A14	Enable NO FAULT/FAULT to cause transmission of a 200 msec BREAK
A15	Enable NO FAULT/FAULT to turn off circuit CD
A16	Enable NO FAULT/FAULT to turn off circuit CA
SELECT CONTROL	
A17	Not assigned
A18	Not assigned
A19	Not assigned
A20	Enable ON LINE/OFF LINE status by means of SCA (pins 11 and 19)
A21	Enable printer in OFF LINE to cause transmission of XON/XOFF codes
A22	Enable printer in OFF LINE to cause transmission of a 200 msec BREAK
A23	Enable printer in OFF LINE to turn off circuit CD
A24	Enable printer in OFF LINE to turn off circuit CA
A25	Not assigned

Table 4–2 (Cont.):   Serial Interface Strapping Options

Strap Number	Action When In (In = 1; Out = 0)
A26	Enable transmission of an <ACK> on receipt of an <ETX>
A27	Reverse SCA polarity (active state LOW) if SCA is enabled
A28	Reverse DTR polarity (active state LOW) if DTR is enabled
A29	Inhibit received parity check
A30	Enable two stop bits
A31	Enable transmitter
OTHER	
A32	Reverse CA polarity (active state LOW) if CA is enabled
B1	Not assigned
B2	No parity bit transmitted/received
B3	Enable auto input buffer expansion
B4	Host may not use CC to inhibit transmit
B5	Replaces underline character with <CR>
B6	Seven and eight bit data accepted
B7-B32	Not assigned

NOTE

The configuration menu prints out strap status in serial inter-
face in two rows A1-A32 and B1-B32. The LED display, how-
ever, shows 1 through 64 with 33-64 being equivalent to B1-
B32.

4.4 Print Characteristics

The rest of the configuration entries control the form and location of the
printed data.

4.4.1 Font

Under the font category in the program mode, there are six subcategories
(see Figure 4–8):

1. Style - the quality/density of the printed characters

2. CPI - Characters Per Inch

3. Country

4. Mode (there are no font enhancements available through the control
    panel)

5. Horizontal Expansion

6. Vertical Expansion

To select the font category:

1. Place the printer off-line ([O F L] is displayed). If the printer is
    on-line ([O n L] is displayed), press the ON LINE key.

2. Press the PRG key ([P r o] is displayed). The LG31 printer will print
    the configuration menu.

3. Press the (1) key. The LG31 printer will list the font options (see
    Figure 4–8).

4. Press the key with the same number as the desired font option.

5. Follow the procedure in the related section as follows.

There are no mode options available. The response of the LG31 printer
to mode selection is shown in Figure 4–8.

Figure 4–8:   Font Menu

```
FONT:

0.  Exit
1.  Style
2.  CPI
3.  Country
4.  Mode
5.  Horizontal Expansion
6.  Vertical Expansion
```

4.4.1.1 Style

Figure 4–9: Font Style

```
FONT:

0.  Exit
1.  Style
2.  CPI
3.  Country
4.  Mode
5.  Horizontal Expansion
6.  Vertical Expansion

Style –

0.  Exit
1.  44A511367 Dataprocessing
2.  44A511199 Correspondence
3.  44A511400 OCR-A
4.  44A511400 OCR-B

    Style – 44A511367 Dataprocessing

Press the number '0' to return to normal operation.
To continue modification select (1-8).
```

To select the style subcategory of parameters (see Figure 4–9):

1. Place the printer off-line ([O F L] is displayed). If the printer is on-line ([O n L] is displayed), press the ON LINE key.

2. Press the PRG key ([P r o] is displayed). The LG31 printer will print the configuration menu.

3. Press the (1) key.   The LG31 will print the list of print styles available.

4. Press the key with the same number as the desired style ((3) selects OCR-A).

5. Press the (0) key to return the LG31 printer to off-line operation ([O F L] is displayed).

4.4.1.2 CPI

Figure 4–10:   Font CPI

```
FONT:

0.   Exit
1.   Style
2.   CPI
3.   Country
4.   Mode
5.   Horizontal Expansion
6.   Vertical Expansion

CPI -

0.   Exit
1.   5 CPI
2.   10 CPI
3.   12 CPI
4.   13.3 CPI
5.   15 CPI
6.   16.7 CPI

     CPI - 10 CPI

Press the number '0' to return to normal operation.
To continue modification select (1-8).
```

To select the CPI subcategory of parameters (see Figure 4–10):

1. Place the printer off-line ([O F L] is displayed). If the printer is on-line ([O n L] is displayed), press the ON LINE key.

2. Press the PRG key ([P r o] is displayed). The LG31 printer will print the configuration menu.

3. Press the (2) key. The LG31 will print the list of CPI available.

4. Press the key with the same number as the desired CPI ((3) selects 12 CPI).

5. Press the (0) key to return the LG31 printer to off-line operation ([O F L] is displayed).

4.4.1.3 Country (Character Sets)

Figure 4–11:   Font Country

```
FONT:

0.  Exit
1.  Style
2.  CPI
3.  Country
4.  Mode
5.  Horizontal Expansion
6.  Vertical Expansion

Country -

0.  Exit
1.  US ASCII
2.  Great Britain
3.  DEC Dutch
4.  DEC Finland
5.  France
6.  DEC French (Canada)
7.  Germany
8.  Italy
9.  Continue

Country -

0.  Exit
1.  JIS Roman
2.  DEC Norway/Denmark
3.  Spain
4.  DEC Sweden
5.  DEC Swiss
6.  ISO Norway/Denmark
7.  DEC Portuguese

    Country - US ASCII

Press the number '0' to return to normal operation.
To continue modification select (1-8).
```

To select the character set subcategory of parameters (see Figure 4–11):

1. Place the printer off-line ([O F L] is displayed). If the printer is on-line ([O n L] is displayed), press the ON LINE key.

2.   Press the PRG key ([P r o] is displayed). The LG31 printer will print the configuration menu.

3.   Press the (3) key. The LG31 will print a list of national replacement character sets available.

4.   Press the key with the same number as the desired set ((3) selects Digital Dutch).

5.   If the desired character set is not in the list, press the (9) key. The printer will list the rest of the character sets available. Perform step 4.

6.   Press the (0) key to return the LG31 printer to off-line operation ([O F L] is displayed).

4.4.1.4 Mode

Figure 4–12:   Font Mode

```
FONT:

0.   Exit
1.   Style
2.   CPI
3.   Country
4.   Mode
5.   Horizontal Expansion
6.   Vertical Expansion

Mode -
Cannot change character attributes from the menu

0.   Exit

     Mode - Normal

Press the number '0' to return to normal operation.
To continue modification select (1-8).
```

The character attributes cannot be changed from the configuration menu.

4.4.1.5 Horizontal Expansion

Figure 4–13:   Font Horizontal Expansion

```
FONT:

0.   Exit
1.   Style
2.   CPI
3.   Country
4.   Mode
5.   Horizontal Expansion
6.   Vertical Expansion

Horizontal Expansion -

0.   Exit
1.   X1
2.   X2

    Horizontal Expansion - X1

Press the number '0' to return to normal operation.
To continue modification select (1-8).
```

To select the horizontal expansion subcategory of parameters (see Figure 4–13):

1. Place the printer off-line ([O F L] is displayed). If the printer is on-line ([O n L] is displayed), press the ON LINE key.

2. Press the PRG key ([P r o] is displayed). The LG31 printer will print the configuration menu.

3. Press the (5) key. The LG31 will print the list of horizontal expansions available.

4. Press the key with the same number as the desired expansion ((2) selects the times two expansion).

5. Press the (0) key to return the LG31 printer to off-line operation ([O F L] is displayed).

4.4.1.6 Vertical Expansion

Figure 4–14:   Font Vertical Expansion

```
FONT:

0.  Exit
1.  Style
2.  CPI
3.  Country
4.  Mode
5.  Horizontal Expansion
6.  Vertical Expansion

Vertical Expansion -

0.  Exit
1.  X1
2.  X2
3.  X3

    Vertical Expansion - X1

Press the number '0' to return to normal operation.
To continue modification select (1-8).
```

To select the vertical expansion subcategory of parameters (see Figure 4–14):

1. Place the printer off-line ([O F L] is displayed). If the printer is on-line ([O n L] is displayed), press the ON LINE key.

2. Press the PRG key ([P r o] is displayed). The LG31 printer will print the configuration menu.

3. Press the (6) key. The LG31 will print the list of vertical expansions available.

4. Press the key with the same number as the desired expansion ((3) selects the times three vertical expansion).

5. Press the (0) key to return the LG31 printer to off-line operation ([O F L] is displayed).

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4.4.2 LPI

Figure 4–15:   Lines Per Inch

```
LPI -

0.   Exit
1.   6 lpi
2.   8 lpi
3.   10 lpi

     LPI - 6 lpi

Press the number '0' to return to normal operation.
To continue modification select (1-8).
```

To select the LPI subcategory of parameters (see Figure 4–15):

1. Place the printer off-line ([O F L] is displayed). If the printer is on-line ([O n L] is displayed), press the ON LINE key.

2. Press the PRG key ([P r o] is displayed). The LG31 printer will print the configuration menu.

3. Press the (2) key. The LG31 printer will list the LPI options (see Figure 4–15).

4. Press the key with the same number as the desired LPI option ((3) is 10 lines per inch).

5. Press the (0) key to return the LG31 printer to off-line operation ([O F L] is displayed).

4.4.3 Forms Control

Setting the forms control (see Figure 4–16) differs from the other printing characteristic setups in that you normally perform a sequence of settings, and that the last setting exits back to the configuration menu. There are two methods for setting the form dimension and position. One is to select the function mode (see Section 4.5.2), and the other is to select forms control from the program mode.

Figure 4–16:   Forms Control

```
Form Control:

0.  Exit
1.  Form Feed
2.  Line Feed (forward)
3.  Line Feed (reverse)
4.  Set Top of Form
5.  Set Top Margin
6.  Set Bottom Margin
7.  Set Bottom of Form
8.  1/72 inch Paper Forward
9.  1/72 inch Paper Reverse

Forms Control (lines):

    Form Length   - 66
    Top Margin    - 01
    Bottom Margin - 66

Press the number '0' to return to normal operation.
To continue modification select (1-8).
```

To select the forms control category in the program mode:

1. Place the printer off-line ([O F L] is displayed). If the printer is on-line ([O n L] is displayed), press the ON LINE key.

2. Press the PRG key ([P r o] is displayed). The LG31 printer will print the configuration menu.

3. Press the (3) key. The LG31 printer will list the forms control options (see Figure 4-14).

4. Press and hold the (2) key until the top of the sheet aligns with the notches in the upper tractors.

5. Press the (4) key to start the line count. The display is [0 0 0].

6. Press and hold the (2) key until you reach the desired top margin. The display reads the number of lines the paper moves forward (9 lines equals 1½ inches).

7. Press the (5) key to set the top margin.

8. Press and hold the (2) key until you reach the desired bottom margin. The display reads the number of lines the paper moves forward (51 lines equals 8½ inches). The display reads [6 0] 9+51.

9. Press the (6) key to set the bottom margin.

10. Press and hold the (2) key until you reach the bottom of the form (66 for 11-inch paper).

11. Press the (7) key to set the bottom of the form and to return to the configuration menu.

12. Press the (0) key to return the LG31 printer to off-line operation ([O F L] is displayed).

4.4.4 Margin Settings

Figure 4–17: Margin Settings

```
Margin Settings:

0.  Exit
1.  Advance Left
2.  Advance Right
3.  Set Left Margin
4.  Set Right Margin
5.  Clear Margins
6.  Display Right Margin
7.  Display Left Margin
8.  Display Current Position

Margin Settings (columns):

    Left Margin  - None
    Right Margin - 132

Press the number '0' to return to normal operation.
To continue modification select (1-8).
```

You can set the margin settings from either the function mode (see Section 4.5.5) or the program mode, to select the margin settings category in the program mode:

1. Place the printer off-line ([O F L] is displayed). If the printer is on-line ([O n L] is displayed), press the ON LINE key.

2. Press the PRG key ([P r o] is displayed). The LG31 printer will print the configuration menu.

3. Press the (5) key. The LG31 printer will list the margin setting options (see Figure 4–17).

4. Press the (6) key to display the left margin setting.

5. Press the (2) key until the display reads the column number you want for a left margin.

6. Press the (3) key to set the left margin.

7. Press the (7) key to display the right margin setting.

8. Press the (1) key until the display reads the column number you want for a right margin.

9. Press the (4) key to set the right margin.

10. Press the (0) key to return to the configuration menu.

11. Press the (0) key to return the LG31 printer to off-line operation ([O F L] is displayed).

The (5) key sets the margins to the default values, and the (8) key displays the current column position.

4.4.5 Horizontal Tab Stops

The horizontal tabs cannot be set from the configuration menu. The response of the LG31 printer to a horizontal tab entry is shown in Figure 4–18.

Figure 4–18:   Horizontal Tab Stops

```
Horizontal Tab Stops:
Cannot set horizontal tabs from the menu

0.  Exit

Horizontal Tabs (columns):

    009  017  025  033  041  049  057  065  073  081
    089  097  105  113  121  129  137  145  153  161
    169  177  185  193  201  209  217

Press the number '0' to return to normal operation.
To continue modification select (1-8).
```

Figure 4–19:   Vertical Tab Stops

```
9keep)
Vertical Tab Stops:
Cannot set vertical tabs from the menu

0.  Exit

Vertical Tab Stops:

Press the number '0' to return to normal operation.
To continue modification select (1-8).
```

4.4.6 Vertical Tab Stops

The vertical tab stops cannot be set from the configuration menu. The
response of the LG31 printer to a vertical tab stops entry is shown in
Figure 4–19.

4.4.7 Printer Control Straps

There are 64 printer control straps in the LG31 printer. These straps
control how the LG31 responds when printing data. For a detailed
description of these straps, see Chapter 2, Section 2.2 in the *LG31 User's
Guide (EK-LG31E-UG).*

1.   Printer Control Straps (A) — There are 32 A software straps that
     you can define as in or out. When you enter the interface strap A
     sub-category, the strap number is displayed in the left two digits (1-
     32) of the display panel. The right digit indicates whether the strap
     is in (i) or out (o).

2.   Printer Control Straps (B) — There are 32 B software straps that
     you can define as in or out. When you enter the interface strap B
     sub-category, the strap number is displayed in the left two digits (33-
     64) of the display. The right digit indicates whether the strap is in
     (i) or out (o).

To select the printer control category of parameters (see Figure 4–20).

1.   Place the printer off-line ([O F L] is displayed). If the printer is
     on-line ([O n L] is displayed), press the ON LINE key.

2.   Press the PRG key ([P r o] is displayed). The LG31 printer will print
     the configuration menu.

Figure 4–20: Printer Control Straps — Factory Setting

```
Printer Control Straps:

0.  Exit
1.  Printer Straps A
2.  Printer Straps B

Straps:

0. Exit
1.  Strap 'IN'
2.  Strap 'OUT'
3.  Forward Without Change
4.  Reverse Without Change

Printer Control Straps:
    Printer Straps A:
    0         1         2         3
    123456789012345678901234567890012
    00000000000000000000100001110010
    Printer Straps B:
    0         1         2         3
    123456789012345678901234567890012
    00000000000000000000000000000000

Press the number '0' to return to normal operation.
To continue modification select (1-8).

End of Program Mode
```

3. Press key (8). The printer will list the options available (see Figure 4–20). The interface straps and their present condition are listed in the configuration menu.

4. Press the (3) key until the number of the desired strap shows in the display.

5. Press (1) to enable the strap (an "i" on the display).

6. Press (2) to disable the strap (an "o" on the display).

7. Press the (0) key and the printer will return to the printer control category.

8. Press the (0) key to return to the configuration menu.

9. Press the (0) key and the LG31 printer will return to off-line operation ([O F L] is displayed).

4.5 Function Mode

In the function mode (see Figure 4–21), you can perform the following:

- Printer initialization
- Forms setup
- Print adjustment
- Forms adjustment
- Margin setup
- Reverse form feed
- Buffer clear

Unlike operations in the programming mode, you can perform operations in one of the characteristics for entry into the function mode. A menu is not available to lead you through the modification process. The procedures for performing these operations are contained in the following sections.

4.5.1 Printer Initialization

There are two ways to initialize the LG31 printer:

1. Through the control panel.
2. Through the initialization switch.

It may be necessary to perform the initialization procedure if the printer becomes locked, or if you want to return to the factory settings. Table 4-3 describes how to use the control panel to initialize the LG31 printer. Table 4-4 describes how to initialize the printer using the initialization switch.

Figure 4–21: Function Mode

```
THE PRESENT CONFIGURATION IS:  (44A511526 SY – 44A511527 IM)
FIRMWARE REVISION LEVEL  V2.3
1.  Font:
    Style – 44A511527 Dataprocessing
    CPI – 10 CPI
    Country - US ASCII
    Mode – Normal
    Horizontal Expansion – X1
    Vertical Expansion   – X1
2.  LPI - 6 lpi
3.  Forms Control (lines):
    Form Length   – 66
    Top Margin    – 01
    Bottom Margin – 66
4.  Interface Control:
    Interface Type – Serial
    Input buffer length 2304
    Interface Straps A:
    0         1         2         3
    12345678901234567890123456789012
    00001000000010000000101000001000
    Interface Straps B:
    0         1         2         3
    12345678901234567890123456789012
    01000100000000000000000000000000
    Speed – 9600
    Parity – Even
5.  Margin Settings (columns):
    Left Margin  – None
    Right Martin – 132
6.  Horizontal Tabs (columns):
    009  017  025  033  041  049  057  065  073  081
    089  097  105  113  121  129  137  145  153  161
    169  177  185  193  201  209  217
7.  Vertical Tab stops:
8.  Printer Control Straps:
    Printer Straps A:
    0         1         2         3
    12345678901234567890123456789012
    00000000000000000000100001110010
    Printer Straps B:
    0         1         2         3
    12345678901234567890123456789012
    00000000000000000000000000000000
Press the number '0' to return to normal operation.
To continue modification select (1-8).
```

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Table 4–3: Initialization Procedure

Action	Results	Display
Press (3) ON LINE	Printer set to off-line.	[O F L]
Press (9) FCT	Printer enters Mode Selection mode.	[.F n c]
Press (1) PRG	Printer enters Initialization mode.	[. s u]
Select one:		
Press (0) TEST CLR	Returns to off-line without any changes.	[O F L]
or		
(3) ON LINE	Resets the printer parameters to their respective Reset State.	[.C S U] [.8.8.8] [i P] [.8.8.8] [O F L]
(9) FCT	To initialize printer configuration to default conditions.	[.IS. U] [.8.8.8] [i P] [.8.8.8] [O F L]

NOTE

A user's configuration menu selections are reset to factory settings as a result of a defective battery or unintentional operation of the initialization switch on the inner control panel.

Table 4–4: Lock-Up Printer Initialization Procedure

Action	Results
Turn printer power OFF.	Printer disabled.
Slide the printer initialization switch to its opposite position (Switch located at top of inner control panel).	
Turn printer power ON.	Printer enabled.
When display indicates [. S U], press (9) FCT.	Initializes the printer to factory settings (see Figure 4-2 printout.)
When display indicates [. S U], slide the printer initialization switch back to its original position.	Completes the initialization procedure.

NOTE

If the switch is not returned to its original position, the [. S U] display will reappear at next power-up or self-test procedure. The procedure can be repeated if necessary.

4.5.2 Forms Setup

Use form setup to establish top and bottom of form and top and bottom margin settings without causing any printing action to occur. Minimum form length is one line. Maximum form length is 559 mm (22.0 in). The Form Setup procedure is shown in Table 4-5.

CAUTION

Although the entire length of the form is available for printing, top and bottom margins are recommended in order to avoid printing on paper perforations and print wire snagging.

Prior to pressing key (4) LINE FEED, press any paper motion key to advance paper as appropriate, and the display will not change. After pressing key (4) LINE FEED, the display will change to a counter that will count the line feeds forward as key (2) FORM FEED is pressed or backwards, as key (3) ON LINE is pressed. However, the paper will not move again until key (7) FONT LINE FEED is pressed to set bottom of form. The top of form is actually set when key (4) LINE FEED is pressed. At this point, the 0.23 cm (1/72 inch) paper control keys (8) SET TOF and (9) FCT are disabled. Also, key (2) FORM FEED cannot be enabled because it is being used to increment line feed counts without moving

the paper. Pressing the bottom of form key (7) FONT will cause the form parameters entered to be saved, move the paper to align the top of the next form with the print line, and exit the Form Setup mode.

Table 4–5: Forms Setup Procedure

Action	Results	Display
Press (3) ON LINE	Printer goes to OFF LINE.	[O F L]
Press (9) FCT	Printer enters Mode Selection state.	[.F n c]
Press (2) FORM FEED	Printer enters Form Setup mode.	[F S U]
At this point, the choices are:		
(0) TEST CLR	Exits from Form Setup to OFF LINE, and feeds to top of next form in accordance with current length.	[O F L]
(1) PRG	Form feeds one form length.	[.F S U]
(2) FORM FEED	Forward line feed in accordance with current LPI setting. If pressed and held for more than one second, consecutive line feeds occur at the rate of one each 0.5 of a second.	[.F S U]
(3) ON LINE	Reverse line feed in accordance with current LPI setting. If pressed and held down for one second, consecutive paper reverse line feed steps occur at the rate of one each 0.5 of a second.	[.F S U]
(4) LINE FEED	Sets top of form.	[0 0 1]
(5) CPI LPI	Sets top margin.	[0 0 4]
(6) PAPER REV	Sets bottom margin.	[0 6 2]
(7) FONT	Sets bottom of form and returns to OFF LINE.	[0 6 6]
(8) SET TOF	Advances paper 0.23 cm (1/72 inch).	[.F S U]
(9) FCT	Moves paper 0.23 cm (1/72 inch) in reverse direction.	[.F S U]

4.5.2.1 Top Of Form (TOF)

Figure 4–22: Key (4) Form Size Setup Example
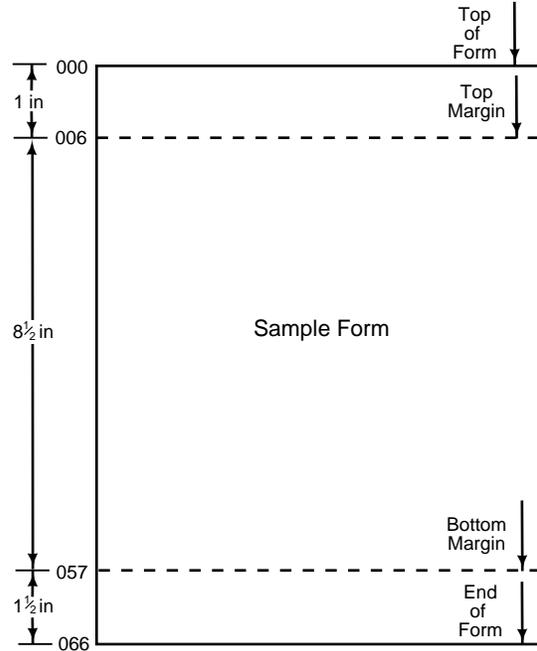
RE_UK00282M_89

Figure 4–22 shows the same form size when Top Of Form (TOF) is set by using key (4) LINE FEED while the printer is in the Form Setup mode. In performing the following TOF set procedure, it is assumed that the Form Setup mode has already been entered, but key (4) LINE FEED has not been pressed and that the printer is set for 6 LPI.

Top Of Form (TOF) Set Procedure

1. Press key (2) FORM FEED again, and hold down to move the first line of the form, even (level) with the print line location. Top of paper line feeds to desired TOF, even with notches in upper tractor doors. Display remains [.F S U].

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2. Press key (4) LINE FEED to set top of form. Display is [0 0 0].

3. One-inch top margin is desired at 6 LPI. Press and hold (2) FORM FEED, count six lines, release pushbutton. Display counts one line feed per half-second. Final display is [.0 0 6].

4. Press key (5) CPI/LPI to set top margin. Display remains at [.0 0 6].

5. The body of the form is 21.6 cm (8½ inches) or 51 lines. Press and hold key (2) FORM FEED, count 51 lines (51 + 6 = 57 total), release pushbutton. Display counts to [.0 5 7] and stops.

6. Press key (6) PAPER REV to set bottom margin. Display remains at [.0 5 7].

7. Form is 27.9 cm (11 in) or 66 lines. Press and hold key (2) FORM FEED, count nine lines, release pushbutton. Display is [.0 6 6].

8. Press key (7) FONT to set bottom of form, save form setup, form feed to first print line of next form, and exit Form Setup. Paper moves forward to first print line of next form. Display is [O F L].

During steps 3, 5, or 7 in the above TOF set procedure, if the counter goes beyond the desired number of lines, press key (3) ON LINE to subtract excess lines from the display counter.

NOTES

1. When a new supply of forms is needed and the same form is used, it is only necessary to align the top perforation with the notches in the paper locking levers (upper tractors) and press keys (0) TEST CLR and (8) SET TOF to set the top of form position. The form will move forward to place the first line of the next form in a printable position. Do not use key (4) LINE FEED for this purpose. Press key (3) ON LINE to resume printing.

2. After the form parameters have been entered by pressing key (7) FONT, changing the vertical pitch will not change form length. Example: changing from 6 to 8 LPI on a 27.9 cm (11 inches) page will not shorten page to 21.0 cm (8¼ inches) or 66 lines/8 LPI=8¼ inches.

3. See Table 4-6 for procedure to adjust form up or down.

4.5.3 Print Adjustment

The Print Adjustment procedure shown in Table 4-6 is used to review the print by observing several print patterns that may be selected. Except for the test pattern, printing starts when key is momentarily pressed, and continues printing until key (9) FCT is momentarily pressed. If key (9) (FCT) is pressed again before another key, the previous pattern is repeated. Further information and sample test pattern printouts are in Chapter 7 of the *LG31 Technical Manual*.

The print review function permits evaluation of the print alignment for proper character formation and graphics printing. If the adjustment is not satisfactory, call Digital.

CAUTION

This print quality adjustment should only be performed by a qualified technician.

Table 4–6:   Print Review Procedure

Action	Results	Display
Press (3) ON LINE	Printer goes to off-line.	[O F L]
Press (9) FCT	Printer enters Function Selection mode.	[.F n c]
Press (3) ON LINE	Printer enters Alignment mode. Cancels any existing special print modes.	[.A d j]
At this point, the options are:		
(0) TEST CLR	Exits from Adjustment to off-line and restores previous menu configuration.	[O F L]
(1) PRG	Prints short segments of the various test patterns. Print width is governed by the number of columns in the current configuration. Software release number, model number, space for printer serial number, and date precede the test pattern printout.	[. 5 9]
(2) FORM FEED	Executes Form Feed.	[. 5 9]
(3) ON LINE	Prints amplitude pattern	[.A .PL]
(4) LINE FEED	Executes Line Feed.	[.A .PL]

Table 4–6 (Cont.):   Print Review Procedure

Action	Results	Display
(5) CPI LPI*	Prints horizontal timing patterns	[.H E P]
(6) PAPER*	Prints vertical timing pattern	[.U E P]
(7) FONT*	Prints intermodule gap pattern	[. 9 P]
(8) SET TOF*	Prints checkerboard pattern	[.c b P]

*Indicates a continuous printing pattern. Press key (9) to stop   printing. Press key (9) again to restart the most recently selected   pattern.

4.5.4 Forms Adjustment

The Forms Adjustment procedure allows movement of the current form up or down on the paper after the form parameters are set by TOF Set procedure, using the Forms Control item 3 in the Configuration Menu (see Chapter 3).

Moving paper forward causes the current top of form to be displaced downward on the paper; moving the paper in the reverse direction causes the form to be moved upward on the paper. The form limits and Top Of Form using the paper tractor locking lever notch should already have been set prior to using the Forms Adjustment procedure in Table 4-7. Adjusting the form locations on the paper does not alter the current form parameters (margins, length).

Table 4–7: Forms Adjustment Procedure

Action	Results	Display
Press (3) ON LINE	Printer goes off-line.	[O F L]
Press (9) FCT	Printer enters Mode Selection mode.	[.F n c]
Press (4) LINE FEED	Printer enters Forms Adjustment mode.	[.F A d]

At this point, the choices are:

(0) TEST CLR	Exits from Forms Adjustment to OFF LINE and feeds to top of next form in accordance with current length.	[O F L]
(1) PRG	Prints rotating test pattern (see NOTE).	[.F A d]
(4) LINE FEED	Advances paper 0.23 cm (1/72 inch).	[.F A d]
(6) PAPER REV	Moves paper 0.23 cm (1/72 inch) in reverse direction.	[.F A d]

NOTE

The pattern begins and continues when key (1) PRG is pressed and held. The pattern stops when the key (1) PRG is released. The Forms Adjustment mode is still active after printing the test pattern.

4.5.5 Margin Setup

The Margin Setup procedure shown in Table 4-8 is used to set and display left and right margins.

Table 4–8:   Margin Setup Procedure

Action	Results	Display
Press (3) ON LINE	Printer goes OFF LINE.	[O F L]
Press (9) FCT	Printer enters Mode Selection mode.	[.F n c]
Press (5) CPI	Printer enters Margin Setup mode.	[.L r S]
At this point, the options are:		
(0) TEST CLR	Exits from Margin Setup to OFF LINE.	[O F L]
(1) PRG	Counts column position to the left.	[.1 3 2] to [.0 0 0]
(2) FORM FEED	Counts column position to the right.	[.0 0 0] to [.1 3 2]
(3) ON LINE	Sets left margin.	[.0 0 0] Factory Setting
(4) LINE FEED	Sets right margin.	[.1 3 2] Factory Setting
(5) CPI LPI	Clears margin to default values (000 and 132 for 10 CPI). Also see Margin vs. Character Pitch procedure below.	[.L r S]
(6) PAPER REV	Displays current right margin.	[.1 3 2]
(7) FONT	Displays current left margin.	[.0 0 0]
(8) SET TOF	Displays current column position.	[.0 0 0]

NOTE

The display examples given for keys (1) through (8) assume the printer is set for 10 CPI.

The following example explains how to select and set desired margins.

NOTE

A counter is used to indicate the current column number counted from the left margin. The count increments or decrements at the rate of two per second when key (1) PRG or (2) FORM FEED is held down. The maximum column count is:

66 for 5 CPI
132 for 10 CPI
158 for 12 CPI
176 for 13.3 CPI
198 for 15 CPI
220 for 16.7 CPI

Example (Margin Setup)

1. To move both margins inward five columns while printing at 10 CPI, press key (7) FONT to display left margin. Display is [.0 0 0].

2. Press and hold key (2) FORM FEED for five column counts and release. Display increases to [.0 0 5] and stops.

3. Press key (3) ON LINE to set left margin. Display remains at [.0 0 5].

NOTE

The column displayed is one less than the column in which printing will begin.

4. Press key (6) PAPER REV to display right margin. Display is [.1 3 2].

5. Press and hold key (1) PRG for five column counts and release. Display decreases from 132 to [.1 2 7] and stops.

6. Press key (4) LINE FEED to set right margin. Display remains at [.1 2 7].

NOTE

The last print column is the one displayed.

7. Press key (0) TEST CLEAR to return to Off Line from Margin Setup. Display is [O F L].

Note

In the above example, the print line is 122 columns wide. Printing is allowable in columns 6 through 127.

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The left margin specifies the first printable position on a line, while the right margin specifies the last printable position on a line. The active position may not be placed outside the left and right margins. The left margin must be one less than the right margin.

If the active position is less than the left margin, the active position is set to the left margin.

If Autowrap is enabled and the active position is greater than the right margin, the next printable character will cause a carriage return/line feed before this character is printed. If Autowrap is disabled (truncated), any following characters will be ignored until the cursor is brought to within the printable area.

These margins are defined as hard margins, since printing is not permitted outside them. The only exception to this rule for vector drawing. The vector sequence is capable of drawing outside the margins.

When character pitch is changed and the same physical margins are desired, it is necessary to reset the margins before any data is sent. Changing the horizontal pitch resets left and right margins to the printable limits (column 1 and the rightmost position).

4.5.6 Reverse Form Feed

Use the Reverse Form Feed procedure shown in Table 4-9 to back the paper up one form's length for every press of the key.

Table 4–9: Reverse Form Feed Procedure

Action	Results	Display
Press (3) ON LINE	Printer goes to off-line.	[O F L]
Press (9) FCT	Printer enters Function mode.	[.F n c]
Press (6) PAPER REV	Printer enters Reverse Form Feed mode.	[.r F F]
At this point, the options are:		
(0) TEST CLR	Exits from Reverse Form Feed to off-line.	[O F L]
(6) PAPER REV	Turns paper back one form length each time the key is pressed.	[.r F F]

4.5.7 Buffer Clear

Use the Buffer Clear procedure shown in Table 4-10 to clear the contents in the printer's buffer.

Table 4–10:   Buffer Clear Procedure

Action	Results	Display
Press (3) ON LINE	Printer goes off-line.	[O F L]
Press (9) FCT	Printer enters Function mode.	[.F n c]
Press (7) FONT	Printer enters Buffer Clear mode.	[O F L]
At this point, the options are:		
(0) TEST CLR	Exits from Buffer Clear to off-line.	[O F L]
(7) FONT	All information in the printer's buffer is cleared.	[C L r]

Chapter 5

PRINTER DIAGNOSTICS

5.1 Introduction

This chapter describes the LG31 self-tests and the alignment tests.

5.2 Self-Tests

The printer automatically verifies its operational integrity by performing the power-up self-tests on power-up. Thereafter, it continually performs the operational self-tests. In addition to these tests, the operator can invoke the printing self-tests.

5.2.1 Power-Up Self-Tests

The LG31 printer automatically self-tests upon power-up, and includes the following diagnostic tests:

- ROM checksum test to verify all bits of ROM.

- RAM pattern test to exercise and verify all bits of RAM.

Additionally, further self-test operations can be programmed into the printer to check internal logic at power-up with detected faults displayed at the control panel (see the *LG31 Printer User's Guide EK-LG31E-UG*). A list of all messages displayed on the LEDs is contained in Appendix A.

5.2.2 Printing Self-Test

The LG31 printer can execute a printing self-test from either the outer
or inner control panel. This test prints the 94 printable characters of
the ASCII character set in the data processing font, at 10 CPI, and 6
LPI. The test is printed in a swirl pattern over the maximum printable
width (see Figure 5–1). Faults are displayed at the control panel. Table
5-1 contains the procedure for an off-line print test. Table 5-2 lists the
diagnostic fault codes.

Figure 5–1:   ASCII Print Test Pattern - Sample Printout

```
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_
"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`
#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`a
$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`ab
%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abc
&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcd
'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcde
()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdef
```

5.2.3 Operational Self-Test

The LG31 printer performs operational self-test diagnostics at regular
intervals during normal operation. Any detected faults are displayed on
the control panel.

Table 5–1: Print Test and Diagnostic Self-Test Procedure

Action	Result
Press (3) ON LINE key to put the printer off-line	Control panel display [O F L].
Press (0) TEST CLR key	Printer prints test pattern (see Chapter 4, Figure 4-20).
	Printing of test pattern ends and printer performs diagnostic self-test (maximum time: 10 seconds). This is the same test performed each time power is applied.
Press (0) TEST CLR key again	[.8.8.8] is displayed and audio alarm sounds, then [i p] is displayed for several seconds as the self-test is executed. [.8.8.8] is displayed again. If no faults are found, [O F L] is displayed. If a fault is detected, the appropriate fault code is displayed (refer to Chapter 5, Table 5-2). The first fault detected is displayed.

Key: [ ] = indicates three-character LED display.

5.2.3.1 Print Test Pattern

The characters printed consist of all printable ASCII characters. They will be in the last selected (locally or remotely) font style, pitch, and line length. A sample print test is shown in Figure 5-1.

Table 5-2 contains a list of the diagnostic fault codes and the faults they indicate. These displays can be initiated at:

- Power-up
- Emulation change
- Following a test pattern
- Initialization

Table 5–2: Diagnostic Fault Codes

Printer Displays	Fault
–	No Fault
[0 2 0]	SMSM Lithium Battery (BT1) (see Table 7.2)
[0 2 2]	SMIM has insufficient RAM
[0 4 X]	SMSM RAM. Display indicates chip number at fault. For U41, X=1; for U42, X=2, and so forth.
[0 5 0]	SMSM memory failed to switch (U9-U13, U18-U25, U42)
[0 5 5]	SMSM switchable RAM failure (PD4016C-2 in U11 and U21)
[0 6 0]	SMSM 7.5 interrupt failure (Timer at U30 to CPU at U3 circuit)
[0 8 0]	SMSM DMA (includes U37, U38, U42, U43, U50-U54)
[I n F]	No operational interface found
[4 2 0]	SMIM Lithium Battery (BT1) (see Table 7.2)
[4 4 0]	SMIM RAM (U19-U22) circuit chip (2K or 8K) may be located in sockets U19-U22
[4 9 0]	SMMC Shuttle Motor Drive
[4 9 1]	SMMC Shuttle Frequency out of range
[4 9 2]	SMIH Imaging Hardware failure SMMC, LVT, Shuttle Motor
[4 9 3]	SMMC or SMIH board (no shuttle interrupt)
[4 9 4]	No INT signal available to cause paper motion
[7 0 0]	SMIM failure (Image Processor)
[R c X]	SMIM image processor timer chip (8253 in U13)

Table 5–2 (Cont.):   Diagnostic Fault Codes

Printer Displays	Fault
[1 3]	Head test failure (X indicates module number of bad actuator. 1=left, 2=middle, 3=right)
[1 4]	SMIM interrupt controller (8259A in U14)
[2 1]	SMIM ROM (U19-U24, U38-U39) image processor ROM (Display indicates chip number at fault)
[2 5] through [3 2]	SMIM NVRAM (5517L in U25-U32) (Display indicates chip number at fault)
[5 2 9]	SMSM NVRAM (5517L in U29)
[5 3 0]	SMSM timer chip (8253 in U30)
[5 3 1]	SMSM Interrupt Controller (8259A in U31)
[5 4 7]	SMSM ROM (U47)
[5 4 8]	SMSM ROM (U48)
[5 4 9]	SMSM ROM (U49)
[F 0 0]	Data processing 10 CPI font check sum fault.
[F 0 1]	Data processing 12 CPI.
[F 0 2]	Data processing 13.3 CPI.
[F 1 0]	Gothic NLQ 10 CPI.
[F 1 2]	Gothic NLQ 12 CPI.
[F 1 3]	Gothic NLQ 13.3 CPI.
[F]	Gothic NLQ 15 CPI.
[F 3 0]	Italic NLQ 10 CPI.
[F 3 1]	Italic NLQ 12 CPI.
[F 3 2]	Italic NLQ 13.3 CPI.
[F 8 0]	Bar code.
[F 9 0]	Oversize characters.

Fault Code Key:

Display	Location of Fault
[0- -]	SMSM circuit board
[41 -] through [45 -]	Through [45 -] SMIM circuit boards
[49 -]	SMIH or SMMC circuit boards
[I- -]	SMIM board component
[S- -]	SMSM board component
[X- -]	A range of number as required
[F 0 0]-[F A 0]	Font Check Sum Fault Codes Any [F—] code display indicates a logic reading problem. Displays range from [F 0 0] to [F A 0]. If a font check sum fault display occurs after the installation of new font chips, check that the new chips are correctly installed. Otherwise, the fault is not operator-correctable and Digital should be contacted (see the LG31 Printer User's Guide for complete code list).

5.3 Alignment Tests

There are a series of printing test patterns that are used for aligning the printer. While the alignment is to be performed by service personnel, the test patterns can be printed by all users.

- Enter the function mode (key (9) FCT).

- Enter print adjustment (key (3) ON LINE).

- Press key 1, 3, or 5 through 9 to select a pattern.

- Press key 0 to exit to local.

Chapter 6

PRINTER OPERATION

6.1 Introduction

This chapter provides information on the operation of the LG31 printer and includes descriptions of the control panels/display, power-up procedure, troubleshooting, and operator-correctable faults.

6.2 Loading Paper

The printer uses edged-punched (sprocket fed) fan-fold paper conforming to the dimensions shown in Figure 6-1.

Figure 6–1: Sprocket Hole Dimensioning Diagram
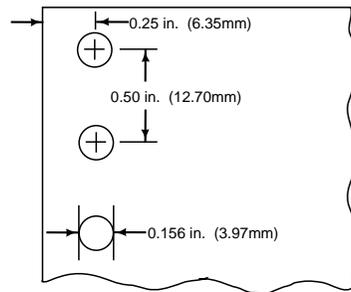
RE_UK00279M_89

To load paper in the LG31, carry out the following steps.

1. Open top cover.

2. Turn Paper Gap Adjuster to Load position (maximum clockwise). See Figure 6-2.

3. Open Paper Tension Adjust lever to position 1 (fully downward).

CAUTION

For initial paper loading, use 377.8 mm (14 7/8 in) wide or wider paper to avoid possibility of printing on striker bar and possible damage to actuator wires.

4. Open printer front door.

5. Cut top from box of fan-fold paper to avoid snagging of paper as it is fed to tractors. Place box of paper on shelf as shown in Figure 6-3.

6. Open upper paper tractor covers. Hand feed paper up through printer behind paper tensioning adjustment fingers as shown in Figure 6-3. Load paper evenly on upper tractor pins until the top edge of the paper is below the notches on the tractors.

Figure 6–2: Paper Loading Diagram

MARGIN
ADJUSTMENT
KNOB

UPPER LEFT
PAPER TRACTOR

PAPER GAP
ADJUSTER

PAPER
THICKNESS
SCALE

PAPER TENSION
ADJUSTMENT
LEVER
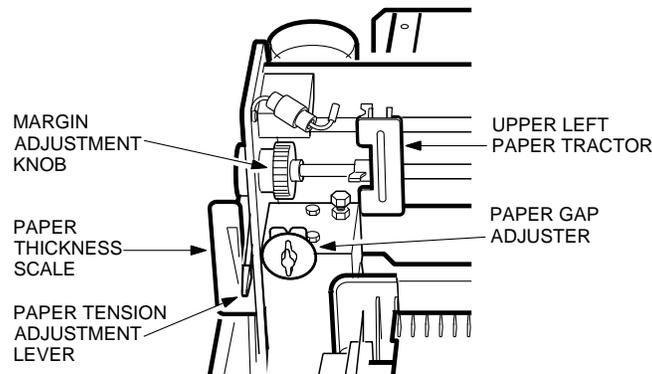
RE_UK00966A_89

CAUTION

Do not attempt to move paper manually by turning pulleys
or belts (pin feed de-synchronization/gear damage may re-
sult).

7. If necessary, release locking lever on right tractor by flipping lever
   upward and slide tractor horizontally to match paper width.

8. Close tractor covers. Slide right tractor slightly to the right to tension
   paper. Lock tractor in place. Excessive tension will cause pin hole
   deformation and degrade paper stacking.

9. Applying a slight downward tension, load paper on lower tractors as
   in steps 6 to 8 for upper tractors (see Figure 6-3).

10. Set Paper Gap Adjuster for paper thickness in use (see step 6 and
    CAUTION).

11. Set Paper Tension Adjust lever for approximate paper thickness in
    use.

Figure 6–3: Paper Loading, Lower Tractor

TRACTORS
(PAPER DRIVE
MECHANISM)

COOLING
FAN

PAPER
SUPPLY

PAPER LOW
SWITCH

PAPER TENSION
ADJUSTMENT FINGERS

LOWER
TRACTOR

LOWER
TRACTOR
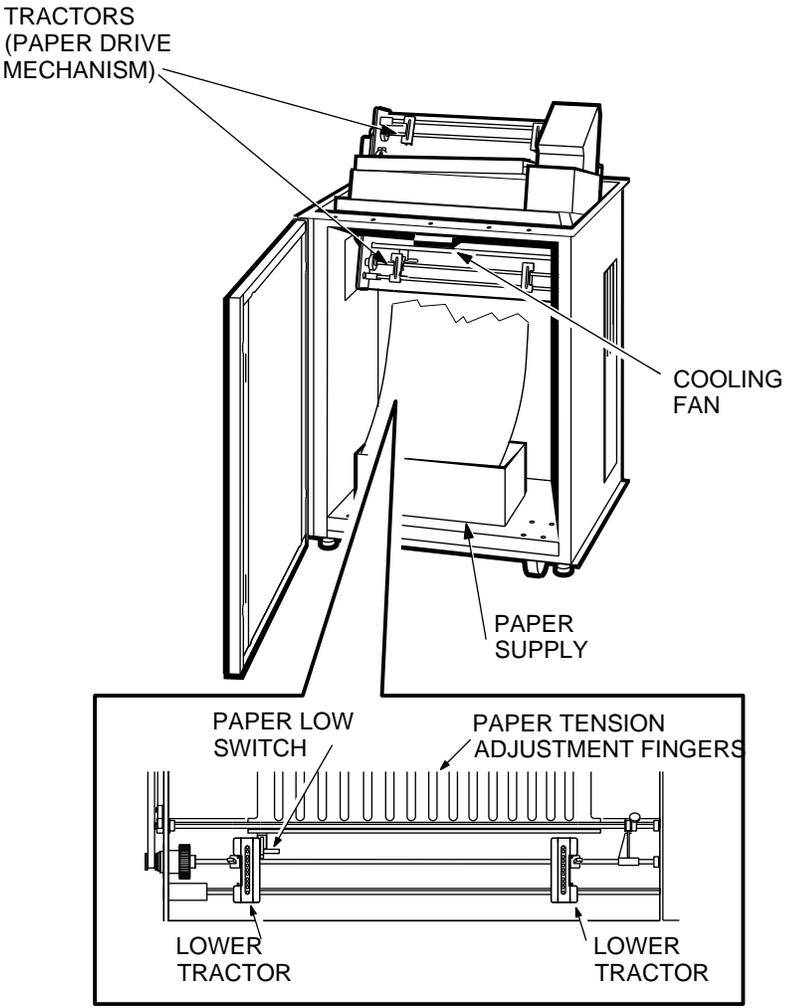
RE_UK00967A_89

6.3 Installing/Replacing Ribbon Cartridge

To install the ribbon cartridge, carry out the following steps:

1. Open printer top access door with the cover interlock switch (located on the top left of the printer).

2. Raise cover interlock switch to its highest position.

3. Clear the [c o] (cover open) error indicator, by pressing the text CLR push button.

> **NOTE**
>
> In replacing the ribbon cartridge (paper thickness remains unchanged), note the paper gap adjuster setting for use in step 7.

4. Turn print gap adjuster clockwise to LOAD position for maximum opening (see Figure 6-4).

Figure 6–4:   Ribbon Cartridge Installation, Paper Gap Adjuster Setting

UPPER LEFT
PAPER TRACTOR

PAPER GAP
ADJUSTER

RE_UK00968A_89

PRINTER OPERATION   6–5
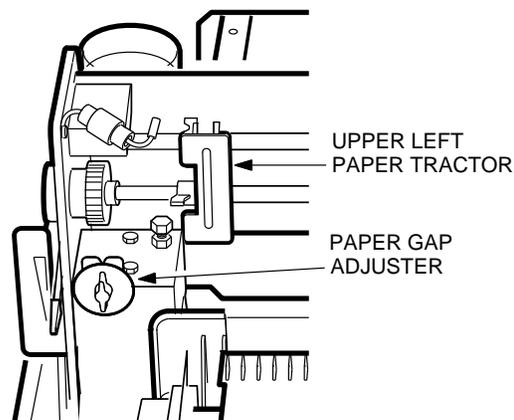
5. If replacing the ribbon cartridge unsnap ribbon cartridge holddown at left side of ribbon cartridge (see Figure 6-5).

NOTE

The LG31 printer has a ribbon weld sensor that detects the point where the two ends of the ribbon are welded together. Printing is temporarily suspended for a few seconds until the ribbon weld passes a certain point for printing to resume. If display [S U S] persists for more than one minute, it may be caused by a damaged ribbon or defective ribbon weld detector.

6. Remove the old ribbon cartridge.

7. Turn knurled knob on new ribbon cartridge clockwise to remove any slack in ribbon (see Figure 6–5). Be sure re-inker is ON (rotated fully clockwise).

Figure 6–5: Ribbon Cartridge Installation, Holddown and Re-Inker
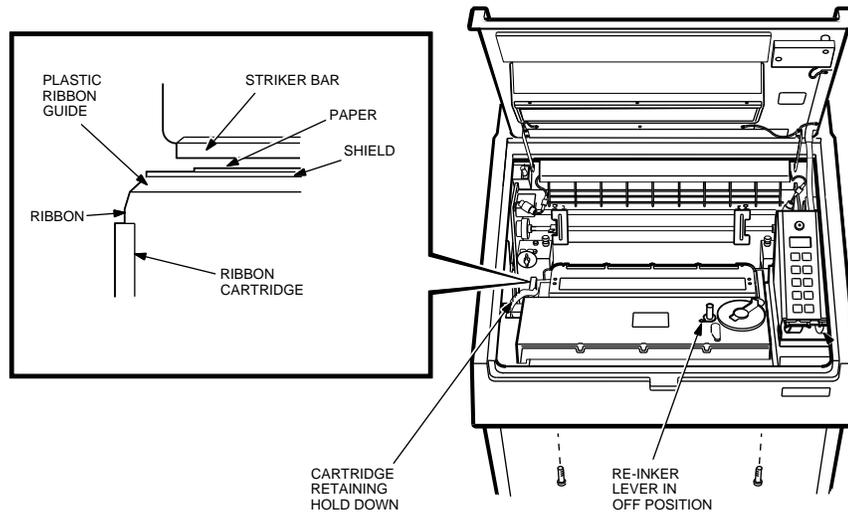
RE_UK01414A_89

8. Tilt ribbon cartridge downward to the left and install left side first (left edge of cartridge will guide ribbon between the ribbon guide and shield as shown in Figures 6-5 and 6-6). Then lower right side onto ribbon motor drive shaft. Turn knurled knob a few times to verify that ribbon is running freely and to remove any remaining slack.

9. Snap ribbon cartridge holddown in place over left side of ribbon cartridge.

10. Reset print gap adjuster to original setting or to a setting appropriate to new paper thickness.

11. Close door in printer top enclosure and press the ON LINE push button.

12. Clear the "Striker Bar Open" [S b o] fault indicator by pressing the TEST CLR push button once.

13. Perform a printing self test. Refer to Section 5.2.2.

NOTE

When the printer quality starts fading, turn the re-inker on (see Section 6.4).

6.4 Re-Inking Ribbon

Turn the ribbon re-inker on when the Ribbon Cartridge is installed. Once turned on, leave it on for the life of the cartridge. To re-ink the ribbon:

1. Open the top cover.

2. Move the re-inking lever on the ribbon cartridge about one half-turn clockwise.

3. Close the cover.

Figure 6–6: Ribbon Cartridge Installation, Ribbon Guide and Striker Bar
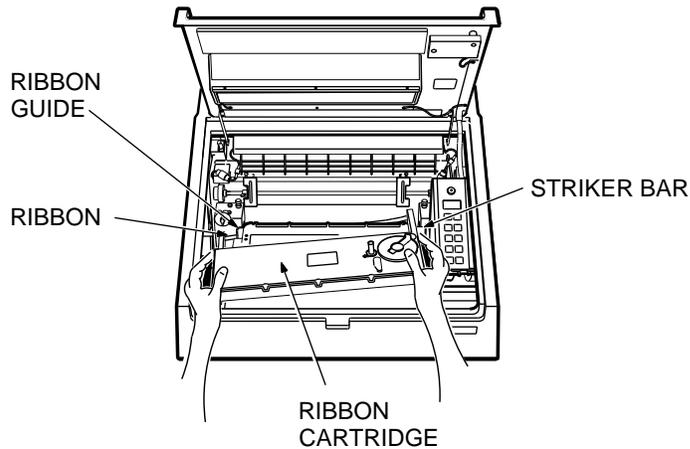
RE_UK00970A_89

6.5 Paper Motion

For many paper motion operations, there are four ways to perform the operation:

1. In off-line mode, when printer control strap A26 is OUT, directly from the associated keys on the control panel.

2. In off-line mode, when printer control strap A26 is IN, directly from the associated keys on the control panel.

3. In program mode, from the configuration menu (see Chapter 4).

4. In function mode (see Chapter 4).

The off-line method is given in the following sections.

6.5.1 Form Feed

To perform a form feed operation, place the printer off-line ([O F L] is displayed). Press the FORM FEED key.

See Chapter 4, Section 4.4.3 and 4.4.6 for alternate methods.

6.5.2 Line Feed

To perform a line feed operation, place the printer off-line ([O F L] is displayed). Press the LINE FEED key.

See Chapter 4, Section 4.4.3 and 4.5.2 for alternate methods.

6.5.3 Forward Microstepping

See Chapter 4, Section 4.4.3 and 4.5.2.

6.5.4 Reverse Microstepping

To perform a reverse microstep operation (1/72 inch increment), place the printer off-line ([O F L] is displayed). Press the PAPER REV key.

See Chapter 4, Section 4.4.3 and 4.5.2 for alternate methods.

6.5.5 Reverse Form Feeds

See Chapter 4, Section 4.4.3 and 4.5.6.

6.6 Aligning Paper

There is a fine horizontal adjust on the LG31 printer. this lets you move the form paper with respect to the printing heads. The adjustment is shown in Figure 6-7.

Figure 6–7: Margin Adjust Knob

MARGIN
ADJUSTMENT
KNOB

PAPER
THICKNESS
SCALE

PAPER TENSION
ADJUSTMENT
LEVER

UPPER LEFT
PAPER TRACTOR

PAPER GAP
ADJUSTER
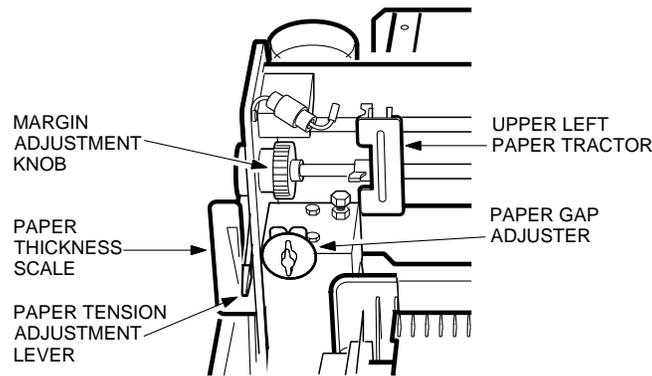
RE_UK00966A_89

6.7 Buffer Clear

To clear the buffer, carry out the procedure in Chapter 4, Section 4.5.7.

6.8 Low Paper Printing

The low paper switch is activated when 21.3 cm (8.4 in) of paper remains in the printer. At this point, a choice may be made to discontinue printing or enter the Low Paper Print (LPP) mode and continue printing for a maximum of 21.3 cm (8.4 in). During the LPP mode, the key (6) PAPER REV is inoperative, but works normally during paper out [P O] and striker bar open [S b o], so that Top Of Form can be set. The low paper printing procedure is shown in Table 6-1.

Note

Setting the paper tension adjust lever to 6 (minimum gap) to increase paper tension will improve printout during low paper printing.

6–10   PRINTER OPERATION

Table 6–1:   Low Paper Printing Procedure

Action	Result
When the low paper switch is activated:	Displayed alternately between [L o P] and [On L]. Printer remains on-line.

NOTE

To DISCONTINUE printing, proceed to step indicated by *.

To CONTINUE printing, carry out the following steps.

Press (0) TEST CLR	Displayed alternately between [L P P] and [On L].
• Lines terminated with <LF> will continue to move paper normally until bottom of form is reached and LPP mode is terminated.	Buffered lines are printed and data transmission continues to the end of form. When paper is replenished, printing continues on the first form of the new supply with correct vertical positioning maintained.
• Lines terminated with <CR> (bold print, underline) will move paper normally until bottom of form is reached and LPP mode is terminated.	
• Receipt of <FF> terminates LPP mode.	
• Receipt of <VT>, VPR, forward VPA (see NOTE 1) or EVFU command moves paper normally until a command is received, which would move paper beyond end of form. The LPP mode is terminated.	
• Receipt of subscript or superscript command (ANSI Emulation) will move paper normally until bottom of form is reached and LPP mode is terminated.	

Table 6–1 (Cont.):   Low Paper Printing Procedure

Action	Result
When paper movement causes LPP mode to be terminated.	Displayed alternately between [P o] and [O F L]. Printing ceases. Audio alarm sounds once (see NOTE 2).
Replenish paper supply. Place perforation below upper tractor notches and LINE FEED into position to avoid having to back up into the perforation skip-over area.	No change.
Press (8) SET TOF, then (0) TEST CLR.	Buffered lines are printed. Paper moves to first print position of next form and printing resumes. Displayed is [O F L]. Paper out condition is cleared.

NOTE

To discontinue printing at LOW PAPER
indication, carry out the following steps:

*Press (3) ON LINE	Display changes to [O F L].
Press (0) TEST CLR	Displayed alternately between [L P P] and [O F L]. Buffered lines are printed.
Press (0) TEST CLR again.	**Displayed alternately between [P o] and [O F L]. A paper out condition exists.**
As required, replenish paper supply. Place perforation below upper tractor notches and LINE FEED into position to avoid having to backup into the perforation skip-over area.	No change.

Table 6–1 (Cont.):   Low Paper Printing Procedure

Action	Result
Press (8) SET TOF, then (0) TEST CLR.	Buffered lines are printed. Paper moves to first print position of next form in readiness for use. Paper out condition is cleared. Displayed is [O F L].

NOTES

1. A reverse VPA command is converted to a forward line feed. Continuity of location cannot be maintained for reverse VPA commands.

2. The serial interface control switches for READY/BUSY may be enabled to cause the following actions at LPP termination:

    A4 IN, switch SCA to the active state
    A5 IN, send XOFF or DC3
    A6 IN, send BREAK

6.9 Hex Dump

HEX DUMP printed data is useful primarily to application programmers or customer service representatives as a program debugging or troubleshooting tool.

To enable HEX DUMP, set the printer control strap A32 IN. Place the printer on-line.

HEX DUMP causes data received from the host to be printed out in hexadecimal ASCII form instead of normal printing. A sample is shown below. The hexadecimal printout is shown on the left side and the equivalent plain language printout is shown on the same line at the right side. Exceptions: ASCII control characters below hexadecimal 20 are printed out as periods. <SP> or hexadecimal 20 causes a blank space in the equivalent print position. Thus the programmer can examine all program codes and instructions to determine whether any are correct.

For example, in the first line below, we have:

<DC1><DC3><ESC>K<ESC>L<CR><LF><ESC><SP> YZ<CR><LF>.

This is a HEX DUMP example printed at a pitch of 10 CPI in DP font.

While debugging, we may find an error such as <DC2> instead of <DC1> (12 instead of 11) or a lower case k instead of an upper case K (6B instead of 4B), and so forth.

In this way, the entire program can be examined for possible errors.

```
11 13 1B 4B 1B 4C 0C 0D 1B 5C 20 59 5A 0D 0D 54 ...K.L...\ YZ..T
48 49 58 20 41 20 48 45 58 20 44 55 4D 50 20 45 HIS A HEX DUMP E
58 41 4D 50 4C 45 20 50 52 49 4E 54 45 44 20 41 XAMPLE PRINTED A
54 20 41 20 50 49 54 43 48 20 4F 46 20 31 30 20 T A PITCH OF 10
49 50 49 2E 20 49 4E 20 44 2E 50 2E 20 46 4F 4E CPI. IN D.P. FON
54 0D 00 00 00 00 00 00 00 00 00 00 00 00 00 00 T...............
```

When data transmission is ended and HEX DUMP is no longer needed, be sure to place the printer in OFF LINE. If any HEX DUMP data remains in the buffer, this will cause it to be printed out and clear the buffer. Also, return the printer control strap 32 to its OUT condition.

Chapter 7

OPERATOR MAINTENANCE

7.1 Introduction

The LG31 printer does not require scheduled preventive maintenance. Operator maintenance consists of the following:

- Normal cleaning

- Changing ribbon cartridges

- Changing paper

The operator should carry out the following maintenance services whenever replacing the ribbon cartridge or as required:

1. Turn power OFF and disconnect the ac power cable from the power outlet.

2. Remove the ribbon cartridge and wipe away any accumulation of dust from the ribbon guide striker bar area.

3. Remove paper lint/chaff accumulations inside the printer with a soft brush or vacuum. The striker bar area and the paper supply compartment are especially prone to paper dust and dirt build-up.

4. Reinstall or replace the ribbon cartridge, if print legibility is not acceptable.

5. Clean the outside surfaces with a clean damp cloth (do not use cleaning solutions). Wipe with a dry cloth to dry the cabinet surfaces.

7.2 Operator Troubleshooting

Faults related to incorrect paper control or configuration settings are operator correctable. Check the current configuration and switch settings for erroneous settings (see Chapter 4 for proper settings). Possible mechanical, electrical, and EVFU problems and the remedial actions taken before calling for service, are listed in Tables 7–1 and 7–2.

NOTE

Before calling for service, always perform the initialization sequence described in Chapter 4. If one of the fault indications listed in Table 7–1 appear on the display, report this when calling for service.

WARNING

Dangerous voltages exist in the LG31. There are no internal user serviceable parts. Refer to qualified service personnel.

Table 7–1: Possible Mechanical Problems and Remedies

Observed Problem	Probable Cause and Remedies
Printer will not print. Display is [P o].	Out of paper. Install paper (if forms, align paper with notches in top tractors). When paper is inserted in bottom tractors, paper out switch is pressed and the fault cleared. Printer is off-line. Press ON LINE key to print.
Printer will not print. Display is [r c o].	Ribbon cartridge is out. Replace in accordance with the "Ribbon Cartridge" procedure in Chapter 6.
Printer will not print. Display is [S b o].	Striker bar open. Adjust striker bar and check other settings as noted under "Load Paper" procedure in Chapter 6.
Printer stalls and printer is locked up. Display is [S d r].	Motor driver interference due to: •Paper jam •Paper gap too small Turn power OFF, correct problem, and turn power ON.

Table 7–1 (Cont.): Possible Mechanical Problems and Remedies

Observed Problem	Probable Cause and Remedies
Light printing.	Ribbon worn; install new ribbon cartridge. Set paper gap adjuster and/or paper tension adjust lever for smaller gap.
Ribbon droops on one side during printing or outer columns of print missing.	Ribbon cartridge improperly installed. Check installation by repeating ribbon cartridge installation procedure in Chapter 6.
	Print module too close to paper; reset paper tension adjust lever to 1 (maximum gap setting) for thicker paper to prevent drag (6 setting = minimum gap setting).
Paper does not feed properly.	Paper supply in lower compartment not aligned properly. Realign. Paper not loaded properly. Refer to "Load Paper" procedure in Chapter 6.
Elongation of paper pin feed holes, tractor disengagement from holes, paper tearing.	Excessive paper tension. Reduce tension by readjusting paper tension adjust lever to lower setting (1=maximum/6=minimum).
Weak or absent printing in some columns, degraded print quality in one decimeter (4.3 inch) wide zone of the print area. Display is [A c 1], [A c 2], or [A c 3].	Defective print actuator module. Call a service engineer to replace module. Ensure that ribbon cable connections to modules are tight. If problem remains and is localized in the same print zone, the cable or SHAD board may be defective. Call for service. The printer may be used, if light or missing dots can be tolerated.
[L o P]*	Low Paper
[L P P]	Low Paper Printing. Permits printing after Low Paper is detected (see "Low Paper Printing" procedure in Chapter 6).

*TEST CLR key must be pressed momentarily after fault is cleared to reset from fault condition. Audio tone sounds with these flashing fault displays.

Table 7–2: Possible Electrical Problems and Remedies

Observed Problem	Probable Cause and Remedies
No indication on front panel when power switch turned ON.	The power cord is not plugged into wall outlet or into rear of printer. The wall outlet may be defective. If it does not operate, call an electrician to fix outlet.
Some keys are inoperative.	Printer is in lock-up mode. Check configuration switch settings; reinitialize printer configuration (refer to Chapter 4, Section 4.5.1).
Printer does not respond correctly to front panel keys.	Invalid configuration causing printer to lock up. Turn power switch OFF and then back ON. If problem persists, perform "Printer Initialization Procedure" in Chapter 4. Selected speed (baud rate) not compatible with data source. Reset speed (see Chapter 4). Parity selected is not compatible with data source. Reset printer parity type (see Chapter 4).
[S L o]	Slow printing. This display flashes while the print rate is reduced by the thermal throttle. Normally occurs only during high density printing. No damage occurs, printing continues at reduced speed. Automatically clears when temperature falls below throttle threshold and normal printing speed resumes.
[S U S]	Suspended print.
	1. After power-up, the first print segment will be delayed while the ribbon moves a specific distance.
	2. After power-down, this display will appear briefly before going blank because low energy is detected.
	3. Low energy from the power supply will produce this display.
	4. As the end of the ribbon passes the print wires, printing is suspended resulting in this display.

Table 7–2 (Cont.): Possible Electrical Problems and Remedies

Observed Problem	Probable Cause and Remedies
	5. This display will be produced by the ribbon weld detector sensing a damaged ribbon or defective ribbon weld detector.
[0 2 0] [4 2 0]	Occasionally, usually after transporting, the printer can lock up with one or both of these codes. Press the reset twice to clear and then perform the power up reset sequence detailed in Table 4.4, followed by the initialization procedure in Table 4.3. If the fault recurs after power off, the error codes are valid as in Table 5.2.

7.3 Printer Parameters

The factory settings for the printer are listed in Table 7–3.

NOTE

The following tables refer to "Control Functions", which are listed in the *LG31 Printer User's Guide EK-LG31E-UG.*

Table 7–3: Factory Settings

Selectable Parameter	Factory Set Condition
Print Status	Off-Line
Horizontal Pitch	10 characters per 2.54 cm/in
Vertical Pitch	6 lines per inch
Font	Data Processing
Forms Length	66 lines (11 in/27.94 cm)
Active Position	Column 1, Line 1
Top Margin	Line 1
Bottom Margin	Line 66
Left Margin	Column 1
Right Margin	Column 132
Underlining	Disabled
Bolding	Disabled
Italics	Disabled
Character Expansion	Disabled
GL Character Set	U.S. ASCII
GR Character Set	Digital Supplemental
G0 Character Set	U.S. ASCII
G1 Character Set	VT100 Graphic Character Set
G2 Character Set	Digital Supplemental
G3 Character Set	U.S. ASCII
Autowrap	Enabled
Line Feed/New Line Mode	Set
Horizontal tabs	At every 8 columns (9, 17,..137)
Unsolicited reports	Disabled
Super/Subscripts	Disabled
Carriage Return New Line Mode	Reset
Vertical Tabs	Every line (1, 2, ... 66)
Number of data bits	8-bit mode
Number of stop bits	1 stop bit
Speed (baud rate)	9600 baud
Parity	Disabled

7.3.1 Power-Up Parameters Set

Table 7-4 lists the default conditions upon power-up of the LG31 printer.

Table 7–4: Printer Parameters Power-Up Set

Selectable Parameter	Power-Up Condition
Print Status	Off Line
Active Position	Column 1 on current active line
Underlining	Disabled
Bolding	Disabled
Expansion	Disabled
Unsolicited Reports	Disabled
Super/Subscripts	Disabled

7.3.2 Power-Up Parameters Retained

Upon power-up of the LG31 printer, the parameters that will be retained from the previous power-on session are listed in Table 7-5.

Table 7–5: Printer Parameters Retained on Power-Up

Selectable Parameter
Horizontal Pitch
Vertical Pitch
Font
Top of Form
Forms Length
Top and Bottom Margin
Left and Right Margin
Autowrap
Line Feed/New Line
Carriage Return/New Line Mode
Horizontal Tabs
Vertical Tabs
GL Character Set
GR Character Set
G0 Character Set
G1 Character Set
G2 Character Set
G3 Character Set
All Interface Settings

7.3.3 Reset State

When the LG31 printer receives a reset sequence from the host computer or the inner control panel (operator's input), the printer is set to the default settings (see Table 7-6).

A RESET sequence does not change the following:

- Any interface settings

- National Replacement Character (NRC) set

- Top of Form

The above parameters remain as previously selected, either through escape sequences or through the inner control panel.

Table 7–6: Reset State Default Parameters

Selectable Parameter	Reset Default Condition
Print Status	On-line (ready)
Horizontal Pitch	10 characters per 2.54 cm/in
Vertical Pitch	6 lines per inch
Font	Data Processing
Forms Length	66 lines (11 inches/27.94 cm)
Active Position	Column 1 on the current active line (line 1)
Top Margin	Line 1
Bottom Margin	Line 66
Left Margin	Column 1
Right Margin	Column 132
Underlining	Disabled
Bolding	Disabled
Italics	Disabled
Character Expansion	Disabled
GL Character Set	U.S. ASCII or the last NCR if selected
GR Character Set	Digital Supplemental
G0 Character Set	U.S. ASCII or the last NCR if selected
G1 Character Set	VT100 Graphic Character Set
G2 Character Set	Digital Supplemental
G3 Character Set	U.S. ASCII
Autowrap	Enabled
Line Feed/New Line Mode	Set
Horizontal tabs	At every 8 columns (9, 17,..137)
Unsolicited reports	Disabled
Super/Subscripts	Disabled
Carriage Return New Line Mode	Reset
Vertical Tabs	Every line (1, 2, ... 66)

The following will not change:

    All Interface settings
    The National Replacement Character Set
    Top and bottom margins
    Left and right margins

These parameters will remain as previously selected, either by escape sequence or control panel.

Appendix   A

LED DISPLAY LIST

A.1 List of All Control Panel Readouts

The following is a list of every message indication that may appear on the LG31 printer LED display to alert the operator to the printer's operational status.

LED DISPLAY LIST

Display	Meaning
[A c X]	Head test or SHAD board (X indicates module number of bad actuator, 1=left, 2=middle, 3=right).
[.A d j]	Printer enters adjustment mode.
[.A P L]	Amplitude pattern.
[.c b P]	Checkerboard pattern.
[c h r]	Character.
[C L r]	Printer enters buffer clear mode.
[c o]	Cover open
[C P I]	Characters per inch.
[C S U]	Customer setup.

[.F A d]   Forms adjustment. The printer is in Forms Adjustment mode.

[.F n c]   Function. The printer has entered the function mode.

[F o n]   Font.

[.F S U]   Forms setup mode.

[F 0 0]   Data processing 10 CPI font check sum fault.

[F 0 1]   Data processing 12 CPI.

[F 0 2]   Data processing 13.3 CPI.

[F 1 0]   Gothic NLQ 10 CPI.

[F 1 2]   Gothic NLQ 12 CPI.

[F 1 3]   Gothic NLQ 13.3 CPI.

[F]   Gothic NLQ 15 CPI.

[F 3 0]   Italic NLQ 10 CPI.

[F 3 1]   Italic NLQ 12 CPI.

[F 3 2]   Italic NLQ 13.3 CPI.

[F 8 0]   Bar code.

[F 9 0]   Oversize characters.

[.H t P]   Horizontal timing pattern.

[I n F]   No operational interface found.

[.IS.U]   Initialize printer to default conditions while in initialization
            mode.

[L o P]   Low paper.

[L P P]   Low paper printing. Permits printing after Low Paper is
            detected.

[.L r S]   Margin setup mode.

[L P I]   Lines per inch.

[O F L]   Off-line. The printer is off-line.

[On.L]   On Line. The printer is on line with a data source.

A–2   LED DISPLAY LIST

[P o]	Paper out. The paper supply has run out.
[P r o]	Program. The printer is in Program mode.
[r c o]	Ribbon cartridge out.
[S b o]	Striker bar open.
[S d r]	Shuttle motor driver. Shuttle motor driver interference to paper stuck or paper gap too small.
[S L o]	Slow printing. This display flashes while the print rate is reduced by the thermal throttle.
[. S U]	Printer enters initialization mode.
[S U S]	Suspended print.
[.S i 9]	Prints short segments of various test patterns or executes a form feed.
[.U t P]	Vertical timing pattern.
[0 2 0]	SMSM Lithium Battery (BT1) (see Table 7.2).
[0 2 2]	SMSM has insufficient RAM.
[0 4 X]	SMSM RAM, display indicates chip number at fault. For U41, X=1; for U42, X=2, and so forth.
[0 5 0]	SMSM memory failed to switch (U9-U13, U18-U25, U32-U35, U42).
[0 5 5]	SMSM switchable RAM failure (PD4016C-2 in U11 and U21).
[0 6 0]	SMSM 7.5 interrupt failure (Timer at U30 to CPU at U3 circuit.
[0 8 0]	SMSM IMA (includes U37, U38, U42, U43, U50-U54).
[1 0 0]	Missing TOF code in EVFU load sequence.
[1 0 2]	Invalid characters in EVFU load sequence.
[1 0 3]	EVFU table length exceeded.
[1 0 4]	ANSI EVFU load multiple TOFs sensed.
[4 2 0]	SMIM Lithium Battery (BT1) (see Table 7.2).
[4 4 0]	SMIM RAM (U19-U22) SMIM RAM circuit chip (2K or 8K) may be located in sockets U19-U22 only.

[4 9 0]	SMMC shuttle motor drive.
[4 9 1]	SMMC shuttle frequency out of range.
[4 9 2]	SMIH imaging hardware failure.
[4 9 3]	SMMC or SMIH board (no shuttle interrupt). Check all SMIH jumper positions.
[4 9 4]	No INT signal available to cause paper motion.
[5 2 9]	SMSM NVRAM (5517L in U29).
[5 3 0]	SMSM timer chip (8253 in U30).
[5 3 1]	SMSM interrupt controller (8259A in U31).
[5 4 7]	SMSM ROM (U47).
[5 4 8]	SMSM ROM (U48-U49).
[5 4 9]	SMSM ROM (U48-U49).
[7 0 0]	SMIM, SMSM failure (image processor).
[.8.8.8]	Used to test all the LED lights when power is turned ON. Lasts only a few seconds.
[i P]	Indicates self-test in progress. Lasts for several seconds after power on sequence.
[i 9 P]	Intermodule gap return.
[i 1 3]	SMIM image processor timer chip (8253 in U13).
[i 1 4]	SMIM interrupt controller (8259A in U14).
[i 2 1]	SMIM ROM (U19-U24, U38, U39) image processor. ROM (display indicates chip number at fault).
[i 2 5] through [i 3 2]	SMIM NVRAM (5517L in U25-U32). Display indicates chip number at fault).
[0 5] through [1 6 E]	When Data Processing font is selected available characters per inch (CPI).selections using the key (5) CPI LPI.

A–4   LED DISPLAY LIST

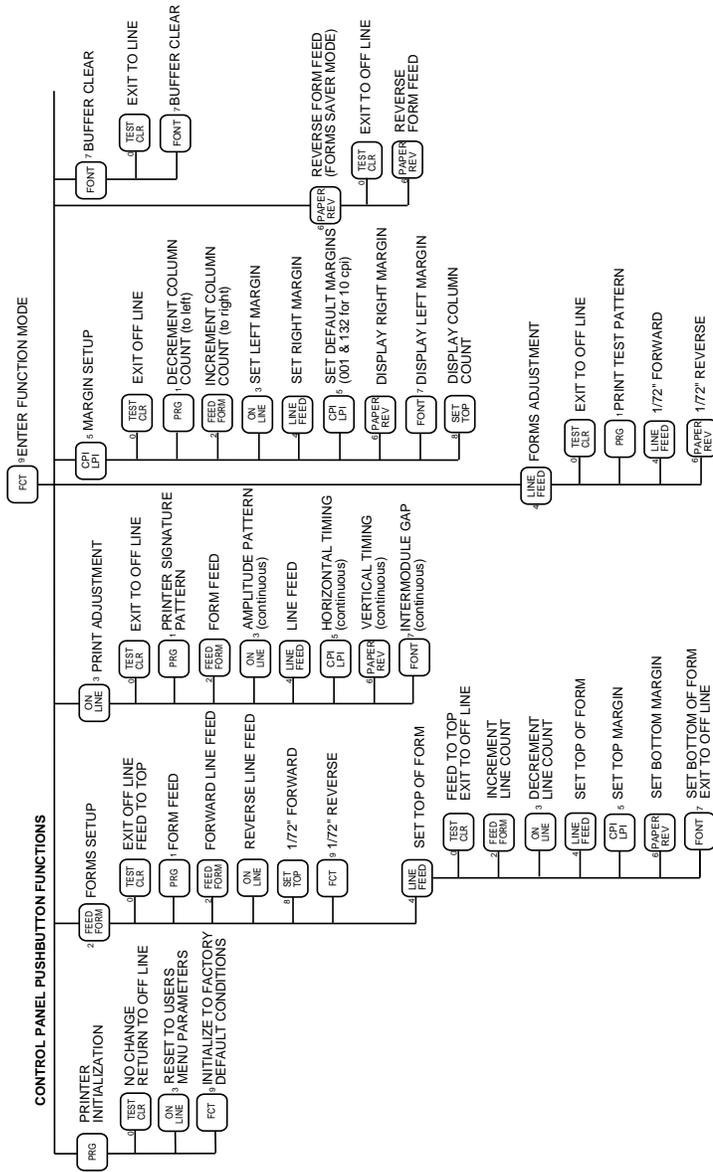|	
[0 6 L] through [1 0 L]	Number of lines per inch (LPI) while selecting from the through menu.
[1 0 i] through [1 5 i]	CPI in italics while selecting from the menu.
[n 0 5] through [n 15]	CPI in gothic NLQ while selecting from the menu.
[.0 0 0] through [2 2 0]	Counter used during certain function modes.
[0 1 o] through [3 3 o]	The first two digits indicate the currently selected software strap. The third digit indicates either "o" for strap out, or "i" for strap in.
[n 0 5] [O c A] [n 1 2] [n 1 5] [1 6 E]	When OCR-A is selected.
[n 0 5] [O c b] [n 1 2] [n 1 5] [1 6 E]	When OCR-B is selected.

Appendix   B
PARAMETER SELECTION

Figure B–1 contains the congfiguration menu with the parameter options available on the LG31 printer.

Figure B–2 contains the function mode options available on the LG31 printer.

Figure B–1:   Configuration Menu with Program Mode Parameters

EXAMPLE OF CONFIGURATION MENU

THE PRESENT CONFIGURATION IS
(44A511526 SY - 44A511527 (M)
FIRMWARE REVISION LEVEL V2.3

1. Font
   Style - 44A511367 Dataprocessing
   CPI - 10CPI
   Country - US ASCII
   Mode - Normal
   Horizontal Expansion - X1
   Vertical Expension - X1
2. LPI - 6lpi
3. Forms Control (Lines)
   Forms Length - 66
   Top Margin - 01
   Bottom Margin - 66
4. Interface Control:
   Interface Type - Serial
   Input Buffer Length 2304
   Interface Straps A:
   ```
                 1         2         3
   1234567890123456789012345678901 2
   00001000000100000010000000000000
   ```
   Interface Straps B:
   ```
                 1         2         3
   1234567890123456789012345678901 2
   01000100000000000000000000000000
   ```
   Speed - 9600
   Parity - Even
5. Margin Settings (Columns)
   Left Margin - None
   Right Margin - 132
6. Horizontal Tabs (Columns)
   ```
   009 017 025 033 041 049 057 065 073 000
   089 097 105 113 121 129 137 145 000 000
   169 177 185 193 201 209 217
   ```
7. Vertical Tab Stops:
8. Printer Control Straps:
   Printer Straps A:
   ```
                 1         2         3
   1234567890123456789012345678901 2
   00000000000000000000000001110010
   ```
   Printer Straps B:
   ```
                 1         2         3
   1234567890123456789012345678901 2
   10000000000000000000000000000000
   ```

Press the number '0' to return to normal operation
to continue modification select (1.8)

NOTES

1. 1-Strap IN. 0-Strap OUT. Serial interface has 64 Straps.
2. Display positions begin in first option position. For example, to modify
   strap 8, press control panel button '3' until 8 is displayed, then press
   button "1" or "2" as appropriate. The three-digit display is the counter
   for strap numbers.
3. When number of selections exceeds eight, the ninth selection is used
   to continue menu.
4. Horizontal margin settings at default are columns 001 and 132 at 10 CPI.
5. Display is counter fgor margin or strap. It wraps when maximum
   or minimum value is encountered.
6. When a new font is selected, the horizontal spacing is initially set to the
   default spacing for the particular font.
7. Space and mark are applicable to 7-bit operation only Menu item 4 strap B1
   (display33) must be OUT.

FONT
0. Exit
1. Style
2. CPI
3. Country
4. Mode
5. Horizontal Expansion
6. Vertical Expansion

Style (as applicable)
0. Exit
1. 44AXXXXX-DATA PROCESSING
2. CORRESPONDENCE
3. 44AXXXXX-OCR-A
4. 44AXXXXX-OCR-B

CPI -
0. Exit
1. 5 CPI
2. 10 CPI
3. 12 CPI
4. 13.3 CPI
5. 15 CPI
6. 16.7

Country -
0. EXIT
1. US ASCII
2. Great Britain
3. DEC Dutch
4. DEC Finland
5. French
6. DEC French (Canada)
7. Germany
8. Italy
9. Continue

Country -
0. Exit
1. US ASCII
2. DEC Norway/Denmark
3. Spain
4. DEC Swiss
5. DEC Swiss
6. ISO Norway/Denmark
7. DEC Portuguese

Mode -
0. Exit

Horizontal Expansion
0. Exit
1. X1
2. X2

Vertical Expansion
0. Exit
1. X1
2. X2

LPI
0. Exit
1. 6 lpi
2. 8 lpi
3. 10 lpi

Form Control
0. Exit
1. Form Feed
2. Line Feed (Forward)
3. Line Feed (Reverse)
4. Set Top of Form
5. Set Top Margin
6. Set Bottom Margin
7. 1/72 inch Paper (Forward)
8. 1/72 inch Paper (Reverse)

Margin Settings
0. Exit
1. Advance Left (See Note 6)
2. Advance Right (See Note 6)
3. Set Left Margin
4. Set Right Margin
5. Clear Margin (Default Note 4)
6. Display Left Margin
7. Display Right Margin
8. Display Current Position

Interface Control
0. Exit
1. Interface Type
2. Interface Straps A
3. Interface Straps B
4. Speed
5. Parity

Interface Type -
0. Exit
1. Serial

Straps
0. Exit
1. Strap "in"
2. Strap "out"
3. Forward Without Change
4. Reverse Without Change
5. (See Notes 1 and 2)

Speed -
0. Exit
1. 110
2. 300
3. 800
4. 1200
5. 1800
6. 2400
7. 4800
8. 9600
9. 19200

Parity -
0. Exit
1. Even
2. Odd

Horizontal Tab Stops
0. Exit

Vertical Tab Stops
0. Exit

Straps -
0. Exit
1. Strap "IN"
2. Strap "OUT"
3. Advance Without Change (See Note 6)
4. Reverse Without Change (See Note 6)
(See Notes 1 and 2)

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Figure B–2: Function Mode Options

CONTROL PANEL PUSHBUTTON FUNCTIONS

PRG

PRINTER INITIALIZATION

- TEST CLR | 0 NO CHANGE RETURN TO OFF LINE
- ON LINE | 3 RESET TO USERS MENU PARAMETERS
- FCT | 9 INITIALIZE TO FACTORY DEFAULT CONDITIONS

FEED FORM | 2 FORMS SETUP

- TEST CLR | 0 EXIT OFF LINE FEED TO TOP
- PRG | 1 FORM FEED
- FEED FORM | 2 FORWARD LINE FEED
- ON LINE | REVERSE LINE FEED
- SET TOP | 8 1/72" FORWARD
- FCT | 9 1/72" REVERSE

LINE FEED | 4 SET TOP OF FORM

- TEST CLR | 0 FEED TO TOP EXIT TO OFF LINE
- FEED FORM | 2 INCREMENT LINE COUNT
- ON LINE | 3 DECREMENT LINE COUNT
- LINE FEED | 4 SET TOP OF FORM
- CPI LPI | 5 SET TOP MARGIN
- PAPER REV | 6 SET BOTTOM MARGIN
- FONT | 7 SET BOTTOM OF FORM EXIT TO OFF LINE

ON LINE | 3 PRINT ADJUSTMENT

- TEST CLR | 0 EXIT TO OFF LINE
- PRG | 1 PRINTER SIGNATURE PATTERN
- FEED FORM | 2 FORM FEED
- ON LINE | 3 AMPLITUDE PATTERN (continuous)
- LINE FEED | 4 LINE FEED
- CPI LPI | 5 HORIZONTAL TIMING (continuous)
- PAPER REV | 6 VERTICAL TIMING (continuous)
- FONT | 7 INTERMODULE GAP (continuous)

FCT | 9 ENTER FUNCTION MODE

CPI LPI | 5 MARGIN SETUP

- TEST CLR | 0 EXIT OFF LINE
- PRG | 1 DECREMENT COLUMN COUNT (to left)
- FEED FORM | 2 INCREMENT COLUMN COUNT (to right)
- ON LINE | 3 SET LEFT MARGIN
- LINE FEED | 4 SET RIGHT MARGIN
- CPI LPI | 5 SET DEFAULT MARGINS (001 & 132 for 10 cpi)
- PAPER REV | 6 DISPLAY RIGHT MARGIN
- FONT | 7 DISPLAY LEFT MARGIN
- SET TOP | 8 DISPLAY COLUMN COUNT

LINE FEED | 4 FORMS ADJUSTMENT

- TEST CLR | 0 EXIT TO OFF LINE
- PRG | 1 PRINT TEST PATTERN
- LINE FEED | 4 1/72" FORWARD
- PAPER REV | 6 1/72" REVERSE

FONT | 7 BUFFER CLEAR

- TEST CLR | 0 EXIT TO LINE
- FONT | 7 BUFFER CLEAR

PAPER REV | 6 REVERSE FORM FEED (FORMS SAVER MODE)

- TEST CLR | 0 EXIT TO OFF LINE
- PAPER REV | 6 REVERSE FORM FEED

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PARAMETER SELECTION   B–3

Appendix   C

LG31 COUNTRY KITS

Final Country Kit Options

LGK31-AA   U.S., Canada and Mexico/English, Power Cord, 17-00083-09

LGK31-AD   Denmark/English, Power Cord, 17-00310-10

LGK31-AE   U. K. and Ireland/English, Power Cord, 17-00209-00

LGK31-AG   Germany and Austria/German, 17-00199-00

LGK31-AI   Italy/English, Power Cord, 17-00364-01

LGK31-AJ   Japan/English, Power Cord, 17-00083-25

LGK31-AK   Switzerland/German, French, Power Cord, 17-00210-00

LGK31-AT   Israel/English, Power Cord, 17-00457-01

LGK31-AZ   Australia and New Zealand/English, Power Cord, 17-00198-00

LGK31-BJ   India/English, Power Cord, 17-00456-01

LGK31-CA   Country Kit General European, Power Cord, 17-00199-00
                  (Belgium/Finland/France/Netherlands/Norway/Portugal/Spain/Sweden)

All country kits include the following.

Kernel Documentation Kit EK-OLG31-DK

EK-LG31E-UG   *LG31 User Guide* (English)
EK-LG31E-IN   *LG31 Installation/Operator's Manual* (English)

Binder and slipcase

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