



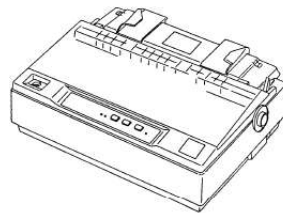
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You can read the recommendations in the user guide, the technical guide or the installation guide for EPSON LX300+. You'll find the answers to all your questions on the EPSON LX300+ in the user manual (information, specifications, safety advice, size, accessories, etc.). Detailed instructions for use are in the User's Guide.

User manual EPSON LX300+
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EPSON TERMINAL PRINTER
LX-300

SERVICE MANUAL



EPSON

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Manual abstract:

@@ WHEN THE POWER SUPPLY CABLE MUST BE CONNECTED, USE EXTREME CAUTION IN WORKING ON POWER SUPPLY AND OTHER ELECTRONIC COMPONENTS. 1. REPAIRS ON EPSON PRODUCT SHOULD BE PERFORMED ONLY BY AN EPSON CERTIFIED REPAIR TECHNICIAN. AGE, LISTED ON THE SERIAL NUMBER/RATING PLATE. IF THE EPSON PRODUCT HAS A PRIMARY AC RATING DIFFERENT FROM AVAILABLE POWER SOURCE, DO NOT CONNECT IT TO THE POWER SOURCE. 2. MAKE CERTAIN THAT THE SOURCE VOLTAGE IS THE SAME AS THE RATED VOLT- 3. ALWAYS VERIFY THAT THE EPSON PRODUCT HAS BEEN DISCONNECTED FROM THE POWER SOURCE BEFORE REMOVING OR REPLACING PRINTED CIRCUIT BOARDS AND/OR INDIVIDUAL CHIPS. 4. IN ORDER TO PROTECT SENSITIVE MICROPROCESSORS AND CIRCUITRY, USE STATIC DISCHARGE EQUIPMENT, SUCH AS ANTI-STATIC WRIST STRAPS, WHEN ACCESSING INTERNAL COMPONENTS.

5. REPLACE MALFUNCTIONING COMPONENTS ONLY WITH THOSE COMPONENTS BY THE MANUFACTURE; INTRODUCTION OF SECOND-SOURCE ICS OR (Y)HER NONAPPROVED COMPONENTS MAY DAMAGE THE PRODUCT AND VOID ANY APPLICABLE EPSON WARRANTY. - ii -
PREFACE This manual describes functions, theory of electrical and mechanical operations, maintenance, and repair of LX-300. The instructions and procedures included herein are intended for the experience repair technician, and attention should be given to the precautions on the preceding page. The chapters are organized as follows: **CHAPTER 1.**

PRODUCT DESCRIPTION Provides a general product overview, lists specifications, and illustrates the main components of the pMter. **CHAPTER 2. OPERATING PRINCIPLES** Describes the theory of printer operation. **CHAPTER 3. DISASSEMBLY AND ASSEMBLY** Includes a step-by-step guide for product d isassembly and assembly.

CHAPTER 4. ADJUSTMENTS Includes a step-by-step guide for adjustment. **CHAPTER 5. TROUBLESHOOTING** Provides Epson-approved techniques for adjustment. **CHAPTER 6. MAINTENANCE** Describes preventive maintenance techniques and lists lubricants and adhesives required to service the equipment. **APPENDIX** Describes connector pin assignments, circuit diagrams, circuit board component layout and exploded diagram. The contents of this manual are subject to change without notice. -iv- ..

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1-20 (T 5) LX-300 Service Manual 1.1 Product Description FEATURES The LX-300 is a small, light-weight, 9-pin serial impact dot-matrix color printer suitable for personal use. The major features of this printer areas follows: 0 Fast printing of 10-cpi draft characters at 220 cps C Compact design saves precious workspace C Easy-to-operate panel L Quiet printing C Standard 8-bit parallel interface and EIA-232D serial interface D Printing of up to 66 lines on A4-size or 62 lines on letter-size paper ~ Optional color printing using a color ribbon (black, magenta, cyan, yellow) ~ Detachable push and pull tractor Figure 1-1 shows an exterior view of the LX-300 and Table 1-1 lists the optional units available for the LX-300. Edge guties ~ ~p"perwppof's A lease r YA& feed b Power.

1. w Pfintercover #/ < /' = 5 A% A Print head Sprocket unit Paper Jpport Troctof - Figure 1-1. Exterior "View of the LX-300 Table 1-1. Optional Units I I I Model Description Ribbon cartridge (monochrome) Ribbon cartridge (monochrome, sub-mtridge) , I Ribbon cartridge (color) Single-bin cut sheet feeder

Hold down the FONT button and turn on the printer. Hold down the LF/FF and FONT button and turn on the printer. Not available. Press the FONT button. Selectable in default-setting mode: 10 cpi. or 12 cpi. Press the FONT button. Only draft condensed is selectable. Press the LF/FF button. Press the LF/FF button or the printer waits 2 seconds after insertion of a cut sheet to load paper automatically. Press the LF/FF button once. Hold down the LF/FF button continuously. Hold down the LF/FF button continuously. Press the FONT and LF/FF buttons at the same time. Only uses auto tear-off function. L ~, . . . 1.4.2 Self-test Function This section explain how to run the self-test. 1. Hold down the LF/FF button and turn on the printer to start the self-test. 2.

If paper is not loaded, the printer attempts to load it. 3. If the printer cannot load paper, it indicates this by turning on the PAUSE light. In this case, insert paper again and press the LF/FF button. 4. The printer prints alphanumeric characters continuously. 5. Quit self-test mode printing by pressing the PAUSE button and turning the printer off. 1-14 Rev. A LX#O Service Manual Pfvduct LMcription 1.

4.3 Hexadecimal Dump Function The hexadecimal dump is a useful tool for troubleshooting data control problems. This section describes how to run a hex dump. Turn on the printer while holding down the LF/FF and FONT buttons. 2.

If paper is not loaded, the printer attempts it (either single sheet or continuous paper). 3. If the printer cannot load the paper, it indicates a paper-out error. In this case, insert paper again, and press the PAUSE button. 4.

The printer waits for data after printing the message "Hex dump." 5. Received data is printed as both hexadecimal codes and ASCII characters. If a corresponding printable character does not exist, the printer outputs a period (.). 6. Quit hexadecimal dump printing by pressing the PAUSE button and turning the printer off. 1. Note: In hex dump mode, the character table depends on the default setting and 10 cpi draft is selected automatically. 1.

4.4 Printer Status Indication It describes how this printer indicates status and error conditions using LEDs and the beeper. The symbols below describe the frequency of beeper sounds. (q): The beeper sounds for 100 ms with an interval of 100 ms between beeps. (-): The beeper sounds for 5 ms with an interval of 100 ms between beeps. While initialize signal is active: During initialization: Ready to print or printing: Paper-out error: Tear-off: Operating error, fatal error: PAUSE light is on. PAUSE light blinks and beeper sounds PAUSE light is off Beeper sounds (q q .) and PAUSE light blinks. (light on:off ratio= 6:1) PAUSE light blinks (light on:off ratio= 1:6) Beeper sounds (- - - - -) and PAUSE light is on. 1.

4.5 Selected Font The combination of two FONT LEDs (1 and 2) is used to indicate the selected font. Table 1-17. Font Selection Selected Font Roman Saris Serif Draft Draft condensed FONT 1 ON ON OFF OFF FONT 2 ON OFF ON OFF 1.4.

6 Paper Position Adjustments To enter adjustment mode, press the PAUSE button for three seconds, until the printer beeps once and the FONT lights blink to indicate that the adjustment operation is available. If the printer state is not one of the conditions shown below, this operation is ignored. . TOF position adjustment: The position can be adjusted just after the paper is loaded. .

Tear-off position adjustment: The position can be adjusted when paper is actually located at the tear-off position. In the adjustment mode, press the LF/FF button to feed paper forward and the FONT button to feed paper backward. You can cancel adjustment mode by pressing the PAUSE button or inputting a print command. The adjusted position is stored in non-volatile memory. Rev. A 1-15 Product Description LXiWO Service Manual 1.4.7 Printer Initialization There are two types of initialization: hardware initialization and software initialization. 1.4.

7.1 Hardware Initialization Hardware initialization is performed by: . Turning on the printer. . Sending @e parallel interface the ~-signal. (If the INIT signal is active when the printer is turned on, hardware initialization is started when the ~ signal becomes inactive.) When hardware initialization is performed: . The printer mechanism is initialized. . Print data in the input buffer is cleared. .

. Download character definitions are cleared. . The printer's settings are returned to the defaults. .

The printer is set to the standby condition, if no fatal error occurs. . Continuous paper home-seeking is performed. In continuous paper home-seeking: . The printer feeds continuous paper to the paper park position.

q The printer then loads the paper again. q If ejection to the paper park position cannot be completed within 16 inches, paper is returned to its previous position. 1.4.7.2 Software Initialization Software initialization is performed upon receipt of the control code ESC C?. When software initialization is performed: . Print characters in the buffer are not cleared. . The printer setting is changed to the default, but the download character definition is not cleared.

1.4.8 Printer Settings 1.4.8.1 Selectable Printer Settings The following printer settings can be changed by users in default-setting mode: Character spacing: Shape of zero: Auto line feed: Character table (Standard): Character table (NLSP): .lQc@ / 12cpi Slashed / Not slashed on/Qff Italic

(J/SA/France/Germany/UK/Denmark /Sweden/Italy/ Spain 1)/PC437/850/860 /861/863 /865/BRASCI/Abicom Italic &?SA/France/German y/UK/Denmark /Sweden/Italy/ Spain 1)/KG7/~ /S2/8S/E5 /857/= /869/07 Greek/ISO Latin IT /ISO 8859-7/Code MJK/Mazowia/Bulgaria 11/ 12/ 8.5 / 70/6 inches on/Qff Single / Double ~ / Auto selection (30 sec wait) / Parallel / Serial 300 / 600/ 12(MI / 2400 / 4800 / \$?6UI / 19200 bps Mm/ Odd / Even Z.Ms / 8 bits ~ / Enabled .. . ~?

. 1 inch skip-over-perforation: on/Qff Page length: Auto tear off: Tractor: interface: Bit rate (serial I/F): Parity bit (serial I/F): Data length (serial I/F): ETX/ACK (serial I/F): Note: 1-16 Underlines show factory setting. Rev. A LX-300 Service Manual Product Description 1.4.

8.2 Changing the Default Settings You can change some parameters that the printer refers to at printer initialization. 1. To enter the default setting mode, turn on the printer while holding down the FONT button. The printer prints out the firmware version. If paper is not loaded, insert a sheet of paper. 2. The printer automatically loads the paper and prints a table of languages to choose from: English, French, German, Italian, and Spanish. The Footlights indicate the currently selected language, as shown in the table below. Table 1-18.

Font Lights and Language Selection FONT Light 1 OFF OFF ON ON ON FONT Light 2 ON Blinks OFF ON Blinks Language English French German Italian Spanish 3. Press the FONT button to change the language, and press the LF/FF button to select. 4. Press the FONT button again after selecting a language. The printer prints help text to guide you in setting defaults.



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... 2-15 ~ f=:, -. LX-3(XI Service Manual Operating Ptinciph3 2.1 PRINTER MECHANISM OPERATION 1%is section describes the M-3G10 printer mechanism and explains how it works. 2.1.

1 Printing Mechanism The printer mechanism is composed of the printhead, ink ribbon, and ribbon mask. The printhead is a 9-pin head for impact dot printing. Each wire has own drive coil, which causes the wire to move in and out of the printhead to print each dot. The four steps below describe how these driving wires work. 1.

A drive signal transmitted from the control arcuit to the printhead drive arcuit is converted to the proper printhead driving voltage, which energizes a corresponding coil. The energized coil then causes the iron core to become magnetized. 2. The magnetic force draws the actuating plate toward the core, and the dot wire, which is comected to the core, rushes toward the platen. 3.

When the dot wire impacts the platen, pressing against the ribbon and paper, it prints a dot. 4. When the driving voltage stops energizing the coil, the magnetic force from the iron core vanishes. The actuating plate returns to its original position (the position betbre coil was energized) with spring action. The dot wire also returns to its original position. This is the sequence used to print a single dot. The mechanism is equipped with a built-in thermistor for head temperature detection. The temperature detected by the thermistor is converted to an electric signal and fed back to the control circuit. Wire Resettin S rin Stopper Dot Wire TY____ r \Actuating Spring Figure 2-1. Printhead Operation Principles Rev.

A 2-1 Operating Principles LX-WI Service Mimual 2.1.2 Carriage Movement Mechanism The carriage movement mechanism consists of the carriage assembly, CR motor assembly, timing belt, driven pulley, HP sensor, etc. The CR motor assembly drives tie tifiig belt. me carriage assembly is comected to the timing belt, which is moved by the CR motor assembly. Figure 2-2 shows the carriage movement mechanism. The printer detects the carriage home position with the HP sensor. This sensor is the basis for determining the carriage home position. The HP sensor informs the CPU of the carnage home position. The sensor is ON, when the carriage is pushed to the right or left.

The striker on the carriage actives the sensor to indicate the carriage home position, which toggles the sensor to OFF. Table 2-1. CR Motor Assembly Specifications Category Type Drive Voltage Coil Resistance Drive Pulse Frequency Excitation Method 31.5 -38.5 VDC 180 ohms * 7Y0 (per phase, at 25° C, 77° F) 1320 p~ Normal Mode Draft 1980 PPS Color Mode Draft Constant-voltage 2-2 phase excitation 1-2 phase excitation Requirement 4-phase, 48-pole, PM-type stepping motor CARRIAGE ASSY.

, TIMING BELT ,,CR Figure 2-2. Carriage Movement Mechanism 2-2 Rev.A LX-300 Sewica Manual Operating Principla 2.1.

3 Paper Handling Mechanism During normal operation, the paper is fed to the printer, advanced to the specified position, and ejected from the printer. These paper handling operations are performed by various paper handling mechanisms, such as the tractors, rollers, and gears. This section describes the paper handling mechanism for this printer. 2.1.3.1 Paper Feed Mechanisms Cut sheets are fed by friction. Continuous paper is fed by a tractor. There are three ways to feed with tractors: the push tractor method, the pull tractor method, and the push-pull tractor method. During normal operation, the printer is set up with only one tractor, which functions as either a push or a pull tractor, depending on where it is attached on the printer.

To use the push-pull tractor feed method, an optional tractor must be attached. There are two ways to insert paper into the printer. Cut sheets use the top entrance and continuous paper use rear insertion. 2.1.3.2 Paper Advance Mechanism This section describes how the friction and tractor advance mechanisms feed paper through the printer. The paper advance mechanism consists of the PF motor assembly, platen, dtiven roller assembly, driven roller cover, tractor assembly, knob, PF gear train, etc. The PF motor assembly can drive the platen both forward and in reverse. Friction Advance Method Paper is held by the platen, the PF driven roller, and the eject roller assembly.

Turning in the direction of the black arrows, the PF motor assembly pinion gear drives the paper advance reduction gear.



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The paper advance reduction gear turns the platen gear, PF driven roller, and the platen. The platen drives the driven roller cover; then the driven roller cover drives to eject the paper. The paper advances in the direction of white arrows. Figure 2-3 shows the friction advance method when the paper is fed through the top paper entrance.

COVER, ROLLER, DRIVEN, PAPER ADVANCE REDUCTION GEAR MOTOR ASSY., PF ROLLER, PF, DRIVEN PLATEN GEAR Pinion Gear Figure 2-3. Friction Advance Mechanism Rev.A 2-3 Operating Principles LX-300 Service Manual Table 2-2. PF Motor Assembly Specifications Category Type Requirement 4-phase, 48-pole, PM-type stepping motor 31.

5 -38.5 VDC 56 ohms f 5Y0 (per phase, at 25°C, 77°F) 800,900,1000,1200,1300 pps Constant-voltage 1-2 phase excitation Drive Voltage Coil Resistance Drive Pulse Frequency Excitation Method Push Tractor Method When the push tractor method is used with the rear entrance, the torque generated by the PF motor assembly is transmitted to the push tractor gear through the PF motor assembly pinion gear, the paper advance reduction gear, and the tractor transmission gear. When the PF motor assembly pinion gear turns in the direction of the black arrows, the tractor gear rotates in the direction of the black arrow and thus feeds the paper into the printer. The paper is advanced by the platen, which is also driven by the PF motor assembly through the gear train. (*,-, Continuous Paper / Push Tractor

~v . . I th I UH ,, \, r~ ". PLATEN COVER, ROLLER, DRIVEN PLATEN GEAR r - Pinion Gear MOTOR ASSY., PF Figure 2-4. Push Tractor Paper Advance Mechanism 2-4 Rev.A LX-300 Sarvica Manual Operating Ptincipla Pull Tractor Method The pull tractor advances paper in basically the same way as the push tractor. When the push tractor is installed at the paper exit instead of paper entrance, the tractor functions as a pull tractor instead of a push tractor, pulling the paper out of the printer mechanism. Figure 2-5 shows the pull tractor advance mechanism.

Continuous Paper , - R PL ,, PF Figure 2-5. Pull Tractor Paper Advance Mechanism Rev.A 2-s Operatjng Prjnciples Push - Pull Tractor Method U400 Smdce Manual The push-pull tractor method is a combination of the push method, using the standard tractor, and , ~' " the pull method, using an optional tractor. The two traders operate simultaneously to push and pull the paper through the printer mechanism. Figure 2-6 shows push-pull tiadoroperation when the paper is fed through the rear paper entrance. ~.i , ..

Figure 2-6. Push-Pull Tractor Paper Advance Mechanism Disengage Lever The disengage lever switches whether or not the printer transmits the torque of the PF motor assembly to the tractor transmission gear. (See Figures 2-5 and 245.) The paper path is different from friction feed and tractor feed. The PF driven roller is not in the tractor feed paper path, so continuous paper is not advanced by this roller. F@me 2-7 shows the paper path. SHEET GUIDE PLATEN Continuous paper QY ; & TRACTOR -> Cut Sheet / ROLLER, PF, DRIVEN `DETECTOR ASSY., PE Figure 2-7. Paper Path ,, 24 Rev.

A LX-IW Service Manual Operating Principlb 2.1.4 Ribbon Advance Mechanism The ribbon is held between the ribbon advance roller (ribbon driven gear) and the ribbon pressure roller. When the carriage moves on the CR guide shaft from left to right and vice versa, the timing belt turns the belt driven pulley. Then the torque is transmitted to the ribbon driving gear through the gear trains. The ribbon driving gear rotates counterclockwise no matter what direction the carriage moves, because a planetary gear is used in the gear linkage. Table 2-3. Ribbon Advance Gear Linkage I Direction of Carriage Movement Left to right (indicated by the black arrow) Right to light indicated by the white arrow) Gear Linkage I Belt driven pulley + Gear(1)+ Gear (2)+ Ribbon driving gear Belt driven pulley + Gear(1) -+ Gear (3)+ Gear (4) + Ribbon driving gear The ribbon brake sprina attached to the exit of the cartridge case, prevents slack in the ribbon and keeps the ribbon tension at an appropriate level. The ribbon mask prevents the ribbon from brushing against the paper. Ribbo Ribbon Spring Figure 2-8.

Ribbon Advance Gear Linkage Rev.A 2-7 Operating Principles LX-300 Service Manual 2.1.5 Ribbon Shift Mechanism This printer can be equipped with a color upgrade kit to print in color. The printer performs color printing unidirectionally.

The option is composed of the color ribbon shift mechanism. The Color ribbon feed mechanism is shared in common with black ribbon feed mechanism, and the shift mechanism shifts the ribbon cartridge up and down. Table 2-2 shows the CS motor assembly specifications. The motor control system is open-loop, so that when the color is being changed, the positioning is controlled by stepping pulse. Table 2-4.

CS Motor Assembly Specifications Category Type Drive Voltage Coil Resistance Drive Pulse Frequency Excitation Method Requirement 4-phase, 48-pole, PM-type stepping motor 35 VDC * 10Yo 150 ohms f 5Y0 (per phase, at 25° C or 77° F) Color shift 500 pps Constant-voltage 2-2 phase excitation The ribbon shift mechanism consists of the color ribbon and color upgrade kit. The color upgrade kit is composed of the CS motor assembly, ribbcm shift gear/cam, motor driver IC, and color ribbon sensor. The l-inch-wide color ribbon is separated into four equal-width bands of different colors. The ribbon shift mechanism shifts the ribbon cartridge up and down. When the color ribbon cartridge is loaded, it is possible to print in up to seven colors. One of the four colors on the ribbon is selected by the color ribbon cartridge motion, which inserts a portion of the plastic posts into the slots in the printer mechanism as a fulcrum. Figure 2-9 illustrates the color shift mechanism. The mechanism shifts the ribbon cartridge by converting the gear rotation to liner motion (up and down) of the color ribbon cartridge, using color shift cam gear. Any color band can be selected by' rotation of the CS motor assembly, using the color home position (the position of the black color band) as a starting point and reference position. Home position is recognized by the CS motor assembly stepping pulse.

When printer is power on, the CS motor assembly is exated at any phase position at first. Next, the CS motor assembly is turned for 235 steps (black + yellow). Then, the motor returns one step (yellow+ black), and the motor is stopped. Finally, the motor returns 223 steps (yellow+ black) and stops. This position is home position. Table 2-5 gives coloring sequences. For halftones, as shown in the table, a color is created by printing one color on top of another. Table 2-5. Coloring Sequences Print Ribbon Print Color First Printing Black Magenta Cyan Yellow Green Orange Violet Note: Black Magenta cyan Yellow Yellow Yellow Magenta Seound Printing - - - - - f.''''' ,.



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cyan Magenta Cyan The printer prints the brighter color first to prevent the ribbon from being stained 2-8 Rev.

A LX-300 Service Manual Operating Principles Color Ribbon Cartridge Fulcrum 1/ LEVER, CS ---- - HOLDER, CARTRIDGE, COLOR Pinion of MOTOR ASSY., CS Color Shift Cam Color Shift Cam Follower Figure 2-9. Color Shift Mechanism 2.1.6 Platen Gap Adjustment Mechanism The platen gap (the gap between the platen and the printhead) can be adjusted to allow the printer to use paper of different weights or thicknesses.

When the gap adjust lever is moved forward or backward, the CR guide shaft rotates. This rotation moves the carriage either toward or away from the platen and changes the platen gap. The correct platen gap is 0.45 ± 0.02 mm with the gap adjust lever set to position O.

LEVER, G, ADJUST Motion PG, TL, II \, i'1. *pfinthead i\$- "> printhead Motion" a ---, LEVER'GJADJUST F "-" "l 5 ." Platen "\ SHAFT, CR, GUIDE Figure 2-10. Platen Gap Adjustment Mechanism Rev.A 2-9 Operating Principles LXXX) Service Manual 2.2 POWER SUPPLY OPERATION The printer can be powered by either of two power supply boards: the C130 F'SB (120V) board assembly or the C130 PSE (230V) power supply. The function of these two boards is the same, except for a difference in primary circuitry.

The power supply board outputs the DC current necessary to drive the printer control circuits and drive mechanism. Table 2-6 shows the input voltages and fuse ratings for these boards. ("+" Table 2-6. Power Supply Board Board C130 PSB Input Voltage 100.5-132 VAC Fuse F1 Rating 2.5A 1125V, 250V 1.25A 1250V C130 PSE 198-284 VAC 2.2.1 Power Supply Overview The power supply board has two power outputs for use in the various control circuits and drive mechanisms. Table 2-7 lists the circuitry and the units that are driven by the two DC output supply voltages.

Table 2-7. Power Supply Output Voltages and Applications 1%\$:i'ul' +35 v (VP) Applications CR motor drivers PF motor drivers Printhead drivers I CS rnotordrivers I Main board assetivkxc arcuitw Various sensors Control panel LED PF motor/ CS motor hold +9 V (VL) , , 2-10 Rev.A LX300 Sarvica Manual Operating Principk 2.2.

2 Power Supply Circuit Operation Figure 2-11 shows a block diagram of the power supply circuitry. When AC power is supplied to the printer from an external power source, a filter circuit removes the noise. The AC voltage then undergoes full-wave rectification and is smoothed to produce the direct current supply voltage. This voltage is fed through a switching circuit and secondary smoothing circuit to produce the stepped down +35 VDC supply. A +35V line voltage detector (ZD51 and PC1) circuit is connected to the switching circuit. This feedback control arrangement ensures that the +35 VDC supply is kept stabilized. A +9 VDC supply is created by putting the +35 VDC line through the +9 VDC power supply circuit. This circuit further steps down the +35 VDC voltage and outputs a stabilized supply. The +9 VDC output is stabilized to +5 VDC using the regulator on the C130 MAIN board assembly. There are several circuits to protect the supply circuits and avoid danger.

The +9 VDC line contains a voltage overload protection circuit. The +9V voltage overload protection circuit (ZD53, Q82, and PC1) cuts the supply if the voltage reaches or exceeds +11 VDC. It stops switching circuit operation, which stops the output from the +35 VDC line. The +35 VDC line has a voltage overload protection circuit. The +35 VDC voltage overload protection circuit (ZD52, Q82, and PC1) cuts the supply if the voltage reaches or exceeds +36 VDC. It stops switching circuit operation, which stops the output from the +35 VDC line. Full-Wave Rectification -- Circuit Smoothing Circuit Switching Circuit Smoothing CirciM D Pflot& Couplef +9VDC + o +35 VDC (VP) Filter Circuit Sfabilizatial + + +9VDC (VL) circuit) A +3SVDC line (-- ~ AC Line +9 VDC line d -- over-voltage FMecthn Circuit +35 VDC line OWr-volfaga Protection Cinxit -- figure 2-11. Power Supply Circuit Block Diagram Rev.A 2-11 Operating Principles LX-300 Service Manual 2.3 CONTROL CIRCUIT The control circuit consists of the C130 MAIN board assembly.

This -on describes the major components and explains how the board works. 2.3.1 Control Circuit Operation Overview The printer's system IC contains a CPU (pPD78C10A-type) that mm at 14.74 MHz, a gate array (E05A79-type) and a main RAM (8KB SRAM).

It oversees control of all the components in the printer. The printer uses the E05A90 gate array to control address decoding parallel communication.s, PF motor drive signals, etc. Table 2-5 shows functions of main IC and circuits. Figure 2-18 shows the control circuits in block diagram form. (: " Table 2-8. Functions of the Main IC Ic Location Function CPU Block: Receives data from the host computer and sends it to the input buffer in RAM (under interrupt processing control). Extends the input data held in the buffer to create image data. Loads this image data to the image buffer in RAM. Transfers the image data to the printhead drive circuit. Also controls various parts of the printer mechanism, such as PF motor control and color select motor control Gate Array Block: Controls the functions below. w Address decoding . Parallel communications q Impact head drive control . CR motor control Main RAM Block: Holds the CPU worldng area and various buffers. Contains the program that runs the CPU and holds the character design (also called the character generator).

Hardware reset function An electrically writable and erasable ROM used to hold such information as the TOF posit-km and bidirectional adjustment value. Driver / receiver SYSTEM IC ICI (~-. - "/ ROM RESET IC EEPROM Serial I/F IC EI A2 A3 IC2 r., , , RESET IC (AZ) PROM (EI) 1+ SYSTEM IC * _&m 4 RELEASE LEVER SENSOR Ai ~: : (ICI) .~w .h#Jwfax4usY#J .mww : . . (OPTION) . . !

..... +5V OC(VL) Figure 2-12. Control Circuit Block Diagram 2-12 Rev.

A LX-300 Sarvice Manual Operating Principk 2.3.2 Power On Reset Circuit When the power supply is turned on, the VL goes up to +9 VDC immediately, but reset IC output (IC A2, - 6) is delayed for approximately 80- 1 ma before going up to +9 VDC. The system IC Pin receives this Lowlevel signal ~om the res& IC and resets itself. VL +5V t ? 3ESFT IC SYSTEM IC (ICI) R37 * \:2) R38 4 4 v(-.~ ~ & GND OUT 6 `3 RESET T C24 Figure 2-13. Power On Reset Circuit Diagram 2.3.3 Home Position Sensor Circuit This printer has a connector switch to sense the carriage home position.

The system IC receives a signal (HIGH or LOW) from the HP sensor and remgnize the carriage home position when the printer is turned on. The comector switch is closed (LOW) when the carriage is in the home position and is open (HIGH) when the carnage is out of home position.



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+5V SYSTEM IC (ICI) R73 SCK 34 R71 I HP Sensor Figure 2-14. Home Position Sensor Circuit Diagram Rev.A 2-13 Operating Principles LX-300 Service Manual 2.

3.4 Paper End Sensor Circuit This printer has a connector switch for sensing the paper end. The system IC receives a signal (HIGH or LOW) from the connector switch and recognizes a paper end. The connector switch is closed (LOW) when there is no paper on the platen and is open (HIGH) when paper is present. +5V.

SYSTEM IC (ICI) 4 R74 t + PE Sensor R72 PB2 J' Figure 2-15. Paper End Sensor Circuit Diagram 2.3.5 Release Lever Position Sensor Circuit This printer has a connector switch to detect the type of paper handling. The system IC receives a HIGH or LOW signal from the connector switch to indicate whether the paper is fed using friction feed or push tractor feed. The connector switch is closed (LOW) when friction feed is selected and is open (HIGH) when push tractor feed is selected. +5V SYSTEM IC (ICI) R53 Release Sensor A NO 58 R54 J-' Figure 2-16. Release Lever Position Sensor Circuit Diagram 2-14 Flev.A LX-300 Sarvica Manual 2.

3.6 Carriage Motor Driver Circuit Operating Principle Figure 2-17 shows the carriage motor driver circuit. The carriage motor driver uses an open-loop, constant-current drive arrangement. The motor is driven with 2-2 phase excitation and 1-2 phase excitation. IC (AI) detects the amount of current in the carriage motor coils and regulates the current. The amount of the current is set by the system IC (ICI). Signals are sent to CR11 and CR12 on the system IC. The ICI controls motor speed. The ICI controls motor speed. STROBE ..

Figure 2-20. The serial interface conforms to EIA-232D. Data is transferred to an input buffer in the system IC from the CI block. Printing starts when a CR code is received or when the input buffer is filled. Driver/Receiver (IC2) TXD DTR RXD CTS SYSTEM IC (ICI) 365 Pm PB3 35 Pcl 6. ~ q 1 Figure 2-21. Serial Interface Block Diagram Rev.A 2-17 Operating Principles 2.3.10 EEPROM Control Circuit LX#XI Service Manual Figure 2-22 shows the EEPROM control circuit block diagram. The EEPROM (A5) contains such information as the top-of-form position. The EEPROM is non-volatile memory, so information is not lost if the printer is powered off. Since the EEPROM is a serial I/O-type device, the CPU +5V SYSTEM IC (ICI) PB7 PB5 PBO PB1 converts 8-bit data into serial data. IC1 1 2 4 EEPROM (A5) Cs CK 3 DI 4 Do J Figure 2-22. EEPROM Control Circuit Diagram 2.3.

CS Motor Assembly Circuit Figure 2-23 shows a block diagram of the CS motor assembly circuit in the optional color upgrade kit. The CS motor assembly is a permanent magnet (PM) stepping motor, driven with 2-2 phase excitation in proportion to the desired motor speed. The motor can be rotated in either direction and stopped at any position. Four phase signals are directly output from the system IC and pass through a transistor array. The drive voltage is constant (i.e., +35 VDC from the VP line). Source Voltage Current Consumption 35 VDC * 10 245 mA (peak) SYSTEM IC (ICI) PA7 14s PA6 PA5 PA4 a R20 R21 MOTOR ASSY., CS F CS-B CS_A CS B (XA, ...

Figure 2-24. Color Ribbon Sensor Circuit The printer's color ribbon circuitry is shown in the figure below. The CPU receives signals (HIGH or LOW) from the mechanical switch. The signal is HIGH when a color ribbon is installed and is LOW otherwise. +5V Sensor AN4 ~ A i i L i i Printer I Color Upgrade Kit Figure 2-24.

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