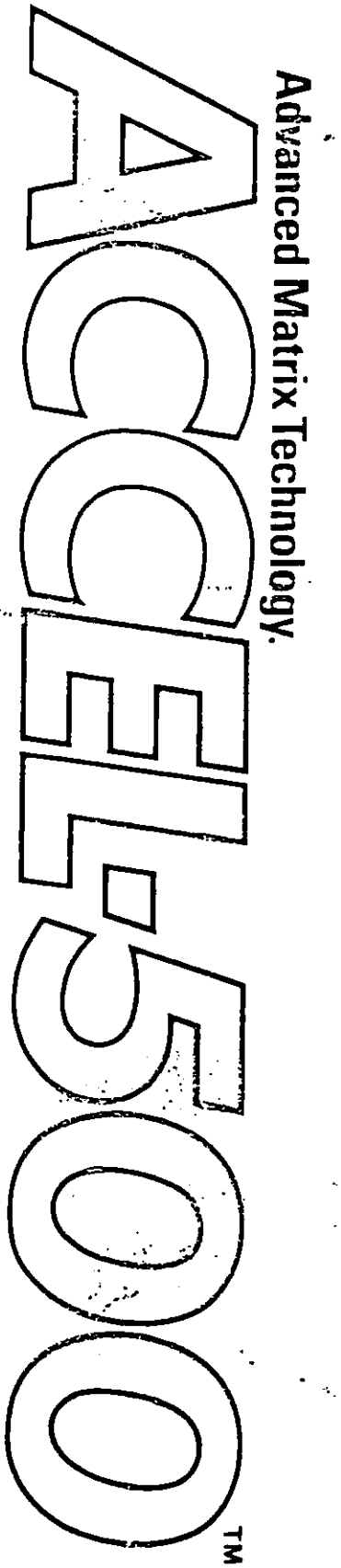
Printer Reference Library



Functional Description

Diagnostics

Replacing Parts

Adjustments

Servicing Accessories

Tools and Spares

Exploded-Views

Schematics

Accel-500™

Field Service Guide

Functional Description

Diagnostics

Replacing Parts

Adjustments

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Exploded-Views

Schematics

Document No. 700120

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Warning

This equipment generates and uses radio frequency energy. If not installed and used in strict accordance with the guidelines in this document, it may cause harmful interference to radio and television reception. This equipment has been tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules. These rules are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio and television reception, the user is encouraged to correct the interference by one or more of the following measures:

- Reorient the receiving antenna.
- Relocate the printer with respect to the receiver.
- Plug the printer into a different outlet so that the printer and receiver are on different branch circuits.

If necessary, the user should consult an experienced radio/television technician for additional suggestions.

This equipment requires a shielded interface cable with metal shell connectors. Using any other type of interface cable will invalidate the FCC Certification for this equipment and may cause interference levels which exceed the limits established by the FCC.

Before You Start

This guide provides field service information for the AMT *Accel-500* printer, including a detailed functional description, diagnostics, removal and replacement procedures, and adjustment procedures. It includes exploded-view diagrams, part lists, and schematics. For information pertaining to other aspects of the printer, such as operation or programming, consult the appropriate guide.

Using This Guide

The purpose of this guide is to help field service technicians isolate and repair printer malfunctions. The guide assumes that the reader has printer servicing experience and is familiar with standard tools and terminology.

Using Other Documentation

There are many other documents available from AMT that cover a wide variety of topics:

- *Operating Guides* for the printer and accessories
- *Programming Guides* for printer emulations
- *Interface Guides* for printer interfaces
- *Font Sheets* for fonts
- *Configuration Sheets* for Intelli-cards

To obtain an update of this guide or other AMT documentation, contact AMT Sales at (805) 388-5799 for ordering information.

Problems/Comments

If you have a problem servicing a printer or comments regarding this publication, call AMT Technical Support at (805) 388-5799 on any normal work day between 8:00 am and 5:00 pm PST.

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Contents

Figures and Tables

Figures

Tables

Guide Overview

This guide contains the following sections:

- Section 1, *Functional Description*, presents overviews of printer components and the mechanical, electro-mechanical, and electronic systems that enable the printer to perform printing operations.
- Section 2, *Diagnostics*, provides procedures for isolating and correcting power, memory, sensor and switch, motor and solenoid, paper loading, ribbon feeding, interface, and print quality problems.
- Section 3, *Replacing Parts*, provides procedures for removing and replacing major spares, subassemblies, and parts.
- Section 4, *Making Adjustments*, provides procedures for adjusting the printer.
- Section 5, *Servicing Accessories*, provides procedures for troubleshooting and repairing the bottom-feed tractor.
- Appendix A, *Tool List*, lists all required tools for performing field service on the printer.
- Appendix B, *Spares List*, lists the major spares, subassemblies, and parts needed for field service.
- Appendix C, *Exploded-View Diagrams and Part Lists*, provides exploded-view diagrams and part lists for the printer.
- Appendix D, *Schematics*, provides cabling and wiring diagrams, and circuit board schematics.
- And an *Index* to help you locate specific information.

1 Functional Description

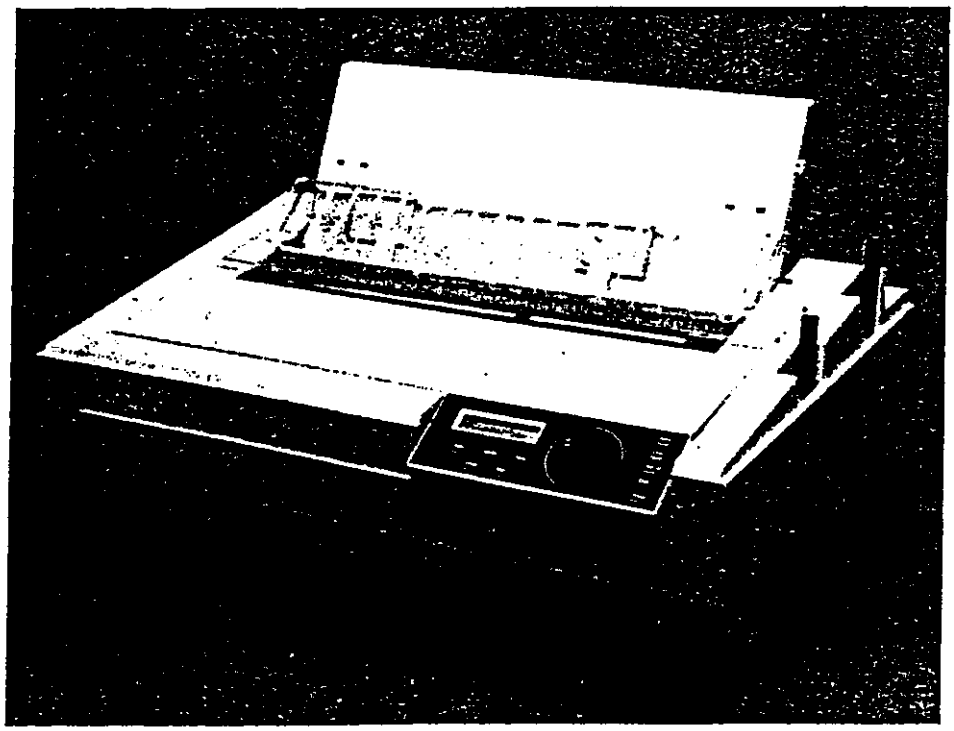
The primary function of AMT's Accel-500 printer is to receive data from a host computer and print it in an operator-selectable format. This section presents a general overview of the printer and more in-depth overviews of the mechanical, electro-mechanical, and electronic systems that enable the printer to perform printing operations. This section also provides printer specifications.

General Overview

General overview

The printer uses a simple design and proven microelectronics to provide reliable operation. If a problem does occur, the printer can use internal diagnostics to isolate the problem. Replacing printer subassemblies is quick and easy. It requires only standard tools and a few simple adjustments.

Accel-500 printer



1-1 AMT Accel-500 Printer

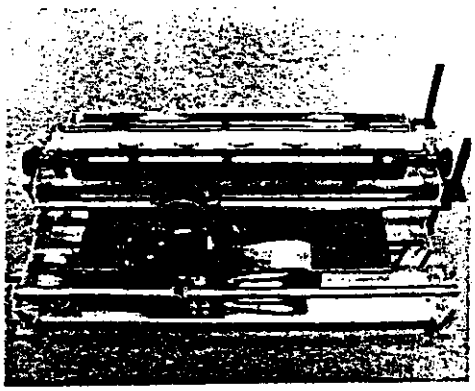
The printer is similar to a conventional fixed-platen, friction-feed typewriter. Paper enters the printer from the top, rear, or bottom and feeds in front of a platen using paper feed belts and various paper guides. Paper exits the printer through a slot in the top case. A sliding carriage with a printhead and ribbon cartridge is positioned in front of the platen and moves parallel to the surface of the paper. With both the up/down movement the paper and the left/right movement of the carriage, the printhead can reach every print position on the paper.

The printer consists of the following general components:

- Chassis
- Case
- Paper paths
- Paper guides
- Carriage
- Printhead
- Ribbon cartridge

CHASSIS

Chassis



1-2 Chassis

The *printer chassis,* made from 1/12-inch thick steel, provides sturdy support for all printer subsystems, minimizes vibration, and offers an excellent environment for precision printing.

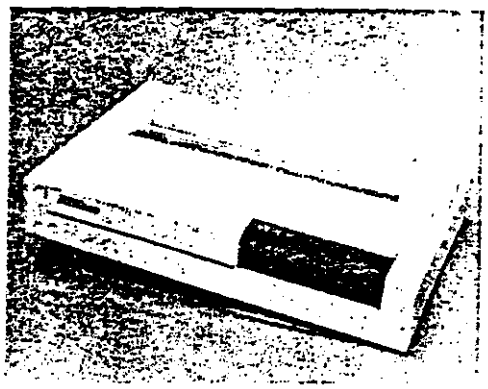
CASE

Case

The printer chassis mounts inside an injection-molded case lined with noise-dampening foam. The case is stylized for aesthetics and engineered for noise reduction. The case consists of several components:

Top case

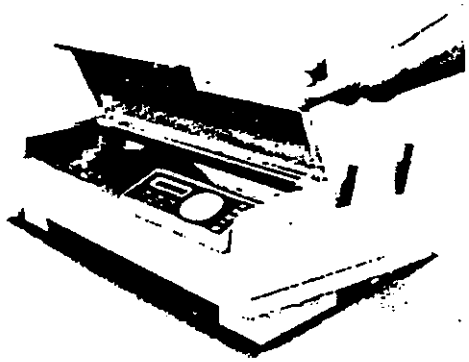
A *top case* attaches to the bottom case and contains the following parts:



1-3 Top Case

Top cover

- A *top cover* gives quick access to internal components including the ribbon cartridge and printhead.



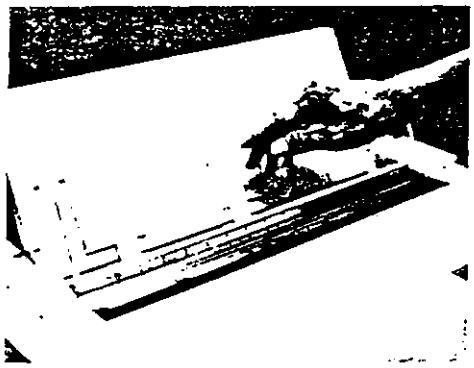
1-4 Top Cover

Platen window

- A *platen window with serrated tear bar* offers a view of printing in progress and enables pin-feed paper tear off.

1-5 Platen Window

Sound window



1-6 Sound Window

- A pivoting *sound window* on top of the platen window dampens printer noise and guides paper exiting the printer.

Platen access covers

1-7 Platen Access Covers

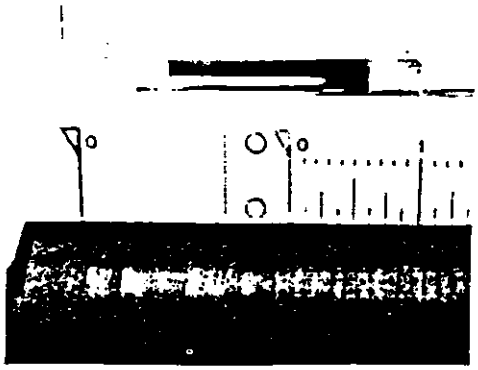
- Two *platen access covers* give easy access to the platen shaft for installation of a sheetfeeder or the bottom-feed tractor.

Paper support

1-8 Paper Support

- A *paper support* guides cut sheets entering the printer. The support contains sliding paper edge guides.

Paper scale

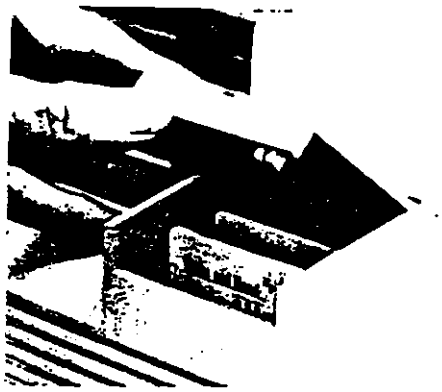


1-9 Paper Scale

- A *paper scale* shows where to align paper and forms in the printer.

- An *Intelli-card cover* gives access to the Intelli-cards and receptacles. Intelli-cards are credit-card-size memory modules that contain the printer firmware.

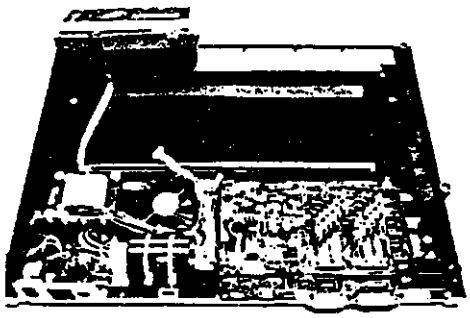
Intelli-card cover



1-10 Intelli-Card Cover

A *bottom case* attaches to the bottom of the printer chassis and contains the control panel and printer electronics.

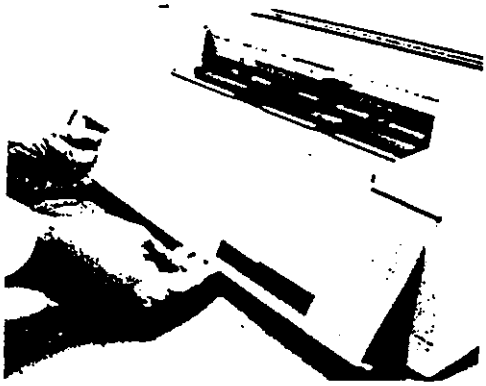
Bottom case



1-11 Bottom Case

A *rear cover* snaps on and off of the top and bottom cases to give easy access to printer electronics.

Rear cover



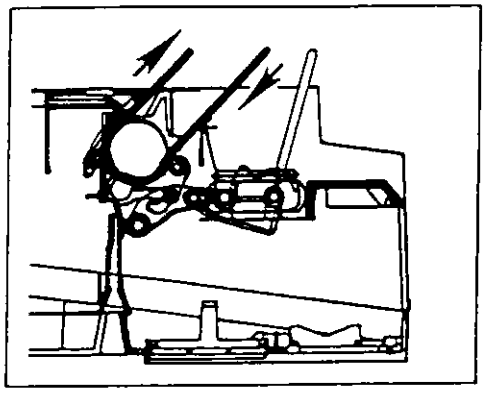
1-12 Rear Cover

PAPER PATHS

Paper paths

There are three paper paths: top-feed, rear-feed, and bottom-feed. Top-feed is for cut sheets; rear-feed is for pin-feed paper; and bottom-feed is for pin-feed paper with the bottom-feed tractor option.

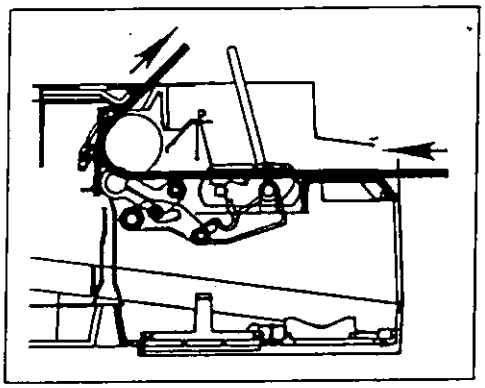
Top-feed



1-13 Top-Feed Paper Path

In *top-feed*, cut sheets enter the printer through a slot in the top case. Sheets feed 180 degrees around the platen, under the bail, and out the top of the printer next to the tear bar.

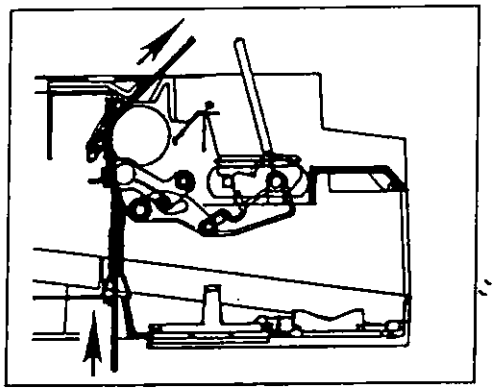
Rear-feed



1-14 Rear-Feed Paper Path

In *rear-feed*, pin-feed paper mounts on the built-in forms tractor and enters the printer through a slot below and behind the platen. The paper feeds 90 degrees around the platen, under the bail, and out the top of the printer next to the tear bar.

Bottom-feed



1-15 Bottom-Feed Paper Path

In *bottom-feed*, pin-feed paper enters through a slot in the bottom of the printer and feeds up through the printer chassis, in front of the platen, under the bail, and out the top of the printer. Then the paper mounts on the bottom-feed tractor option.

PAPER GUIDES

Paper guides

The printer contains various paper guides that accommodate a wide variety of cut-sheet and pin-feed papers, multipart forms, labels, transparencies, and other media. Paper guides consist of the following components:

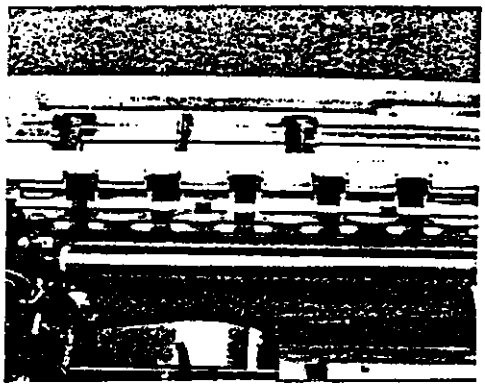
Platen

A conventional typewriter *platen* with rubber surface provides an excellent print impression backing and firm paper support.

1-16 Platen

Paper feed belts

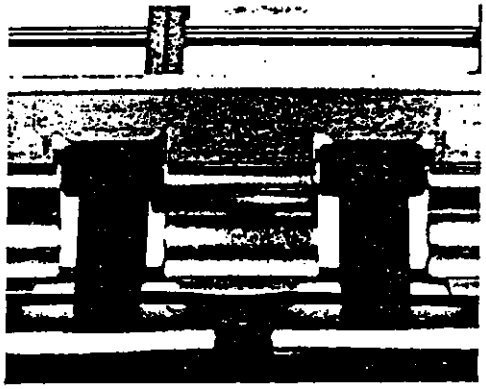
Five *paper feed belts* feed paper around the bottom of the platen. The belts are placed around a rotating support shaft that is geared to the platen. When the platen rotates, the paper feed belts advance.



1-17 Paper Feed Belts

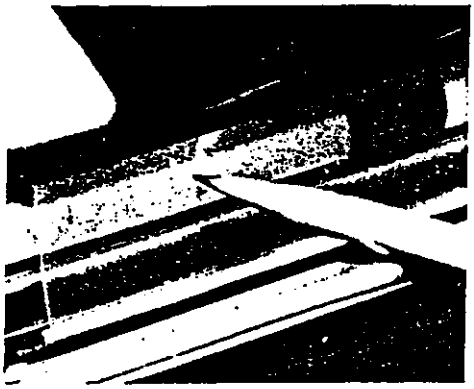
Paper guides

Six two-piece *paper feed guides* guide paper around the bottom of the platen.



1-18 Paper Guides

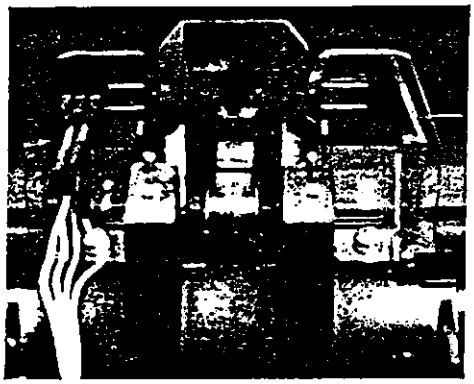
Platen wiper



1-19 Platen Wiper

A plastic *platen wiper* holds paper against the platen.

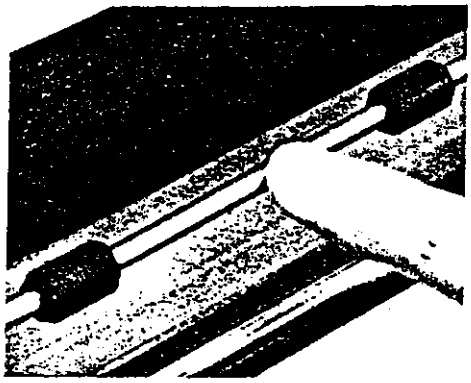
Print-line indicator and ribbon shield



1-20 Print-Line Indicator and Ribbon Shield

A *print-line indicator* holds paper against the platen and indicates the current print line on the page. A *ribbon shield* minimizes ribbon and paper contact to eliminate smearing.

Bail

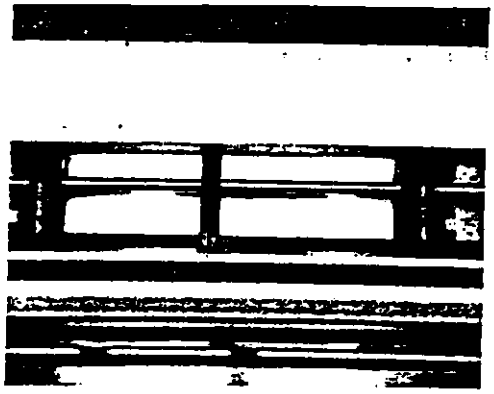


1-21 Bail

The *bail* is a conventional typewriter bail with pressure rollers that hold paper firmly against the platen.

A *built-in forms tractor* feeds pin-feed paper into the printer.

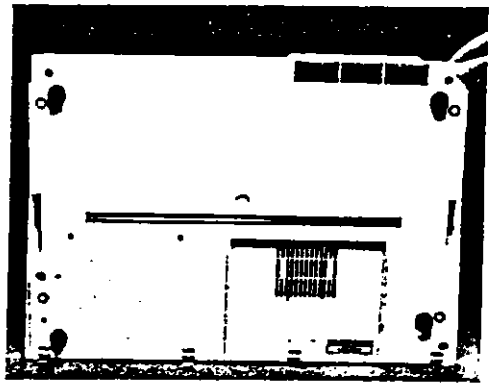
Built-in forms tractor



1-22 Built-In Forms Tractor

A *bottom-feed slot* (for use with the bottom-feed tractor option) guides pin-feed paper up to the platen.

Bottom-feed slot

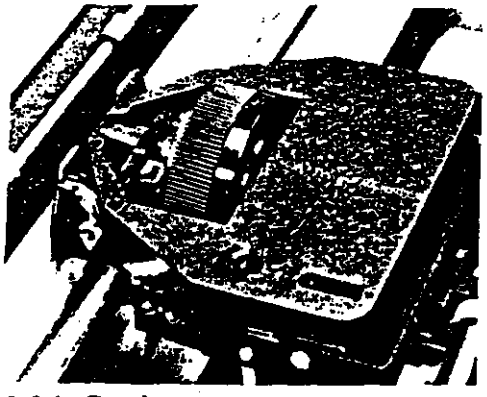


1-23 Bottom-Feed Slot

CARRIAGE

The *carriage* is mounted on two support shafts with self-lubricating bearings. The bearings enable the carriage to slide back and forth on the support shafts.

Carriage

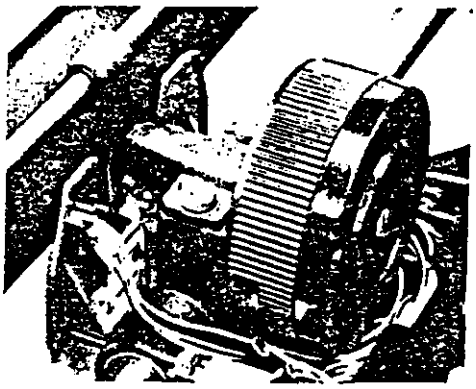


1-24 Carriage

Many components are attached to the carriage, including the carriage board, carriage cables, printhead, print-line indicator, ribbon shield, paper sensor, ribbon platform, ribbon drive mechanism, ribbon cartridge, ribbon lift motor and gears, ribbon home sensor, multicolor ribbon sensor, and the microshift solenoid.

PRINTHEAD

Printhead



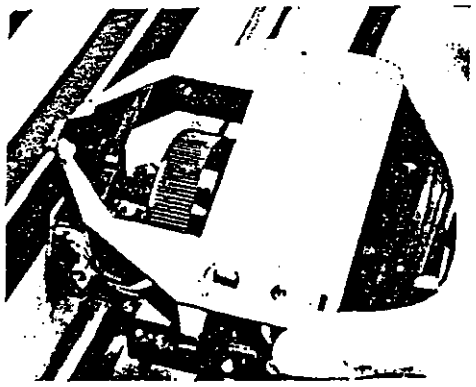
1-25 Printhead

The carriage contains a 24-wire printhead that impacts an inked ribbon at high speed to print hardcopy. Wires are arranged in three eight-wire columns spaced 0.033 inch apart. The middle column is offset 0.0085 inch higher than the outer columns. Wires have a diameter of 0.012 inch and are spaced 0.017 inch apart. This diameter and spacing enables dots to overlap in a single pass of the printhead.

Although printhead life is exceptionally long, print wire erosion and ink migration into the printhead will eventually degrade print quality to an unacceptable level. When this occurs, the operator can replace the printhead in minutes with no special tools.

RIBBON CARTRIDGE

Ribbon cartridge



1-26 Ribbon Cartridge

The printer uses monochrome and color continuous-loop ribbons that come stuffed in protective plastic cartridges. Replacing a ribbon cartridge in the printer does not require any threading or other special handling and can be done with paper loaded. Just snap out the old ribbon cartridge and snap in the new. The knob on the ribbon cartridge removes any slack in the exposed ribbon.

Mechanical Overview

Mechanical overview

Printer mechanisms consist of the following:

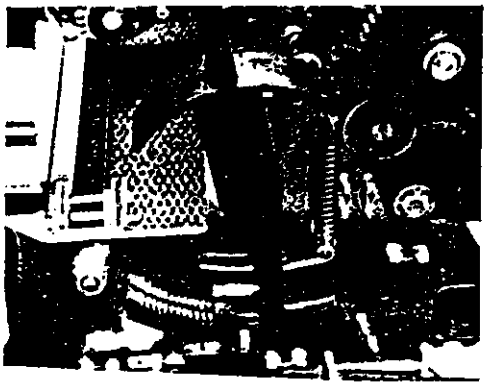
- Print gap mechanism
- Ribbon drive mechanism
- Tractor select mechanism

PRINT GAP MECHANISM

Print gap mechanism

The print gap mechanism changes the distance (gap) between the printhead and the surface of the paper. To maintain optimal print quality and protect the printhead, the gap should be between 0.0125 and 0.0135 inch. The mechanism consists of the following components:

- Carriage support shaft
- Paper thickness lever
- Notched detent



1-27 Print Gap Mechanism

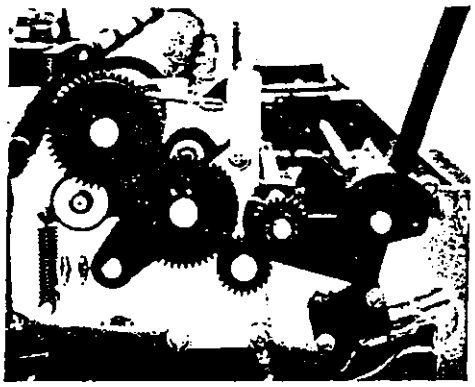
The ends of the carriage support shaft are a smaller diameter than the rest of the shaft and are slightly off-center. When the operator moves the paper thickness lever, the shaft rotates about the off-center ends causing the entire shaft to move forward or backward. As the shaft moves, the printhead moves closer to or farther away from the surface of the paper.

The bottom end of the paper thickness lever rides along a notched detent so that lever movement occurs in discrete steps, or clicks. Each click changes the print gap by about 0.0015 inch.

TRACTOR SELECT MECHANISM

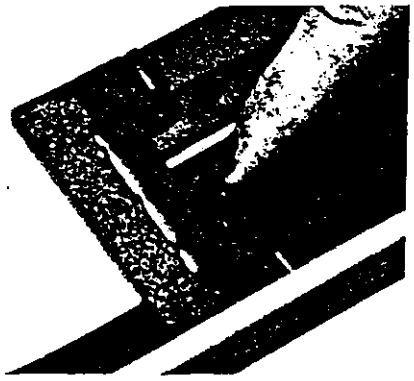
Tractor select mechanism

The tractor select mechanism repositions the paper feed belts and guides to form the rear-feed paper path and causes the built-in forms tractor to feed paper. The mechanism consists of the following components:



1-28 Tractor Select Mechanism

- Two tractors
- Two tractor support shafts
- Spring-loaded gear
- Gear train that meshes with platen gear
- Pivoting actuator and link attached to the paper guide support shaft



1-29 Tractor

The tractors are mounted on the two support shafts. Each tractor contains a pin belt and spring-loaded door to hold pin-feed paper entering the printer. Each tractor also contains a locking lever that tightens and loosens a clamp that grips the rear support shaft. When the clamp is loose, the tractor is free to slide along the support shafts; when the clamp is tight, the tractor is held firmly in place.

The tractor select lever is attached to a pivoting actuator and link that raises and lowers the paper guide support shaft and the paper feed belts and guides. When the paper feed belts and guides are lowered, they form a rear-feed paper path below and behind the platen.

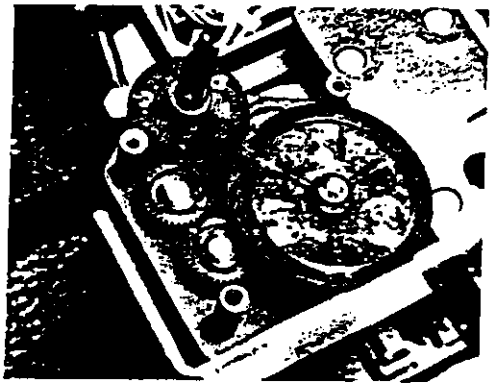
The tractor select lever also moves a spring-loaded gear on the end of the front tractor support shaft so that it meshes with a gear train that is driven by the platen. When the platen rotates, the front tractor support shaft rotates and the tractor pin-belts advance. This, in turn, causes pin-feed paper to feed into the printer.

RIBBON DRIVE MECHANISM

Ribbon drive mechanism

The ribbon drive mechanism advances the continuous-loop ribbon through the ribbon cartridge. The mechanism consists of the following components:

- Gear assembly
- Ribbon drive cable
- Ribbon drive spindle



1-30 Ribbon Drive Mechanism

The gear assembly consists of a ribbon drive pulley that pivots between a left gear train and a right gear train. Both gear trains share a common destination: a ribbon drive spindle.

The ribbon drive cable is looped around the circumference of the ribbon drive pulley. When the carriage moves to the right, the cable forces the ribbon drive pulley to mesh with the right gear train and rotate clockwise. Conversely, when the carriage moves to the left, the cable forces the ribbon drive pulley to mesh with the left gear train and rotate counterclockwise. Since the left gear train contains three gears and the right gear train only two, the ribbon drive spindle always rotates counterclockwise.

The ribbon cartridge mounts directly onto the ribbon drive spindle. The spindle turns pinch rollers inside the ribbon cartridge which advance the ribbon.

Electro-Mechanical Overview

Electro-mechanical overview

The electro-mechanical system in the printer consists of motors, solenoids, optical sensors, and switches.

MOTORS

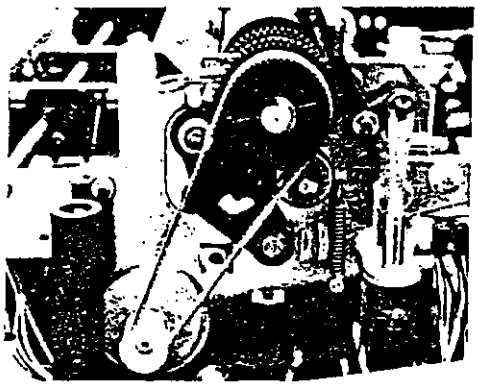
Motors

Printer motors consist of the following:

- Platen motor (platen rotation)
- Carriage motor (carriage motion)
- Ribbon lift motor (ribbon lift)
- Fan (printer cooling)

Platen Motor

Platen motor

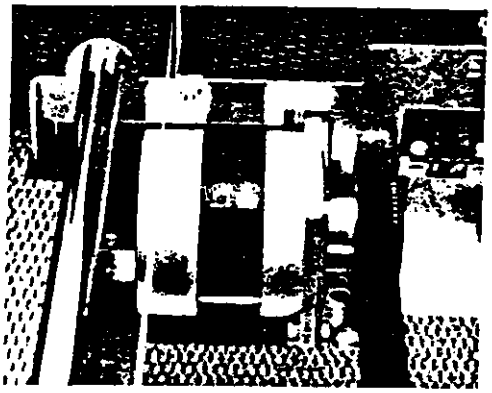


1-31 Platen Motor

The platen motor, using two pulleys and a belt, rotates the platen. The motor is attached to the lower left side of the printer chassis. One pulley is mounted on the platen motor shaft; the other is mounted on the left end of the platen. The belt is placed around the pulleys.

Carriage Motor

Carriage motor

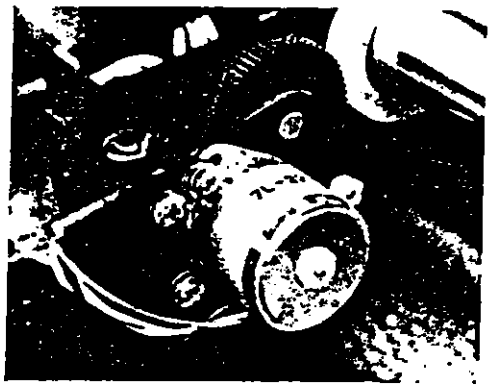


1-32 Carriage Motor

The carriage motor, also using two pulleys and a belt, moves the carriage back and forth in front of the platen. The motor is attached to the left and bottom sides of the printer chassis. One pulley is mounted on the motor shaft; the other is mounted to a bracket on the bottom of the printer chassis at the far right. The belt is attached to the bottom of the carriage and is placed around the pulleys.

Ribbon Lift Motor

Ribbon lift motor

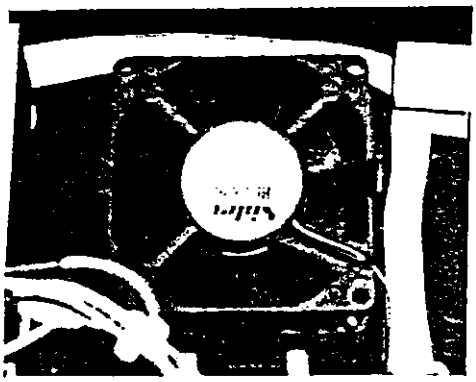


1-33 Ribbon Lift Motor

The ribbon lift motor, using a series of gears, pivots the ribbon platform and cartridge to position the exposed ribbon in front of the printhead. The ribbon platform is mounted on the carriage with two pins that enable the platform to pivot along a horizontal axis. The ribbon lift motor is attached to a bracket on the right side of the carriage. A small gear, mounted on the motor shaft, turns a cluster gear which meshes with a gear quadrant on the edge of the ribbon platform. As the gears turn, the ribbon platform pivots and the exposed ribbon moves in front of the printhead.

Fan

Fan



1-34 Fan

A fan is mounted on the bottom case to provide air circulation and cooling.

SOLENOIDS

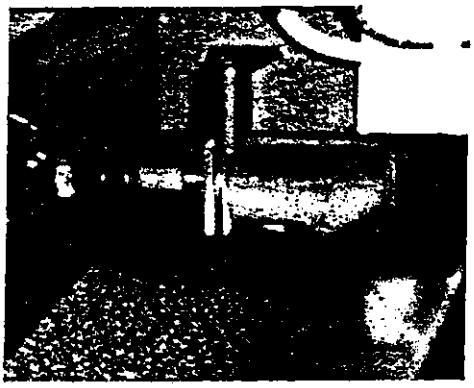
Solenoids

Printer solenoids consist of the following:

- Microshift solenoid (printhead shifting)
- Bail solenoid (bail motion)
- Print wire solenoids (print wire motion)

Microshift Solenoid

Microshift solenoid



1-35 Microshift Solenoid

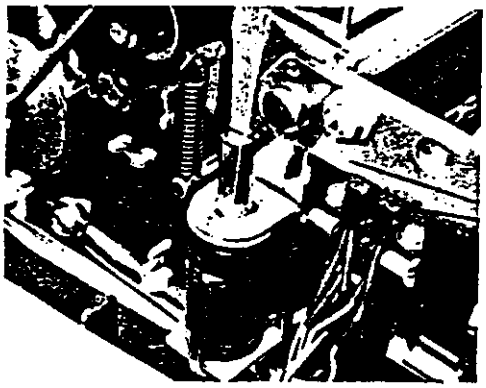
The microshift solenoid, using a lever with an adjustment screw, moves the tip of the printhead up 0.00425 inch during high-resolution two-pass printing. The solenoid is mounted on the bottom of the carriage. The lever is also mounted on the carriage so that one end is in front of the microshift solenoid and the other is just below the tip of the printhead.

As the solenoid extends, it pushes on the lever causing the tip of the printhead to rise. As the solenoid retracts, the printhead moves down to its normal position.

Bail Solenoid

Bail solenoid

The bail solenoid moves the bail away from the platen. The bail is held in place by two bail arms--one at each end of the platen. The arms are attached to the side of the printer chassis with pins that allow the arms to pivot. At the bottom of each bail arm is a spring that also attaches to the side of the printer chassis. The springs pull on the bottom of the bail arms causing the bail to rest against the platen.



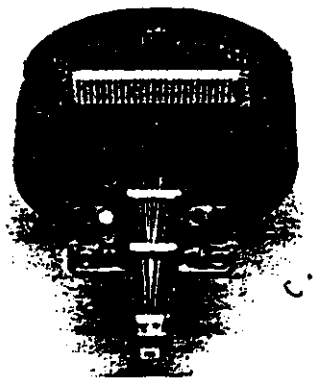
1-36 Bail Solenoid

The bail solenoid is mounted on the left side of the printer chassis and is linked to the left bail arm. When the solenoid retracts, it pulls on the arm causing the arm to pivot and the bail to move away from the platen. When the bail solenoid extends, it no longer pulls on the left bail arm and bail springs back against the platen.

Print Wire Solenoids

Print wire solenoids

Within the printhead are 24 print wire solenoids that fire print wires into the ribbon and paper to produce printed dots on the page. Each solenoid is attached to a print wire. The end of each print wire extends through a separate hole



1-37 Print Wire Solenoids

in the tip of the printhead so that it is properly positioned over the paper. When a print wire solenoid fires, the print wire impacts the ribbon and the paper causing a printed dot to appear on the paper. Then the print wire retracts and settles. Printer logic can fire a print wire solenoid while any number of other solenoids are only part way through the firing cycle, but does not fire a printhead wire before it has returned and settled from a previous firing.

OPTICAL SENSORS

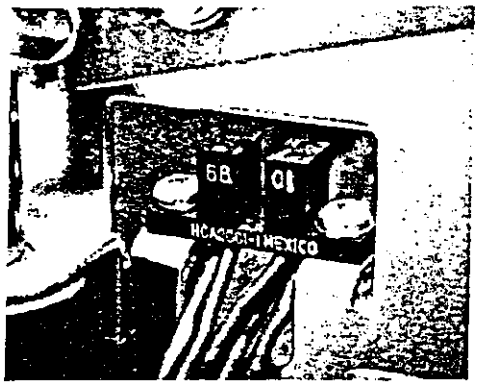
Optical sensors

Printer optical sensors consist of the following:

- Carriage sensor
- Paper sensor
- Select-dial sensors

Carriage Sensor

Carriage sensor

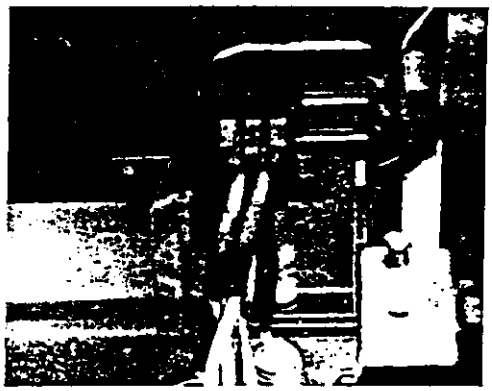


1-38 Carriage Sensor

The carriage sensor detects when the carriage is at the far left position. The sensor is mounted to the left side of the printer chassis. When the carriage moves to the far left, a tab on the carriage passes through a slot in the sensor. The sensor detects the tab and generates a signal. On power up and reset, the printer moves the carriage to the left until it receives a signal from the sensor. The printer can then move the carriage to any valid print position using the sensor position as an index.

Paper Sensor

Paper sensor

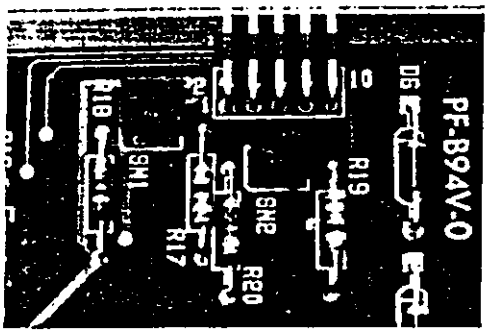


1-39 Paper Sensor

The paper sensor detects when paper is in front of the printhead. The sensor is mounted to the print-line indicator on the carriage and faces the platen. When the sensor detects light reflected off a sheet of paper, it generates a signal. By polling sensor status, the printer can determine when paper is in front of the printhead and where the left and right edges are located.

Select-Dial Sensors

Select-dial sensors



1-40 Select-Dial Sensors

Two Select-dial sensors detect Select-dial movement. On the bottom of the Select-dial is a ring-shaped decal with alternating reflective and non-reflective segments. The two sensors are mounted on the control panel circuit board just below this decal and are positioned so that they can detect the reflective segments. By polling the status of one sensor, the printer can determine how fast the Select-dial is turning. By comparing the status of both sensors, the printer can determine the direction of travel.

SWITCHES

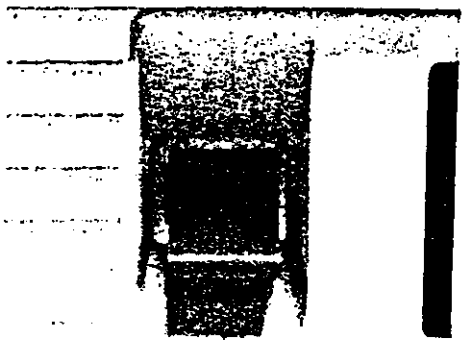
Switches

Printer switches consist of the following:

- On/off switch
- Voltage select switch
- Cover open interlock switch
- Tractor switch
- Print gap switch
- Ribbon home switch
- Multicolor ribbon switch

On/Off Switch

On/off switch



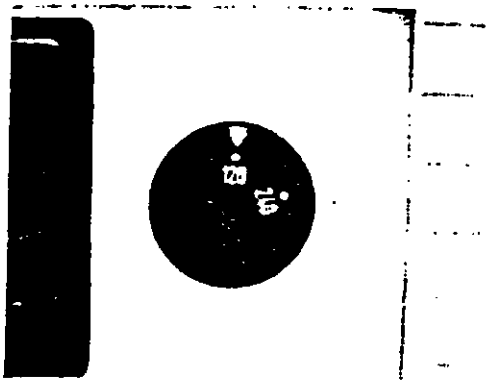
1-41 On/Off Switch

The on/off switch at the rear of the printer turns the printer on and off. To turn on the printer, set the switch to the on (up) position; to turn off the printer, set the switch to the off (down) position.

Voltage Select Switch

Voltage select switch

The voltage select switch, also at the rear of the printer, directs ac input voltage to the correct transformer taps. For 90 to 130 vac input, set the switch to the 100 position; for 180 to 260 vac input, set the switch to the 220 position.

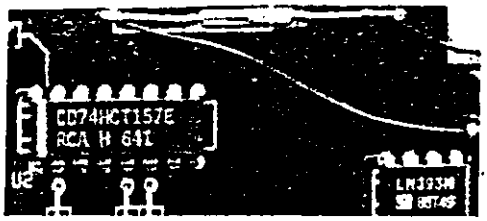


1-42 Voltage Select Switch

Cover Open Interlock Switch

Cover open interlock switch

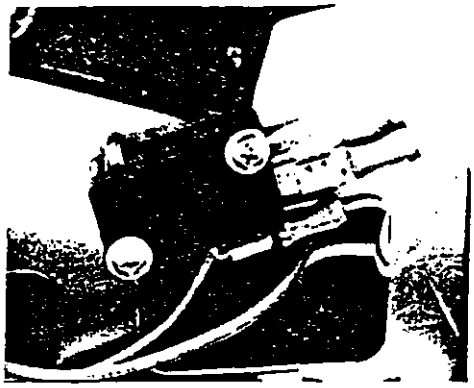
The cover open interlock switch detects when the top cover is raised. To protect the operator, printing cannot occur when the top cover is raised. The cover open interlock switch is located on the control panel circuit board. It is a magnetic reed switch that can detect the presence of a magnet mounted on the top cover. When the top cover is raised, the switch cannot detect the magnet so it generates a signal. By polling the switch status, the printer can determine when the top cover is raised.



1-43 Cover Open Interlock Switch

Tractor Switch

Tractor switch

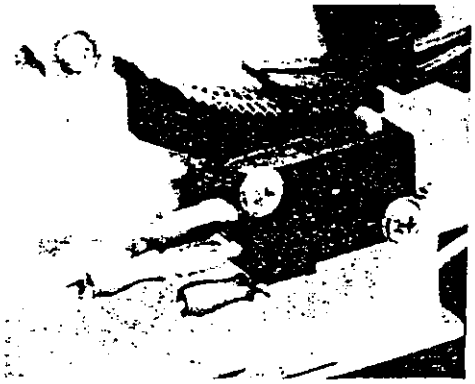


1-44 Tractor Switch

The tractor switch detects the position of the tractor select lever. The printer must know when the tractors are in use so that it can feed paper properly. The switch is mounted on the right side of the printer chassis, near the bottom of the tractor select lever. When the operator pulls the lever towards the front of the printer, the bottom of the lever trips the switch. By polling switch status, the printer can determine when the tractor is in use.

Print Gap Switch

Print gap switch



1-45 Print Gap Switch

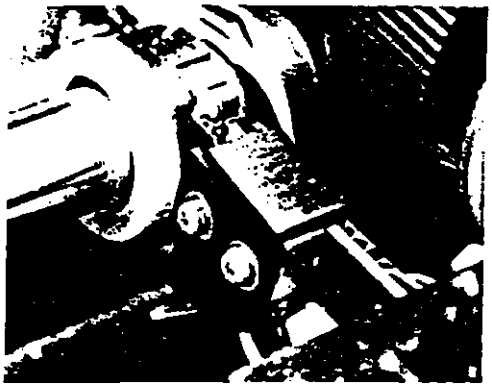
The print gap switch detects the position of the paper thickness lever. Currently, the printer does not use the print gap switch; its function is reserved for future use. The switch is mounted on the right side of the printer chassis, near the bottom of the paper thickness lever. When the operator pulls the lever towards the front of the printer, the bottom of the lever trips the switch.

Note: Some Accel-500 printers do not have a print gap switch.

Ribbon Home Switch

Ribbon home switch

The ribbon home switch detects when the ribbon cartridge is at the lowest position, which signifies that the top ribbon band is in front of the printhead. The switch is mounted on the left side of the carriage. When the ribbon cartridge pivots to the lowest position, the bottom of the cartridge trips the switch. On power up and reset, the printer lowers the ribbon cartridge until it receives a signal from the switch. The printer can then move the ribbon cartridge and ribbon to any valid position using the switch position as an index.

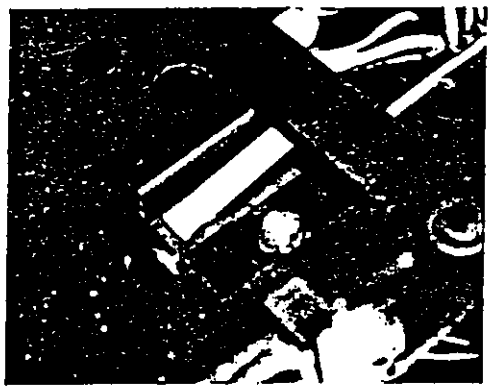


1-46 Ribbon Home Switch

Multicolor Ribbon Switch

Multicolor ribbon switch

The printer uses two ribbon lift methods: incremental and four-position. When a monochrome ribbon is installed, the printer lifts and lowers the ribbon in small increments causing the ribbon to wear evenly. When a multicolor ribbon is installed, the printer lifts and lowers the ribbon to correspond with the four color bands.

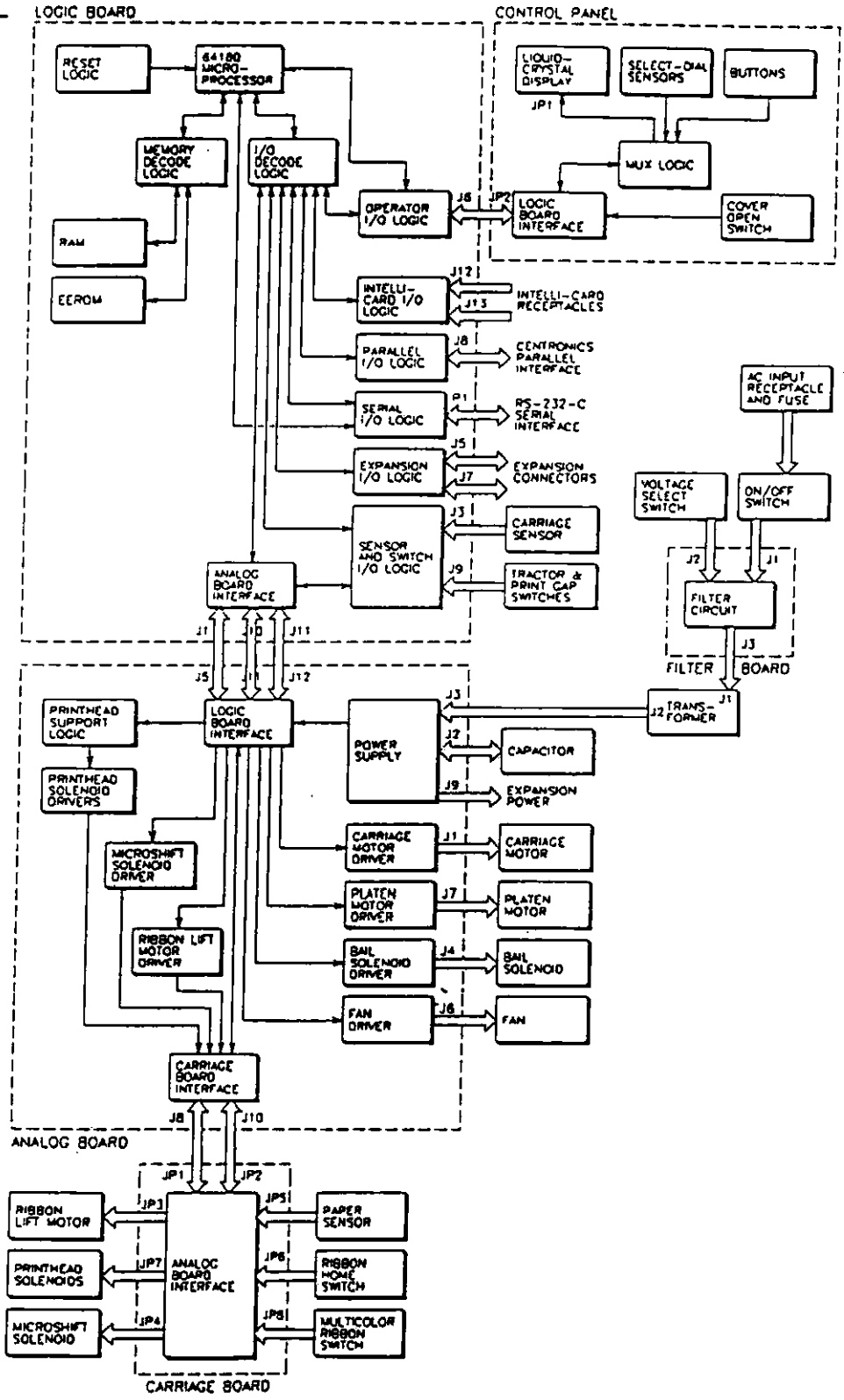


1-47 Multicolor Ribbon Switch

Multicolor ribbon cartridges have a small protruding pin on the bottom side; monochrome ribbon cartridges do not. The multicolor ribbon switch is mounted under the ribbon platform. There is a small hole in the ribbon platform just above the switch. When a multicolor ribbon cartridge is installed, the protruding pin trips the switch. By polling switch status, the printer can determine the ribbon type in use.

Electronics Overview

Functional block diagram



1-48 Functional Block Diagram

Printer electronics consist of a power supply system and four electronic circuit boards: the logic board, analog board, control panel, and carriage board. Figure 1-48 on the previous page shows a functional block diagram of printer electronics.

Electronics overview

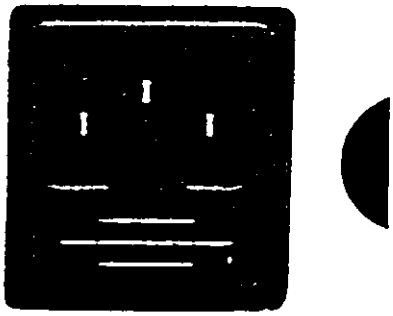
POWER SUPPLY SYSTEM

The power supply system converts either 90 to 130 or 180 to 260 vac input power into approximately 10 and 34 vac. These voltages are then supplied to the analog board for conversion into dc. The power supply system consists of an ac power receptacle and fuse, filter circuit board, and transformer.

Power supply system

AC Power Receptacle and Fuse

The ac power receptacle is located at the rear of the printer. Input voltage is applied to the receptacle via a properly grounded power cable. The voltage passes through a safety fuse in the receptacle and then on to the on/off switch.

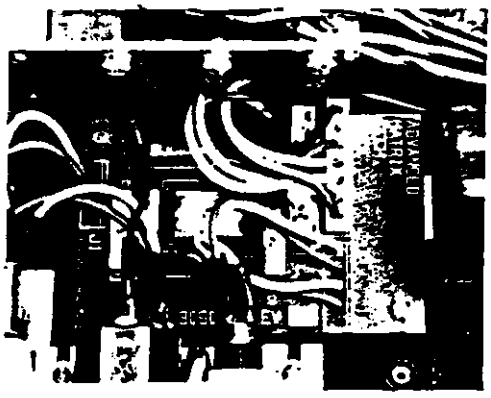


1-49 AC Power Receptacle

AC power receptacle and fuse

Filter Board

From the on/off switch, ac input power is applied to the filter board. This board filters out high-frequency noise and spikes in the line and can be jumpered to compensate for too high or too low input voltage. From the filter board, ac input voltage goes to the voltage select switch.

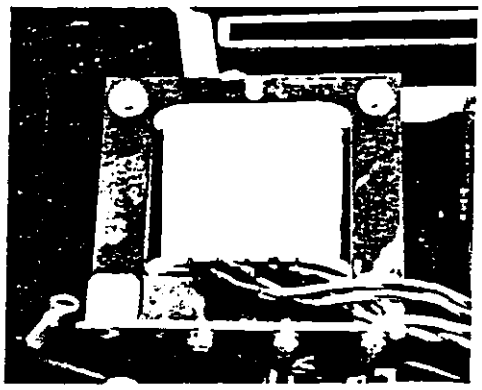


1-50 Filter Board

Filter board

Transformer

Transformer



1-51 Transformer

From the voltage select switch, ac input voltage returns to the filter board and is then applied to a transformer that outputs approximately 10 and 34 vac to the analog board.

LOGIC BOARD

Logic board

The logic board consists of a crystal oscillator, microprocessor, reset circuit, electronic-erasable read-only memory, random-access memory, memory decode logic, input/output (I/O) decoder, Intelli-card I/O logic, serial I/O logic, parallel I/O logic, operator I/O logic, analog I/O logic, and sensor I/O logic.

Input Voltage

Input voltage

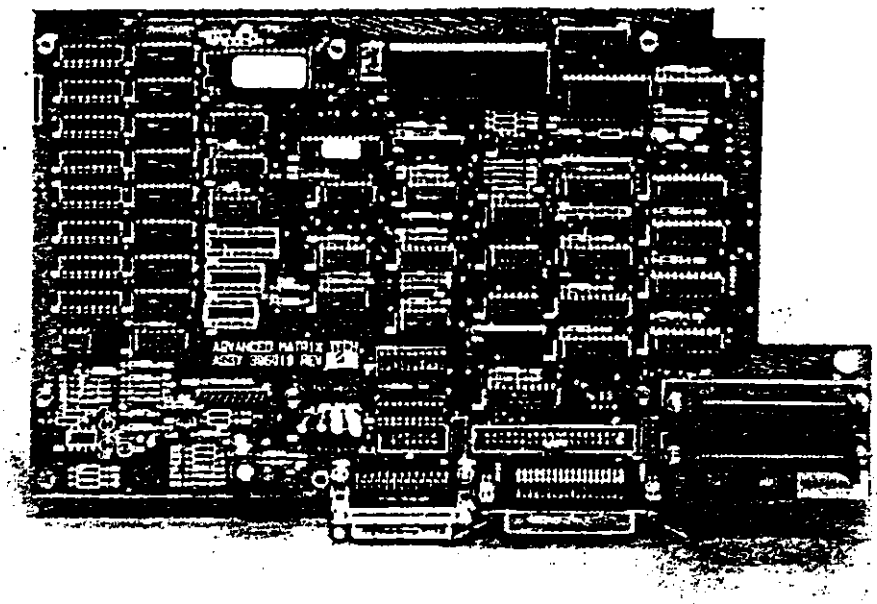
The logic board receives +5 and +34 vdc from the analog board. The board distributes the +5 vdc to all of the logic circuits.

Crystal Oscillator

Crystal oscillator

A 12.288 MHz crystal oscillator provides basic timing input to the microprocessor.

Logic board



1-52 Logic Board

Microprocessor

Microprocessor

The logic board contains an Hitachi 64180 microprocessor to sequence and direct printer operations. The microprocessor performs the following basic functions:

- Generates a 6.144 MHz system clock.
- Performs all status/control bus activity, including external bus cycle wait state timing, resets, random-access memory refresh, master DMA bus exchange, and dual-bus control signals for compatibility with all printer components. Also, manages 19-bit address bus providing physical memory addresses of up to 512 kilo-bytes and bi-directional 8-bit data bus.
- Monitors and prioritizes four external and eight internal interrupt sources.

- Maps the 64 kilobyte logical memory address space into a 512 kilobyte physical memory address space.
- Executes the executive printer program and printer emulations.

In addition, the microprocessor contains four integrated input/output resources:

- Two-channel direct memory access (DMA) controller
- Two asynchronous serial communication interfaces
- Clocked serial input/output port
- Programmable reload timer (PRT)

Reset Circuit

Reset circuit

The reset circuit monitors the +5 vdc input and compares it to a backup +5 vdc. If the +5 vdc input begins to drop, the circuit uses the +5 vdc backup to send a reset signal to the microprocessor. The reset signal causes all output signals to return to their inactive states and terminates processing. If the reset signal ends, the microprocessor starts program execution from the beginning.

The +5 vdc backup is created from the +34 vdc supply. The backup voltage is present for an extended period of time after input power is lost, due to an 18,000 micro-farad capacitor that stores the +34 vdc charge. The +34 vdc charge in the capacitor is drained after printer shut-down by the fan.

Electronic-Erasable Read-Only Memory

Electronic-erasable read-only memory

The logic board contains a 2- or 8-kilobyte electronic-erasable read-only memory (EEROM). The microprocessor can both read data from and write data to EEROM. Data in EEROM is non-volatile; that is, it remains intact even when the printer is turned off. EEROM provides storage for the following:

- *Bootstrap loader.* This is the first program that the microprocessor executes following power-up. The bootstrap loader checks to see if a valid Intelli-card is loaded in one of the Intelli-card receptacles. If a valid card is installed, the bootstrap loader copies the executive program and other information in the card to random-access memory and then transfers control to the executive program. If a valid card is not installed, the bootstrap loader displays LOAD INTELLI-CRD on the control panel and rechecks for a valid Intelli-card every three seconds.

- *Setup menu settings.* These are the parameter settings that the operator saves from the Setup menu.

Random-Access Memory

Random-access memory

The logic board can contain from 64K to 512K of internal random-access memory (RAM), using eight or sixteen 1 x 64K (4164) or 1 x 256K (41256) 120-nanosecond chips:

Memory Chip	Quantity	Total Memory
4164	8	64K
4164	16	128K
41256	8	256K
41256	16	512K

RAM is physically and logically separated into two banks: A and B. Bank A consists of the first eight chips, providing the lower 64K or 256K of RAM; bank B consists of the second eight chips, providing the upper 64K or 256K of RAM.

The microprocessor can both read data from and write data to RAM. Unlike EEROM, RAM stores data only temporarily. As soon as the printer is turned off, all data in RAM is lost. RAM provides temporary storage for the following:

- *Executive program.* This is the master printer control program that the microprocessor executes to control all printer operations. The executive program is written to RAM at power-up by the bootstrap loader.

- *Printer emulations.* These are add-on programs to the executive program that enable the printer to imitate other popular printers by responding to the same control commands. Printer emulations are also written to RAM at power-up by the bootstrap loader.

- *Variables.* These are special values that the executive program and printer emulations use to perform various operations. These variables are written to RAM on an as-needed basis by the executive program and the printer emulations.

- *Font coding.* This is information that tells the executive program how to print each character in a specific font. Font coding is written to RAM at power-up and on an "as-needed" basis during printing. Font coding can also be downloaded from the host and written to RAM.

- *Data input buffer.* This is a special area reserved for storing incoming data from the serial or parallel interface.

Memory Decode Logic

Memory decode logic

Memory decode logic interfaces the microprocessor with EEROM and RAM by performing the following functions:

- Multiplexes each 18-bit memory address from the microprocessor into 9-bit row and column addresses

- Provides the necessary row address strobe (RAS) and column address strobe (CAS) to clock the multiplexed row and column addresses

- Handles memory switching between RAM and EEROM

Input/Output (I/O) Decoder

I/O decoder

The logic board contains an input/output (I/O) decoder that interfaces the microprocessor with external I/O-mapped ports. The I/O decoder receives a 4-bit port number from the microprocessor over the address bus and selects the corresponding port. External ports consist of eleven 8-bit data latches, three 8-bit buffers, and two stepper motor controllers.

Intelli-Card I/O Logic

Intelli-card I/O logic

Intelli-card I/O logic interfaces the microprocessor with two Intelli-cards. Intelli-cards are credit-card-size read-only memory modules that contain the executive program, printer emulations, variables, and fonts. At power-up, the bootstrap loader copies the data in these cards to RAM and then transfers control to the executive program. The executive program rereads data in the Intelli-cards on an as-needed basis.

Intelli-cards install into two receptacles on the logic board. The receptacles are easily accessible by removing the Intelli-card cover at the top-rear of the printer.

Intelli-card receptacles connect the Intelli-cards to a 20-bit address bus, 8-bit data bus, power line, and ground line. The address and data buses are connected to I/O-mapped ports. To read data at an Intelli-card location, the microprocessor latches an Intelli-card address and then reads the Intell-card data port.

Serial I/O Logic

Serial I/O logic

Serial I/O logic interfaces the microprocessor with the host computer using EIA RS-232-C control signals. A serial cable from the host computer attaches to a DB-25 female connector on the logic board. The serial connector protrudes through the rear panel of the printer for easy access.

From the connector, most of the serial lines connect directly to the asynchronous receive, transmit, and modem control inputs of the microprocessor; the serial handshake lines, however, connect to I/O-mapped ports.

To enable serial communications, the executive program sets the microprocessor's asynchronous serial interface registers to the operator-selected serial parameters, sets the DMA controller registers to transfer incoming data from the asynchronous serial interface to the input buffer in RAM, and then enables the DMA controller.

The DMA controller can receive up to 256 data bytes without interrupting the CPU or slowing program execution. After the DMA controller receives these bytes, it generates an interrupt to notify the executive program. The executive program handles the interrupt by supplying the required serial handshake signals to the serial handshake ports, resetting the DMA controller registers, and re-enabling the DMA controller when the input buffer has room for more data.

You can configure the RS-232-C serial connector to provide either DTE or DCE serial functions by positioning a DIP shunt on the logic board.

For further information about the RS-232-C serial interface, including signal descriptions and pin assignments, refer to the *Interface Guide*.

Parallel I/O Logic

Parallel I/O logic

Parallel I/O logic interfaces the microprocessor with the host computer using Centronics parallel control signals. A parallel cable from the host computer attaches to a Centronics 36-pin female connector on the logic board. The parallel data lines connect to I/O-mapped ports.

To enable parallel communications, the executive program sets the DMA controller registers to transfer data from the parallel I/O port to the input buffer in RAM and then enables the DMA controller.

A strobe pulse from the host computer sets the parallel data latch so that it holds the current data byte. The strobe pulse also sets a flip-flop that returns a busy signal to the host computer and issues a DMA request signal to the microprocessor. To handle the DMA request, the DMA controller reads the parallel data port and writes the data byte to the input buffer in RAM. This action causes the busy flip-flop to reset which turns off the busy signal and also causes a four microsecond acknowledge signal to be sent to the host computer.

After receiving 256 data bytes, the DMA controller generates an interrupt to notify the executive program. The executive program handles the interrupt by resetting DMA controller registers and re-enabling the DMA controller when the input buffer has room for more data.

For further information about the Centronics parallel interface, including signal descriptions and pin assignments, refer to the *Interface Guide*.

Operator I/O Logic

Operator I/O logic

Operator I/O logic interfaces the microprocessor with the control panel and ultimately the operator. The control panel contains a 16-digit, one-line alphanumeric liquid-crystal display (LCD), twelve buttons, and a Select-dial. The control panel attaches to a 10-pin connector on the logic board. The connector serves the following purposes:

- Connects the control panel to +5 vdc and ground.
- Connects the LCD driver to the microprocessor's serial clock and transmit data lines. The executive program can then control the LCD by setting up internal I/O-mapped registers.
- Connects Select-dial sensors and control panel buttons to the appropriate ports. The executive program can then check control panel status by polling these ports.

Analog I/O Logic

Analog I/O logic

Analog I/O logic interfaces the microprocessor with the analog board. The analog board contains the motor and solenoid drivers, printhead support circuitry, audible alarm driver, and carriage board interface. The analog board attaches to three 10-pin connectors on the logic board. The connectors serve the following purposes:

- Connects the logic board to +34 vdc, +5 vdc, and ground.
- Connects the I/O decoder on the logic board to the appropriate ports on the analog board.
- Connects motor control signals to the appropriate motor drivers on the analog board.

- Connects various sensor and switch feedback signals from the analog board to the appropriate ports on the logic board.
- Connects the logic board data bus to a data port on the analog board.

Sensor/Switch I/O Logic

Sensor/switch I/O logic

Sensor/switch I/O logic interfaces the microprocessor with printer sensors and switches. The carriage home sensor, print gap switch, and tractor select switch plug into connectors on the logic board. The cover open interlock switch is mounted on the control panel board. All other sensors and switches plug into connectors on the carriage board. Feedback signals from the sensors and switches connect to a port on the logic board. The executive program can monitor the status of printer sensors and switches by polling this port.

ANALOG BOARD

Analog board

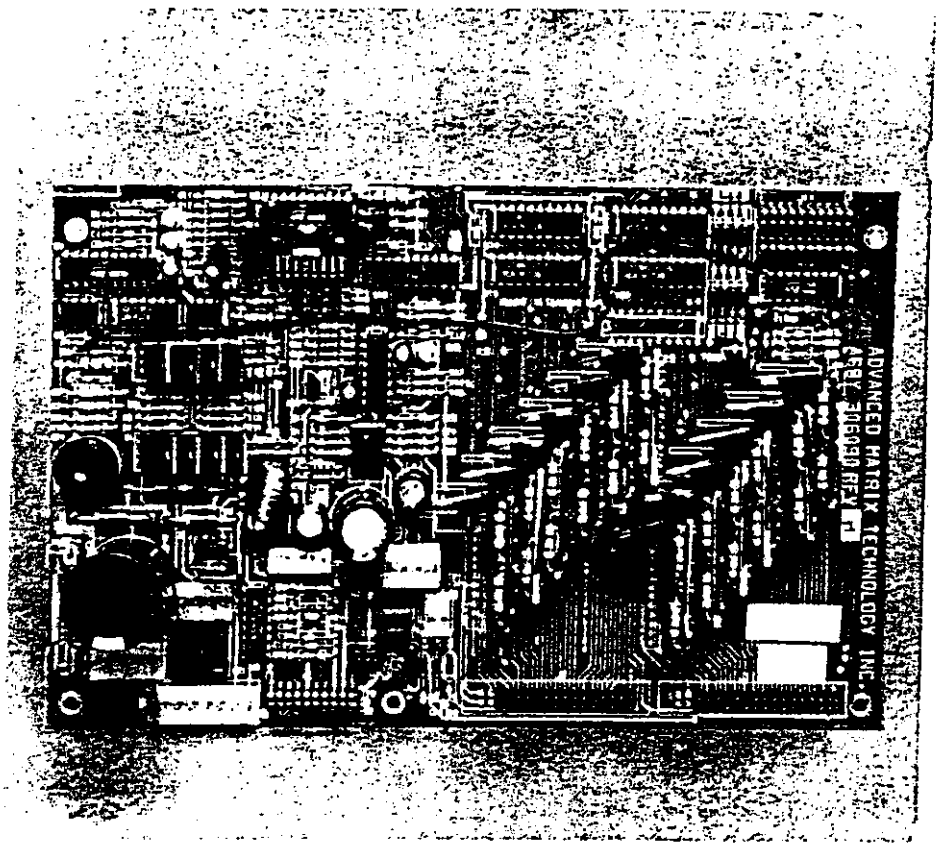
The analog board contains power supply circuitry, printhead support circuitry, printhead wire solenoid drivers, a ribbon lift motor driver, carriage motor driver, line feed motor driver, fan driver, microshift and bail solenoid driver, audible alarm, and carriage board interface.

Input Voltage and Power Supply Circuitry

Input voltage and power supply circuitry

The analog board receives approximately 34 and 10 vac from the transformer. The 34 vac goes to a rectifier bridge which converts the voltage to +34 vdc. The +34 vdc goes to an 18,000 microfarad capacitor, 5 amp fuse, and then on to the motor and solenoid driver circuits. The 10 vac goes to a diode that converts the voltage to +10 vdc. The +10 vdc goes to a 10,000 microfarad capacitor and then on to the bail and microshift solenoid driver circuits, carriage motor, and ribbon lift motor.

Analog board



1-53 Analog Board

The analog board creates +5 vdc from the +10 vdc using a switching voltage regulator. A choke and several capacitors filter the +5 vdc before the analog board distributes the voltage to printer logic.

Printhead Support Circuitry

Printhead support circuitry

Printhead support circuitry consists of four ports--one for each bank of printhead wires and one to handle the three additional wires of an optional 27-wire printhead. To fire printhead wire solenoids, the microprocessor writes data to these ports. When a data bit is 1, the signal is high and the corresponding printhead wire fires; when a data bit is 0, the signal is low and the corresponding printhead wire does not fire.

One of the printhead bank enable signals from the microprocessor also goes to a one-shot that generates a printhead enable signal. Printhead wire solenoid drivers require this input signal to operate.

Printhead Wire Solenoid Drivers

Printhead wire solenoid drivers

The analog board contains 14 identical printhead wire solenoid drivers--each handling two printhead wires. When a driver receives printhead and wire enable signals from the microprocessor, it switches on +34 vdc to the corresponding printhead wire solenoid and the wire extends. When the wire enable signal ends after approximately 300 microseconds, the driver cuts off the +34 vdc to the solenoid and the wire retracts and settles. The microprocessor can fire the wire again in approximately 500 microseconds.

Within each printhead wire solenoid driver are two transistors connected to +34 vdc and ground. The printhead and wire enable signals turn on both transistors. The output current from one transistor passes through a current sensing resistor. The voltage drop across this resistor is compared to a reference voltage. When the voltage drop exceeds the reference voltage, one of the transistors turns off. When the voltage drop returns to an acceptable level, the transistor turns back on. This voltage chopping technique maintains a consistent current to the printhead wire throughout the firing cycle.

Ribbon Lift Motor Driver

Ribbon lift motor driver ply circuitry

The ribbon lift motor driver consists of a port and a stepper motor controller. The microprocessor writes motor phase patterns to the port which, in turn, supplies them to the stepper motor controller. The controller uses the patterns o turn on and off four integral transistors that control the direction of current through ribbon lift motor windings.

Carriage Motor Driver

Carriage motor driver

The carriage motor driver consists of a stepper motor controller and two identical current sensing circuits. The microprocessor supplies motor enable, motor direction, and current mode signals to the stepper motor controller via I/O ports. The motor enable signal turns on and off the stepper motor controller. The motor direction signal determines the order that current is applied to the carriage motor windings. The current mode signal selects a high or low reference voltage and therefore a high or low current level for the motor. To maximize motor torque, the carriage motor operates in a high current mode during ramp-up and ramp-down; the motor switches to a low current mode after reaching a constant speed.

The microprocessor also supplies a step pulse signal to the stepper motor controller using its own programmable reload timer (PRT). To drive the carriage motor at a particular step pulse frequency, the executive program simply sets up the PRT registers with the correct timer information and data. When the PRT times out, it generates an internal interrupt to the microprocessor. The executive program handles this interrupt by sending a step command to the stepper motor controller and resetting the PRT registers.

The stepper motor controller uses these input signals to turn on and off transistors that supply the correct voltage sequence to the carriage motor windings. The output current from an active transistor passes through a current sensing resistor. The voltage drop across this resistor is compared to the reference voltage. When the voltage drop exceeds the reference voltage, the transistor turns off. When the voltage drop returns to an acceptable level, the transistor turns back on. This voltage chopping technique maintains a consistent current to the carriage motor windings.

Platen Motor Driver

Platen motor driver

The platen motor driver is similar to the carriage motor driver, except that a discrete stepper motor driver replaces the external current-sensing circuits.

Fan Driver

Fan driver

The fan driver consists of a transistor and voltage regulator. The executive program can turn the transistor on or off via an I/O port. The transistor supplies a voltage reference to the voltage regulator. When the transistor is off, the voltage regulator supplies +24 vdc to the fan (high-speed mode); when the transistor is on, the voltage regulator supplies +12 vdc to the fan (low-speed mode). The executive program sets the fan to high-speed mode during printing and to low-speed mode when the printer is idle.

Microshift and Bail Solenoid Driver

Microshift and bail solenoid driver

The microshift and bail solenoid driver consists of a one-shot and four transistors. To energize a solenoid, the microprocessor sends either a bail or microshift select signal and a solenoid energize signal via an I/O port. The select signal turns on a transistor which connects +10 vdc to the selected solenoid. At the same time, the solenoid energize signal triggers the one-shot which turns on two transistors that connect +34 vdc to the selected solenoid. When the one-shot turns off, the selected solenoid continues to receive +10 vdc until the microprocessor cancels the select signal.

Audible Alarm

Audible alarm

The audible alarm speaker connects to +10 vdc and to a transistor that connects to ground. To drive the speaker at a particular frequency, the microprocessor sends a pulsed speaker enable signal to the transistor via an I/O port on the logic board. The enable signal turns the transistor on and off, which in turn powers the speaker.

Carriage Board Interface

Carriage board interface

The carriage board attaches to two 34-pin connectors on the analog board. The connectors serve the following purposes:

- Connects the carriage board to +5 vdc and ground.
- Connects the power outputs and returns from the print-head wire solenoid drivers to the appropriate print-head wire solenoids.
- Connects the power output and return from the micro-shift solenoid driver to the microshift solenoid.
- Connects the power outputs from the ribbon lift motor driver to the ribbon lift motor.
- Connects the feedback signals from the paper sensor, ribbon home switch, and multicolor ribbon switch to the analog board which, in turn, sends these signals to a port on the logic board.

CONTROL PANEL

Control panel

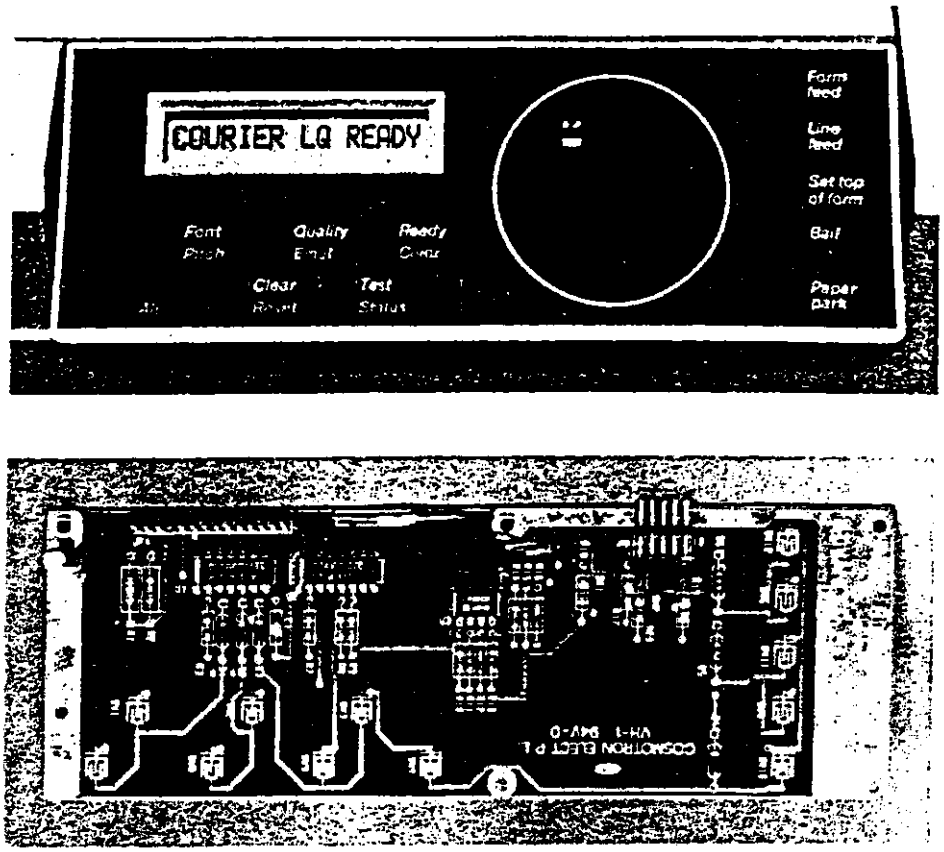
The control panel contains a 16-digit, one-line, alphanumeric liquid-crystal display (LCD) to display information received from the logic board. The panel also contains 12 buttons and a Select-dial that enable the operator to send input back to the logic board.

Liquid-Crystal Display

Liquid-crystal display

The liquid-crystal display (LCD) connects to +5 vdc, ground, an 8-bit data bus, an enable signal, and a reset signal. The data bus connects to an 8-bit serial-in/parallel-out shift register that receives serial clock pulses and input data from the microprocessor's serial clock and transmit data lines. The enable and reset signals connect to an I/O port on the logic board.

Control panel



1-54 Control Panel

To write data to the LCD, the microprocessor sets up internal I/O-mapped registers for the serial clock and transmit data lines and then strobes the LCD enable line.

Buttons

Buttons

The twelve buttons are logically organized into six columns and two rows. Each column of buttons is connected to one of the LCD data lines. Each row of buttons is connected to a multiplexer that can output two row signals to an I/O port on the logic board. To send a row signal, the LCD data line for a column of buttons must be grounded and the operator must be pressing a button in that column.

To read button status, the microprocessor makes sure the LCD enable line is inactive and then grounds the LCD data lines one at a time while checking for row signals.

Select-Dial

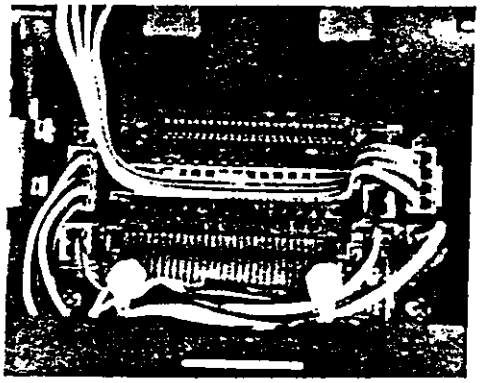
Select-dial

The Select-dial sensors are connected to the same multiplexer as the control panel buttons. When the multiplexer receives an enable signal, it connects the Select-dial sensor signals to the two output lines, in place of the button row signals.

To read sensor status, the microprocessor makes sure the LCD enable line is inactive, selects the LCD data line that provides the multiplexer enable signal, and then reads the multiplexer output signals at the appropriate port.

CARRIAGE BOARD

Carriage board



1-55 Carriage Board

The carriage board is connected to the analog board with two 34-pin cables. The carriage board connects the lines in these cables to the appropriate lines in six onboard connectors.

The carriage board contains the following connectors:

- 50-pin printhead connector
- 4-pin ribbon lift motor connector
- 4-pin paper sensor connector
- 2-pin microshift solenoid connector
- 2-pin ribbon home switch connector
- 2-pin multicolor ribbon switch connector

Specifications

AMT printer specifications are as follows:

Table 1-1. Specifications

Specifications

Item	*Specification*
Physical Characteristics	
Dimensions Height Width Depth Weight	 7.35 inches (18.7 cm) 24 inches (70.0 cm) 16.9 inches (42.9 cm) 40 pounds (18.1 kg)
Printing Characteristics	
Method Movement Color Speed Letter mode Memo mode Draft mode	Serial impact, dot-matrix, logic-seeking, Bi-directional Fully supported using color ribbon 80 characters per second 200 characters per second 400 characters per second during 10-pitch printing; 480 characters per second during 12- and higher-pitch printing

Table 1-1. Specifications (continued)

Item	*Specification*
Printing Characteristics (continued)	
Printhead No. of wires Wire diameter Option Noise level	 24 0.3 millimeters Tungsten carbide wires Less than 55 dBA maximum
Controls and Indicators	
Control panel Buttons Display Select-dial Levers	 Font/Pitch, Quality/Emul, Ready/ Color, Clear/Reset, Test/Status, Setup, Form feed, Line feed, Set top of form, Bail, Paper park, Alt 16-place, one-line alphanumeric liquid-crystal display (LCD) For paper/carriage movement and printer setup Paper thickness, tractor select
Motors, Solenoids, Sensors, and Switches	
Motors/solenoids Sensors Switches	Carriage, platen, ribbon lift, fan, microshift, bail, printhead Carriage, paper, Select-dial Print gap, tractor, cover open, ribbon home, color ribbon, on/off, voltage select

Table 1-1. Specifications (continued)

Item	*Specification*
Interface Compatibility	
Interfaces	Centronics-compatible parallel, EIA RS-232-C serial
Serial settings	
Baud rates	150, 300, 600, 1200, 2400, 4800, 9600, 19200, 38400
Handshaking	DTR, X-ON/X-OFF, ETX/ACK
Parity	Even, odd, none
Data bits	7-bit, 8-bit, 8-bit with MSB set to 0
Stop bits	1, 2
Input buffer	16K bytes, expandable to over 400K
Printer/Plotter Emulations	
Standard	AMT, Diablo 630 ECS, Xerox 4020, Epson JX, Epson LQ-2550, IBM XL24, IBM 5182
Optional	DEC LQ and LA series, Apple ImageWriter LQ and ImageWriter II, Hewlett-Packard (HP-GL), others
Vertical and Horizontal Spacing	
Line spacing	
Operator-selectable	3, 4, 6, 8 and 12 lines per inch
Software-selectable	1 to 120 lines per inch

Table 1-1. Specifications (continued)

Item	*Specification*
Vertical and Horizontal Spacing (continued)	
Text spacing	
Operator-selectable	10, 12, 13.3, 15, 17.1 and 20 characters per inch and proportional
Software-selectable	1 to 120 characters per inch and proportional
Line length	
Operator-selectable	8, 13.6 and 16 inches
Software-selectable	
10-pitch	Up to 136 character columns
12-pitch	Up to 163 character columns
13.3-pitch	Up to 180 character columns
15-pitch	Up to 204 character columns
17.1-pitch	Up to 232 character columns
20-pitch	Up to 272 character columns
Fonts	
Standard	Courier, Gothic, Trend, Elite
Character set	256-character IBM/ASCII (with lowercase descenders and underlining)
Options	Courier Legal, Gothic PS, General Scientific, Orator, IBM PS, DEC Scientific, APL, OCR-A, OCR-B, MEC Chemical, Elite Scientific, Bar Code 39 (3 of 9), others

Table 1-1. Specifications (continued)

Item	*Specification*
	Fonts (continued)
Character matrix Draft mode Memo mode Letter mode	 8V x 15H (one pass) 16V x 36H (one pass) 32V x 36H (two passes)
Special character printing	Expanded (double-high, double-wide, double-high/double-wide); italic (10-, 20- or 30-degrees); automatic bold, shadow, underscore, center, and justify
	Graphics
Single-pass dot resolutions	60V x 60H, 60V x 120H, 120V x 120H, 120V x 240H, 120V x 480H
Double-pass dot resolutions	240V x 120H, 240V x 240H, 240V x 480H
Dots per column	Up to 16 dots per column
Print speed	14.5 inches per second (60H graphics); 7.25 inches per second (120H and 240H graphics); 40 inches per second (high-speed space skip)
Columns per line 60H graphics 120H graphics 240H graphics 480H graphics	 Up to 960 Up to 1,920 Up to 3,840 Up to 7,680

Table 1-1. Specifications (continued)

Item	*Specification*
	Paper
Size/thickness	Up to 17 inches wide; any length over 3 inches
Paper	Up to 0.010 inch thick
Forms	Up to 0.024 inch thick
Paper paths	
Standard	Top for cut paper; top-rear for pin-feed paper
Optional	Bottom (requires bottom-feed tractor option)
Feeding methods	Friction for cut sheets; tractor for continuous pin-feed paper
Special features	Tear bar, first-line printing, auto bail, auto print gap, paper out and paper jam sensing, demand document and paper park features
Form length	
Operator-selectable	0 to 30.3 inches
Software-selectable	0 to 30.3 inches
Slew rate	10 inches per second
Line feed rate	50 milliseconds maximum
Options	Bottom-feed tractor, single-, double-, and triple-bin sheet/envelope feeders

Table 1-1. Specifications (continued)

Item	*Specification*
	Ribbon
Type	Nylon fabric stuffed in plastic cartridge
Dimensions	20 mm x 16 meters
Ink	
Monochrome	Black (standard and long-life)
Color	Black, cyan, magenta, yellow
Life	
Standard	Exceeds 5 million characters
Color	Exceeds 2 million characters
Compatibility	Toshiba P351C ribbon cartridge
	Power and Environmental Requirements
Voltage	
Domestic	100, 120, 140 vac (+/-10%)
International	220, 240, 260 vac (+/-10%)
Frequency	47 Hz to 63 Hz
Operating	
Temperature	7° to 46° C (45° to 115° F)
Humidity	10% to 90% (non-condensing)
Altitude	-100 to +10,000 feet
Storage	
Temperature	-20° to 60° C (-4° to 140° F)
Humidity	10% to 90% (non-condensing)
Altitude	-100 to +30,000 feet

Table 1-1. Specifications (continued)

Item	*Specification*
	Printer Tests
Status printout	Automatic printout of printer status
Self test	Rotating character pattern
Hex printing	Automatic hexadecimal printout
Diagnostics	Full set of interactive printer tests to check all printer subsystems, including memory, serial interface, sensors, ribbon alignment
	Reliability and Agency Compliance
Product Warranty	Two years, parts and labor; one year on the printhead
Mean Time To Repair (MTTR)	Less than 15 minutes (average)
Mean Time Between Service Calls (MTBSC)	Over one year (average when operated at 50% duty cycle and 50% print density)
Mean Time Between Failures (MTBF)	15,000 hours at 80% confidence (when operated at 50% duty cycle, 50% print density)
Regulatory agencies	UL listed; CSA certified; FCC Class B compliance; VDE or TUV compliance (optional)

2 Diagnostics

Although the Accel-500 printer has been carefully designed to provide long periods of trouble-free operation, certain malfunctions can occur that cause faulty printing. There are eight types of printer malfunctions:

Printer malfunctions

- *Power.* The printer must receive the correct ac input voltage and provide the correct dc voltages to power printer logic and the various motor and solenoid driver circuits. If any voltage is out of range, printing cannot occur.

- *Memory.* If memory is defective, unpredictable and intermittent problems can occur. There are several tests that you can run to check the printer memory.

- *Sensors and Switches.* The printer uses various sensors and switches to check printer status. If a sensor or switch malfunctions, printing may be faulty.

- *Motors and Solenoids.* The printer uses various motors and solenoids to move printer components and perform printing functions. If a motor or solenoid malfunctions, printing may be faulty.

- *Paper Feeding.* The printer uses various paper guides and belts to ensure that paper feeding is smooth and straight. If a paper feed component is misaligned or damaged, paper feeding may be faulty.

- *Ribbon Feeding.* The printer uses a ribbon feed mechanism and cable to advance the ribbon through the ribbon cartridge and in front of the printhead. If the mechanism or cable is misaligned or defective, ribbon feeding may be faulty.

- *Interface*. The printer can receive Centronics-compatible parallel and RS-232-C serial control signals and data from a host computer. If the printer does not receive and print data sent from the host, the interface may be faulty.

- *Print quality*. If the printer operates normally but the print quality is poor, certain alignments in the printer may need adjustment.

Acceptance Tests

Acceptance tests

This section provides eight acceptance tests--one for each type of printer malfunction. To check a printer for normal operation, you should perform all eight tests. If the printer fails any test, you should perform the required actions and then retry the test. Only printers that pass all eight tests are ready for normal operation.

POWER ACCEPTANCE TEST

Power acceptance test

To check printer power, perform the following procedure:

1. Make sure that the power cable is attached to the printer and the printer is turned off.

2. Remove all installed Intelli-cards.

3. Turn on the printer. Depending on what happens, perform one of the following actions:

   - If the message LOAD INTELLI-CRD appears on the control panel display and the fan is running, the printer passes the test. You're ready to perform the next acceptance test.

   - If the message LOAD INTELLI-CRD does not appear on the control panel display or the fan is not running, the printer fails the test. Perform the *Power Diagnostic* later in this section.

MEMORY ACCEPTANCE TEST

Before performing this test, make sure that the printer passes the power acceptance test. To check printer memory, perform the following procedure:

Memory acceptance test

1. With the printer turned on and the message LOAD INTELLI-CRD on the control panel display, install an EECHECK Intelli-card in one of the Intelli-card receptacles. Depending on what happens, perform one of the following actions:

   - If the message EECHECK VER 1.0 appears followed by TEST IN PROGRESS, the EECHECK program is executing. After one minute, the message EEROM OK or EEROM FAIL will appear on the control panel display. Depending on which message appears, perform one of the following actions:

     - If EEROM OK appears, the printer passes the EECHECK test; skip to step 2.

     - If EEROM FAIL appears, perform the *Memory Diagnostic* later in this section.

   - If the message LOAD INTELLI-CRD remains on the control panel display, you must perform the *Memory Diagnostic* later in this section.

2. Turn off the printer.

3. Install an Intelli-card with an Accel-500 Executive (master) program in the vacant Intelli-card receptacle.

4. Remove the EECHECK Intelli-card.

5. Turn on the printer. Depending on what happens, perform one of the following actions:

   - If the primary status message appears on the control panel display, skip to step 6.
   - If RIBBON ERROR appears on the control panel display, press the Ready button to clear the error and display the primary status message. Now, skip to step 6.
   - If the message LOAD INTELLI-CRD or CONFIG ERROR appears on the control panel display or the display goes blank, check that the Intelli-card is installed correctly. If it is, try another Intelli-card. If the problem recurs, you must perform the *Memory Diagnostic*.
   - If the message LOWER TOP COVER appears, make sure that the top cover is lowered as far as possible. If the top cover is lowered and the message remains, the cover open interlock switch is malfunctioning. You must perform the *Sensor and Switch Diagnostic*.
   - If the carriage slams to the far left, the printer makes a loud grinding noise, and CARRIAGE ERROR appears on the control panel display, the carriage sensor is malfunctioning. Turn off the printer immediately. You must perform the *Sensor and Switch Diagnostic*.
   - If EEROM ERROR appears on the control panel display, you must perform the *Memory Diagnostic*.

6. Press the Setup button on the control panel to display the Setup menu. If the Setup menu does not display, the Setup button is malfunctioning. You must perform the *Sensor and Switch Diagnostic*.

7. Turn the Select-dial until the TEST parameter appears. If the Select-dial does not scroll through the parameters on the Setup menu, the Select-dial is malfunctioning. You must perform the *Sensor and Switch Diagnostic*.

8. Hold down the Alt button and turn the Select-dial until the *Memory* setting appears; then release the Alt button. The message TEST IN PROGRESS appears as the printer executes the memory test. Depending on what happens next, perform one of the following actions:

   - If the printer beeps and the Setup menu reappears, the printer passes the memory acceptance test. Press the Setup button to exit the Setup menu and proceed with the next acceptance test.

   - If the message MEMORY ERROR ### appears on the control panel display, you must perform the *Memory Diagnostic*. Be sure to make a note of the number displayed in the message.

   - If holding down the Alt button while turning the Select-dial does not scroll through the test settings, the Alt button is malfunctioning and you must perform the *Sensor and Switch Diagnostic*.

SENSOR AND SWITCH ACCEPTANCE TEST

Sensor and switch acceptance test

Before performing this test, make sure that the printer passes the power and memory acceptance tests. To check the sensors and switches, perform the following procedure:

1. With the printer turned on and the primary status message on the control panel display, press the Setup button to display the Setup menu.

2. Turn the Select-dial until the TEST parameter appears.

3. Hold down the Alt button and turn the Select-dial until the *Sensor* setting appears; then release the Alt button. The message SENSOR TEST appears.

4. At this point, you should test each printer sensor and switch by performing the following actions. If the printer verifies normal operation, a confirmation message appears. If a sensor or switch is malfunctioning, the confirmation message does not appear.

Switch/Sensor	*Action*	*Confirm Message*
Carriage sensor	Slide carriage to far left	Carriage Sensor
Paper sensor	Insert and remove paper between paper sensor on print-line indicator and platen	Paper Sensor
Cover open switch	Raise and lower top cover	Cover Switch
Print gap switch	Move paper thickness lever to extreme limits	Print Gap Switch
Tractor switch	Move tractor select lever to opposite position	Tractor Switch
Ribbon home switch	Remove ribbon cartridge and press ribbon home switch	Rbn Home Switch
Color ribbon switch	Remove ribbon cartridge and press color ribbon switch	Color Rbn Switch
Font/Pitch button	Press Font button	Font Button
Quality/Emul button	Press Quality button	Quality Button
Ready/Color button	Press Ready button	Ready Button

Switch/Sensor	*Action*	*Confirm Message*
Alt button	Press Alt button	Alt Button
Clear/Reset button	Press Clear button	Clear Button
Test/Status button	Press Test button	Test Button
Setup button	Press Setup button	Setup Button
Form feed button	Press Form feed button	Form feed Button
Line feed button	Press Line feed button	Line feed Button
Set top of form button	Press Set top of form button	Top of form Bttn
Bail button	Press Bail button	Bail Button
Paper park button	Press Paper park button	Paper park Bttn
Select-dial	Turn Select-dial	*Terminates test*

5. If you are unable to get a confirmation message for a particular switch or sensor, you must perform the *Sensor and Switch Diagnostic*. If all of the printer sensors and switches are operating, press the Setup button to exit the Setup menu. You're ready to move on to the next acceptance test.

MOTOR AND SOLENOID ACCEPTANCE TEST

Motor and solenoid acceptance test

Before performing this test, make sure that the printer passes the power, memory, and sensor and switch acceptance tests. To check the motors and solenoids, perform the following procedure:

1. With the printer turned on and the primary status message on the control panel display, press the Ready button to disable printing.

2. Turn the Select-dial in both directions and verify that the platen rotates. If not, perform the *Motor and Solenoid Diagnostic*.

3. Hold down the Alt button and turn the Select-dial in both directions. Verify that the carriage moves left and right. If not, perform the *Motor and Solenoid Diagnostic*.

4. Press the Bail button and verify that the bail moves away from the platen. Press the Bail button again and verify that the bail moves back against the platen. If the bail moves sluggishly or does not move, perform the *Motor and Solenoid Diagnostic*.

5. Lift the top cover and gently turn the gear on the ribbon lift motor until the lowest ribbon band is in front of the printhead; then lower the top cover.

6. Hold down the Alt button and press the Reset button to re-initialize the printer.

7. Lift the top cover and inspect the ribbon position. If the ribbon has *not* moved, perform the *Motor and Solenoid Diagnostic*. Lower the top cover.

8. Pull the paper thickness lever all the way towards the front of the printer to maximize the print gap.

9. Press the Quality button until LQ appears on the control panel display.

10. Load a sheet of paper into the printer and then lift the top cover.

11. Hold a magnet or magnetized screwdriver near the cover open interlock switch to defeat the interlock. The switch is located inside the control panel near the top edge.

12. While keeping your hands clear of the printer carriage, press the Test button. As the carriage moves, verify that the microshift solenoid energizes on every other pass. If not, perform the *Motor and Solenoid Diagnostic*.

13. Press the Ready button to stop the carriage, lower the top cover, and proceed with the next acceptance test.

PAPER FEEDING ACCEPTANCE TEST

Paper feeding acceptance test

Before performing this test, make sure that the printer passes the power, memory, sensor and switch, and motor and solenoid acceptance tests. To check for proper paper feeding, perform the following procedure:

1. Make sure that the printer is turned on and the primary status message appears on the control panel display.

2. Push the tractor select lever all the way towards the rear of the printer to disengage the tractors. If the tractor select lever is loose or broken, perform the *Paper Feeding Diagnostic*.

3. Position a single sheet of paper in the top paper entry slot and press the Form feed button. The paper should advance smoothly into the ready to print position in front of the printhead. If not, perform the *Paper Feeding Diagnostic*.

4. Press the Form feed button again to eject the paper. The paper should not skew or crinkle as it ejects. If paper feeding is not smooth and straight, perform the *Paper Feeding Diagnostic*.

5. Pull the tractor select lever all the way towards the front of the printer to engage the tractors.

6. Load pin-feed paper in the tractors and press the Form feed button. The paper should advance smoothly into the ready to print position in front of the printhead. If not, perform the *Paper Feeding Diagnostic*.

7. Press the Form feed button again to advance the paper to the next top-of-form. The paper should not skew or crinkle as it advances. If it does, perform the *Paper Feeding Diagnostic*.

8. Press the Paper park button to reverse feed the pin-feed paper out of the printer. The message CHECK TRACTR LVR should appear on the control panel display. The paper should not skew or crinkle as it reverse feeds. If it does, perform the *Paper Feeding Diagnostic* before continuing.

9. Push the tractor select lever all the way towards the back of the printer to disengage the tractors. Now, move on to the next acceptance test.

RIBBON FEEDING ACCEPTANCE TEST

Ribbon feeding acceptance test

Before performing this test, make sure that the printer passes the power, memory, sensor and switch, motor and solenoid, and paper feeding acceptance tests. To check for proper ribbon feeding, perform the following procedure:

1. Turn off the printer and lift the top cover.

2. Slide the carriage from side to side. Verify that the ribbon advance knob on the ribbon cartridge turns as the carriage slides in either direction. If the knob does not turn or there is a clicking sound, install a new ribbon cartridge. If the problem recurs, perform the *Ribbon Feeding Diagnostic*.

3. Lower the top cover and move on to the next test.

INTERFACE ACCEPTANCE TEST

Interface acceptance test

Before performing this test, make sure that the printer passes the power, memory, sensor and switch, motor and solenoid, aper feeding, and ribbon feeding acceptance tests. To check the printer interfaces, perform the following procedure:

1. Turn off the printer.

2. Attach an RS-232-C serial cable, Centronic-compatible parallel cable, or both from the host to the appropriate connector on the printer.

3. Turn on the printer.

4. Press the Setup button on the control panel to display the Setup menu.

5. Turn the Select-dial until INTRFCE appears.

6. Check that the current interface setting corresponds to the interface you want to test. *Par* means parallel; *Ser* means serial. If the setting is incorrect, hold down the Alt button and turn the Select-dial to change the setting.

7. If you are going to check the serial interface, also set the BAUD, PARITY, DTA BITS, STOP BITS, HNDSHAK and DTR parameters in the Setup menu to match those of the host. If you are unfamiliar with any of these settings, refer to section 5 of the *Accel-500 Operating Guide*.

8. Instruct the host operator to send a page of ASCII text data (codes 33 to 126) through the active interface to the printer. Depending on what happens, perform one of the following actions:

   - If the printer prints the text, the interface is operating and you can move on to the next acceptance test. Or, you can repeat this procedure and test the other interface.

- If FRAMING ERROR, PARITY ERROR or BUFFER OVERFLOW appears on the control panel display, one or more of your Setup menu settings is wrong. Refer to section 8 of the *Accel-500 Operating Guide* for assistance in correcting these errors.

- If the printer prints garbage text or nothing at all, the interface is faulty. Perform the *Interface Diagnostic*.

PRINT QUALITY ACCEPTANCE TEST

Print quality acceptance test

The print quality acceptance test is the most important test. Even if the printer passes all of the previous tests, it is not ready for operation unless the print quality is good. To check the print quality, perform the following procedure:

1. Turn off the printer and lift the top cover.

2. Install a new ribbon cartridge in the printer.

   Note: Refer to section 3 of the *Accel-500 Operating Guide* for the ribbon installation procedure.

3. Lower the top cover and turn on the printer.

4. Make sure the printer is set for letter-quality (LQ should appear on the control panel display). If not, press the Quality button to select letter-quality.

5. Make sure the Courier font is selected (COURIER should appear on the control panel display). If not, press the Font button to select Courier.

6. Push the tractor select lever all the way towards the rear of the printer to disengage the tractors.

7. Pull the paper thickness lever all the way towards the front of the printer to maximize the distance between the printhead and the paper. If the paper thickness lever is loose or broken, perform the *Paper Thickness Lever* procedure in section 3 and retry this acceptance test.

8. Position a single sheet of paper in the top paper entry slot and press the Form feed button. The paper should advance into the ready to print position.

9. Press the Test button to print a self test. With printing in progress, slowly push the paper thickness lever toward the rear of the printer until the print quality is optimized.

10. When the print quality is optimized, press the Ready button to terminate the self test at the end of the current line.

11. Evaluate the print quality using the following criteria:

    - Uniform print density
    - Crisp edge definition
    - Solid characters with no breaks (no missing dots)
    - No ink smears
    - Proper rounding of rounded characters
    - Uniform spacing between characters and lines

    If the print quality is poor, perform the *Print Quality Diagnostic*.

12. *Congratulations!* The printer has passed all eight acceptance tests and is ready for normal operation.

Recommended Cleaning

Recommended cleaning

Although is is not mandatory, AMT recommends that you perform the following cleaning procedures while servicing the printer:

- *Cleaning the Platen and Bail Rollers*
- *Cleaning the Carriage Shaft*
- *Cleaning the Printhead Wires*
- *Cleaning Printer Surfaces*

These procedures are provided in section 7 of the *Accel-500 Operating Guide.*

Power Diagnostic

Power diagnostic

This section provides a procedure for isolating and correcting power problems. Any of the following conditions can cause a power problem:

- AC power problems
  - No ac power
  - Incorrect ac power
  - Blown or defective fuse in ac power receptacle
  - Incorrectly set voltage select switch
  - Defective ac power panel or filter board
  - Defective transformer
  - Broken cable or connector
- DC power problems
  - Defective analog board
  - Defective logic board
  - Defective capacitor
  - Broken cable or connector

- Other problems

  - Detached control panel cable
  - Defective control panel or cable
  - Detached fan cable
  - Defective fan

If the printer fails the power acceptance test, perform the following procedure to isolate the problem:

1. Turn off the printer and unplug the power cable.

2. Lift the top cover and verify that the connector from the logic board is securely attached to the edge of the control panel; then lower the top cover.

   Solution: If the connector is loose or detached, plug in the connector and retry the acceptance test.

3. Use a voltmeter to measure the ac input voltage supplied by the power cable. Verify that the voltage is between 90 and 150 vac or between 200 and 280 vac.

   Solution: If the voltage is not correct, connect the power cable to an alternate outlet that supplies the correct ac voltage and retry the acceptance test.

4. Check that the voltage select switch is set correctly for the ac voltage. If the voltage is between 90 and 150 vac, set the switch to 120; if the voltage is between 200 and 280 vac, set the switch to 240.

   Solution: If the switch is set wrong, change the setting and retry the acceptance test.

5. Make sure that the fuse in the ac power receptacle has not blown and is the correct rating for the ac voltage. If the voltage is between 90 and 150 vac, use a 3.0 amp, 250 volt slow-blow fuse; if the voltage is between 200 and 280 vac, use a 1.6 amp, 250 volt slow-blow fuse.

   Solution: If the fuse is blown or the rating is wrong, change the fuse and retry the acceptance test.

6. Unsnap the lower edge of the rear cover from the bottom case and remove the rear cover.

7. Use a Phillips screwdriver to remove the four screws that secure the electronics shield to the bottom case. Also loosen but do not remove the three screws that secure the electronics shield to the printer chassis. Then, remove the electronics shield.

8. Use a Phillips screwdriver to remove the screw that secures the filter board shield to the transformer grounding bracket. Then, remove the filter board shield.

9. Make sure that all of the connectors that plug into the analog and logic boards are securely attached.

Board	*Location*	*No. of Pins*	*Cable Destination*
Analog	J1	4-pin	Carriage motor
Analog	J2	5-pin	Capacitor
Analog	J3	7-pin	Transformer
Analog	J4	2-pin	Bail solenoid
Analog	J6	2-pin	Fan
Analog	J7	4-pin	Platen motor
Analog	J8	34-pin	Carriage board
Analog	J10	34-pin	Carriage board
Logic	J3	5-pin	Carriage sensor
Logic	J6	10-pin	Control panel
Logic	J9	10-pin	Tractor/gap switches

Solution: If any cable is loose or detached, plug in the cable at the correct location and retry the acceptance test.

10. Make sure that the filter board jumpers at locations JP1 and JP2 are positioned correctly for the ac voltage. Refer to the label on the filter board shield for the correct jumper positions. Most printers require the following jumper placements:

AC Voltage	*JP1 Pins*	*JP2 Pins*
100 or 220	1 and 2	2 and 3
120 or 240	1 and 2	1 and 2 *(Factory setting)*
140 or 260	2 and 3	1 and 2

Solution: If the jumpers are positioned incorrectly, move the jumpers and retry the acceptance test.

11. Unplug the connector at location J3 on the filter board.

12. Plug in the power cable and turn on the printer.

13. Use a voltmeter to measure the ac power on pins 1 and 4 of the 7-pin header at location J3 on the filter board. Verify that the voltage is between 108 and 132 vac.

Solution: If the voltage is not correct, perform the *AC Power Panel And Filter Board* procedure in section 3 and retry the acceptance test.

14. Turn off the printer.

15. Plug in the connector that belongs at location J3 on the filter board.

16. Unplug the connector at location J3 on the analog board and then turn on the printer.

17. Use a voltmeter to verify the following ac voltages across the following pins in the connector that belongs at location J3 on the analog board:

Pin Nos.	*Wire Colors*	*Voltage Range*
1 and 3	Brown and red	28 to 30 vac
5 and 6	Orange and green	7 to 9 vac
6 and 7	Green and blue	7 to 9 vac

Also verify that the voltages measured across pins 5 and 6 and across pins 6 and 7 are within 0.2 volt of each other.

Solution: If any of the voltages are incorrect, perform the *Transformer* procedure in section 3 and retry the acceptance test.

18. Turn off the printer.

19. Plug in the connector that belongs at location J3 on the analog board and then turn on the printer.

20. Make sure that the fuse at location F1 on the analog board has not blown.

Solution: If the fuse is blown, perform the *Analog Board* procedure in section 3 and retry the acceptance test. Although it may seem easier to just replace the fuse, it is not recommended. A blown fuse is an indication of a serious short on the analog board.

21. Use a voltmeter to measure the dc voltage across the following test points on the analog board:

Test Points	*Voltage Range*
TP3 and TP1	+34.2 to +44 vdc
TP3 and pin 2 of J9 header	+8.1 to +11.6 vdc
TP3 and TP2	+4.9 to +5.2 vdc

Depending on your voltage measurements, perform one of the following actions:

- If all three voltages are correct and the control panel display is blank or filled with unreadable garbage, perform the following actions:

  - Unplug the control panel cable from the control panel and plug it into a spare control panel.

    Solution: If the spare operates, perform the *Control Panel* procedure in section 3 and retry the acceptance test.

  - If the spare does not operate, unplug the connector at location J6 on the logic board and attach a spare control panel cable to the control panel and logic board.

    Solution: If the control panel operates, perform the *Control Panel Cable* procedure in section 3 and retry the acceptance test.

  - If the control panel still does not operate, plug the original control panel cable back into the control panel.

    Solution: Perform the *Logic Board* procedure in section 3 and retry the acceptance test.

- If all three voltages are correct but the fan is not running, perform one of the following actions:

  - Unplug the connector at location J6 on the analog board and plug in a spare fan at this location.

    Solution: If the spare operates, perform the *Fan* procedure in section 3 and retry the acceptance test.

- If the spare does not operate, unplug the spare and plug in the original fan.

  Solution: Perform the *Analog Board* procedure in section 3 and retry the acceptance test.

  Solution: If the fan still does not run, perform the *Logic Board* procedure in section 3 and retry the acceptance test.

- If the +34 vdc is out of range, perform the following actions:

  - Turn off the printer.

  - Unplug the connector at location J2 on the analog board.

  - Turn on the printer.

  - Check for +34 vdc across the test points.

    Solution: If the voltage is correct, perform the *Capacitor* procedure in section 3 and retry the acceptance test.

    Solution: If the +34 vdc remains out of range, perform the *Analog Board* procedure in section 3 and retry the acceptance test.

- If the +10 or +5 vdc is out of range, the problem is probably due to a faulty analog or logic board.

  Solution: Perform the *Analog Board* procedure in section 3 and retry the acceptance test.

  Solution: If the +10 or +5 vdc remains out of range, perform the *Logic Board* procedure in section 3 and retry the acceptance test.

22. If the printer still fails the power acceptance test, contact AMT Technical Support for assistance.

Memory Diagnostic

Memory diagnostic

This section provides a procedure for isolating and correcting memory problems. Memory problems can cause unpredictable and intermittent printer problems. There are two types of memory in the printer:

- EEROM. This memory contains the printer bootstrap program, an Intelli-card reading program, and the printer default and user settings. If the EEROM is defective, the printer may not power up, read Intelli-cards, or save and restore printer settings.

- RAM. This memory contains the Executive (master) program, printer emulations, and fonts read from the Intelli-card. It also contains the input buffer, downloaded fonts, and other variables. If the RAM is defective, the printer can exhibit different kinds of problems ranging from the inability to power up to printing incorrect characters.

Any of the following conditions can cause a memory problem:

- Defective EEROM
- Defective RAM
- Defective logic board

If the printer fails the memory acceptance test, perform one of the following actions:

- If EEROM FAIL appears on the control panel display while running the EECHECK program, the EEROM or the logic board is defective.

  Solution: Perform the *Logic Board* procedure in section 3 and replace the EEROM in socket U21. If the problem recurs, perform the *Logic Board* procedure again and replace the entire logic board.

- If EEROM ERROR appears on the control panel display, the EEROM does not contain the necessary information to run the installed Intelli-card. Perform the following actions:

  - Turn off the printer.
  - Remove all installed Intelli-cards.
  - Install the EEWRITE Intelli-card.
  - Turn on the printer.
  - When EEWRITE DONE appears on the control panel, turn off the printer and remove the EEWRITE card. Then, retry the acceptance test.

- If LOAD INTELLI-CRD remains on the control panel display after you install the EECHECK Intelli-card or the Accel-500 Executive Intelli-card, the logic board is defective.

  Solution: Perform the *Logic Board* procedure in section 3 and retry the acceptance test.

- If MEMORY ERROR ### appears on the control panel display while running the *Memory* test, one of the RAM chips on the logic board is defective. The ### in the message is the socket location of the defective RAM chip.

  Solution: Perform the *Logic Board* procedure in section 3 and replace the RAM chip in the indicated socket. Be sure to use a spare RAM chip that is identical to the defective one. Then, retry the acceptance test.

Sensor and Switch Diagnostic

Sensor and switch diagnostic

This section provides a procedure for isolating and correcting sensor and switch problems. Any of the following conditions can cause a sensor or switch to malfunction:

- Incorrect alignment of sensor or switch
- Defective cable or connector
- Defective sensor or switch
- Defective logic board
- Defective control panel
- Defective carriage board or cables

If the printer fails the sensor and switch acceptance test, perform the following procedure to isolate and correct the problem:

1. Turn off the printer.

2. If a control panel button, the Select-dial, or the cover open interlock switch is malfunctioning, perform the following actions:

   - Lift the top cover and unplug the control panel cable from the control panel. Then, plug the cable into a spare control panel and retry the acceptance test.

     Solution: If the spare operates, perform the *Control Panel* procedure in section 3.

   - If the spare control panel does not operate, unsnap the lower edge of the rear cover from the bottom case and remove the rear cover.

   - Use a Phillips screwdriver to remove the four screws that secure the electronics shield to the bottom case. Also loosen but do not remove the three screws that secure the electronics shield to the printer chassis. Then, remove the electronics shield.

- Unplug the connector at location J6 on the logic board and attach a spare control panel cable to the control panel and logic board. Then, retry the acceptance test.

  Solution: If the control panel operates, perform the *Control Panel Cable* procedure in section 3.

  Solution: If the control panel still does not operate, perform the *Logic Board* procedure in section 3 and retry the acceptance test.

3. If the paper sensor, ribbon home switch, or multicolor ribbon switch is malfunctioning, perform the following actions:

   - Perform the *Printhead* removal procedure in section 3.

   - Verify that the connector of the malfunctioning sensor or switch is plugged into the appropriate header on the carriage board. The paper sensor plugs into header JP5, the ribbon home switch JP6, and the multicolor ribbon switch JP8.

     Solution: If the connector is loose or detached, plug in the cable and retry the acceptance test.

   - Unplug the malfunctioning sensor or switch from the carriage board and plug in a spare. Then, retry the acceptance test.

     Solution: If the spare operates, perform the *Paper Sensor, Ribbon Home Switch*, or *Multicolor Ribbon Switch* procedure in section 3.

- If the spare does not operate, unplug both of the carriage board cables from the bottom of the printer chassis and plug in a spare carriage board and sensor or switch. Then, retry the acceptance test.

  Solution: If the spare operates, perform the *Carriage Board and Cables* procedure in section 3.

- If the spare does not operate, unsnap the lower edge of the rear cover from the bottom case and remove the rear cover.

- Use a Phillips screwdriver to remove the four screws that secure the electronics shield to the bottom case. Also loosen but do not remove the three screws that secure the electronics shield to the printer chassis. Then, remove the electronics shield.

- Unplug the connectors at locations J8 and J10 on the analog board and plug in a spare carriage board and sensor or switch. Then, retry the acceptance test.

  Solution: If the spare operates, perform the *Bottom Carriage Cables* procedure in section 3.

  Solution: If the spare does not operate, perform the *Analog Board* procedure in section 3 and retry the acceptance test.

  Solution: If the sensor or switch still does not operate, perform the *Logic Board* procedure in section 3 and retry the acceptance test.

4. If the carriage sensor, tractor switch, or print gap switch is malfunctioning, perform the following actions:

   - Unsnap the lower edge of the rear cover from the bottom case and remove the rear cover.

- Use a Phillips screwdriver to remove the four screws that secure the electronics shield to the bottom case. Also loosen but do not remove the three screws that secure the electronics shield to the printer chassis. Then, remove the electronics shield.

- Verify that the connector of the malfunctioning sensor or switch is plugged into the appropriate header on the logic board. The carriage sensor plugs into header J3. The tractor and print gap switches plug into header J9.

  Solution: If the connector is loose or detached, plug in the connector.

- Unplug the malfunctioning sensor or switch from the logic board and plug in a spare. Then, retry the acceptance test.

  Solution: If the spare operates, perform the *Carriage Sensor*, *Tractor Switch*, or *Print Gap Switch* procedure in section 3.

- If the spare does not operate, the logic board is defective.

  Solution: Perform the *Logic Board* procedure in section 3.

Motor and Solenoid Diagnostic

Motor and solenoid diagnostic

This section provides procedures for isolating problems with the printer motors and solenoids. Any of the following conditions can cause a motor or solenoid problem:

- Defective cable or connector
- Defective motor or solenoid
- Defective analog board
- Defective logic board
- Defective carriage board

If the printer fails the motor and solenoid acceptance test, perform the following procedure to isolate and correct the problem:

1. Turn off the printer.

2. If the ribbon lift motor or microshift solenoid is malfunctioning, perform the following actions:

   - Perform the *Printhead* removal procedure in section 3.

   - Verify that the connector of the ribbon lift motor or microshift solenoid is plugged into the correct header on the carriage board. The ribbon lift motor plugs into header JP3 and the microshift solenoid JP4.

     Solution: If the connector is loose or detached, plug in the cable and retry the acceptance test.

   - Unplug the malfunctioning motor or solenoid from the carriage board and plug in a spare. Then, retry the acceptance test.

     Solution: If the spare operates, perform the *Ribbon Lift Motor* or *Microshift Solenoid* procedure in section 3.

   - If the spare does not operate, unplug both of the carriage board cables from the bottom of the printer chassis and plug in a spare carriage board and motor or solenoid. Then, retry the acceptance test.

     Solution: If the spare operates, perform the *Carriage Board and Cables* procedure in section 3.

   - If the spare does not operate, unsnap the lower edge of the rear cover from the bottom case and remove the rear cover.

- Use a Phillips screwdriver to remove the four screws that secure the electronics shield to the bottom case. Also loosen but do not remove the three screws that secure the electronics shield to the printer chassis. Then, remove the electronics shield.

- Unplug the connectors at locations J8 and J10 on the analog board and plug in a spare carriage board and motor or solenoid. Then, retry the acceptance test.

  Solution: If the spare operates, perform the *Bottom Carriage Cables* procedure in section 3.

  Solution: If the spare does not operate, perform the *Analog Board* procedure in section 3 and retry the acceptance test.

  Solution: If the motor or solenoid still does not operate, perform the *Logic Board* procedure in section 3 and retry the acceptance test.

3. If the carriage does not move, the platen does not rotate, or the bail moves sluggishly or not at all, perform the following actions:

   - If the carriage does not move, check the carriage belt. Also check the pulley on the carriage motor shaft.

     Solution: If the belt is loose or broken, perform the *Carriage Belt* procedure in section 3. If the pulley is loose, use a 3/32-inch hex driver to tighten the set screw that secures the pulley to the motor shaft and retry the acceptance test.

   - Perform the *Top Case* removal procedure in section 3.

- If the bail moves sluggishly, check that the internal star ring on the left bail arm is not exerting too much pressure on the rubber grommet.

  Solution: Adjust the internal star ring to lessen the pressure on the rubber grommet and retry the acceptance test.

- Use a Phillips screwdriver to remove the four screws that secure the electronics shield to the bottom case. Also loosen but do not remove the three screws that secure the electronics shield to the printer chassis. Then, remove the electronics shield.

- Verify that the connector of the malfunctioning motor or solenoid is plugged into the appropriate header on the analog board. The carriage motor plugs into header J1, the platen motor J7, and the bail solenoid J4.

  Solution: If the connector is loose or detached, plug in the connector and retry the acceptance test.

- Unplug the malfunctioning motor or solenoid from the analog board and plug in a spare. Then, retry the acceptance test.

  Solution: If the spare operates, perform the *Carriage Motor*, *Platen Motor*, or *Bail Solenoid* procedure in section 3.

  Solution: If the spare does not operate, perform the *Analog Board* procedure in section 3 and retry the acceptance test.

  Solution: If the motor or solenoid still does not operate, perform the *Logic Board* procedure in section 3 and retry the acceptance test.

Paper Feeding Diagnostic

Paper feeding diagnostic

This section provides procedures for isolating paper feeding problems. Any of the following conditions can cause a paper feeding problem:

- Damaged print-line indicator or ribbon shield
- Broken tractor lever
- Missing tractor lever spring
- Cracked actuator or link
- Defective tractor gear train
- Debris in the paper path
- Damaged platen surface or bail
- Damaged paper feed belts
- Damaged platen wiper

If the printer fails the paper feeding acceptance test, perform the following procedure to isolate and correct the problem:

1. Turn off the printer.

2. Lift the top cover and inspect the print-line indicator and ribbon shield for damage. Check that there is no debris caught between the print-line indicator or ribbon shield and the platen. Then, lower the top cover.

   Solution: If the print-line indicator or ribbon shield is damaged, perform the *Print-Line Indicator* procedure in section 3 and retry the acceptance test.

3. Perform the *Top Case* removal procedure in section 3.

4. Inspect the tractor select lever for cracks or chips.

   Solution: If the lever is broken, perform the *Tractor Select Lever* procedure in section 3 and retry the acceptance test.

5. Verify that the spring between the tractor select lever and printer chassis is in place.

   Solution: If the spring is not in place, reinstall the spring and retry the acceptance test.

6. Check for cracks or chips in the left actuator and link. Verify that these parts mesh correctly.

   Solution: If the left actuator or link is broken, perform the *Left Actuator and Link* procedure in section 3 and retry the acceptance test.

7. Check for cracks or chips in the right actuator, link, and tractor gear train. Verify that these parts mesh correctly.

   Solution: If the right actuator, link, or tractor gear train is broken, perform the *Right Actuator, Link, and Tractor Gear Train Plate* procedure in section 3 and retry the acceptance test.

8. Perform the *Platen* removal procedure in section 3.

9. Check for debris (such as dust, paper fibers, gummed labels, etc.) in the paper path.

   Solution: If you find debris, remove it and retry the acceptance test.

10. Inspect the platen for dents in the rubber surface.

    Solution: If the platen is flawed, perform the *Platen* procedure in section 3 and retry the acceptance test.

11. Make sure the bail is not bent and there are not defects in the rubber rollers.

    Solution: If the bail is defective, perform the *Bail* procedure in section 3 and retry the acceptance test.

12. Inspect the paper feed belts for defects and normal tension.

    Solution: If a paper feed belt is damaged, perform the *Paper Feed Belts* procedure in section 3 and retry the acceptance test.

13. Inspect the platen wiper for damage and for proper positioning (refer to the *Platen Wiper Adjustment* in section 4).

    Solution: If the platen wiper is damaged, perform the *Platen Wiper* procedure in section 3 and retry the acceptance test.

14. Perform the *Platen* replacement procedure in section 3.

15. Perform the *Top Case* replacement procedure in section 3.

16. Retry the acceptance test. If the paper feeding problem recurs, contact AMT Technical Support for assistance.

Ribbon Feeding Diagnostic

Ribbon feeding diagnostic

This section provides a procedure for isolating ribbon feed problems. Any of the following conditions can cause a ribbon feed problem:

- Defective ribbon cartridge
- Loose or broken ribbon drive cable
- Defective ribbon drive mechanism

If the printer fails the ribbon feed acceptance test, perform the following procedure to isolate and correct the problem:

1. Replace the ribbon cartridge. Make sure that the cartridge is fully seated on the ribbon platform and locked into place. Then, retry the acceptance test. If the problem recurs, continue this procedure.

2. Lift the top cover and inspect the ribbon drive cable. Make sure that the cable is looped around the pulley under the ribbon platform and is hooked to both sides of the printer chassis. Then, perform the *Ribbon Drive Cable* measurement in section 4.

   Solution: If the ribbon drive cable is damaged, perform the *Ribbon Drive Cable* procedure in section 3. If the cable tension is incorrect, perform the *Ribbon Drive Cable Adjustment* in section 4. Then, retry the acceptance test.

3. If the ribbon drive cable checks out, the ribbon drive mechanism is defective.

   Solution: Perform the *Ribbon Drive Mechanism* procedure in section 3 and retry the acceptance test.

Interface Diagnostics

Interface diagnostics

This section provides procedures for isolating serial and parallel interface problems. Any of the following conditions can cause an interface problem:

- Printer INTRFCE parameter set incorrectly
- Communications protocol problems
  - Incorrect serial parameters (baud rate, handshake, parity, data byte size, number of stop bits)
  - Incorrect parallel timing
- Host transmission problems
- Interface cable problems
  - Incorrect pin-to-pin wiring
  - Host transmission signal requirements not met
  - Defective cable
- Defective logic board

SERIAL INTERFACE DIAGNOSTIC

Serial interface diagnostic

If the printer fails the serial interface acceptance test, perform the following procedure to isolate and correct the problem:

1. Turn off the printer.
2. Detach the serial interface cable.
3. Turn on the printer.
4. Press the Setup button to display the Setup menu.
5. Turn the Select-dial until the TEST parameter appears.
6. Hold down the Alt button and turn the Select-dial until the *Serial* setting appears. Then, release the Alt button. The message CONNECT LOOPBACK appears.
7. Attach a serial loopback connector or breakout box jumpered for loopback to the serial receptacle:

Serial loop-back pin outs

Signal	Pin No.	*connects to*	Signal	Pin No.
TxD	2		RxD	3
RTS	4		CTS	5
DTR	20		DSR	6
DTR	25 *or* 11		DCD	8

8. Turn the Select-dial. The message TEST IN PROGRESS appears as the printer checks the serial drivers and receivers. Depending on what happens next, perform one of the following actions:

   - If the printer beeps and the Setup menu appears, the serial interface is operating normally. The problem is due to the host computer or interface cable. Continue this procedure.

- If TxD/RxD ERROR, RTS/CTS ERROR, DTR/DSR ERROR, or BUSY/DCD ERROR appears, the serial interface is malfunctioning.

  Solution: Perform the *Logic Board* procedure in section 3 and retry the acceptance test.

9. Use an ohmmeter to check the continuity of the lines in the serial cable. Also, write down the pin-to-pin connections.

   Solution: If a line is broken or shorted, replace the serial cable and retry the acceptance test.

10. Refer to the host computer manual for the serial pin assignments and signal input requirements for data transmission. Computers vary in their signal input requirements. Computers operating as Data Terminal Equipment (DTE) may require CTS, DSR and/or DCD to be high (positive) before data can be sent. Computers operating as Data Communications Equipment (DCE) may require RTS and/or DTR to be high. Some computers use a resistor to pull the required signals high automatically when the lines are disconnected. Other computers ignore these signals altogether.

11. Match the signal requirements and pin assignments of the host computer to those shown in section 2 of the *Accel-500 Interface Guide*. Verify that the cable provides the necessary connections.

    Solution: If the cable is wired incorrectly, rewire the cable or install a correct cable and retry the acceptance test. If the host or cable requires that the printer be configured as DCE (data communications equipment), perform the *Converting the Printer From DTE to DCE* procedure later in this section.

12. If the cable is wired correctly, the problem is due to the host computer.

    Solution: Try an alternate serial interface if one is available; otherwise, instruct the host operator to contact computer service personnel.

PARALLEL INTERFACE DIAGNOSTIC

Parallel interface diagnostic

If the printer fails the parallel interface acceptance test, perform the following procedure to isolate and correct the problem:

1. Turn off the printer.
2. If the printer printed incorrect characters during the acceptance test, skip to step 5 in this procedure.
3. Detach the parallel interface cable from the printer and plug it into an alternate Centronics-compatible printer.
4. Instruct the host operator to send a page of ASCII text data (codes 33 to 126) through the interface to the alternate printer. Depending on what happens, perform one of the following actions:
   - If the alternate printer prints the text, perform the *Logic Board* procedure in section 3 and retry the acceptance test.
   - If the alternate printer does not print the text, continue this procedure.
5. Verify that the parallel cable is not longer than eight feet.

   Solution: If the cable is too long, replace the cable with one that is eight feet or shorter and retry the acceptance test.
6. Turn on the printer.
7. Press the Setup button to display the Setup menu.

8. Turn the Select-dial until the STROBE parameter appears.

9. Hold down the Alt button and turn the Select-dial to select the other STROBE setting (if STROBE is *Neg*, select *Pos*; and vice-versa).

10. Press the Setup button again and retry the acceptance test.

    Solution: If the printer passes the acceptance test, you should save the new STROBE setting as the default. Refer to SAVE and DFALT parameters in section 5 of the *Accel-500 Operating Guide*.

11. Unplug the parallel cable from the printer and the host computer.

12. Use a continuity tester to check the continuity of the lines in the parallel cable. Also, write down the pin-to-pin connections.

    Solution: If a line is broken or shorted, replace the parallel cable and retry the acceptance test.

13. Refer to the host computer manual for the parallel pin assignments. Also refer to section 1 of the *Accel-500 Interface Guide* for the printer pin assignments. Verify that the cable provides the necessary connections.

    Solution: If the cable is wired incorrectly, re-wire the cable or install a correct cable and retry the acceptance test.

14. If the cable is wired correctly, the problem is due to the host computer.

    Solution: Try an alternate parallel interface if one is available; otherwise, instruct the host operator to contact computer service personnel.

Print Quality Diagnostic

Print quality diagnostic

This section provides a guide for isolating print quality problems. Any of the following conditions can cause poor print quality:

- Ribbon problems
  - Improperly installed ribbon
  - Worn ribbon
  - Snagged or jammed ribbon
  - Misaligned ribbon home switch
  - Defective ribbon drive mechanism or cable
- Printhead problems
  - Printhead too close or too far from platen
  - Worn printhead
  - Loose carriage board cables
  - Defective carriage board or cables
  - Defective printhead
  - Improper microshift
- Miscellaneous problems
  - Dirty or damaged platen
  - Dirty or damaged bail rollers
  - Loose carriage belt
  - Loose platen belt
  - Defective analog board
  - Defective logic board
  - Misaligned carriage
  - Incorrect print gap
  - Misaligned platen wiper
  - Dirty carriage shaft
  - Misaligned or damaged ribbon shield or print-line indicator

To use the print quality guide, compare the acceptance test printout with the print samples in the guide. When you find a match, perform the recommended action(s). If you are unable to correct the problem, contact AMT Technical Support for assistance.

Table 2-1. Print Quality Guide

Item	*Description*
	Good Print Quality
1	*Sample:* ABCDEFGHIJKLMNOPQRSTUVWXY 123456789:;<=>?@ABCDEFGHI !"#$%&'()*+,-./0123456789 qrstuvwxyz{\|}~¬¢!"#$%&'()
	Characters Too Light or Edges Not Smooth
2	*Sample:* ABCDEFGHIJKLMNOPQRSTUVWXY 123456789:;<=>?@ABCDEFGHI !"#$%&'()*+,-./0123456789 qrstuvwxyz{\|}~¬¢!"#$%&'()
3	*Sample:* ABCDEFGHIJKLMNOPQRSTUVWXY 123456789:;<=>?@ABCDEFGHI !"#$%&'()*+,-./0123456789 qrstuvwxyz{\|}~¬¢!"#$%&'() *Cause:* Print gap is too large. Push the paper thickness lever towards the back of the printer. *Cause:* Ribbon is worn and should be replaced. Replace the ribbon cartridge. *Cause:* Printhead is worn and should be replaced. Perform the *Printhead* procedure in section 3. *Cause:* Print gap is set incorrectly. Perform the *Print Gap Adjustment* in section 4.

Print Quality Guide

Table 2-1. Print Quality Guide (continued)

Item	*Description*
	Characters Disappearing
4	*Sample:* ABC[illegible] *Cause:* Ribbon is not fully seated on the ribbon platform and locked into place. Install the ribbon cartridge correctly. *Cause:* Ribbon is jammed in cartridge or contains worn spots. Replace the ribbon cartridge. *Cause:* Ribbon drive mechanism or cable is malfunctioning. Perform the *Ribbon Feed Diagnostic*.
	Characters Change Density Across Page
5	*Sample:* ABCDEFGHIJKLMNOPQRSTUVWXY 123456789:;<=>?@ABCDEFGHI !"#$%&'()*+,-./0123456789 qrstuvwxyz{\|}~¬¢!"#$%&'()
6	*Sample:* ABCDEFGHIJKLMNOPQRSTUVWXY 123456789:;<=>?@ABCDEFGHI !"#$%&'()*+,-./0123456789 qrstuvwxyz{\|}~¬¢!"#$%&'() *Cause:* Carriage is not parallel to the platen. Perform the *Parallelism Adjustment* and *Print Gap Adjustment* in section 4.

Table 2-1. Print Quality Guide (continued)

Item	*Description*
	Characters Missing Dots
7	*Sample:* ABCDEFGHIJKLMNOPQRSTUVWXY 123456789:;<=>?@ABCDEFGHI !"#$%&'()*+,-./0123456789 qrstuvwxyz{\|}~¬¢!"#$%&'()
8	*Sample:* ABCDEFGHIJKLMNOPQRSTUVWXY 123456789:;<=>?@ABCDEFGHI !"#$%&'()*+, ./0123456789 qrstuvwxyz{\|}~ ¢!"#$%&'()
9	*Sample:* ABCDEFGHIJKLMNOPQRSTUVWXY 123456789:;<= >?@ABCDEFGHI !"#$%&'()*+, -./0123456789 qrstuvwxyz{\|}~ ¢!"#$%&'()
	Cause: Printhead wires are dirty or printhead is defective. Perform the *Cleaning the Printhead Wires* procedure in section 7 of the *Accel-500 Operating Guide*. If the problem recurs, perform the *Printhead* procedure in section 3.
	Cause: Analog board is defective. Perform the *Analog Board* procedure in section 3.
	Cause: Logic board is defective. Perform the *Logic Board* procedure in section 3.
	Cause: Carriage board or cable is defective. Perform the *Carriage Board and Cables* procedure in section 3.
	Cause: Bottom carriage cables are loose or defective. Perform the *Bottom Carriage Cables* procedure in section 3.

Table 2-1. Print Quality Guide (continued)

Item	*Description*
	Characters Mixed Color
10	*Sample:* ABCDEFGHIJKLMNOPQRSTUVWXY !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHI !"#$%&'()*+,-./0123456789 COLOR CHANGE qrstuvwxyz{|}~¬¢!"#$%&'() *Cause:* Ribbon is not fully seated on the ribbon platform and locked into place. Install the ribbon cartridge correctly. *Cause:* If different colors do not appear on the control panel display when you press the Color button, the pin on the bottom of the multicolor ribbon cartridge is broken off or the multicolor ribbon switch is defective. Check and replace the ribbon cartridge if necessary. Otherwise, perform the *Sensor and Switch Diagnostic*. *Cause:* Ribbon home switch is misaligned. Perform the *Ribbon Home Switch Adjustment* in section 4. *Cause:* Gears on the ribbon lift motor do not mesh correctly with the gear quadrant on the ribbon platform. Check the gears and adjust them if necessary. *Cause:* Ribbon lift motor is stalling. Perform the *Motor and Solenoid Diagnostic*.

Table 2-1. Print Quality Guide (continued)

Item	*Description*
	Ink Smearing
11	*Sample:* ABCDEFGHIJKLMNOPQRSTUVWXY 123456789:;<=>?@ABCDEFGHI !"#$%&'()*+,-./0123456789 qrstuvwxyz{\|}~¬¢!"#$%&'()
12	*Sample:* ABCDEFGHIJKLMNOPQRSTUVWXY 123456789:;<=>?@ABCDEFGHI !"#$%&'()*+,-./0123456789 qrstuvwxyz{\|}~¬¢!"#$%&'() *Cause:* Print gap is too small. Pull the paper thickness lever towards the front of the printer. *Cause:* Bail rollers are dirty. Perform the *Cleaning the Platen and Bail Rollers* procedure in section 7 of the *Accel-500 Operating Guide*. *Cause:* Print-line indicator or ribbon shield is defective. Perform the *Print-Line Indicator and Ribbon Shield* procedure in section 3. *Cause:* Platen wiper is misaligned. Perform the *Platen Wiper Adjustment* in section 4.

Table 2-1. Print Quality Guide (continued)

Item	*Description*
Tops and Bottoms of Rounded Characters Flat	
13	*Sample:* ABCDEFGHIJKLMNOPQRSTUVWXY 123456789:;<=>?@ABCDEFGHI !"#$%&'()*+,-./0123456789 qrstuvwxyz{\|}~¬¢!"#$%&'() *Cause:* Incorrect microshift. Perform the *Microshift Adjustment* in section 4. *Cause:* Microshift solenoid is malfunctioning. Perform the *Motor and Solenoid Diagnostic*.
No Characters Print–Printhead Operating	
14	*Sample:* [illegible] *Cause:* Print gap is too large. Push the paper thickness lever towards the back of the printer. *Cause:* No ribbon cartridge installed. Install a ribbon cartridge. *Cause:* Ribbon is tangled, folded, or snagged. Replace the ribbon cartridge. *Cause:* Ribbon home switch is misaligned. Perform the *Ribbon Home Switch* adjustment in section 4.

Table 2-1. Print Quality Guide (continued)

Item	*Description*
	No Printhead Wires Firing
15	*Cause:* Analog board is defective. Perform the *Analog Board* procedure in section 3. *Cause:* Logic board is defective. Perform the *Logic Board* procedure in section 3. *Cause:* Carriage board or cable is defective. Perform the *Carriage Board and Cables* procedure in section 3. *Cause:* Bottom carriage cables are loose or defective. Perform the *Bottom Carriage Cables* procedure in section 3. *Cause:* Printhead is defective. Perform the *Printhead* procedure in section 3.
	Uneven Spacing Between Characters or Ragged Left Margins
16	*Sample:* ABCDEFGHIJKLMNOPQRSTUVWXY 123456789:;<=>?@ABCDEFGHI !"#$%&'()*+,-./0123456789 qrstuvwxyz{\|}~¬¢!"#$%&'() *Cause:* Carriage belt tension is incorrect. Perform the *Carriage Belt Adjustment* in section 4. *Cause:* Carriage belt slipping due to loose pulley on carriage motor shaft. Use a 3/32-inch hex driver to tighten the set screw that secures the pulley to the carriage motor shaft.

Table 2-1. Print Quality Guide (continued)

Item	*Description*
	Uneven Spacing Between Characters or Ragged Left Margins (continued)
	Cause: Carriage belt slipping due to loose attachment to bottom of carriage. Perform the *Carriage Belt* procedure in section 3 and correct the problem. *Cause:* Carriage motor is malfunctioning. Perform the *Carriage Motor* procedure in section 3.
	Uneven Spacing Between Lines
17	*Sample:* ABCDEFGHIJKLMNOPQRSTUVWXY ABCDEFGHIJKLMNOPQRSTUVWXY ABCDEFGHIJKLMNOPQRSTUVWXY ABCDEFGHIJKLMNOPQRSTUVWXY *Cause:* Platen belt tension is incorrect. Perform the *Platen Belt Adjustment* in section 4. *Cause:* Platen belt slipping due to loose pulley on platen motor shaft. Use a 3/32-inch hex driver to tighten the set screw that secures the pulley to the shaft. *Cause:* Tractor gear train is binding. Perform the *Tractor Gear Train Plate* removal procedure in section 3 and loosen the tractor gear train plate. *Cause:* Platen motor is malfunctioning. Perform the *Platen Motor* procedure in section 3.

Converting the Printer From DTE to DCE

Converting the printer from DTE to DCE

Some computers may require the printer's serial interface .o provide DCE (Data Communications Equipment) signal functions instead of the default DTE (Data Terminal Equipment) functions. To convert the printer's serial interface from DTE to DCE or vice-versa, perform the following procedure:

Note: For information on the printer's DTE and DCE signal functions and the pin assignments refer to the *Accel-500 Interface Guide*.

1. Perform the *Logic Board* removal procedure in section 3 of this guide.

2. Use a small slotted screwdriver to pry up the DIP shunt in socket U37 (or U36) on the logic board.

3. For DCE serial interface signals, install the DIP shunt in socket U36; for DTE signals, install the DIP shunt in socket U37. Be careful not to bend any of the pins and make sure all the pins are seated in the socket holes.

4. Perform the *Logic Board* replacement procedure in section 3 of this guide.

3 Replacing Parts

This section contains replacement procedures for the major spares, subassemblies, and parts in the Accel-500 printer. The procedures are presented in alphabetical order.

Ordering Replacement Parts

Ordering parts

To order replacement parts, refer to the *Spares List* in appendix B or the *Exploded-View Diagrams and Part Lists* in appendix C for the correct part numbers. Then, call the AMT parts department at (805) 388-5799 on any normal work day between 8:00 am and 5:00 pm PST for the current prices.

Some Guidelines

Guidelines

While performing a replacement procedure, observe the following guidelines:

Power off

- Before beginning any procedure always turn off the printer and unplug the ac power cable.

Tools/spares

- Before beginning any procedure, make sure that all the required tools are available. Appendix A provides a complete tool list for performing field service on the printer; appendix B provides a list of the major spares.

Illustrations

- To help you locate specific parts and understand how to assemble them, refer to the exploded-view diagrams and part lists in appendix C.

Wiring

- To help you understand printer wiring and cable routing, refer to the printer wiring diagram and cable routing information in appendix D.

Directions

- All directions given in the procedures (such as top, bottom, front, back, left and right) are relative to an observer looking at the printer straight on from the front. For example, "left" always refers to the side of the printer with the carriage and platen motors; "right" always refers to the side of the printer with the paper thickness and tractor select levers; etc.

Connectors

- Despite safeguards such as keyed connectors and receptacles, labeled connectors, and color-coded wires, it is possible to plug in some connectors incorrectly, either by plugging them in backwards or plugging them into the wrong receptacle. Before unplugging a connector, always note its proper connection and location.

Power off

- Do not remove or install a circuit board while the power is on; do not connect or disconnect any plug or cable while the power is on.

Top cover

- Operating the printer with the top cover raised and the cover open interlock switch defeated is not recommended for anyone other than qualified service technicians.

  WARNING: High velocity carriage movement occurs during normal operation and unpredictable carriage movement can occur during certain types of malfunctions. Stay clear of the carriage travel path while operating the printer with the top cover raised.

Adjustments

- Certain replacement procedures require that an adjustment procedure also be performed. Be sure to perform all required adjustment procedures.

Self-test

- After performing a replacement procedure, always verify proper operation by turning the printer on and running self-test.

Replacement Procedure List

Replacement procedure listing

Here is a list of the replacement procedures in this section l the page numbers where to find them.

Replacement Procedure Order

Replacement procedure order

:rtain replacement procedures require that other procedures ve performed first. The removal and replacement tree in figure 3-1 shows the order in which replacement procedures must be performed.

Removal and replacement tree

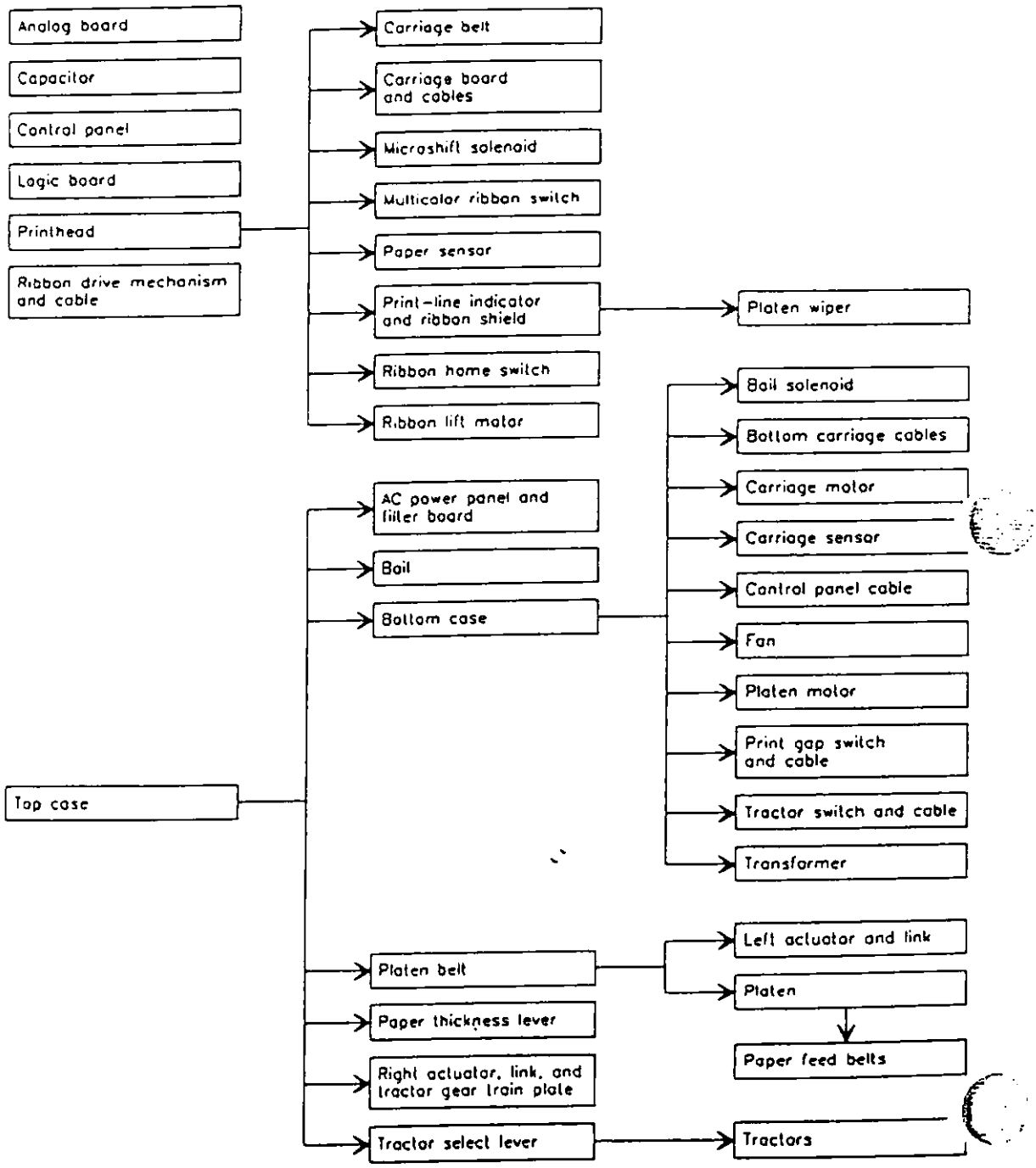


Figure 3-1. Removal and Replacement Tree

AC Power Panel and Filter Board

AC power panel and filter board removal

Removal:

1. Perform the *Top Case* removal procedure.
2. Use a Phillips screwdriver to remove the screw that secures the filter board shield to the transformer grounding bracket.
3. Use a Phillips screwdriver to remove the screw that secures the filter board shield to the bottom case; then remove the filter board shield.
4. Use a Phillips screwdriver to remove the screw that secures the green ground wire from the ac power receptacle to the grounding bracket on the transformer.
5. Unplug the connector from the header at location J3 on the filter board.
6. Use a Phillips screwdriver to remove the two screws that secure the filter board to the bottom case.
7. Use a Phillips screwdriver to remove the two screws that secure the ac panel to the bottom case. Then, remove the ac panel and filter board.

AC power panel and filter board replacement

Replacement:

1. Align the ac panel over the mounting holes in the bottom case and install the two screws.
2. Position the filter board back into place on the bottom case and install the two screws.
3. Plug the transformer cabling connector into the header at location J3 on the filter board.

4. Secure the green ground wire from the ac power receptacle to the hole that is second from the left on the transformer grounding bracket.

5. Position the filter board shield back into place and install the two screws. Be sure to attach the two green ground wires to the screw that secures the filter board shield to the transformer grounding bracket.

6. Perform the *Top Case* replacement procedure.

Analog and Logic Boards

Analog and logic board removal

Removal:

1. Turn off the printer and unplug the power cable.

2. Lift the Intelli-card cover and remove the Intelli-card(s).

3. Unsnap the lower edge of the rear cover from the bottom case and remove the rear cover.

4. Use a Phillips screwdriver to remove the four screws that secure the electronics shield to the bottom case. Also, loosen but do not remove the three screws that secure the electronics shield to the printer chassis. Then, remove the electronics shield.

5. Use a Phillips screwdriver to remove the remaining screw that secures the logic board to the bottom case.

6. Unplug the connectors from the headers at locations J3, J6 and J9 on the logic board.

7. Unplug the connectors from the headers at locations J1, J2, J3, J4, J6, J7, J8 and J10 on the analog board.

8. Slide the logic and analog boards towards the ac panel and then remove the boards from the printer.

9. Use a Phillips screwdriver to remove the six screws that secure the analog board to the logic board. Then, lift the analog board off of the logic board.

Analog and logic board replacement

Replacement:

1. Align the analog board shield and Mylar overlay over the mounting holes on the logic board.

2. Align the analog board over the mounting holes on the logic board and carefully plug the analog board into the three 10-pin headers at locations J1, J10 and J11 on the logic board. Make sure that all 30 pins are in the correct holes on the analog board.

3. Install the six screws that secure the analog board to the logic board.

4. Carefully insert the logic and analog boards back inside the printer and align them over the mounting holes.

5. Plug the appropriate connectors into the headers at locations J1, J2, J3, J4, J6, J7, J8 and J10 on the analog board.

Location	*No. of Pins*	*Cable Destination*
J1	4-pin	Carriage motor
J2	5-pin	Capacitor
J3	7-pin	Transformer
J4	2-pin	Bail solenoid
J6	2-pin	Fan
J7	4-pin	Platen motor
J8	34-pin	Carriage board
J10	34-pin	Carriage board

6. Plug the appropriate connectors into the headers at locations J3, J6 and J9 on the logic board.

Location	*No. of Pins*	*Cable Destination*
J3	5-pin	Carriage sensor
J6	10-pin	Control panel
J9	10-pin	Tractor/gap switch

7. Position the electronics shield back into place and install the five screws that secure the shield and the logic board to the bottom case. Also, tighten the three screws that secure the electronics shield to the printer chassis.

8. Snap the rear cover between the top and bottom cases.

9. Install the Intelli-card(s).

10. Attach the power cable and turn on the printer.

11. Run self-test and adjust the paper thickness lever until print quality is optimized.

Bail

Bail removal

Removal:

1. Perform the *Top Case* removal procedure.

2. Use a flat-blade screwdriver to pry off the internal star ring that secures the left bail arm to the bail solenoid. Then, detach the left bail arm from the bail solenoid.

3. Use a flat-blade screwdriver to remove the E-ring that secures the left bail arm to the mounting pin on the left side of the printer chassis. Then, remove the left bail arm. Be careful not to damage the spring that attaches to the left bail arm.

4. Remove the bail shaft, sleeve, and rollers.

5. Remove the bail rollers from the bail sleeve.

Replacement:

Bail replacement

1. Place the bail rollers onto the bail sleeve.

2. Insert the bail shaft into the bail sleeve.

3. Insert the right end of the bail shaft into the mounting hole on the right bail arm.

4. Mount the left bail arm onto the mounting pin on the left side of the printer chassis. Insert the left end of the bail shaft into the mounting hole on the left bail arm.

5. Hook the spring on the left bail arm onto the catch on the left side of the printer chassis.

6. Install the E-ring that secures the left bail arm to the mounting pin on the left side of the printer chassis.

7. Mount the rubber grommet on the bail solenoid onto the left bail arm. Install the internal star ring that secures the solenoid to the arm.

8. Perform the *Top Case* replacement procedure.

Bail Solenoid

Removal:

Bail solenoid removal

1. Perform the *Bottom Case* removal procedure.

2. Cut and remove the two tie-wraps that secure the bail solenoid cabling to the holders on the left side of the printer chassis.

3. Cut and remove the two tie-wraps that secure the bail solenoid cabling to the holders on the bottom of the printer chassis.

4. Use a flat-blade screwdriver to pry off the internal star ring that secures the bail solenoid actuator to the left bail arm. Then, detach the bail solenoid actuator from the left bail arm.

5. Slide the carriage to the far right.

6. Use a Phillips screwdriver to remove the two screws that secure the bail solenoid to the printer chassis. Then, remove the bail solenoid.

Bail solenoid replacement

Replacement:

1. Position the bail solenoid back into place over the mounting holes and install the two screws.

2. Mount the bail solenoid actuator onto the left bail arm and install the internal star ring.

3. Install two new tie-wraps to attach the bail solenoid cabling and other cabling to the holders on the left side of the printer chassis.

4. Install two new tie-wraps to attach the bail solenoid cabling and other cabling to the holders on the bottom of the printer chassis.

5. Perform the *Bottom Case* replacement procedure.

Bottom Carriage Cables

Bottom carriage cable removal

Removal:

1. Perform the *Bottom Case* removal procedure.
2. Slide the carriage to the far right.
3. Unplug the two carriage cable connectors from the receptacles on the floor of the printer chassis.
4. Set the printer chassis on its front edge.
5. Use a Phillips screwdriver to remove the four screws that secure the bottom carriage cable receptacles to the bottom of the printer chassis.
6. Unhook the bottom carriage cables from the four clips on the bottom of the printer chassis and remove the carriage cables.

Bottom carriage cable replacement

Replacement:

1. Insert the bottom carriage cable receptacles into the the holes in the bottom of the printer chassis and install the four screws.
2. Route the bottom carriage cables along the bottom of the printer chassis and insert the cables in the four clips.
3. Set the printer chassis back down to its normal position.
4. Plug the carriage cable connectors into the receptacles on the floor of the printer chassis.
5. Perform the *Bottom Case* replacement procedure.

Bottom Case

Bottom case removal

Removal:

1. Perform the *Top Case* removal procedure.
2. Use a Phillips screwdriver to remove the four screws that secure the electronics shield to the bottom case. Also loosen but do not remove the three screws that secure the electronics shield to the printer chassis. Then, remove the electronics shield.
3. Unplug the connectors from the headers at locations J3, J6 and J9 on the logic board.
4. Unplug the connectors from the headers at locations J1, J2, J3, J4, J6, J7, J8 and J10 on the analog board.
5. Use a Phillips screwdriver to remove the screw that secures the filter board shield to the transformer.
6. Use a Phillips screwdriver to remove the four screws that secure the printer chassis to the bottom case.
7. Grasping the front carriage shaft and the rear of the printer chassis, lift up and remove the printer chassis from the bottom case.

Bottom case replacement

Replacement:

1. Grasping the front carriage shaft and the rear of the printer chassis, place the printer chassis back into place on the bottom case. Then, reinstall the four screws.
2. Use a Phillips screwdriver to install the screw that secures the filter board shield to the transformer. Be sure to attach both of the green ground wires to the screw.

3. Plug in the appropriate connectors to the headers at locations J1, J2, J3, J4, J6, J7, J8 and J10 on the analog board.

Location	*No. of Pins*	*Cable Destination*
J1	4-pin	Carriage motor
J2	5-pin	Capacitor
J3	7-pin	Transformer
J4	2-pin	Bail solenoid
J6	2-pin	Fan
J7	4-pin	Platen motor
J8	34-pin	Carriage board
J10	34-pin	Carriage board

4. Plug in the appropriate connectors to the headers at locations J3, J6 and J9 on the logic board.

Location	*No. of Pins*	*Cable Destination*
J3	5-pin	Carriage sensor
J6	10-pin	Control panel
J9	10-pin	Tractor/gap switch

5. Position the electronics shield back into place and install the four screws. Also, tighten the three screws that secure the electronics shield to the printer chassis.

6. Perform the *Top Case* replacement procedure.

Capacitor

Removal:

Capacitor removal

1. Turn off the printer and unplug the power cable.

2. Unsnap the lower edge of the rear cover from the bottom case and remove the rear cover.

3. Use a Phillips screwdriver to remove the four screws that secure the electronics shield to the bottom case. Also, loosen but do not remove the three screws that secure the electronics shield to the printer chassis. Then, remove the electronics shield.

4. Cut and remove the two tie-wraps that secure the capacitor to the bottom case.

5. Use a Phillips screwdriver to remove the two screws and wires from the capacitor leads; then remove the capacitor.

Capacitor replacement

Replacement:

1. Attach the black wire connector and screw to the negative (-) capacitor lead.

2. Attach the red wire connector and screw to the positive (+) capacitor lead.

3. Insert two new tie-wraps in the holders on the bottom case.

4. Position the capacitor back into place on the bottom case and secure it with the tie-wraps.

5. Position the electronics shield back into place and install the four screws that secure the shield to the bottom case. Also tighten the three screws that secure the electronics shield to the printer chassis.

6. Snap the rear cover back into place between the top and bottom cases.

7. Plug in the power cable and turn on the printer.

8. Run self-test and adjust the paper thickness lever until print quality is optimized.

Carriage Belt

Carriage belt removal

Removal:

1. Perform the *Printhead* removal procedure.

2. Unplug the connectors from the headers at locations JP3, JP4, JP5, JP6 and JP8 on the carriage board.

3. Use a Phillips screwdriver to remove the four screws that secure the carriage board to the carriage.

4. Insert a Phillips screwdriver through the holes in the ribbon platform to remove the four screws that secure the bottom carriage cable clamp to the top carriage cable clamp; then remove the bottom clamp.

5. Pull up on the carriage board to gain access to the screw that secures the carriage belt to bottom of the carriage.

6. Use a Phillips screwdriver to remove the screw and clamp that secure the carriage belt to the carriage.

7. Use a Phillips screwdriver to loosen the two screws that secure the right carriage pulley bracket to the floor of the printer chassis.

8. Use an 11/32-inch open-end wrench to loosen the nut that secures the right carriage pulley bracket to the right side of the printer chassis.

9. Remove the right carriage pulley from the bracket; then remove the carriage belt.

Carriage belt replacement

Replacement:

1. Place the carriage belt around the right carriage pulley.

2. Place the right carriage pulley into the right carriage pulley bracket.

3. Install the screw that secures the carriage belt and clamp to the bottom of the carriage.
4. Position the carriage board back into place on the carriage.
5. Install the four screws that secure the carriage board to the carriage.
6. Plug in the appropriate connectors to the headers at locations JP3, JP4, JP5, JP6 and JP8 on the carriage board.
7. Route the carriage board cabling along the surface of the carriage board; make sure that the cabling does not interfere with the printhead receptacle.
8. Align the bottom carriage cable clamp below the top carriage cable clamp and install but do not tighten the four screws that secure the top and bottom clamps. The carriage cables and shields must be sandwiched between the two clamps.
9. Adjust the carriage cable shields so that they are flush with the carriage cables; then tighten the four screws that secure the top and bottom clamps.
10. Slide the carriage from side to side. Make sure that the carriage cables and shields do not touch the ribbon drive cable that is suspended across the length of the printer. Also, make sure that there is at least 1/8-inch clearance between the carriage cables and the printer chassis when the carriage is at the far right.
11. Perform the *Printhead* replacement procedure, steps 1 through 3.
12. Perform the *Carriage Belt* adjustment in section 4 of this guide.
13. Attach the power cable and turn on the printer.
14. Run self-test and adjust the paper thickness lever until print quality is optimized.

Carriage Board and Cables

Carriage board and cable removal

Removal:

1. Perform the *Printhead* removal procedure.
2. Slide the carriage to the far right.
3. Use a Phillips screwdriver to remove the two screws that secure the carriage cable bracket to the floor of the printer chassis; then remove the bracket.
4. Unplug the two carriage cable connectors from the receptacles on the floor of the printer chassis.
5. Slide the carriage to the center of the printer.
6. Unplug the connectors from the headers at locations JP3, JP4, JP5, JP6 and JP8 on the carriage board.
7. Use a Phillips screwdriver to remove the four screws that secure the carriage board to the carriage.
8. Insert a Phillips screwdriver through the holes in the ribbon platform to remove the four screws that secure the bottom carriage cable clamp to the top carriage cable clamp; then remove the bottom clamp.
9. Remove both of the metal shields that protect the carriage cables.
10. Pull up on the carriage board and cables and remove them from the printer.

Carriage board and cable replacement

Replacement:

1. Thread the carriage cables through the hole in the bottom of the carriage until the carriage board is positioned back into place on the carriage.

2. Install the four screws that secure the carriage board to the carriage.

3. Plug in the appropriate connectors to the headers at locations JP3, JP4, JP5, JP6 and JP8 on the carriage board.

Location	*No. of Pins*	*Cable Destination*
JP3	4-pin	Ribbon lift motor
JP4	2-pin	Microshift solenoid
JP5	4-pin	Paper sensor
JP6	2-pin	Ribbon home switch
JP8	2-pin	Multicolor ribbon switch

4. Route the carriage board cabling along the surface of the carriage board; make sure that the cabling does not interfere with the printhead receptacle.

5. Slide the carriage to the far right.

6. Plug the carriage cable connectors into the receptacles on the floor of the printer chassis.

7. Sandwich the carriage cables between the two carriage cable shields. The longer of the two shields must be on the outside of the cable loop and the black tape on the shields must face the cables. Also, the ends of the shields with black tape set in about 3/8-inch must attach to the carriage--not the bracket on the floor of the printer chassis.

8. Align the carriage cable bracket over the carriage cables and shields; then install the two screws. While tightening the screws, adjust the carriage cables and shields so that they are parallel with the carriage shaft. Also, adjust the cable shields so that the ends are concealed below the bracket.

9. Slide the carriage to the center of the printer.

10. Align the bottom carriage cable clamp below the top carriage cable clamp and install but do not tighten the four screws that secure the top and bottom clamps. The carriage cables and shields must be sandwiched between the two clamps.

11. Adjust the carriage cable shields so that they are flush with the carriage cables; then tighten the four screws that secure the top and bottom clamps.

12. Slide the carriage from side to side. Make sure that the carriage cables and shields do not touch the ribbon drive cable that is suspended across the length of the printer. Also, make sure that there is at least 1/8-inch clearance between the carriage cables and the printer chassis when the carriage is at the far right.

13. Perform the *Printhead* replacement procedure.

Carriage Motor

Removal:

Carriage motor removal

1. Perform the *Bottom Case* removal procedure.

2. Cut and remove the three tie-wraps that secure the carriage motor cabling to the holders on the left side of the printer chassis.

3. Cut and remove the two tie-wraps that secure the carriage motor cabling to the holders on the bottom of the printer chassis.

4. Use a Phillips screwdriver to remove the three screws that secure the carriage motor to the printer chassis. Then, remove the carriage motor.

5. Use a 3/32-inch hex driver to loosen the set screw in the pulley on the carriage motor shaft. Then, pull the pulley off the shaft.

Carriage motor replacement

Replacement:

1. Mount the pulley onto the carriage motor shaft but do not tighten the set screw.

2. Position the carriage motor back into place over the mounting holes and place the carriage belt around the carriage motor pulley. Then, install the three screws. Make sure that the carriage motor cabling faces the left side of the printer.

3. Adjust the carriage belt so that it is parallel to the platen and then tighten the set screw in the pulley on the carriage motor shaft.

4. Perform the *Carriage Belt* adjustment in section 4 of this guide.

5. Install three new tie-wraps to attach the carriage motor cabling and other cabling to the holders on the left side of the printer chassis.

6. Install two new tie-wraps to attach the carriage motor cabling and other cabling to the holders on the bottom of the printer chassis.

7. Perform the *Bottom Case* replacement procedure.

Carriage Sensor

Carriage sensor removal

Removal:

1. Perform the *Bottom Case* removal procedure.

2. Cut and remove the two tie-wraps that secure the carriage sensor cabling to the holders on the left side of the printer chassis.

3. Cut and remove the two tie-wraps that secure the carriage sensor cabling to the holders on the bottom of the printer chassis.

4. Use a Phillips screwdriver to remove the two screws that secure the carriage sensor to the printer chassis. Then, remove the carriage sensor.

Carriage sensor replacement

Replacement:

1. Position the carriage sensor back into place over the mounting holes and install the two screws.

2. Slide the carriage to the far left and make sure that the tab on the carriage trips but does not touch the carriage sensor.

3. Install two new tie-wraps to attach the carriage sensor cabling and other cabling to the holders on the left side of the printer chassis.

4. Install two new tie-wraps to attach the carriage sensor cabling and other cabling to the holders on the bottom of the printer chassis.

5. Perform the *Bottom Case* replacement procedure.

Control Panel

Control panel removal

Removal:

1. Turn off the printer and unplug the power cable.
2. Raise the top cover.
3. Unplug the ribbon cable connector from the edge of the control panel.
4. Use a Phillips screwdriver to remove the two screws under the front lip of the bottom case that secure the control panel to the bottom case; then remove the control panel.

Control panel replacement

Replacement:

1. Position the control panel back into place over the two mounting holes.
2. Install the two screws that secure the control panel to the bottom case.
3. Plug in the ribbon cable connector to the receptacle on edge of the control panel.
4. Lower the top cover.
5. Plug in the power cable and turn on the printer.
6. Perform the *Sensor Test* in section 2 of this guide to verify that the control panel buttons, Select-dial and display operate normally.

Control Panel Cable

Control panel cable removal

Removal:

1. Perform the *Bottom Case* removal procedure.
2. Unplug the control panel cable connector from the receptacle on the edge of the control panel.
3. Unhook the control panel cable from the four clips on the bottom case and remove the control panel cable.

Control panel cable replacement

Replacement:

1. Plug the control panel cable connector into the receptacle on the edge of the control panel.
2. Route the control panel cable along the bottom case and insert the cable in the four clips.
3. Perform the *Bottom Case* replacement procedure.

Fan

Fan removal

Removal:

1. Perform the *Bottom Case* removal procedure.
2. Unhook the fan from the latches on the bottom case.
3. Unhook the fan cabling from the clip on the bottom case; then remove the fan.

Fan replacement

Replacement:

1. Position the fan back into place on the bottom case and snap it into the latches.
2. Insert the fan cabling into the clip on the bottom cases.
3. Perform the *Bottom Case* replacement procedure.

Left Actuator and Link

Left actuator and link removal

Removal:

1. Perform the *Platen Belt* removal procedure.
2. Unlatch the wire lock at the left end of the platen.
3. Rotate the bushing at the left end of the platen about 90 degrees until the left end of the platen releases from the printer chassis.
4. Use a flat-blade screwdriver to remove the two E-rings that secure the link to the left ends of the paper feed shafts.
5. Use a flat-blade screwdriver to pry off the gear and washer on the left end of the front paper feed shaft.
6. Unhook the spring from the link.
7. Pull off the link from the left ends of the paper feed shafts.
8. Use a flat-blade screwdriver to remove the E-ring that secures the actuator to the paper release shaft. Then, pull the actuator off the shaft.

Left actuator and link replacement

Replacement:

1. Mount the actuator on the left end of the paper release shaft and install the E-ring.
2. Mount the link on the left ends of the paper feed shafts.
3. Apply a modest amount of silicone grease to the connection between the left actuator and link.
4. Mount the washer and then the gear onto the left end of the front paper feed shaft. Then, install the E-ring that secures the washer and gear to the front paper feed shaft.

5. Install the E-ring that secures the link to the left end of the rear paper feed shaft.

6. Hook the spring on the left side of the printer chassis to the link.

7. Move the tractor select lever back and forth to verify that the rear paper feed shaft moves easily.

8. Rotate the bushing at the left end of the platen about 90 degrees until the left end of the platen locks into the printer chassis.

9. Latch the wire lock at the left end of the platen onto the printer chassis.

10. Perform the *Platen Belt* replacement procedure.

Microshift Solenoid

Microshift solenoid removal

Removal:

1. Perform the *Printhead* removal procedure.

2. Cut and remove the tie-wraps that secure the microshift solenoid cabling to the other carriage board cabling.

3. Unplug the connector from the header at location JP4 on the carriage board.

4. Unthread the microshift solenoid cabling from the hole in the bottom of the carriage.

5. Use a Phillips screwdriver to remove the four screws that secure the carriage board to the carriage.

6. Lift up the carriage board to gain access to the two screws that secure the microshift solenoid to the carriage.

7. Use a miniature Phillips screwdriver to remove the two screws that secure the microshift solenoid to the carriage; then remove the solenoid.

Microshift solenoid replacement

Replacement:

1. Align the microshift solenoid below the mounting holes on the bottom of the carriage and install the two screws using service-removable Loctite.

2. Position the carriage board back into place on the carriage and install the four screws.

3. Thread the microshift solenoid cabling through the hole in the bottom of the carriage.

4. Plug the microshift solenoid connector into the header at location JP4 on the carriage board.

5. Install two new tie-wraps to bundle the microshift solenoid cabling with the other carriage board cabling. Bend the cabling as necessary to minimize slack.

6. Route the carriage board cabling along the surface of the carriage board; make sure that the cabling does not interfere with the printhead receptacle.

7. Perform the *Printhead* replacement procedure, step 1 through 5.

8. Perform the *Microshift* adjustment in section 4 of this guide.

9. Run self-test and adjust the paper thickness lever until print quality is optimized.

Multicolor Ribbon Switch

Multicolor ribbon switch removal

Removal:

1. Perform the *Printhead* removal procedure.
2. Use a Phillips screwdriver to remove the screw that secures the multicolor ribbon switch to the carriage.
3. Cut and remove the tie-wraps that secure the multicolor ribbon switch cabling to the other carriage board cabling.
4. Unplug the connector from the header at location JP8 on the carriage board.
5. Unthread the multicolor ribbon switch cabling from the hole in the bottom of the carriage and remove the multicolor ribbon switch.

Multicolor ribbon switch replacement

Replacement:

1. Align the multicolor ribbon switch over the mounting hole and install the screw.
2. Thread the multicolor ribbon switch cabling through the hole in the bottom of the carriage. .
3. Plug the multicolor ribbon switch connector into the header at location JP8 on the carriage board.
4. Install two new tie-wraps to bundle the multicolor ribbon switch cabling with the other carriage board cabling. Bend the cabling as necessary to minimize slack.
5. Route the carriage board cabling along the surface of the carriage board; make sure that the cabling does not interfere with the printhead receptacle.
6. Perform the *Printhead* replacement procedure.

Paper Feed Belts

Paper feed belt removal

Removal:

1. Perform the *Platen* removal procedure.
2. Use a Phillips screwdriver to remove the two screws that secure the paper deflector to the printer chassis; then remove the paper deflector.
3. Use a flat-blade screwdriver to remove the E-rings from the left ends of the paper feed shafts.
4. Use a flat-blade screwdriver to pry off the gear and washer on the left end of the front paper feed shaft.
5. Unhook the spring from the link on the left ends of the paper feed shafts.
6. Pull off the link from the left ends of the paper feed shafts.
7. Pull on the right end of the front paper feed shaft and remove the shaft from the printer. The plastic shaft sleeve should remain in the printer.
8. Use a Phillips screwdriver to remove two of the three screws that secure the tractor gear train plate to the right side of the printer chassis; loosen but do not remove the third screw with the ground wire. Then, push the tractor gear train plate out of the way.
9. Use a flat-blade screwdriver to remove the E-ring from the right end of the rear paper feed shaft.
10. Lift out the rear paper feed shaft with the paper feed belts, paper guides, and plastic shaft sleeve from the printer.
11. Remove the paper feed belts from the rear paper feed shaft.

Replacement:

Paper feed belt replacement

1. Position the paper feed belts around the rubber rollers on the rear paper feed shaft and around the plastic shaft sleeve.

2. Position the rear paper feed shaft with belts, guides, and the plastic shaft sleeve back into place in the printer.

3. Push the plastic shaft sleeve in front of the six paper guides attached to the printer chassis. Be careful not to bend the paper guides or damage the platen wiper.

4. Position the six paper guides attached to the rear paper feed shaft so that they rest on the six paper guides attached to the printer chassis.

5. Push the right end of the rear paper feed shaft through the hole in the printer chassis and then through the bearing in the link. Install the E-ring that secures the link to the right end of the rear paper feed shaft.

6. Align the tractor gear train plate on the right side of the printer chassis over the mounting holes and install the two screws. While tightening the screws, adjust the tractor gear train plate for maximum looseness between the gears. Also tighten the screw with the ground wire.

7. Align the right end of the plastic shaft sleeve over the hole in the right side of the printer chassis and insert the front paper feed shaft into the hole. Push the front paper feed shaft through the plastic shaft sleeve and through the hole in the left side of the printer chassis.

8. Mount the link on the left ends of the paper feed shafts.

9. Adjust the paper feed belts so that they are centered on the rubber rollers on the rear paper feed shaft.

10. Mount the washer and then the gear onto the left end of the front paper feed shaft. Then, install the E-ring that secures the washer and gear to the front paper feed shaft.

11. Install the E-ring that secures the link to the left end of the rear paper feed shaft.

12. Hook the spring on the left side of the printer chassis to the link.

13. Move the tractor select lever back and forth to verify that the rear paper feed shaft moves easily and the paper feed belts and shafts are positioned correctly.

14. Position the paper deflector over the mounting holes and install the two screws.

15. Perform the *Platen* replacement procedure.

Paper Sensor

Paper sensor removal

Removal:

1. Perform the *Printhead* removal procedure.

2. Use your thumbnail to pull up the top latch of the paper sensor bracket on the print-line indicator and then pull out the sensor. Be careful not to bend the top latch.

3. Unplug the connector from the header at location JP5 on the carriage board and remove the paper sensor.

Paper sensor replacement

Replacement:

1. Plug the paper sensor connector into the header at location JP5 on the carriage board.

2. Mount the paper sensor in the bracket on the print-line indicator. Make sure that the sensor is held firmly in place by the latches.

3. Route the paper sensor cabling along the surface of the carriage board. Make sure that the cabling does not interfere with the printhead receptacle.

4. Perform the *Printhead* replacement procedure.

Paper Thickness Lever

Removal:

Paper thickness lever removal

1. Perform the *Top Case* removal procedure.

2. Use a Phillips screwdriver to remove the screw that secures the paper thickness lever to the right end of the main carriage shaft. Then, pull the lever off the shaft.

Replacement:

Paper thickness lever replacement

1. Mount the paper thickness lever onto the right end of the main carriage shaft.

2. Install but do not tighten the screw that secures the paper thickness lever to the right end of the main carriage shaft.

3. Perform the *Print Gap* adjustment in section 4 of this guide.

4. Perform the *Top Case* replacement procedure.

Platen

Platen removal

Removal:

1. Perform the *Platen Belt* removal procedure.
2. Unlatch the wire locks at both ends of the platen that secure the platen to the printer chassis.
3. Rotate the bushings at both ends of the platen about 90 degrees until the platen releases from the printer chassis.
4. Lift up the platen and remove it from the printer.

Platen replacement

Replacement:

1. Position the platen back onto the printer chassis. Be careful not to damage the platen wiper. Make sure that the platen wiper is flush against the platen.
2. Rotate the bushings at both ends of the platen about 90 degrees until the platen is locked onto the printer chassis.
3. Latch the wire locks at both ends of the platen onto the printer chassis.
4. Perform the *Platen Belt* replacement procedure.

Platen Belt

Platen belt removal

Removal:

1. Perform the *Top Case* removal procedure.
2. While rotating the platen with one hand, pull outwards on the platen belt until the belt is free of the platen and platen motor pulleys.

Replacement:

Platen belt replacement

1. Position the platen belt around the platen motor pulley.
2. While turning the platen with one hand, slide the platen belt onto the platen pulley.
3. Perform the *Platen Belt* adjustment in section 4 of this guide.
4. Perform the *Top Case* replacement procedure.

Platen Motor

Removal:

Platen motor removal

1. Perform the *Bottom Case* removal procedure.
2. Cut and remove the two tie-wraps that secure the platen motor cabling to the holders on the bottom of the printer chassis.
3. While rotating the platen with one hand, pull outwards on the platen belt until the belt is free of the platen and platen motor pulleys.
4. Use a Phillips screwdriver to remove the three screws that secure the platen motor to the printer chassis. Then, remove the platen motor.
5. Use a 3/32-inch hex driver to loosen the set screw in the pulley on the platen motor shaft. Then, pull the pulley off the shaft.

Replacement:

Platen motor replacement

1. Mount the pulley onto the platen motor shaft but do not tighten the set screw.

2. Position the platen motor back into place over the mounting holes and place the platen belt around the platen motor pulley. Then, install but do not tighten the three screws that secure the motor to the printer chassis.
3. Adjust the platen belt so that it is parallel to the left end of the printer chassis and then tighten the set screw in the pulley on the platen motor shaft.
4. Perform the *Platen Belt* adjustment in section 4 of this guide.
5. Install two new tie-wraps to attach the platen motor cabling and other cabling to the holders on the bottom of the printer chassis.
6. Perform the *Bottom Case* replacement procedure.

Platen Wiper

Platen wiper removal

Removal:

1. Perform the *Print-Line Indicator* removal procedure.
2. Carefully pry off the platen wiper from the foam adhesive that secures the platen wiper to the printer chassis.
3. Use a slotted screwdriver or single-edge razor blade to scrape off any remaining foam adhesive from the printer chassis.

Platen wiper replacement

Replacement:

1. Remove the backing sheet from the foam adhesive on a new platen wiper.
2. Using a line gauge or ruler, stick the new platen wiper onto the printer chassis so that the distance between the top edge of the platen wiper and the top edge of the front cross brace is 1.5 inches at both ends of the platen. Press down on the platen wiper and make sure that it is held securely in place.
3. Perform the *Print-Line Indicator* replacement procedure.

Print Gap Switch and Cable

Removal:

Print gap switch and cable removal

1. Perform the *Bottom Case* removal procedure.
2. Cut and remove the tie-wrap that secures the print gap switch cabling to the holder on the right side of the printer chassis.
3. Cut and remove the two tie-wraps that secure the print gap switch cabling to the holders on the bottom of the printer chassis.
4. Use a Phillips screwdriver to remove the two screws that secure the print gap switch and notched detent plate to the right side of the printer chassis.

Replacement:

Print gap switch and cable replacement

1. Align the notched detent plate and print gap switch over the two mounting holes on the right side of the printer chassis and install the two screws.
2. Install a new tie-wrap to secure the print gap switch cabling to the holder on the right side of the printer chassis.
3. Thread the print gap switch cabling through the hole in the right side of the printer chassis.
4. Install two new tie-wraps to secure the print gap switch cabling and other cabling to the holders on the bottom of the printer chassis.
5. Perform the *Bottom Case* replacement procedure.

Print-Line Indicator and Ribbon Shield

Print-line indicator and ribbon shield removal

Removal:

1. Perform the *Printhead* removal procedure.
2. Use your thumbnail to pull up the top latch of the paper sensor bracket on the print-line indicator and then pull out the sensor. Be careful not to bend the top latch.
3. Use a Phillips screwdriver to remove the two screws that secure the print-line indicator, ribbon shield and clamp to the carriage and then remove these parts.

Print-line indicator and ribbon shield replacement

Replacement:

1. Position the print-line indicator, ribbon shield and clamp back into place on the carriage and install but do not tighten the two screws.
2. With the paper thickness lever all the way towards the back of the printer, insert a 0.020-inch feeler gauge between the print-line indicator and the platen. Then, tighten the two screws.
3. Mount the paper sensor in the bracket on the print-line indicator. Make sure that the sensor is held firmly in place by the latches.
4. Perform the *Printhead* replacement procedure.

Printhead

Printhead removal

Removal:

1. Turn off the printer and unplug the power cable.
2. Pull the paper thickness lever towards the front of the printer.
3. Lift up and remove the top cover.
4. Raise the platen window.

5. Slide the carriage to the center of the printer.

6. Remove the ribbon cartridge.

7. Use a flat-blade screwdriver to remove the two screws that secure the printhead to the carriage.

8. Pull up on the printhead and remove it from the printer.

Printhead replacement

Replacement:

1. Align the printhead over the receptacle at location JP7 on the carriage board and plug the printhead into the receptacle. Press down the printhead until it is fully seated in the receptacle.

2. Install the two screws that secure the printhead to the carriage.

3. Install the ribbon cartridge.

4. Lower the platen window and install the top cover.

5. Attach the power cable and turn on the printer.

6. Run self-test and adjust the paper thickness lever until print quality is optimized.

Ribbon Drive Mechanism and Cable

Ribbon drive mechanism and cable removal

Removal:

1. Turn off the printer and unplug the power cable.

2. Raise the top cover and remove the ribbon cartridge.

3. Use a Phillips screwdriver to remove the three screws that secure the ribbon drive mechanism to the ribbon platform.

4. Slide the carriage to the right.

5. Unhook the ribbon drive cable from the anchor posts on both sides of the printer chassis; then remove the ribbon drive mechanism and cable.

Ribbon drive mechanism and cable replacement

Replacement:

1. Hook one end of the ribbon drive cable to the left anchor post.

2. Loop the ribbon drive cable once around the largest pulley on the ribbon drive mechanism.

3. While holding the ribbon drive cable looped around the largest pulley, thread the loose end of the cable between the ribbon drive platform and the carriage and pull the wire through.

4. Hook the loose end of the ribbon drive cable to the right anchor post.

5. Insert the ribbon drive spindle on the ribbon drive mechanism through the hole in the ribbon drive platform and align the ribbon drive mechanism under the three mounting holes.

6. Install the three screws that secure the ribbon drive mechanism to the ribbon platform. Make sure that the ribbon drive spindle is centered in the hole and does not touch the ribbon platform.

7. Slide the carriage from side to side and verify that the ribbon drive spindle rotates counterclockwise regardless of the direction of carriage travel.

8. Install the ribbon cartridge and lower the top cover.

9. Attach the power cable and turn on the printer.

10. Run self-test and adjust the paper thickness lever until print quality is optimized.

Ribbon Home Switch

Ribbon home switch removal

Removal:

1. Perform the *Printhead* removal procedure.
2. Use a Phillips screwdriver to remove the two screws that secure the ribbon home switch and shield to the carriage.
3. Cut and remove the tie-wrap that secures the ribbon home switch cabling to the holder on the side of the carriage.
4. Cut and remove the tie-wraps that secure the ribbon home switch cabling to the other carriage board cabling.
5. Unplug the connector from the header at location JP6 on the carriage board.
6. Unthread the ribbon home switch cabling from the hole in the bottom of the carriage and remove the ribbon home switch.

Ribbon home switch replacement

Replacement:

1. Align the ribbon home switch and shield over the mounting holes and install but do not tighten the two screws.
2. Thread the ribbon home switch cabling through the hole in the bottom of the carriage.
3. Plug the ribbon home switch connector into the header at location JP6 on the carriage board.
4. Install a new tie-wrap to secure the ribbon home switch cabling to the holder on the side of the carriage.
5. Install two new tie-wraps to bundle the ribbon home switch cabling with the other carriage board cabling. Bend the cabling as necessary to minimize slack.

6. Route the carriage board cabling along the surface of the carriage board; make sure that the cabling does not interfere with the printhead receptacle.

7. Perform the *Printhead* replacement procedure, steps 1 through 3.

8. With the ribbon cartridge at its lowest position (that is, with the top ribbon band in front of the printhead) position the ribbon home switch so that the switch lever is not tripped by the ribbon cartridge. Then, tighten the screws.

9. Lower the platen window and reinstall the top cover.

10. Attach the power cable and turn on the printer.

11. Perform the *Ribbon Home Switch* adjustment in section 4 of this guide.

12. Run self-test and adjust the paper thickness lever until print quality is optimized.

Ribbon Lift Motor

Ribbon lift motor removal

Removal:

1. Perform the *Printhead* removal procedure.

2. Use a Phillips screwdriver to remove the three screws that secure the ribbon lift motor assembly and spacers to the carriage. Be careful not to lose the spacers as you remove the screws.

3. Cut and remove the tie-wraps that secure the ribbon lift motor cabling to the other carriage board cabling.

4. Unplug the connector from the header at location JP3 on the carriage board.

5. Unthread the ribbon lift motor cabling from the hole in the bottom of the carriage and remove the ribbon lift motor.

Replacement:

Ribbon lift motor replacement

1. Align the ribbon lift motor assembly over the mounting holes and install the spacers and screws. Make sure that the gear on the ribbon lift motor assembly meshes with the gear quadrant on the ribbon platform. Pivot the ribbon platform and make sure that the gears do not slip.

2. Thread the ribbon lift motor cabling through the hole in the bottom of the carriage.

3. Plug the ribbon lift motor connector into the header at location JP3 on the carriage board.

4. Install two new tie-wraps to bundle the ribbon lift motor cabling with the other carriage board cabling. Bend the cabling as necessary to minimize slack.

5. Route the carriage board cabling along the surface of the carriage board; make sure that the cabling does not interfere with the printhead receptacle.

6. Perform the *Printhead* replacement procedure.

Right Actuator, Link, and Tractor Gear Train Plate

Removal:

Right actuator, link, and tractor gear train plate removal

1. Perform the *Top Case* removal procedure.

2. Use a Phillips screwdriver to remove the three screws that secure the tractor gear train plate to the right side of the printer chassis. Then, remove the tractor gear train plate.

3. Use a flat-blade screwdriver to remove the two E-rings that secure the link to the right ends of the paper feed shafts.

4. Unhook the spring from the link.

5. Pull off the link from the right ends of the paper feed shafts.

6. Use a flat-blade screwdriver to remove the E-rings that secure the actuator to the paper release shaft and the tractor select lever to the rear tractor shaft.

7. Carefully pull the tractor select lever off of the rear tractor shaft. Be careful not to lose the wire spring that is released when you remove the lever.

8. Pull the right actuator off of the paper release shaft.

Right actuator, link, and tractor gear train plate replacement

Replacement:

1. Mount the actuator onto the right end of the paper release shaft.

2. Apply a modest amount of silicone grease to the areas where the actuator will touch the tractor select lever and link.

3. Place one end of the tractor select lever spring into the mounting hole on the lever and hold the spring in place.

4. Push the tractor select lever onto the right end of the rear tractor shaft. Place the other end of the spring into the hole on the right side of the printer chassis. Make sure the slot in the tractor select lever mounts on the actuator pin.

5. Install the E-ring that secures the tractor select lever to the right end of the rear tractor shaft.

6. Install the E-ring that secures the actuator to the paper release shaft.

7. Mount the link onto the right ends of the paper feed shafts and then install the two E-rings that secure the link to the shafts.

8. Hook the spring on the right side of the printer chassis onto the link.

9. Align the tractor gear train plate on the right side of the printer chassis over the mounting holes and install the three screws. While tightening the screws, adjust the plate for maximum looseness between the gears. Remember to attach the green ground wire to the lower rear screw.

10. Perform the *Top Case* replacement procedure.

Top Case

Removal:

Top case removal

1. Turn off the printer and unplug the power cable.

2. Pull the tractor select and paper thickness levers toward the front of the printer.

3. Grasp the lower edge of the rear cover and unsnap it from the bottom case; then remove the rear cover.

4. Use a Phillips screwdriver to loosen the four captive screws on the bottom of the printer that secure the top case to the bottom case.

5. Grasp the rear of the top case, lift it up, and remove the top case from the printer.

Replacement:

Top case replacement

1. Position the top case back into place on the bottom case.

2. Tighten the four captive screws that secure the top case to the bottom case.

3. Snap the rear cover back into place between the top and bottom cases.

4. If necessary, move the tractor select lever back to its original position.

5. Attach the power cable and turn on the printer.

6. Run self-test and adjust the paper thickness lever until print quality is optimized.

Tractor Select Lever

Tractor select lever removal

Removal:

1. Perform the *Top Case* removal procedure.

2. Use a flat-blade screwdriver to remove the E-ring that secures the spring and gear to the right end of the front tractor shaft; then remove the spring and gear.

3. Use a Phillips screwdriver to remove two of the three screws that secure the tractor gear train plate to the right side of the printer chassis; loosen but do not remove the third screw with the ground wire. Then, push the tractor gear train plate down and out of the way.

4. Use a flat-blade screwdriver to remove the E-ring that secures the tractor select lever to the right end of the rear tractor shaft.

5. Carefully pull the tractor select lever off of the rear tractor shaft. Be careful not to lose the wire spring that is released when you remove the lever.

Replacement:

Tractor select lever replacement

1. Apply a modest amount of silicone grease to the slot in the tractor select lever that connects to the actuator.
2. Place one end of the tractor select lever spring into the mounting hole on the lever and hold the spring in place.
3. Push the tractor select lever onto the right end of the rear tractor shaft. Place the other end of the spring into the hole on the right side of the printer chassis. Make sure the slot in the tractor select lever mounts on the actuator pin.
4. Install the E-ring that secures the tractor select lever to the right end of the rear tractor shaft.
5. Align the tractor gear train plate on the right side of the printer chassis over the mounting holes and install the two screws. While tightening the screws, adjust the plate for maximum looseness between the gears. Also tighten the screw with the ground wire.
6. Mount the gear and then the spring onto the right end of the front tractor shaft. Install the E-ring that secures the gear and spring to the shaft.
7. Perform the *Top Case* replacement procedure.

Tractor Switch and Cable

Removal:

Tractor switch and cable removal

1. Perform the *Bottom Case* removal procedure.
2. Cut and remove the two tie-wraps that secure the tractor switch cabling to the holders on the bottom of the printer chassis.
3. Use a Phillips screwdriver to remove the two screws that secure the tractor switch to the right side of the printer chassis. Then, remove the tractor switch and cable.

Tractor switch and cable replacement

Replacement:

1. Align the tractor switch over the two mounting holes and install the two screws.
2. Thread the tractor switch cabling through the hole in the right side of the printer chassis.
3. Install two new tie-wraps to secure the print gap switch cabling and other cabling to the holders on the bottom of the printer chassis.
4. Perform the *Bottom Case* replacement procedure.

Tractors

Tractor removal

Removal:

1. Perform the *Tractor Select Lever* removal procedure.
2. Use a flat-blade screwdriver to remove the E-ring that is about one inch from the right end of the rear tractor shaft.
3. Use a flat-blade screwdriver to remove the E-ring that secures the front tractor shaft to the bearing in the right side of the printer chassis.
4. Pull on the left end of the rear tractor shaft and remove the shaft from the printer.
5. Remove the front tractor shaft from the printer and slide off the tractors and center support. Be careful not to lose the wave washer on the left end of the front tractor shaft.

Replacement:

Tractor replacement

1. Slide the left tractor, center support, and right tractor onto the front tractor shaft (square shaft). Make sure that the locking levers on the tractors face the sides of the printer and the tractors doors face the center of the printer. Also make sure that the alignment marks that are etched into the sides of the front tractor belt pulleys face the front of the printer.

2. Mount the wave washer on the left end of the front tractor shaft.

3. Position the front tractor shaft back into the mounting holes on the printer chassis. The end of the shaft with the pin goes through the hole in the right side of the printer chassis.

4. Install the E-ring that secures the right end of the front tractor shaft to the printer chassis.

5. Insert the rear tractor shaft through the holes in the left side of the printer chassis, left tractor, center support, right tractor, and then the right side of the printer chassis.

6. Install the E-ring in the groove that is about one inch from the right end of the rear tractor shaft.

7. Perform the *Tractor Select Lever* replacement procedure.

Transformer

Removal:

Transformer removal

1. Perform the *Bottom Case* removal procedure.
2. Using a Phillips screwdriver, remove the screws that secure the three ground wires to the transformer grounding bracket.

3. Unplug the connector from the header at location J3 on the filter board.

4. Cut and remove the tie-wrap that bundles the transformer cabling to the capacitor cabling.

5. Use a Phillips screwdriver to remove the four screws that secure the transformer and grounding bracket to the bottom case. Then, remove the transformer and grounding bracket.

Transformer replacement

Replacement:

1. Position the transformer and grounding bracket back into place on the bottom case and install the four screws.

2. Plug the transformer cabling connector into the header at location J3 on the filter board.

3. Install a new tie-wrap to secure the transformer cabling to the capacitor cabling.

4. Secure the green ground wire from the transformer to the rightmost hole on the transformer grounding bracket.

5. Secure the black ground wire from the transformer connector to the hole that is second from the right on the transformer grounding bracket.

6. Secure the green ground wire from the ac power receptacle to the hole that is second from the left on the transformer grounding bracket.

7. Perform the *Bottom Case* replacement procedure.

4 Making Adjustments

For the Accel-500 printer to operate properly and produce excellent print quality, certain alignments and tolerances within the printer must be maintained. Initially, these alignments and tolerances are calibrated and set at the factory. When you replace certain parts, however, it may be necessary to make adjustments. This section provides procedures for the adjustments listed below.

Adjustment Procedure List

Here is a list of the adjustment procedures in this section and the page numbers where to find them.

Adjustment procedure listing

Page	*Adjustment*	*Description*
4-2	Carriage belt	Carriage belt tension affects the horizontal registration of printing.
4-4	Microshift	Microshift affects the quality of letter-quality text and 240V graphics.
4-6	Platen	Platen positioning (parallelism to the printhead) affects the consistency of the print quality across the page.
4-8	Platen belt	Platen belt tension affects the vertical registration of printing on the page.
4-10	Platen wiper	Platen wiper positioning affects the quality of printing on the page.
4-11	Print gap	Print gap affects the overall quality of printing on the page.
4-14	Ribbon drive cable	Ribbon drive cable tension affects the advancement of the ribbon through the cartridge and in front of the printhead.
4-16	Ribbon home switch	Ribbon home switch positioning affects color registration of printing on the page.

Carriage Belt Adjustment

Carriage belt tension affects carriage motion and the horizontal registration of printing on the page. If the carriage belt is too loose, it can slip causing horizontal spacing distortions on printed lines; if the belt is too tight, it can bind the carriage motor or break after only limited use.

Specification:

Carriage belt specification

With the carriage at the far left, pressing on the center of the carriage belt with eight ounces of force shall cause the belt to deflect between 0.21 and 0.25 inch, measured one-half inch to the right of center.

Symptoms:

Carriage belt symptoms

Symptoms of incorrect carriage belt tension include:

- Jagged left margins
- Left margins that change abruptly in the middle of the page
- Vertical lines that print as broken line segments
- Consecutive lines of text or graphics that do not align properly

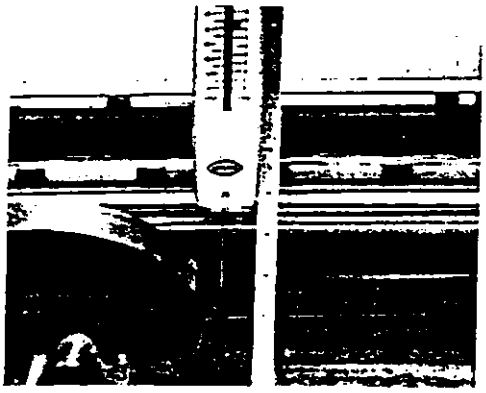
Measurement:

Carriage belt measurement

To measure carriage belt tension, perform the following procedure:

1. Turn off the printer and unplug the power cable.
2. Raise the top cover.
3. Slide the carriage to the far left.

4. Position a line gauge or ruler next to the carriage belt about one-half inch to the right of center. Let the gauge rest on the floor of the chassis.



4-1 Carriage Belt Measurement

5. Use a spring gauge to press down on the center of the carriage belt with eight ounces of force. Then, measure the deflection. If the deflection is less than 0.21 inch or more than 0.25 inch, perform the adjustment procedure.

6. Lower the top cover, plug in the power cable, and turn on the printer.

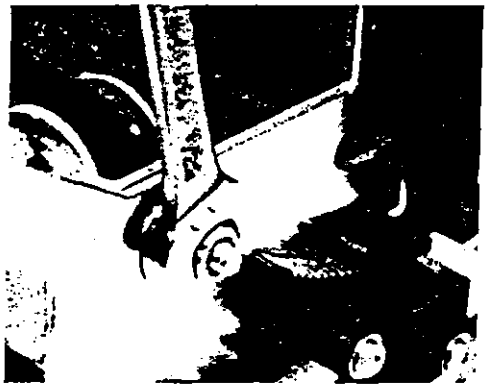
Adjustment:

Carriage belt adjustment

To adjust carriage belt tension, perform the following procedure:

1. Use a Phillips screwdriver to loosen the two screws that secure the right carriage pulley bracket to the bottom of the printer chassis.

2. Use an 11/32-inch open-end wrench to turn the nut that secures the right carriage pulley bracket to the right side of the printer chassis. Turn the nut clockwise to tighten the carriage belt and decrease the belt deflection, or counter-clockwise to loosen the belt and increase the belt deflection.



4-2 Carriage Belt Adjustment

Tighten the two screws that secure the right carriage pulley bracket to the bottom of the printer chassis.

4. Perform the measurement procedure again, beginning at step 4.

Microshift Adjustment

Microshift affects the quality of letter-quality text and 240V graphics. If the microshift is incorrect, the tops and bottoms of rounded characters and curved graphics are flattened.

Specification:

Microshift specification

When energized, the microshift solenoid must lift the printhead between 0.0041 and 0.0045 inches.

Symptoms:

Microshift symptoms

Symptoms of incorrect microshift include:

- Noticeable flatness to the top or bottom of letter-quality rounded characters, such as c, e and o
- Slightly jagged curved lines in 240V graphics

Measurement:

Microshift measurement

To measure the microshift, perform the following procedure:

1. Load paper in the printer and run self-test using the letter-quality Courier font. Compare the lowercase "o" with those below to determine whether the microshift needs adjustment:

   0.0023-inch: ooooooooooooooooooooooooo

   0.0033-inch: ooooooooooooooooooooooooo

   0.0043-inch: ooooooooooooooooooooooooo

   0.0053-inch: ooooooooooooooooooooooooo

   0.0063-inch: ooooooooooooooooooooooooo

   0.0073-inch: ooooooooooooooooooooooooo

   0.0083-inch: ooooooooooooooooooooooooo

2. If the microshift needs adjustment, perform the adjustment procedure.

Adjustment:

Microshift adjustment

To adjust the microshift, use the following procedure:

Turn off the printer and unplug the power cable.

2. Remove the top cover and lift the platen window.

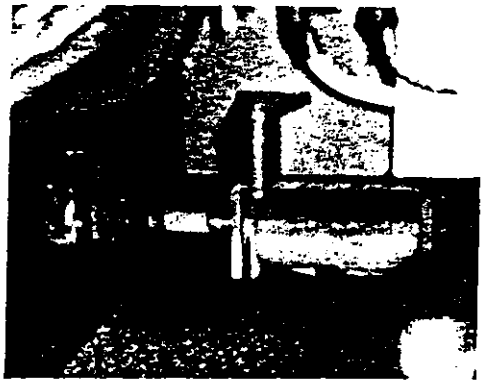
3. Slide the carriage to the center of the printer.

4. Remove the ribbon cartridge.

5. Use a 1/4-inch open-end wrench to turn the microshift adjustment screw on the bottom of the microshift lever as follows:

   To increase the microshift, turn the screw *counterclockwise*. Each 15 degrees of turn increases the microshift by about 0.0001 inch.

   To decrease the microshift, turn the screw *clockwise*. Each 15 degrees of turn decreases the microshift by about 0.0001 inch.



4-3 Microshift Adjustment

6. Install the ribbon cartridge.

7. Lower the platen window and install the top cover.

8. Plug in the power cable and turn on the printer.

Perform the measurement procedure again.

Platen Adjustment

The platen adjustment ensures that the platen is parallel to the printhead path. If the platen is not parallel, print quality worsens across the page.

Specification:

Platen specification

The print gap measured at the left end of the platen must equal the print gap measured at the right end of the platen.

Symptoms:

Platen symptoms

Symptoms of an incorrect platen adjustment include:

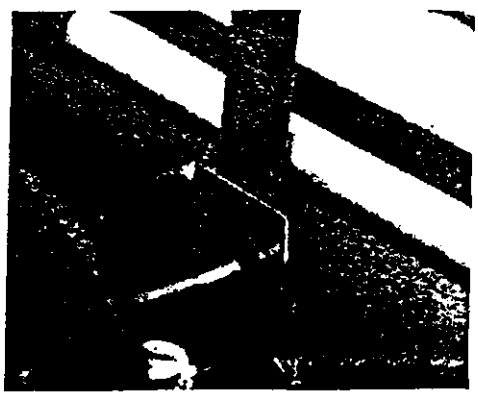
- Inconsistent print quality across the page
- Lines of text that become lighter or darker across the page

Measurement:

Platen measurement

To check that the platen is parallel to the printhead path, perform the following procedure:

1. Turn off the printer and unplug the power cable.
2. Remove the top cover and lift the platen window.
3. Push the paper thickness and tractor select levers all the way towards the back of the printer. This decreases the print gap to the smallest setting.
4. Slide the carriage to the far right.



4-4 Platen Measurement

5. Use a feeler gauge to measure the distance between the platen and the printhead (print gap).

C Exploded-View Diagrams and Part Lists

This appendix provides exploded-view diagrams and part lists for the Accel-500 printer. These diagrams should help you identify parts while performing removal and replacement procedures.

Figures C-1 through C-15 are the exploded-view diagrams; tables C-1 through C-15 are the corresponding part lists:

Figure and Table Nos.	*Description*
C-1	Ribbon cartridge
C-2	Ribbon platform
C-3	Ribbon drive mechanism
C-4	Carriage
C-5	Platen
C-6	Paper guides
C-7	Chassis, top
C-8	Chassis, bottom
C-9	Chassis, left side
C-10	Chassis, right side
C-11	Control panel
C-12	Analog/logic board set
C-13	Bottom case
C-14	Top case, bottom
C-15	Top case, top

Table C-1. Ribbon Cartridge Parts List

Item	*Part Number*	*Quantity*	*Description*
1	None	1	Cover, ribbon cartridge
2	None	1	Ribbon, continuous-loop
3	None	8	Washer, felt
4	None	1	Pinch roller
5	None	1	Pinch roller with ribbon advance knob
6	None	2	Holder, pinch roller
7	None	1	Spring, brass
8	None	1	Spring, pinch roller holder
9	None	1	Base, ribbon cartridge

Spares:

300001	Ribbon cartridge, black	(items 1 thru 9)
300004	Ribbon cartridge, color	(items 1 thru 9)

6. Slide the carriage to the far left.

7. Once again, use a feeler gauge to measure the print gap. If the left print gap does not equal the right print gap, perform the adjustment procedure.

8. Lower the platen window and install the top cover.

9. Plug in the power cable and turn on the printer.

Adjustment:

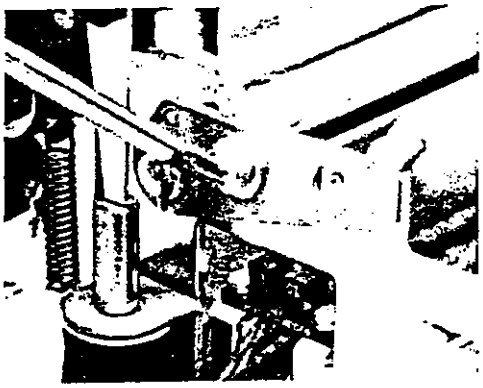
Platen adjustment

To adjust the platen, perform the following procedure:

1. Perform the *Top Case* removal procedure in section 3 of this guide.

2. Push the paper thickness lever all the way towards the back of the printer.

3. Use a Phillips screwdriver to loosen the platen adjustment screw on the left side of the printer chassis.



4-5 Platen Adjustment

4. While using a feeler gauge to measure the left and right print gaps, move the platen adjustment lever until both print gaps are equal.

5. Tighten the platen adjustment screw.

6. Perform the *Print Gap* measurement and adjustment procedures in this section.

7. Perform the *Top Case* replacement procedure in section 3 of this guide.

Platen Belt Adjustment

Platen belt tension affects platen motion and vertical registration of printing on the page. If the platen belt is too loose, it can slip causing vertical spacing distortions on printed lines; if the belt is too tight, it can bind the platen motor or break after only limited use.

Specification:

Platen belt specification

Pressing on the center of the platen belt with two pounds of force must cause the belt to deflect between 0.15 and 0.20 inch, measured 1.8 inches from the center of the platen motor pulley and over one full rotation of the platen.

Symptoms:

Platen belt symptoms

Symptoms of incorrect platen belt tension include:

- Consecutive lines of text overlap
- Line spacing varies from line to line
- Consecutive lines of graphics do not align

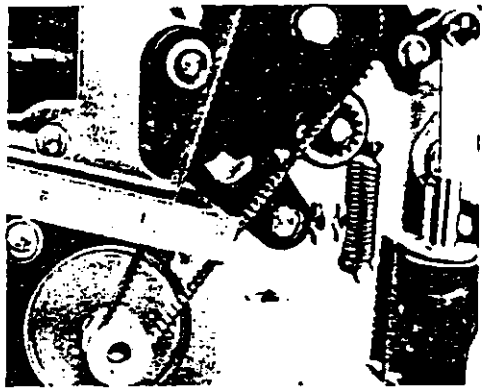
Measurement:

Platen belt measurement

To measure platen belt tension, perform the following procedure:

1. Perform the *Top Case* removal procedure in section 3 of this guide.
2. Position a line gauge or ruler next to the center of the platen belt.

3. Press down on the center of the platen belt with two pounds of force. Then, measure the deflection. If the deflection is less than 0.15 inch or more than 0.20 inch, perform the adjustment procedure.



4-6 Platen Belt Measurement

4. Perform the *Top Case* replacement procedure in section 3 of this guide.

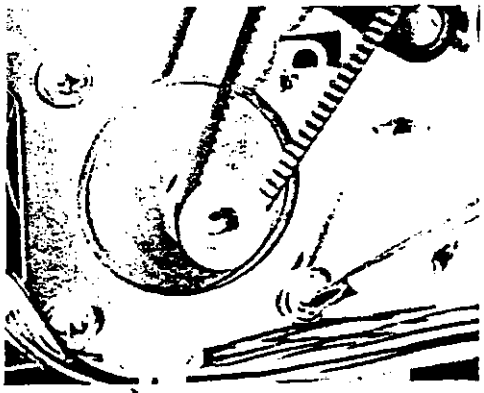
Adjustment:

Platen belt adjustment

To adjust platen belt tension, perform the following procedure:

1. Perform the *Bottom Case* removal procedure in section 3 of this guide.

2. Use a Phillips screwdriver to loosen the three screws that secure the platen motor to the side of the printer chassis.



4-7 Platen Belt Adjustment

3. Move the platen motor as necessary to attain the correct platen belt tension; then, tighten the three screws that secure the platen motor to the printer chassis.

4. Perform the measurement procedure again, steps 2 and 3.

5. Perform the *Bottom Case* replacement procedure in section 3 of this guide.

Platen Wiper Adjustment

The platen wiper holds paper firmly against the platen while printing is in progress. If the platen wiper is positioned incorrectly, excessive smearing and paper jams can occur.

Specification:

Platen wiper specification

The top edge of the platen wiper must be positioned between 1.48 and 1.52 inches from the top edge of the front cross brace.

Symptoms:

Platen wiper symptoms

Symptoms of an incorrectly positioned platen wiper include:

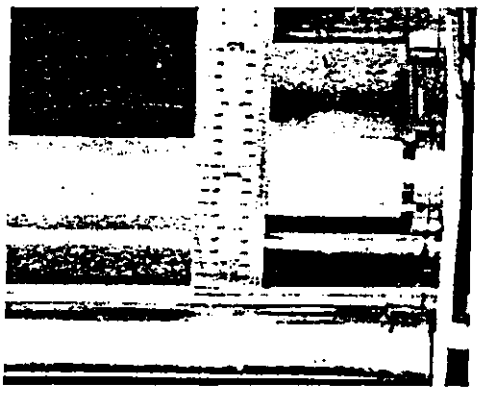
- Horizontal smearing across the page
- Paper jams due to paper catching on the printhead

Measurement:

Platen wiper measurement

To measure platen wiper alignment, perform the following procedure:

1. Turn off the printer and unplug the power cable.
2. Raise the top cover.
3. Slide the carriage to the far left.



4-8 Platen Wiper Measurement

4. At the right end of the platen, use a line gauge or ruler to measure the distance between the top edge of the platen wiper and the top edge of the front cross brace. If the distance is less than 1.48 inches or more than 1.52 inches, perform the adjustment procedure.

5. Slide the carriage to the far right.

6. Measure the platen wiper again at the left end of the platen. If the distance is incorrect, perform the adjustment procedure.

7. Lower the top cover.

Adjustment:

To adjust the platen wiper, perform the *Platen Wiper* removal and replacement procedures in section 3.

Platen wiper adjustment

Print Gap Adjustment

The print gap adjustment sets the distance between the platen and the printhead. If the print gap is incorrect, print quality is poor and printhead life decreases.

Specification:

With both the paper thickness and tractor select levers all the way towards the back of the printer, the print gap must be between 0.0127 and 0.0133 inch measured across the full width of the print area and full revolution of the platen.

Print gap specification

Symptoms:

Symptoms of an incorrect print gap include:

Print gap symptoms

- Light or ragged characters
- Breaks in characters
- Smearing that traces the printhead path across the page

Measurement:

Print gap measurement

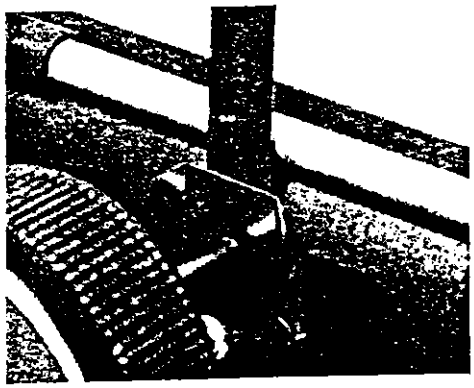
To measure the print gap, perform the following procedure:

1. Turn off the printer and unplug the power cable.

2. Remove the top cover and lift the platen window.

3. Push the paper thickness lever all the way towards the back of the printer. This decreases the print gap to the smallest setting.

4. Slide the carriage to the far right.



4-9 Print Gap Measurement

5. Insert a 0.013-inch feeler gauge between the platen and the printhead. Then, try a 0.012-inch gauge and finally a 0.014-inch gauge. The 0.013-inch gauge should fit snugly, the 0.012-inch gauge should fit easily, and the 0.014-inch gauge should barely fit.

   Note: Never force a feeler gauge between the platen and the printhead since this defeats the purpose of the measurement and can damage the printhead.

6. Slide the carriage to the far left and repeat step 5.

7. If the left and right print gaps are different, perform the *Platen* adjustment in this section and then repeat this measurement procedure. If the left and right print gaps are the same but not correct, perform the adjustment procedure.

8. Lower the platen window and install the top cover. Then, plug in the power cable and turn on the printer.

Adjustment:

Print gap adjustment

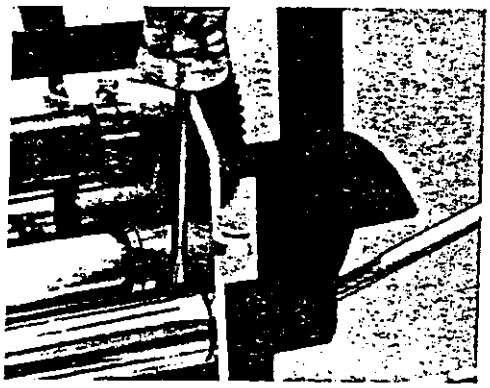
To adjust the print gap, perform the following procedure:

1. Perform the *Top Case* removal procedure in section 3 of this guide.

2. Slide the carriage to the center of the printer.

3. Use a Phillips screwdriver to loosen the screw that secures the paper thickness lever to the right end of the main carriage shaft.

4. Insert a small screwdriver into the hole near the right end of the main carriage shaft.



4-10 Print Gap Adjustment

5. While holding the paper thickness lever all the way towards the back of the printer, rotate the main carriage shaft forward or backward to change the print gap.

6. Use a feeler gauge to measure print gap.

7. Repeat steps 5 and 6 until the print gap is set correctly; then tighten the screw that secures the paper thickness lever to the main carriage shaft. Be sure to hold the paper thickness lever and the main carriage shaft stationary while tightening the screw.

8. Perform the *Top Case* replacement procedure in section 3 of this guide.

Ribbon Drive Cable Adjustment

Ribbon drive cable tension affects the advancement of the ribbon through the cartridge and in front of the printhead. If the ribbon drive cable is too loose, it can slip causing the ribbon to stop advancing. If the cable is too tight, it can cause excessive wear on the ribbon drive mechanism.

Specification:

Ribbon drive cable specification

Pressing down on the center of the ribbon drive cable with 65 grams of force must cause the cable to deflect between 0.335 and 0.365 inches, measured at the center of the cable.

Symptoms:

Ribbon drive cable symptoms

Symptoms of incorrect ribbon drive cable tension include:

- Ribbon spindle does not rotate while carriage is in motion
- Print density becomes lighter and lighter on the page

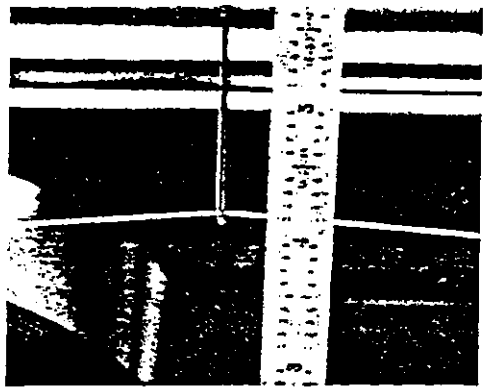
Measurement:

Ribbon drive cable measurement

To measure ribbon drive cable tension, perform the following procedure:

1. Turn off the printer and unplug the power cable.
2. Raise the top cover.
3. Slide the carriage to the far left.

4. Position a line gauge or ruler next to the ribbon drive cable at the center of the printer.



4-11 Ribbon Drive Cable Measurement

5. Use a spring gauge with wire hook to pull up on the ribbon drive cable with 65 grams of force. Then, measure the deflection. If the deflection is less than 0.335 inch or more than 0.365 inch, perform the adjustment procedure.

6. Lower the top cover.

7. Plug in the power cable and turn on the printer.

Adjustment:

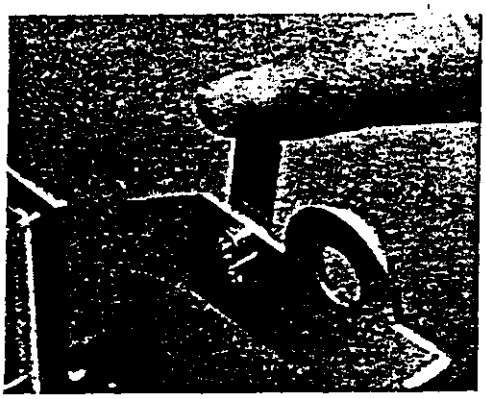
Ribbon drive cable adjustment

To adjust ribbon drive cable tension, perform the following procedure:

1. Unhook the right end of the ribbon drive cable from the anchor post on the right side of the printer chassis.

2. Bend the right anchor post as necessary to attain the correct ribbon drive cable tension.

3. Hook the right end of the ribbon drive cable back on the anchor post.



4-12 Ribbon Drive Cable Adjustment

4. Perform the measurement procedure again.

Ribbon Home Switch Adjustment

Ribbon home switch positioning affects the color registration of printing on the page. If the switch is positioned incorrectly, text and graphics print in the wrong colors.

Specification:

Ribbon home switch specification

The ribbon home switch must be positioned to pass the measurement procedure described below.

Symptoms:

Ribbon home switch symptoms

Symptoms of an incorrectly positioned ribbon home switch include:

- A RIBBON ERROR is reported on the control panel display
- The top half of a character prints in a different color than the bottom half
- Graphics print in the wrong colors

Measurement and Fine Adjust:

Ribbon home switch measurement and fine adjust

To check if the ribbon home switch is aligned correctly and perform a fine adjust, perform the following procedure:

1. Make sure that a color ribbon is installed in the printer.
2. Load paper in the printer.
3. Press the Quality button on the control panel to select draft-quality (DQ) printing.
4. Press the Setup button on the control panel to display the Setup menu.

5. Turn the Select-dial until the IBM SET parameter appears.

6. While holding down the Font and Mode buttons, turn the Select-dial until the normally hidden RIBBON parameter appears.

7. Press the Alt button to print a short test pattern of repeating H and A characters.

8. Inspect the test pattern. The crossbar of the H characters should be blue and the crossbar of the A characters should be red. If the crossbars are not the correct colors, perform one or more of the following actions:

   - If the crossbar of the H characters are red, hold down the Alt button and turn the Select-dial counterclockwise to decrease the ribbon offset number. Then, repeat step 7.

   - If the crossbar of the A characters are blue, hold down the Alt button and turn the Select-dial clockwise to increase the ribbon offset number. Then, repeat step 7.

   - If you are unable to print a correct test pattern after adjusting the RIBBON setting, perform the adjustment procedure.

9. Turn the Select-dial until the OPERATIONS message appears; then, press the Setup button to re-display the primary status message.

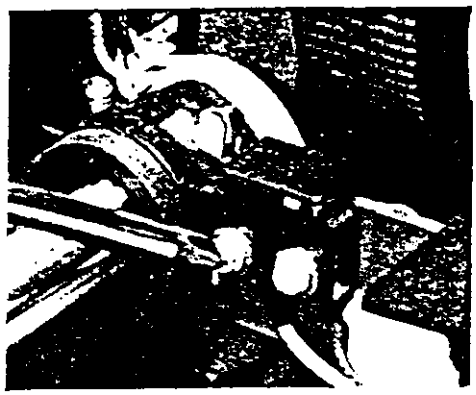
Adjustment:

Ribbon home switch adjustment

To adjust the ribbon home switch, perform the following procedure:

Turn off the printer and raise the top cover.

2. Slide the carriage to the center of the printer.



4-13 Ribbon Home Switch Adjustment

3. Use a Phillips screwdriver to loosen the two screws that secure the ribbon home switch to the carriage. Le the switch as far do as possible.

4. Lower the top cover and turn on the printer. The RIBBON ERROR message should appear on the control panel display.

5. Press the Setup button twice to display the Setup menu.

6. Turn the Select-dial until the IBM SET parameter appears.

7. While holding down the Font and Mode buttons, turn the Select-dial until the normally hidden RIBMOV parameter appears.

8. Raise the top cover.

9. While holding down the Alt button, turn the Select-dial clockwise until the ribbon platform raises two or three steps from the lowest position.

10. Turn the Select-dial until the TEST parameter appears.

11. While holding down the Alt button, turn the Select-dial until the Sensor setting appears.

12. Raise the ribbon home switch until the printer "beeps" and the message *Rbn Home Switch* appears; then tighten the two screws while holding the switch in this position.

13. Repeat steps 6 and 7.

14. While holding down the Alt button, turn the Select-dial to raise and lower the ribbon platform. Make sure that the Home message appears and the printer beeps when the ribbon platform is raised two or three steps from the lowest position.

15. Perform the measurement and fine adjust procedure.

5 Servicing Accessories

This section provides diagnostic, parts replacement and adjustment procedures for the following paper feeding accessories:

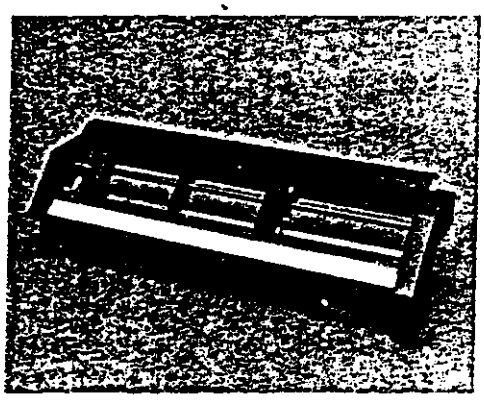
- Bottom-feed tractor
- Single-bin sheetfeeder
- Dual-bin sheetfeeder
- Triple-bin sheet/envelope feeder

Before performing any procedure in this section, first make sure that the printer feeds paper correctly without an accessory installed. The procedures in this section assume that paper feeding problems are due to the accessory and not the printer itself.

Bottom-Feed Tractor

The bottom-feed tractor (see figure 5-1) mounts on top of the printer and pulls pin-feed paper through the printer.

With the bottom-feed tractor, pin-feed paper enters the printer through the bottom-feed slot, feeds up through the printer chassis, in front of the platen, under the bail, and out the top of the printer. Then the paper mounts on the bottom-feed tractor.



Bottom-feed tractor

5-1 Bottom-Feed Tractor

BOTTOM-FEED TRACTOR DIAGNOSTIC

Bottom-feed tractor diagnostic

If paper feeding through the bottom-feed tractor is faulty, perform the following procedure to isolate the problem:

1. Unload paper from the bottom-feed tractor.

2. Lift up and remove the bottom-feed tractor from the printer.

3. Inspect the left and right support legs (side frames) for cracks or breakage.

   Solution: If the left support leg is damaged, perform the *Left Side Frame* procedure later in this section. If the right support leg is damaged, perform the *Right Side Frame* procedure later in this section.

4. Verify that the tractor levers clamp and unclamp the tractors, that the tractor doors and pin belts are not damaged, and that the center support is not cracked.

   Solution: If a tractor lever, door, or pin belt is damaged or the center support is cracked, perform the *Tractors and Center Support* procedure later in this section.

5. Verify that the pin belts are aligned with each other (that is, paper does not mount crooked on them).

   Solution: If the pin belts are not aligned so that paper mounts crooked, perform the *Tractors and Center Support* procedure later in this section. Do not replace the tractors--just remove them and then reinstall them following the replacement procedure.

6. Insert a 0.045-inch feeler gauge into the paper slot and verify that the gauge fits snugly. Check the paper slot width across the length of the slot.

Solution: If the width of the paper slot varies across the length of the slot, or the slot is too wide or too narrow, perform the *Paper Slot Adjustment* later in this section.

7. Turn the lowest bottom-feed tractor gear and verify that the tractor pin belts advance. Also verify that there are no broken gear teeth.

   Solution: If a gear tooth is broken, perform the *Gears* procedure later in this section.

8. If you are still unable to solve the bottom-feed tractor option, call AMT Technical Support for assistance.

REPLACING BOTTOM-FEED TRACTOR PARTS

Replacing bottom-feed tractor parts

To replace a bottom-feed tractor part, find the part in this section and perform the removal and replacement procedures.

Gears

Gear removal

Removal:

1. Unload paper from the bottom-feed tractor.

2. Lift up and remove the bottom-feed tractor from the printer.

3. Use a Phillips screwdriver to remove the two screws that secure the left cover to the left side frame of the bottom-feed tractor. Then remove the left cover.

4. Use a small slotted screwdriver to remove the four E-rings that secure the gears to the left side frame. Then pull off and remove the four gears.

Gear replacement

Replacement:

1. Mount the four gears onto the shafts on the left side frame and install the E-rings.
2. Position the left cover back into place and install the two screws.
3. Install the bottom-feed tractor on the printer and check for normal operation.

Left Side Frame

Left side frame removal

Removal:

1. Perform the *Gears* removal procedure.
2. Use a Phillips screwdriver to remove the five screws that secure the left side frame to the bottom-feed tractor shafts and paper slot. Then remove the left side frame.

Left side frame replacement

Replacement:

1. Mount the left side frame back into place on the bottom-feed tractor shafts and paper slot, and install the five screws. *Do not tighten the two screws that secure the left side frame to the paper slot.*
2. Perform the *Paper Slot* adjustment later in this section beginning at step 3.
3. Perform the *Gears* replacement procedure.

Right Side Frame

Right side frame removal

Removal:

1. Unload paper from the bottom-feed tractor.
2. Lift up and remove the bottom-feed tractor from the printer.

3. Use a Phillips screwdriver to remove the two screws that secure the right cover to the right side frame of the bottom-feed tractor. Then remove the right cover.

4. Use a Phillips screwdriver to remove the five screws that secure the right side frame to the bottom-feed tractor shafts and paper slot. Then remove the right side frame.

Right side frame replacement

Replacement:

1. Mount the right side frame back into place on the bottom-feed tractor shafts and paper slot, and install the five screws. *Do not tighten the two screws that secure the right side frame to the paper slot.*

2. Perform the *Paper Slot* adjustment later in this section beginning at step 3.

3. Position the right cover back into place and install the two screws.

4. Install the bottom-feed tractor on the printer and check for normal operation.

Tractors and Center Support

Tractors and center support removal

Removal:

1. Perform the *Right Side Frame* removal procedure.

2. Slide the tractors and center support off of the shafts. If a tractor does not slide, move the tractor lever to unclamp the tractor from the shaft.

Replacement:

Tractors and center support replacement

1. Advance the left tractor pin belt until the etched circle on the side of the square-holed mounting pulley aligns with the line on the side of the tractor. Then slide the left tractor onto the shafts. Make sure that the tractor lever and door face the front of the bottom-feed tractor.
2. Mount the center support onto the shafts.
3. Advance the right tractor pin belt until the etched circle on the side of the square-holed mounting pulley aligns with the line on the side of the tractor. Then slide the right tractor onto the shafts. Make sure that the tractor lever and door face the front of the bottom-feed tractor.
4. Verify that the etched circles still align with the lines on the sides of the tractors. If one does not, remove the tractor and try again.
5. Perform the *Right Side Frame* replacement procedure.

ADJUSTING THE BOTTOM-FEED TRACTOR

Adjusting the bottom-feed tractor

The bottom-feed tractor requires only one adjustment.

Paper Slot Adjustment

Paper slot adjustment

The width of the bottom-feed paper slot affects how smoothly paper feeds through the bottom-feed tractors. If the paper slot is too narrow, thick paper or multipart forms may not feed through the slot; if the paper slot is too wide, paper can drift or balloon causing a jam.

Specification:

The bottom-feed tractor paper slot must be between 0.035 and 0.055 inch wide.

Symptoms:

Symptoms of incorrect paper slot width include:

- Paper that does not feed smoothly through the tractors
- Paper tearing or jamming while mounted on the tractors

Measurement:

To measure the width of the paper slot, insert a 0.045-inch feeler gauge at various points across the length of the slot. Verify that the feeler gauge fits snugly and that the width of the slot does not change over the length of the slot. If the width of the paper slot is incorrect, perform the adjustment procedure.

Adjustment:

1. Use a Phillips screwdriver to remove the two screws that secure the left cover to the left side frame and the two screws that secure the right cover to the right side frame of the bottom-feed tractor. Then remove the left and right covers.

2. Loosen but do not remove the two screws that secure the left side frame to the paper slot. Also, loosen but do not remove the two screws that secure the right side frame to the paper slot.

3. Insert a 0.045-inch feeler gauge into the paper slot and adjust the paper slot bars so that the feeler gauge fits snugly across the length of the paper slot. Then tighten the four screws.

4. Position the left cover back into place and install the two screws. Then, position the right cover back into place and install the two screws.

A Tool List

The following tools are required to perform field service on the Accel-500 printer:

- AC/DC digital voltmeter
- Cleaners
  - Low residue cleaner (Formula 409, Lux, mild soap and water, etc.)
  - Fedron platen cleaner
- Diagonal wire cutters, small
- EECHECK Intelli-card (available from AMT)
- Feeler gauge set, 0.012- to 0.020-inch
- Hex driver, 3/32-inch
- IC extraction tool
- Line gauge or ruler
- Lubricants
  - 3-In-One household oil, Singer sewing machine oil, or equivalent
  - Silicone grease
- Magnetic screwdrivers
  - #1 Phillips, 3-inch blade
  - #2 Phillips, 4-inch blade
  - #1 Phillips, 10-inch blade
  - #1 slotted, 10-inch blade

- Pliers
  - Needle-nose, small
  - Slip-joint, medium
  - Snipe-nose, small
- Razor blade, single-edge
- RS-232-C serial breakout box or serial loopback connector
- Service-removable Loctite
- Spring gauge with wire hook, 100 grams, 8 ounces, and 2 pounds
- Tie-wrap gun and plastic tie-wraps
- Tweezers, small
- Wire stripper, 24-gauge
- Wrenches
  - Open-end, 1/4-inch
  - Open-end, 11/32-inch

B Spares List

Table B-1 list the major spares, subassemblies and piece parts recommended for field service.

Table B-1. Accel-500 Spares List

Part No.	*Part/Assembly Description*
301043-001	AC power panel and filter board, gray
301043-002	AC power panel and filter board, white
306090	Analog board
305085	Bail rollers (set of 5)
301016	Bail solenoid
305134	Bail springs (set of 2)
306072	Bottom carriage cable (JP1 to J8)
306073	Bottom carriage cable (JP2 to J10)
301049-001	Bottom case, gray
301049-002	Bottom case, white
306076	Capacitor
868201-000	Carriage belt
306105	Carriage board and cables
306108	Carriage motor
306078	Carriage sensor
306106	Control panel cable
301035-001	Control panel, gray
301035-002	Control panel, white
306107	Fan
304015	Left actuator
304034	Left bail arm
304017	Left link
306077	Logic/analog board set
306010	Logic board
830301-000	Microshift solenoid

Table B-1. Accel-500 Spares List (continued)

Part No.	*Part/Assembly Description*
306100	Multicolor ribbon switch
305007	Paper feed belts (set of 5)
306079	Paper sensor
304037	Paper thickness lever
301003	Platen
868200-005	Platen belt
306102	Platen motor
301084	Platen wiper
800316-000	Print gap switch
305020	Printhead
301042	Printhead screws (set of 2)
304020	Print-line indicator
300001	Ribbon cartridge, black
300004	Ribbon cartridge, color
305018	Ribbon drive cable
301026	Ribbon drive mechanism
306111	Ribbon home switch
301024	Ribbon lift motor
303003	Ribbon shield
304014	Right actuator
304033	Right bail arm
304016	Right link
301050-001	Top case, gray
301050-002	Top case, white
301032	Tractor gear train plate
890127-000	Tractor pair
304035	Tractor select lever
800316-000	Tractor switch
816100-000	Transformer, CSA/UL
816104-000	Transformer, VDE/CSA/UL

Ribbon cartridge exploded-view

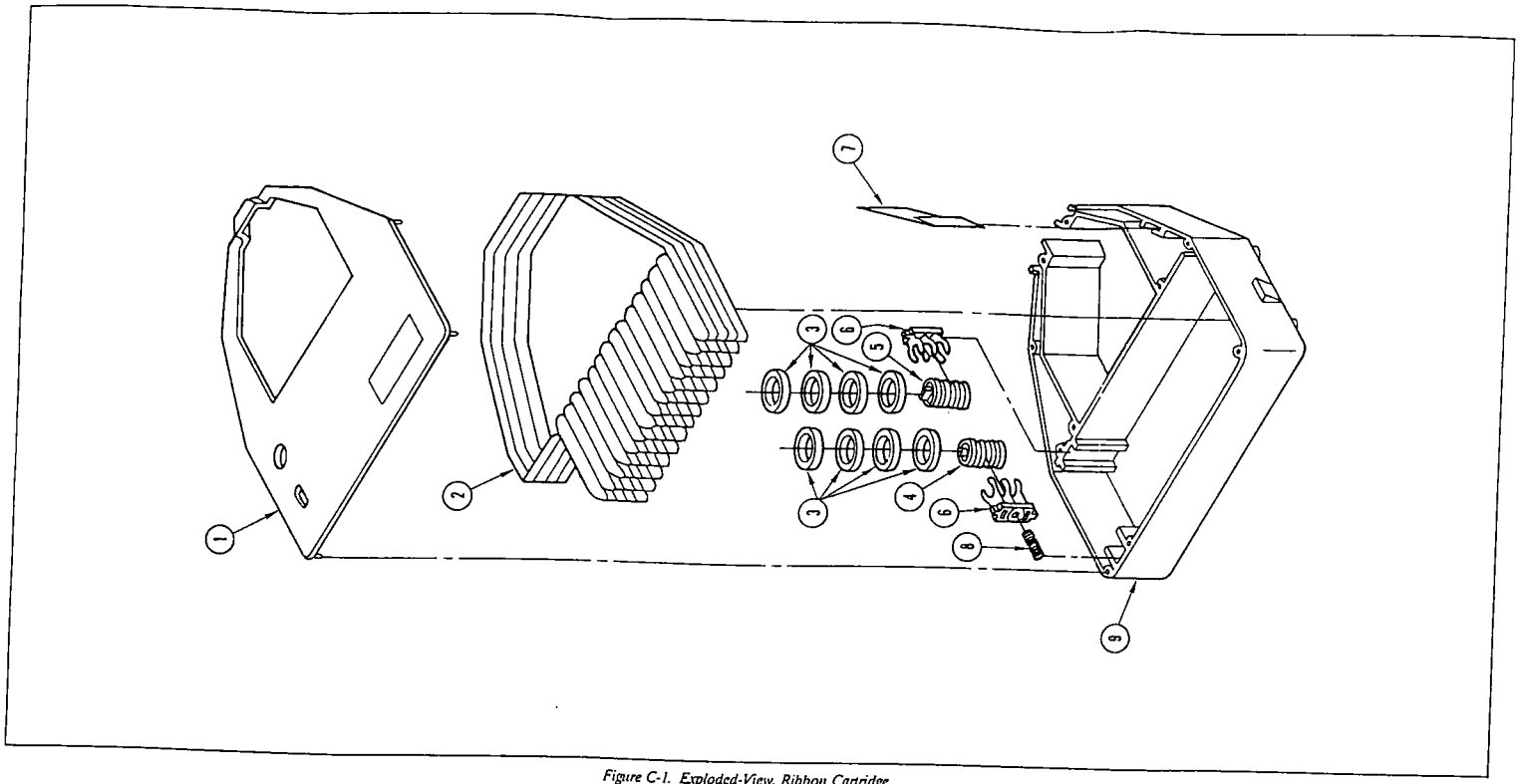


Figure C-1. Exploded-View, Ribbon Cartridge

Table C-2. Ribbon Platform Parts List

Item	Part Number	Quantity	Description
1	300001	1	Ribbon cartridge, black
	300004	1	Ribbon cartridge, color
2	304011	2	Clip, ribbon cartridge
3	305175	4	Pad, ribbon cartridge
4	852440-004	3	Screw, #4-40 x 1/4, Phillips pan-head, zinc-plated steel
5	865150-004	3	Washer, split-lock, #4, zinc-plated steel
6	303010	1	Platform, ribbon elevator
7	850256-001	1	Nut, hex, #2-56, STD, zinc-plated steel
8	304021	1	Gear quadrant, ribbon elevator
9	855256-003	1	Screw, #2-56 x 3/16, Phillips flat-head, 100-degrees
10	872109-188	2	Ring, retaining, external, shaft 0.188
11	302021	2	Pin, pivot, ribbon elevator
12	865200-003	2	Washer, wave spring, ID 0.203, OD 0.375
13	855440-004	4	Screw, #4-40 x 1/4, Phillips flat-head, 100-degrees
14	306100	1	Multicolor ribbon switch assembly
15	865100-002	1	Washer, flat, #2, zinc-plated steel
16	865150-002	1	Washer, split-lock, #2, zinc-plated steel
17	852256-006	1	Screw, #2-56 x 3/8, Phillips pan-head, zinc-plated steel
18	303066	1	Bracket, ribbon elevator

Spares:

306100 Multicolor ribbon switch (item 14)

Other assemblies:

305176 Platform, ribbon with pads (items 3 and 6)

Ribbon platform exploded-view

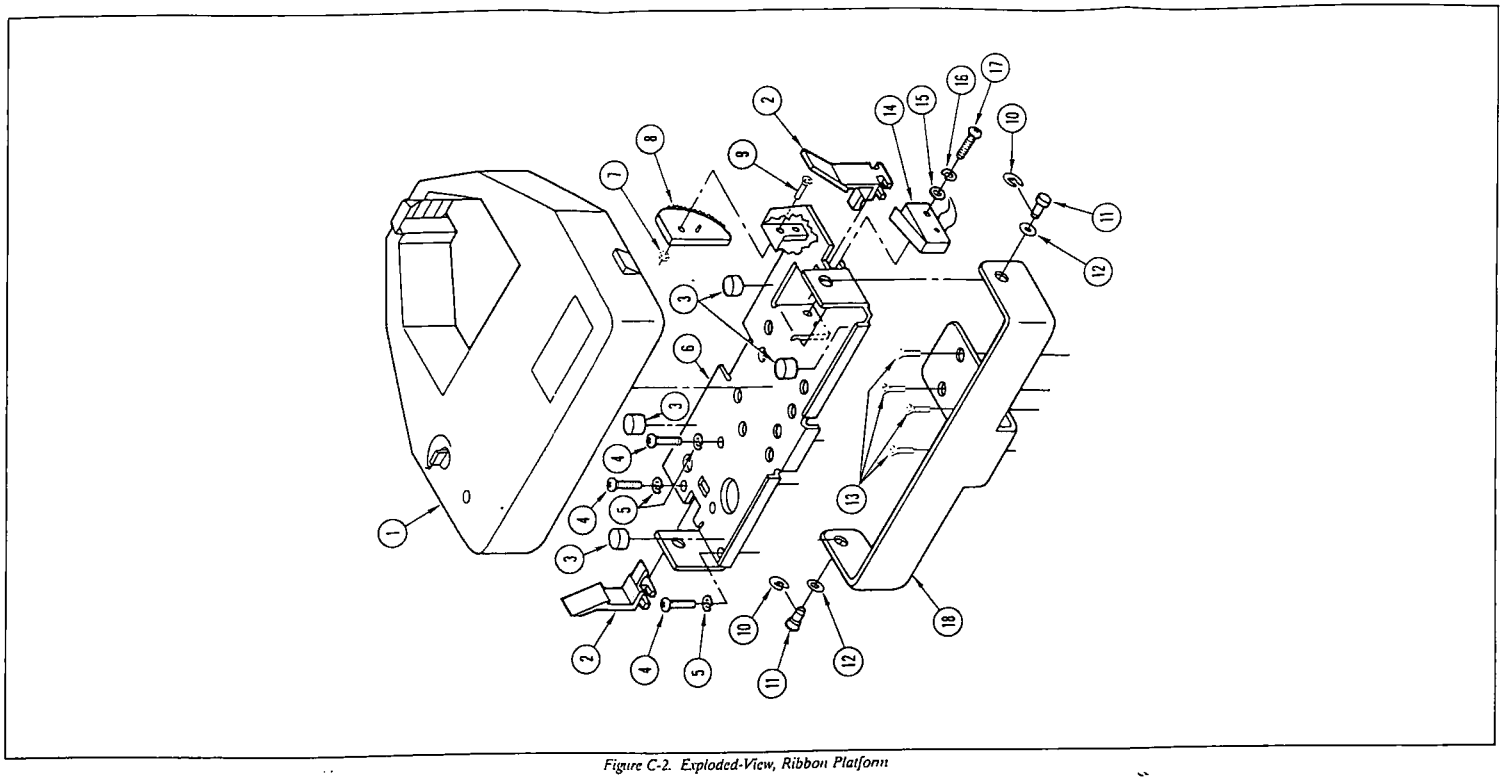


Figure C-2. Exploded-View, Ribbon Platfonn

Table C-3. Ribbon Drive Mechanism Parts List

Item	Part Number	Quantity	Description
1	872109-125	1	Ring, retaining, external, shaft 0.125
2	865330-010	1	Washer, flat, ID 0.195, OD 0.375
3	304007	1	Pulley, ribbon drive
4	305018	1	Cable, ribbon drive
5	~~304090~~	1	~~Spindle, ribbon drive~~
6	872109-094	1	Ring, retaining, external, shaft 0.094
7	865330-004	1	Washer, flat, ID 0.115, OD 0.270, 0.010 thick
8	304008	3	Gear, ribbon drive idler
9	304009	1	Gear, ribbon drive reversing
10	865330-012	1	Washer, flat, ID 0.114, OD 0.312, 0.005 thick
11	865202-004	1	Washer, crescent spring, ID 0.099, OD 0.25
12	302005	1	Pin, reversing gear
13	304051	1	Arm, ribbon reversing
14	302022	3	Spacer, ribbon drive
15	302002	1	Pin, ribbon drive
16	302003	3	Pin, ribbon drive idler
17	302004	1	Pin, pulley, ribbon drive
18	303001	1	Plate, gear train
19	855440-004	3	Screw, #4-40 x 1/4, Phillips flat-head, 100-degrees

Spares:

301026	Ribbon drive mechanism	(items 1 thru 19, except 4)

Other assemblies:

301027	Ribbon drive plate	(items 15, 16, 17 and 18)
301028	Ribbon reverse arm/gear	(items 6, 7, 9, 10, 11, 12, and 13)
301029	Ribbon reverse arm	(items 12 and 13)

Ribbon drive mechanism exploded-view

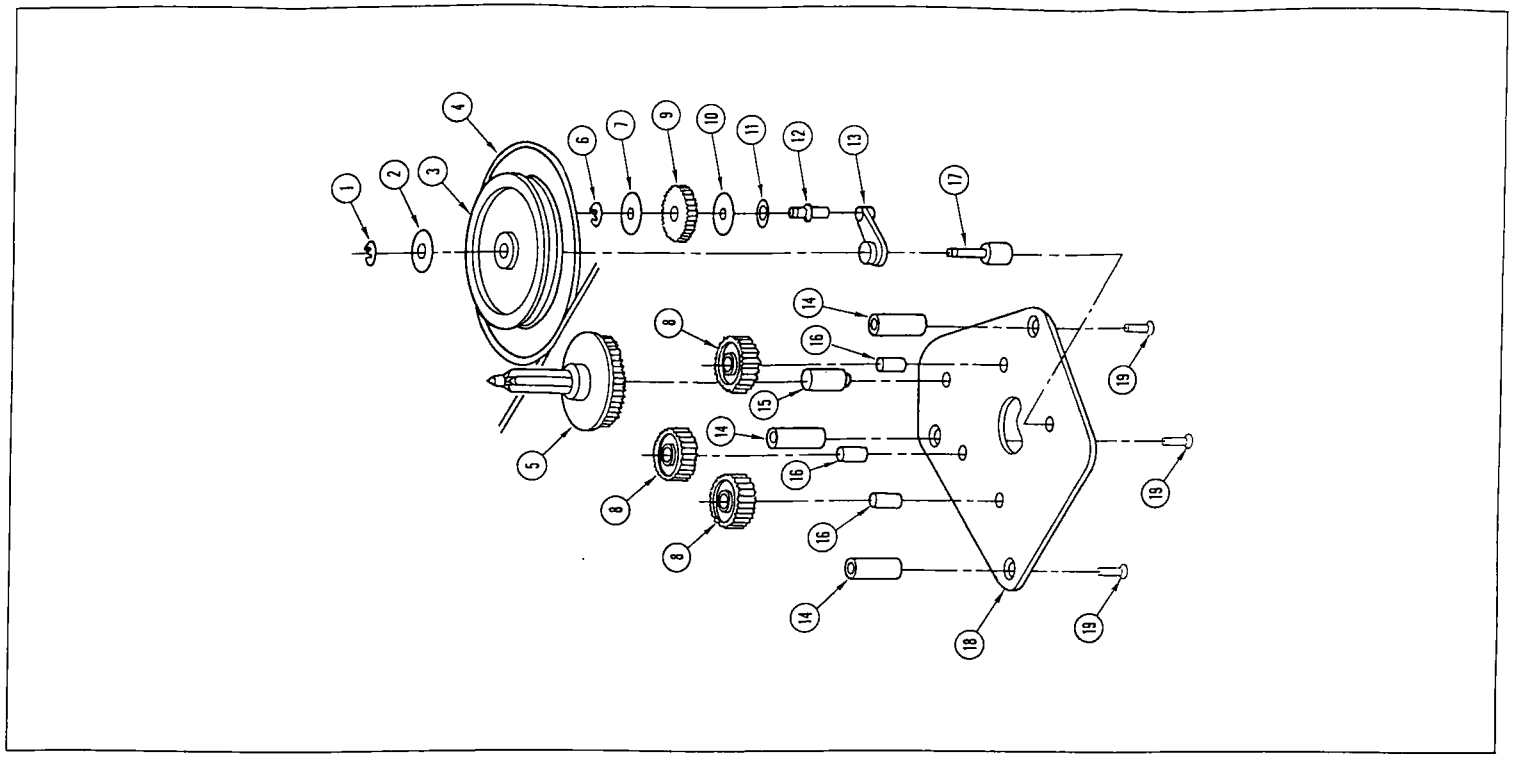


Figure C-3. Exploded-View, Ribbon Drive Mechanism

Table C-4. Carriage Parts List (continued)

Item	Part Number	Quantity	Description
57	303020	1	Clamp, printhead cables
58	None	4	Nut, self-clinching #4-40
59	303034	1	Shield, printhead cable, major
60	306075	1	Cable, printhead interconnect, JP2-J10
61	306074	1	Cable, printhead interconnect, JP1-J8
62	845107-008	2	Tape, two-sided foam, 0.025 thick, 0.5 wide
63	303035	1	Shield, printhead cable, minor
64	304019	1	Lever, microshift, machined
NS	817500-002	3	Tie-wrap, 0.09 - 0.11 x 4 1/8

Spares:

868201	Carriage belt	(item 35)
306105	Carriage board and cables	(item 7)
830301-000	Microshift solenoid	(item 38)
306079	Paper sensor	(item 13)
305020	Printhead	(item 4)
301042	Printhead screws--set of 2	(items 1, 2 and 3)
304020	Print-line indicator	(item 12)
306111	Ribbon home switch	(item 28)
301024	Ribbon lift motor	(items 40 thru 51)
303003	Ribbon shield	(item 11)

Other assemblies:

301023	Ribbon lift motor	(items 46 and 50)
301025	Ribbon lift plate	(items 42, 43 and 51)
301091	Shield, printhead cable, major	(items 59 and 62)
301092	Shield, printhead cable, minor	(items 62 and 63)
301058	Wiper retainer, left	(items 19 and 20)
301057	Wiper retainer, right	(items 19 and 24)

Table C-4. Carriage Parts List (continued)

Item	Part Number	Quantity	Description
30	None	2	Nut, miniature self-clinching #2-56
31	817510-001	1	Cable tie holder, nylon
32	852632-008	1	Screw, #6-32 x 1/2, Phillips pan-head, zinc-plated steel
33	865150-006	1	Washer, split-lock, #6, zinc-plated steel
34	865100-006	1	Washer, flat, #6, zinc-plated steel
35	868201-000	1	Belt, carriage, 0.083 pitch, 490 groove, 0.38 wide
36	304048	1	Clamp, carriage belt
37	852172-003	2	Screw, #1-72 x 3/16, Phillips pan-head, zinc-plated steel
38	830301-000	1	Solenoid, microshift, 12 V, 1.44 L (SP-50)
39	302011	3	Spacer, ribbon lift motor
40	304066	1	Gear, cluster, ribbon lift motor
41	872109-125	1	Ring, retaining, external, shaft 0.125
42	302010	1	Shaft, ribbon lift motor plate
43	None	2	Nut, miniature self-clinching #2-56
44	865150-004	3	Washer, split-lock, #4, zinc-plated steel
45	852440-010	3	Screw, #4-40 x 5/8, Phillips pan-head, zinc-plated steel
46	306104	1	Ribbon lift motor assembly
47	865330-001	2	Washer, flat, ID 0.105, OD 0.190
48	865150-002	2	Washer, split-lock, #2, zinc-plated steel
49	852256-004	2	Screw, #2-56 x 1/4, Phillips pan-head, zinc-plated steel
50	304005	1	Gear, ribbon lift motor
51	303000	1	Plate, ribbon lift motor
52	304055	1	Bearing, carriage shaft minor
53	852440-004	4	Screw, #4-40 x 1/4, Phillips pan-head, zinc-plated steel
54	865150-004	4	Washer, split-lock, #4, zinc-plated steel
55	303018	1	Plate, mating printhead cables
56	855440-004	4	Screw, #4-40 x 1/4, Phillips flat-head, 100-degrees

Table C-4. Carriage Parts List

Item	Part Number	Quantity	Description
1	302032	2	Screw, printhead
2	303031	2	Washer, spring printhead
3	302033	2	Spacer, printhead
4	~~305020~~	1	~~Modified 24-wire printhead~~ 063
5	857424-006	4	Screw, #4-24 x 3/8, Phillips pan-head, self-tapping, type B
6	304050	4	Washer, carriage PCB
7	306105	1	Carriage PCB assembly and cables
8	852440-004	2	Screw, #4-40 x 1/4, Phillips pan-head, zinc-plated steel
9	865150-004	2	Washer, split-lock, #4, zinc-plated steel
10	303027	1	Clamp, ribbon shield
11	303003	1	Shield, ribbon
12	304020	1	Deflector, print-line indicator
13	306079	1	Paper sensor assembly
14	865330-007	2	Washer, flat, ID 0.133, OD 0.255, 0.01 thick, stainless-steel
15	873100-020	1	Dowel pin, 0.125 diameter x 0.625 long
16	302012	1	Stop, microshift lever
17	304062	2	Mount, carriage PCB
18	873104-001	2	Dowel pin, metric, stainless-steel, 2mm diameter x 8mm long
19	305083	2	Bumper, carriage
20	304076	1	Retainer, wiper, carriage, left
21	305082	2	Wiper, carriage shaft, felt
22	304070	2	Bearing, carriage
23	304012	1	Carriage, machined
24	304075	1	Retainer, wiper, carriage, right
25	852256-008	2	Screw, #2-56 x 1/2, Phillips pan-head, zinc-plated steel
26	865150-002	2	Washer, split-lock, #2, zinc-plated steel
27	865100-002	2	Washer, flat, #2, zinc-plated steel
28	306111	1	Ribbon home switch assembly
29	303023	1	Shield, ribbon home switch

Carriage exploded-view

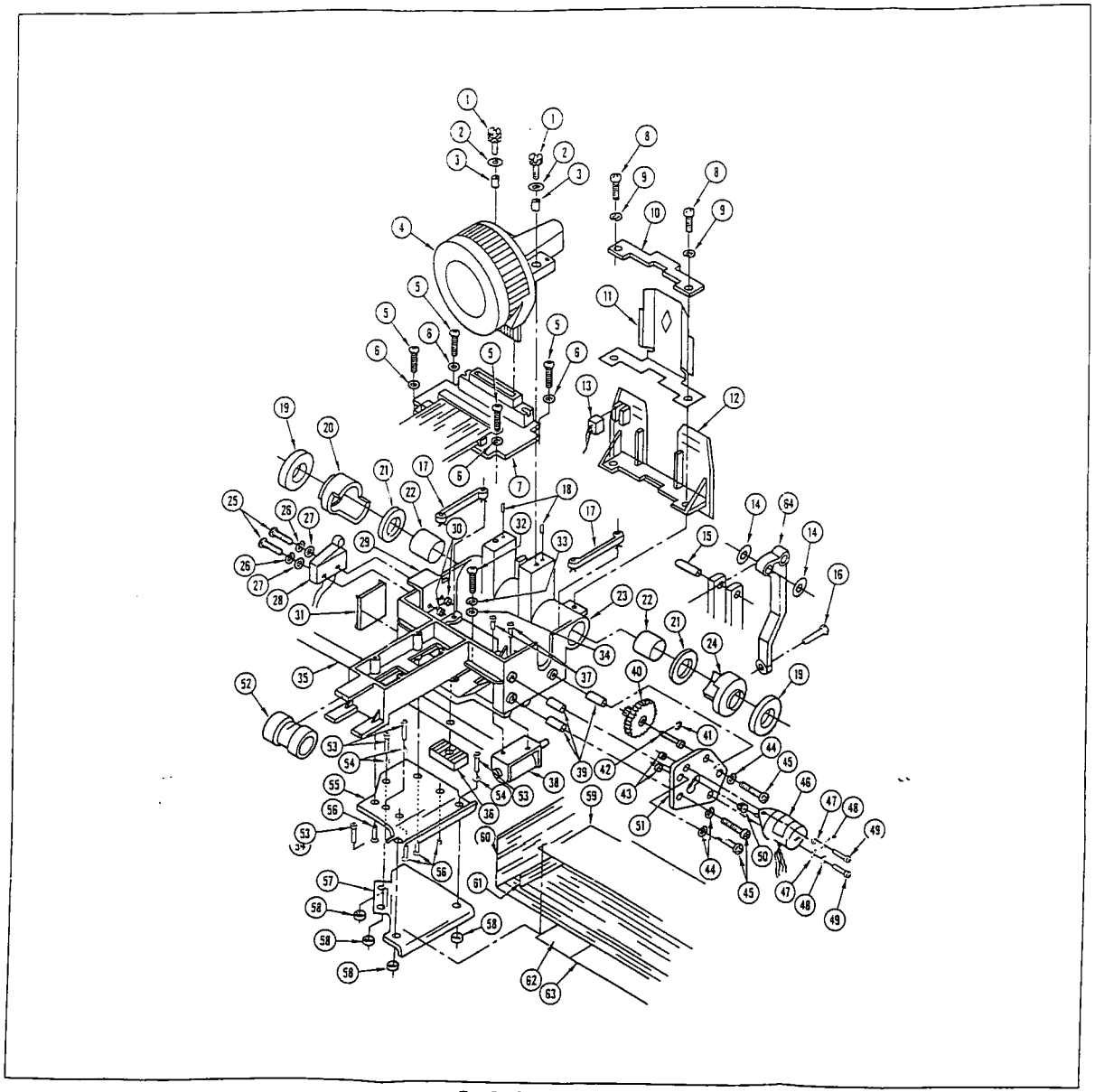


Figure C-4. Exploded-View, Carriage

Table C-5. Platen Parts List

Item	*Part Number*	*Quantity*	*Description*
1	872109-312	1	Ring, retaining, external, shaft 0.312
2	304000	1	Pulley, platen drive
3	~~304026~~	2	Bearing, platen 304125
4	849032-004	2	Screw, set, #10-32 x 1/4, hex socket head, knurled cup-point
5	200744	2	Gear, platen drive
6	304027	1	Bushing, platen left
7	865200-002	1	Washer, wave spring, ID 0.385, OD 0.50
8	~~303022~~	~~1~~	~~Spacer, platen~~
9	305001	1	Platen
10	304028	1	Bushing, platen right .312
11	872109-~~375~~ 312	1	Ring, retaining, external, shaft 0-~~375~~ ~~(not included on printers manufactured after July 1988)~~

Spares:

~~301003~~ 305001	Platen	(items 1 thru 11)

Platen
exploded-view

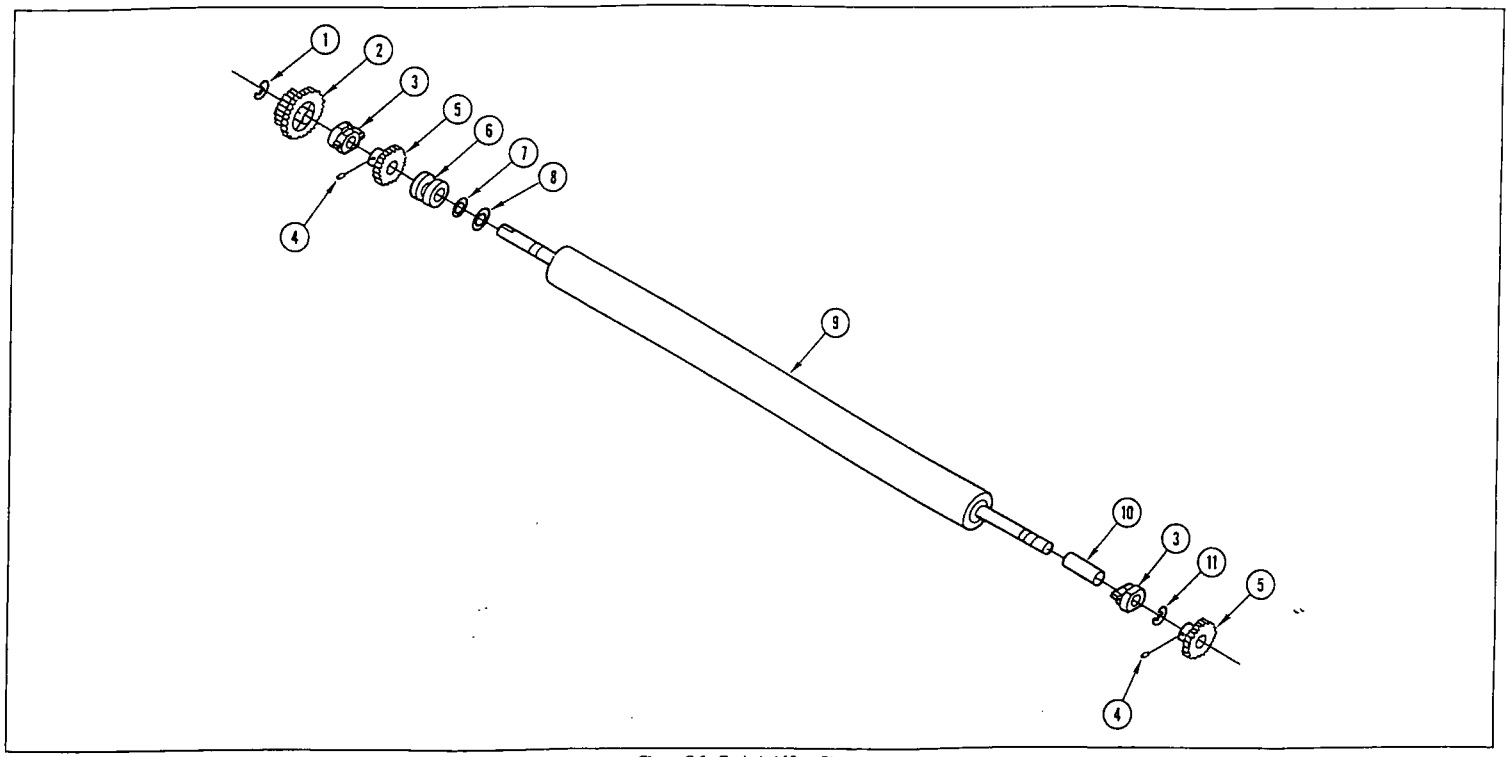


Figure C-5. Exploded-View, Platen

Table C-6. Paper Guides Parts List

Item	*Part Number*	*Quantity*	*Description*
1	303005	6	Guide, paper feed rear
2	304013	5	Roller, paper feed
3	305007	5	Belt, paper feed
4	872116-438	2	Ring, retaining, crescent, shaft 0.438
5	302009	1	Shaft, roller support
6	302008	1	Shaft, paper feed
7	305172	1	Sleeve, paper feed shaft

Spares:

305007	Paper feed belts--set of 5	(item 3)

Other assemblies:

301010	Roller support shaft	(items 1, 2, 4 and 5)

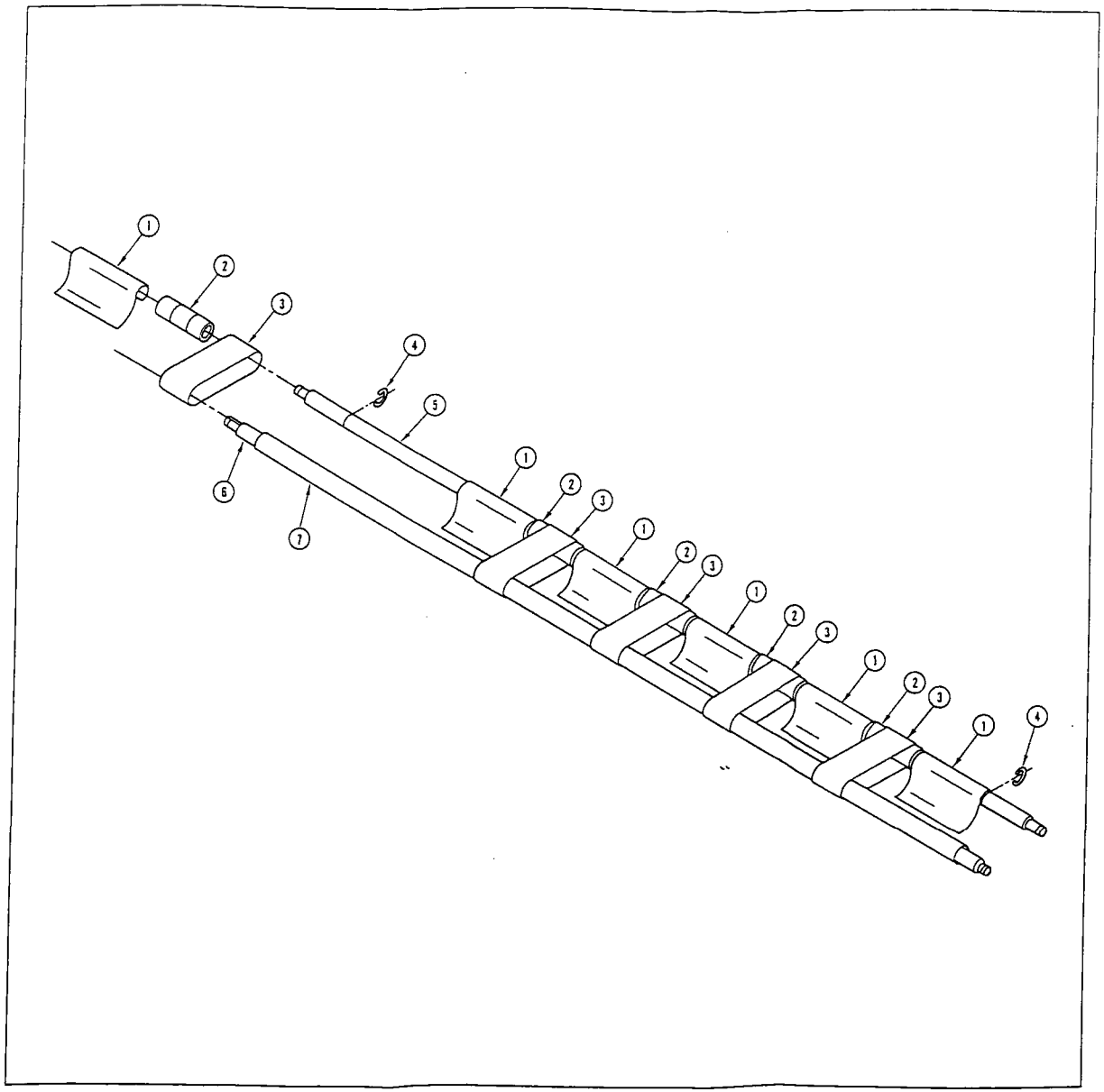


Figure C-6. Exploded-View, Paper Guides

Table C-7. Chassis, Top, Parts List

Item	*Part Number*	*Quantity*	*Description*
1	305099	1	Wiper, platen, w/black edge
2	845107-008	1	Tape, two-sided foam, 0.025 thick, 0.5 wide, 17.48 long
3	303004	6	Guide, paper feed front
4	304058	6	Fastener, paper feed guide, front
5	~~301009~~	1	~~Chassis assembly~~
6	852440-004	2	Screw, #4-40 x 1/4, Phillips pan-head, zinc-plated steel
7	865150-004	2	Washer, split-lock, #4, zinc-plated steel
8	303036	1	Clamp, printhead cable shield
9	306075	1	Cable, printhead interconnect, JP2-J10
10	306074	1	Cable, printhead interconnect, JP1-J8
11	301092	1	Shield, printhead cable assembly, minor
12	301091	1	Shield, printhead cable assembly, major
13	None	4	Nut, self-clinching, #6-32
14	306072	1	Cable, carriage/analog interconnect, JP1-J8
15	306073	1	Cable, carriage/analog interconnect, JP2-J10
16	865600-004	4	Washer, flat, light, #4, zinc-plated steel
17	865150-004	4	Washer, split-lock, #4, zinc-plated steel
18	852440-008	4	Screw, #4-40 x 1/2, Phillips pan-head, zinc-plated steel
19	305057	1	Acoustic foam, cross-brace, front
NS	305028	1	Label, chassis serial number

Spares:

306072	Bottom carriage cable (JP1 to J8)	(item 14)
306073	Bottom carriage cable (JP2 to J10)	(item 15)
301084	Platen wiper	(items 1 and

Chassis, top exploded-view

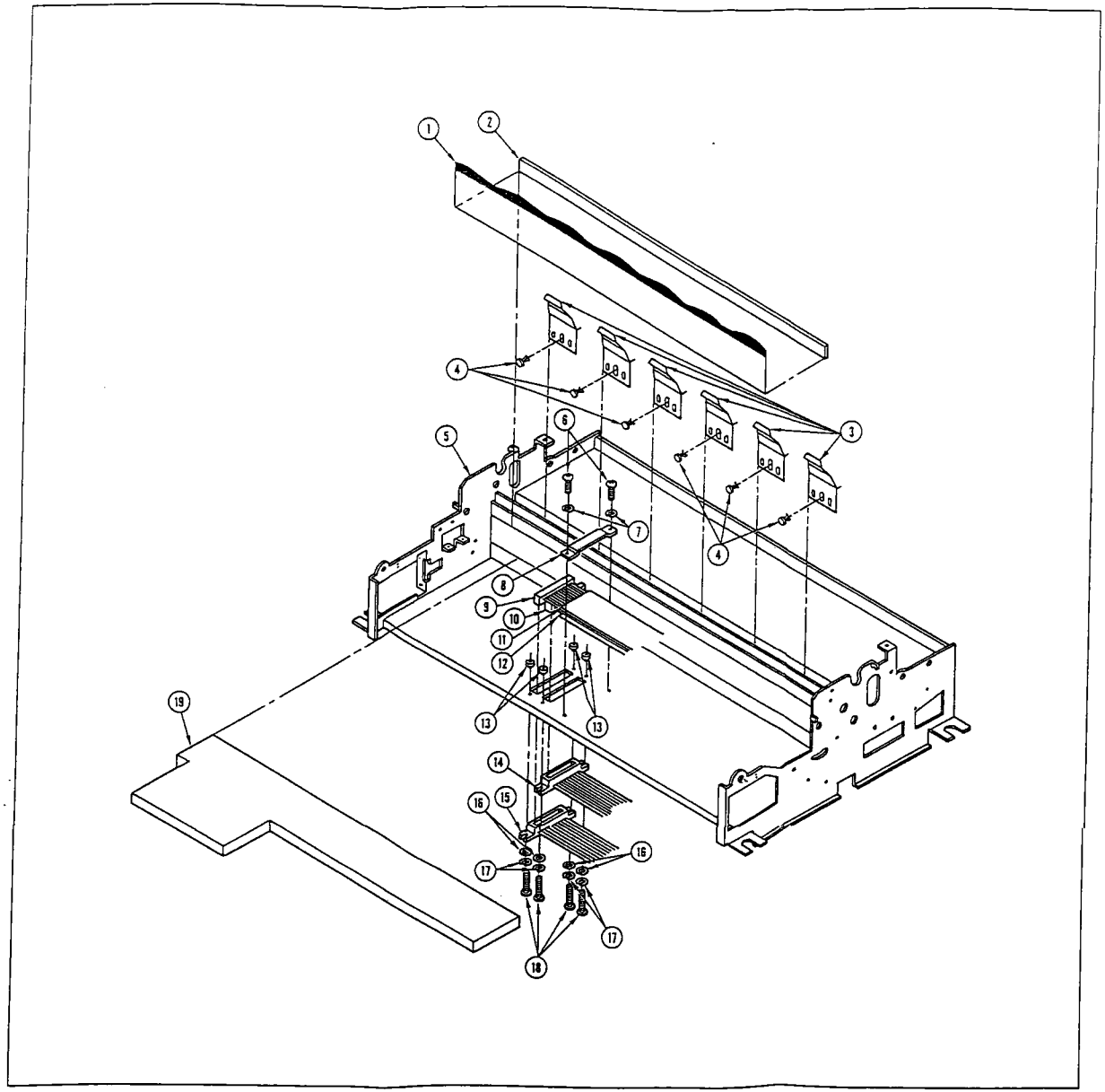


Figure C-7. Exploded-View, Chassis, Top

Table C-8. Chassis, Bottom, Parts List

Item	*Part Number*	*Quantity*	*Description*
1	817513-000	4	Clip, cable retaining, w/adhesive backing
2	305058	1	Damping sheet, cross, front
3	305060	1	Damping sheet, cross, center
4	None	1	Nut, self-clinching, #8-32
5	852832-006	2	Screw, #8-32 x 3/8, Phillips pan-head, zinc-plated steel
6	865150-008	2	Washer, split-lock, #8, zinc-plated steel
7	~~301009~~	1	Chassis assembly 361014
8	817510-001	3	Cable tie holder, nylon
9	305059	1	Damping sheet, cross, rear
10	~~None~~	2	Nut, self-clinching, #6-32

873109-000

Chassis, bot
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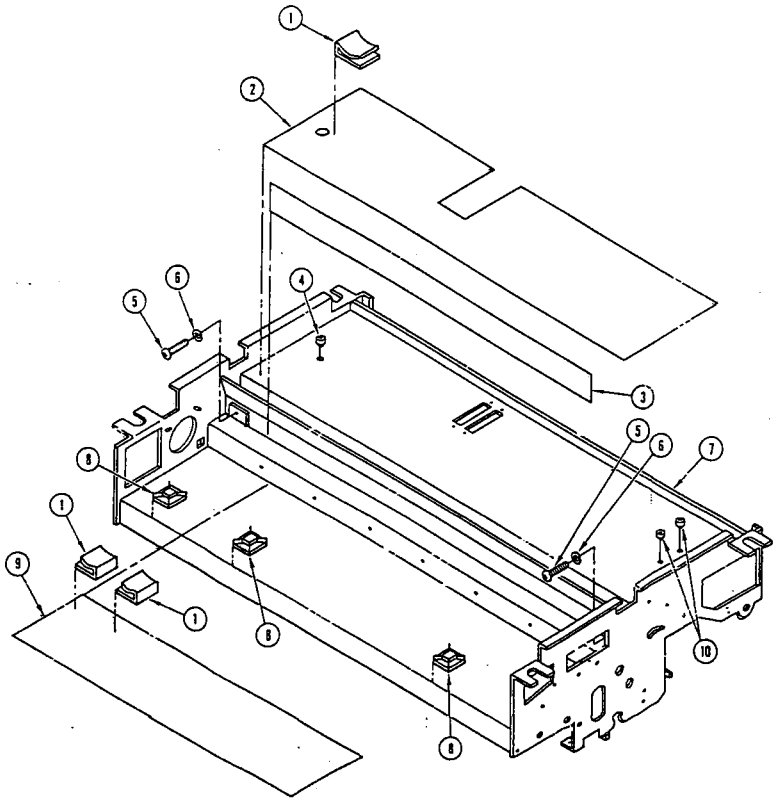

Figure C-8. Exploded-View, Chassis, Bottom

Table C-9. Chassis, Left Side, Parts List (continued)

Item	Part Number	Quantity	Description
58	882002-001	1	Grommet, ID 0.12, OD 0.34, 0.19 thick
59	872110-002	1	Nut, push, external, diameter 1/8
60	303021	1	Actuator, bail
61	873119-001	1	Pin, grooved (type C), 1/16 diameter, 1/4 long
62	306103	1	Shaft, bail solenoid
63	306103	1	Solenoid, bail
64	303019	1	Support, carriage shaft, main
65	852832-004	1	Screw, #8-32 x 1/4, Phillips pan-head, zinc-plated steel
66	865150-008	1	Washer, split-lock, #8, zinc-plated steel
67	865100-008	1	Washer, flat, #8, zinc-plated steel
68	304015	1	Actuator, paper release, left
69	872109-219	1	Ring, retaining, external, shaft 0.219
70	304017	1	Link, left
71	305079	1	Spring, external paper release
72	303016	1	Washer, thrust paper feed
73	304001	1	Gear, paper feed shaft
74	304022	1	Bearing, roller support shaft
75	872109-188	2	Ring, retaining, external, shaft 0.188
76	868200-005	1	Belt, 40 DP, 1/4 wide, 125 grooves
77	None	2	Nut, self-clinching, #8-32
78	302007	1	Pin, bail arm pivot
79	302034	1	Stud, paper release spring
80	302016	1	Stud, platen lock mounting
81	302017	1	Stop, platen lock
82	None	1	Nut, self-clinching #6-32
83	869104-001	2	Spacer, ID 0.166, OD 0.312, 0.5 long
84	None	1	Nut, flush, self-clinching, #8-32

Table C-9. Chassis, Left Side, Parts List (continued)

Item	Part Number	Quantity	Description
30	852440-004	2	Screw, #4-40 x 1/4, Phillips pan-head, zinc-plated steel
31	865150-004	2	Washer, split-lock, #4, zinc-plated steel
32	~~309023~~	1	Bearing, paper feed shaft
33	304025	1	Bearing, tractor drive shaft, left
34	865200-003	1	Washer, wave spring, ID 0.203, OD 0.375
35	306102	1	Motor, platen
36	868100-018	1	Pulley, 40 DP, 18 groove, 0.250 bore
37	849832-004	1	Screw, set, #8-32 x 1/4, hex socket head, knurled cup-point
38	873201-001	3	Insert, self-tapping, #8-32 x 0.218
39	~~303008~~	1	Frame, side, left 363000
40	817510-001	3	Cable tie holder, nylon
41	842103-000	2	Grommet, OD 0.75, 0.49 high
42	865330-008	2	Washer, flat, ID 0.187, OD 0.75
43	865150-008	2	Washer, split-lock, #8, zinc-plated steel
44	852832-012	2	Screw, #8-32 x 3/4, Phillips pan-head, zinc-plated steel
45	852832-006	3	Screw, #8-32 x 3/8, Phillips pan-head, zinc-plated steel
46	865150-008	3	Washer, split-lock, #8, zinc-plated steel
47	865100-008	3	Washer, flat, #8, zinc-plated steel
48	852832-006	1	Screw, #8-32 x 3/8, Phillips pan-head, zinc-plated steel
49	865150-004	1	Washer, split-lock, #8, zinc-plated steel
50	865330-008	1	Washer, flat, ID 0.187, OD 0.75
51	~~309013~~	1	Bracket, ribbon drive cable support
52	852440-004	1	Screw, #4-40 x 1/4, Phillips pan-head, zinc-plated steel
53	865150-004	1	Washer, split-lock, #4, zinc-plated steel
54	305018	1	Cable, ribbon drive
55	305134	1	Spring, bail
56	304034	1	Arm, bail, left
57	872109-188	1	Ring, retaining, external, shaft 0.188

(32) 304023

(51) 363011

Table C-9. Chassis, Left Side, Parts List

Item	Part Number	Quantity	Description
1	306108	1	Motor, carriage
2	304087	1	Pulley, flanged, 0.0833 deep, 40 teeth
3	849032-004	1	Screw, set, #10-32 x 1/4, hex socket, knurled cup-point
4	852832-006	1	Screw, #8-32 x 3/8, Phillips pan-he..., zinc-plated steel
5	865150-008	4	Washer, split-lock, #8, zinc-plated steel
6	~~303017~~	1	Bracket, carriage motor
7	865832-008	3	Screw, #8-32 x 1/2, Phillips pan-head, zinc-plated steel
8	865100-008	1	Washer, flat, #8, zinc-plated steel
9	None	1	Nut, self-clinching, #8-32
10	305010	1	Lock, platen, left
11	872109-188	1	Ring, retaining, external, shaft 0.188
12	301056	1	Deflector/damping sheet assembly
13	852632-004	1	Screw, #6-32 x 1/4, Phillips pan-head, zinc-plated steel
14	865150-006	1	Washer, split-lock, #6, zinc-plated steel
15	865100-006	1	Washer, flat, #6, zinc-plated steel
16	306078	1	Sensor, carriage home
17	852440-004	2	Screw, #4-40 x 1/4, Phillips pan-head, zinc-plated steel
18	865600-004	2	Washer, flat, light, #4, zinc-plated steel
19	302020	1	Shaft, carriage, rear
20	~~302019~~	1	Shaft, carriage, main
21	302009	1	Shaft, paper feed
22	302015	1	Shaft, paper release
23	301010	1	Roller support shaft assembly
24	302013	1	Shaft, tractor drive
25	302014	1	Shaft, tractor support
26	890127-000	1	Tractor, right
27	304094	1	Support, tractor
28	890127-000	1	Tractor, left
29	None	1	Nut, self-clinching, #4-40

(20) 302070

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Table C-9. Chassis, Left Side, Parts List (continued)

Spares:

301016	Bail solenoid	(items 58, 60, 61, 62, 63)
305134	Bail springs--set of 2	(item 55)
306108	Carriage motor	(item 1)
306078	Carriage sensor	(item 16)
304015	Left actuator	(item 68)
304034	Left bail arm	(item 56)
304017	Left link	(item 70)
868200-005	Platen belt	(item 76)
306102	Platen motor	(items 35 and 38)
305018	Ribbon drive cable	(item 54)
890127-000	Tractor pair	(items 26 and 28)

Other assemblies:

301014	Carriage motor	(items 1 thru 6)
301031	Left link	(items 70 and 74)
301008	Left side frame	(items 32, 33, 39, 78, 79, 80 and 81)
301012	Platen motor	(items 35, 36, 37 and 38)
301110	Vibration mount	(items 41 and 83)

Chassis, left side exploded-view

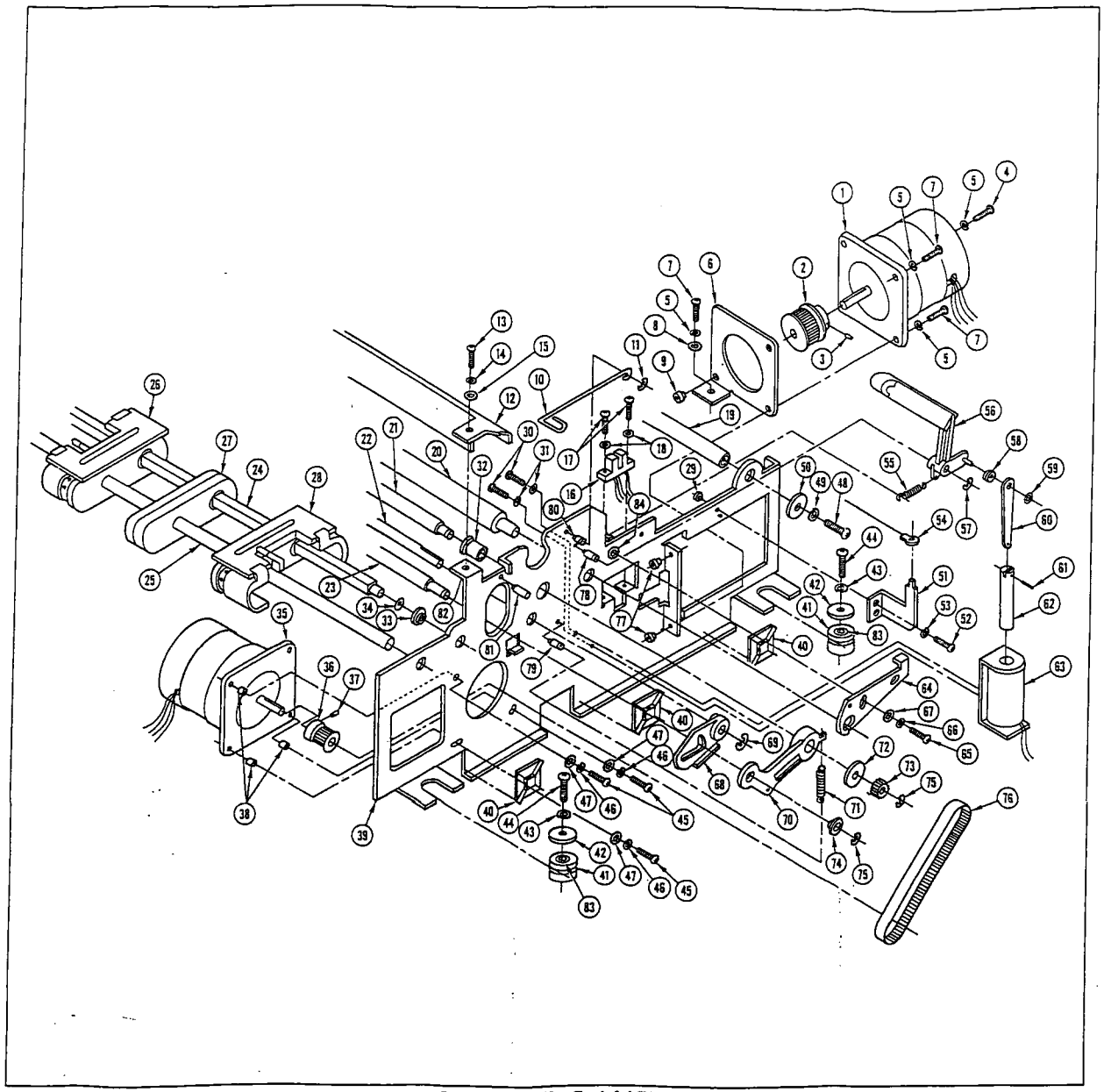

Figure C-9. Exploded-View, Chassis, Left Side

Table C-10. Chassis, Right Side, Parts List (continued)

Item	Part Number	Quantity	Description
62	872109-188	1	Ring, retaining, external, shaft 0.188
63	303002	1	Plate, gear mounting
64	852632-006	3	Screw, #6-32 x 3/8, Phillips pan-head, zinc-plated steel
65	865150-006	3	Washer, split-lock, #6, zinc-plated steel
66	865100-006	3	Washer, flat, #6, zinc-plated steel
67	304004	1	Gear, tractor drive idler, 48 teeth
68	304003	1	Gear, tractor drive idler, 24 teeth
69	302001	1	Stud, tractor drive idler gear, 48 teeth
70	304002	1	Gear, tractor drive
71	871350-006	1	Spring, compression, OD 0.265, 0.5 long
72	872109-219	1	Ring, retaining, external, shaft 0.219
73	817510-001	1	Cable tie holder, nylon
74	304036	1	Plate, detent gap adjustment
75	800316-000	1	Switch, print gap
76	865330-004	2	Washer, flat, #4, zinc-plated steel
77	852440-012	2	Screw, #4-40 x 3/4, Phillips pan-head, zinc-plated steel
78	304037	1	Lever, paper thickness
79	865341-008	1	Washer, lock, internal star, #8
80	852832-008	1	Screw, #8-32 x 1/2, Phillips pan-head, zinc-plated steel
81	865150-008	1	Washer, split-lock, #8, zinc-plated steel
82	865100-008	1	Washer, flat, #8, zinc-plated steel
83	875832-001	1	Nut, hex, nylok, #8-32
84	302034	1	Stud, paper release spring
85	302007	1	Pin, bail arm pivot
86	302016	1	Stud, platen lock mounting
87	302017	1	Stop, platen lock
88	None	3	Stand-off, self-clinching, #6-32
89	872109-188	1	Ring, retaining, external, shaft 0.188
90	305004	1	Lock, platen right
91	870105-500	2	Bearing, ball, two-shield, OD 0.5, ID 0.18

Table C-10. Chassis, Right Side, Parts List (continued)

Item	Part Number	Quantity	Description
	363001		
32	~~303009~~	1	Frame, side, right
33	842103-000	2	Grommet, OD 0.75, 0.49 high
34	865330-008	2	Washer, flat, ID 0.187, OD 0.75
35	865150-008	2	Washer, split-lock, #8, zinc-plated steel
36	852832-012	2	Screw, #8-32 x 3/4, Phillips pan-head, zinc-plated steel
37	865330-008	1	Washer, flat, ID 0.187, OD 0.75
38	865150-008	1	Washer, split-lock, #8, zinc-plated steel
39	852832-006	1	Screw, #8-32 x 3/8, Phillips pan-head, zinc-plated steel
40	852440-004	1	Screw, #4-40 x 1/4, Phillips pan-head, zinc-plated steel
41	865150-004	1	Washer, split-lock, #4, zinc-plated steel
42	~~305081~~	1	Tube, bail roller
43	305085	5	Roller, bail
44	304074	2	Bushing, bail roller
45	302006	1	Shaft, bail
46	304033	1	Arm, bail, right
47	872109-188	1	Ring, retaining, external, shaft 0.188
48	305005	1	Arm, tractor select lever
49	305134	1	Spring, bail
50	304035	1	Lever, tractor select
51	872109-312	1	Ring, retaining, external, shaft 0.312
52	800316-000	1	Switch, tractor
53	852440-010	2	Screw, #4-40 x 5/8, Phillips pan-head, zinc-plated steel
54	865330-004	2	Washer, flat, #4, zinc-plated steel
55	304014	1	Actuator, right
56	872109-219	1	Ring, retaining, external, shaft 0.219
57	304016	1	Link, right
58	~~304022~~	1	Bearing, roller support shaft 085
59	305079	1	Spring, external paper release
60	303016	1	Washer, thrust paper feed
61	872109-188	1	Ring, retaining, external, shaft 0.188

305247 TUBE, Roller - MINOR RT
305246 TUBE, Roller - MJR - LFT

Table C-10. Chassis, Right Side, Parts List

Item	Part Number	Quantity	Description
1	305136	1	Guide, paper, rear-feed
2	303014	1	Deflector, paper
3	852632-004	1	Screw, #6-32 x 1/4, Phillips pan-head, zinc-plated steel
4	865150-006	1	Washer, split-lock, #6, zinc-plated
5	865100-006	1	Washer, flat, #6, zinc-plated steel
6	305061	1	Damping sheet, paper deflector
7	302014	1	Shaft, tractor support
8	872109-312	1	Ring, retaining, external, shaft 0.312
9	302013	1	Shaft, tractor drive
10	872109-188	1	Ring, retaining, external, shaft 0.188
11	873117-001	1	Pin, groove type E, 3/32 diameter x 3/8 long
12	304024	1	Bearing, tractor drive shaft, right
13	301010	1	Roller support shaft assembly
14	~~309027~~	1	Bearing, paper feed shaft
15	302009	1	Shaft, paper feed
16	302015	1	Shaft, paper release
17	~~302019~~	1	Shaft, carriage, main
18	~~365380-002~~	1	Washer, wave spring, ID 0.385, OD 0.5
19	852632-006	2	Screw, #6-32 x 3/8, Phillips pan-head, zinc-plated steel
20	865150-006	2	Washer, split-lock, #6, zinc-plated steel
21	865100-006	2	Washer, flat, #6, zinc-plated steel
22	303007	1	Bracket, return pulley
23	None	1	Stud, self-clinching, #8-32
24	868201-000	1	Belt, 0.083 pitch, 490 grooves, 0.
25	301002	1	Pulley, return, 30 teeth, 0.0833 p
26	302023	1	Shaft, return pulley
27	872109-188	2	Ring, retaining, external, shaft 0.188
28	305018	1	Cable, ribbon drive
29	305006	1	Spring, ribbon drive cable
30	None	1	Nut, self-clinching, #4-40
31	302020	1	Shaft, carriage, rear

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(14) 304023
(17) 302070
(18) 865200-602

Table C-10. Chassis, Right Side, Parts List (continued)

Item	Part Number	Quantity	Description
92	869104-001	2	Spacer, ID 0.166, OD 0.312, 0.5 long
93	302000	1	Stud, tractor drive idler gear, 24 teeth
94	None	1	Nut, self-clinching, #6-32
NS	303039	1	Strap, grounding

Spares:

305085	Bail rollers—set of 5	(item 43)
305134	Bail springs—set of 2	(item 49)
868201-000	Carriage belt	(item 24)
304037	Paper thickness lever	(item 78)
800316-000	Print gap switch	(item 75)
305018	Ribbon drive cable	(item 28)
304014	Right actuator	(item 55)
304033	Right bail arm	(item 46)
304016	Right link	(item 57)
301032	Tractor gear train plate	(items 63, 67, 68, 69 and 93)
304035	Tractor select lever	(item 50)
800316-000	Tractor switch	(item 52)

Table C-10. Chassis, Right Side, Parts List (continued)

Other assemblies:

301056	Deflector/damping sheet	(items 2 and 6)
301015	Return pulley	(items 25, 26, 27 and 91)
301030	Right link	(items 57 and 58)
301007	Right side frame	(items 14, 32, 84, 85, 86 and 87)
301011	Tractor drive shaft	(items 9, 11 and 12)
301110	Vibration mount	(items 33 and 92)

Chassis, right side exploded-view

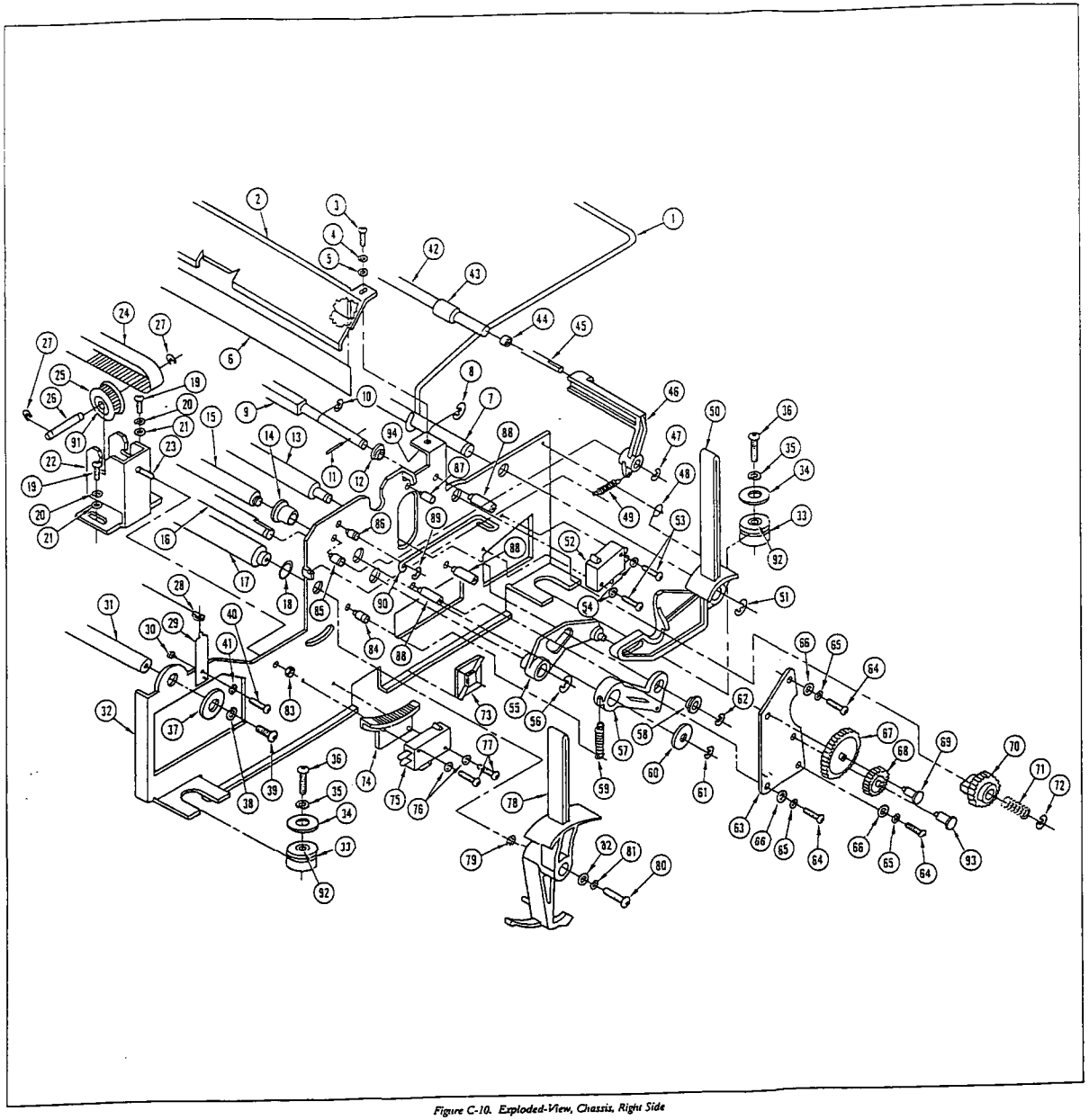


Figure C-10. Exploded-View, Chassis, Right Side

Table C-11. Control Panel Parts List (continued)

Spares:

301035-001	Control panel, gray	(items 1 thru 21)
301035-002	Control panel, white	(items 1 thru 21)

Other assemblies:

301036-001	Bezel, gray	(items 10, 12, 13, 15 and 16)
301036-002	Bezel, white	(items 10, 12, 13, 15 and 16)
301037	Dial	(items 18, 19, 20 and 21)

Table C-11. Control Panel Parts List

Item	*Part Number*	*Quantity*	*Description*
1	855440-006	6	Screw, #4-40 x 3/8, Phillips flat-head, 100-degrees
2	None	2	Insert, #8-32 x 0.185
3	~~305140~~	1	Bracket, control panel DBS
4	~~305074~~	1	Shield, control panel
5	306030	1	Control panel PCB assembly
6	857232-004	4	Screw, #2-32 x 1/4, Phillips pan-head, self-tapping type B
7	306112	1	Liquid-crystal display assembly
8	~~872108-125~~ 872110-002	1	Ring, retaining, external, reinforced, shaft 0.125
9	~~865330-031~~ 865330-031	1	Washer, flat, ID 0.135, OD 0.312
10	~~302042~~	1	~~Ferrule, bezel~~
11	304030	1	Keyboard, rubber, paper handling
12	None	6	Insert, #4-40 x 0.135
13	~~304073~~	1	Bushing, control panel
14	304029	1	Keyboard, rubber, control panel
15	~~305137-001~~	1	Bezel, control panel, gray
	~~305137-002~~	1	Bezel, control panel, white
16	305016	1	Overlay, control panel
17	865202-003	1	Washer, crescent spring, ID 0.13, OD 0.468
18	~~302029~~	1	~~Shaft, dial~~
19	~~302041~~	1	~~Ferrule, dial~~
20	305017	1	Decal, dial timing
21	~~304054~~ 304153	1	Dial, control panel
NS	~~305041~~	1	Acoustic foam, bezel, right — DBS
NS	~~305064~~	1	Acoustic foam, base, right side — DBS
NS	~~305142~~	1	Acoustic foam, bezel, left side — DBS
NS	~~305165~~	1	Acoustic foam, bezel, rear — DBS
NS	817513-000	1	Clip, cable retainer w/adhesive backing

(15) 304152-002
305327 ACST, FOAM BRKT CONT PNL
305338 " " SIDE LFT C/PNL
305341 " " BEZEL, RT
305342 " " FRONT BRKT-CONT PNL

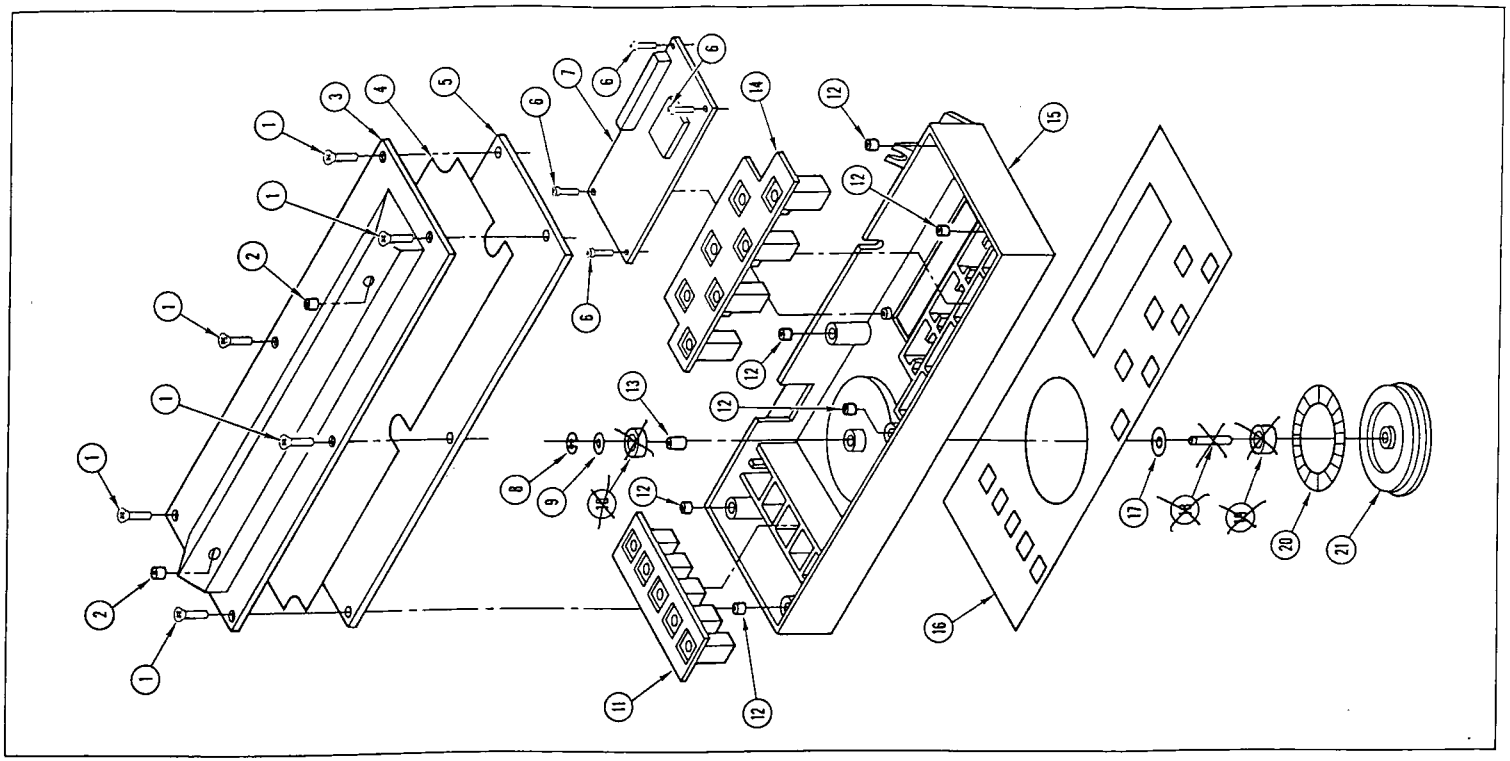


Figure C-11. Exploded-View, Control Panel

Table C-12. Analog/Logic Board Set Parts List

Item	Part Number	Quantity	Description
1	~~852440-006~~	5	~~Screw, #4-40 x 3/8, Phillips pan head, zinc-plated steel~~
2	~~865340-004~~	6	~~Washer, lock, external star, #4~~
3	~~852440-004~~	2	~~Screw, #4-40 x 1/4, Phillips pan head, zinc-plated steel~~
4	~~306090~~	1	~~Analog PCB assembly~~ 088
5	~~305090~~	1	~~Shield, analog, mylar~~
6	~~None~~	5	~~Stand-off, clear-hole, #4~~
7	~~303038~~	1	~~Shield, analog, brass~~
8	~~869221-002~~	5	~~Stand-off, 1/4 hex, male/female, #4-40, 0.375 length~~
9	~~869220-007~~	1	~~Stand-off, 1/4 hex, female/female, #4-40, 0.44 length~~
10	~~301048~~	1	Intelli-card assembly 301309
11	~~306010~~	1	~~Logic PCB assembly~~
12	~~305089~~	1	~~Shield, logic, mylar~~
13	~~303037~~	1	~~Shield, logic, brass~~
14	~~301079~~	1	~~Logic shield assembly~~
15	~~None~~	5	Stand-off, threaded, #4-40

Spares:

306090	Analog board	(items 4, 5, 6 and 7)
306077	Logic/analog board set	(items 1 thru 14)
306010	Logic board	(items 8, 9, 11, 12, 13, 14 and 15)

306300-201 PCB Assy, Main

Analog/logic board set exploded-view

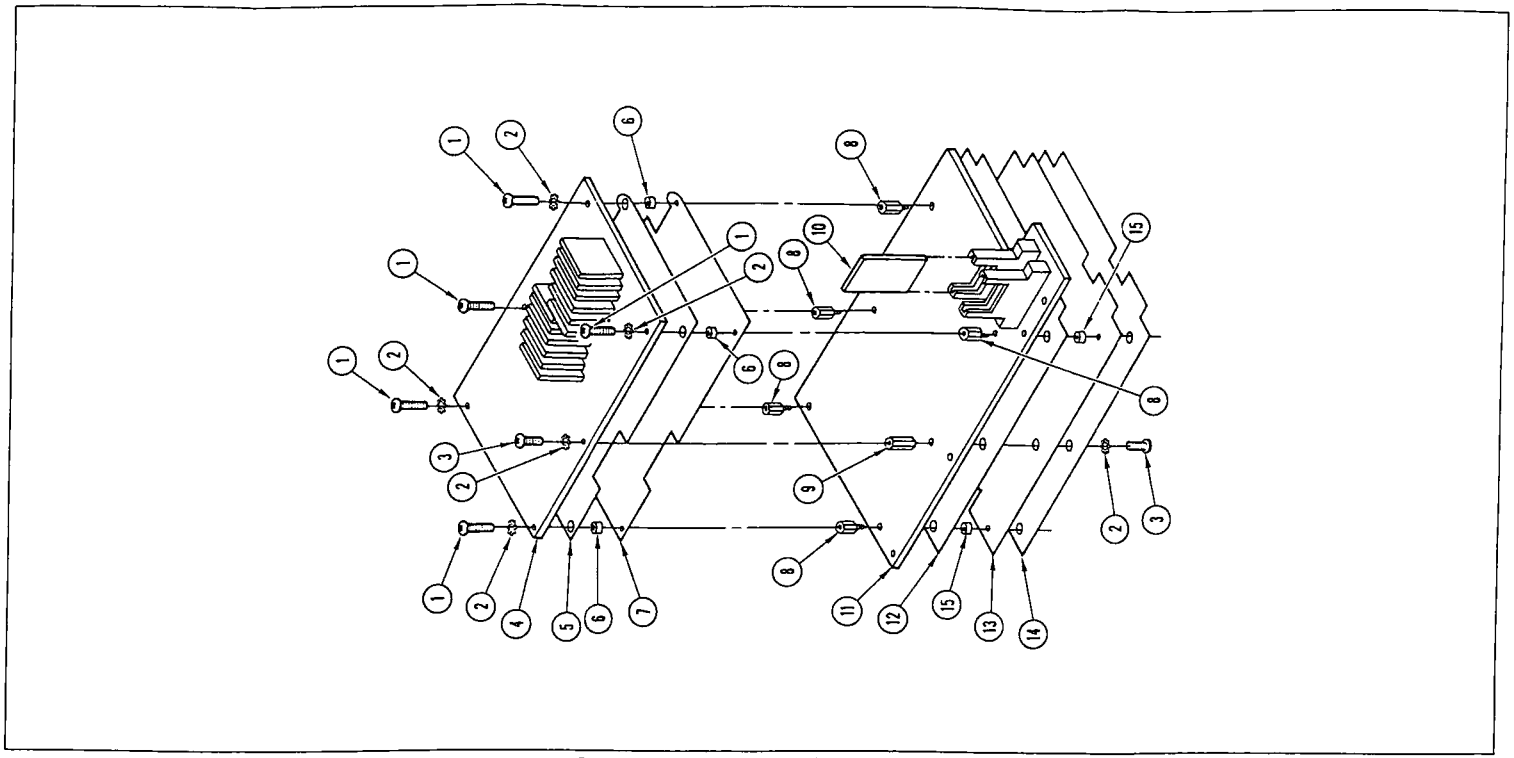


Figure C-12. Exploded-View, Analog/Logic Board Set

Table C-13. Bottom Case Parts List (continued)

Item	Part Number	Quantity	Description
51	876000-001	4	Screw, captive, #8-32, Phillips pan-head
52	865100-008	4	Washer, flat, #8, zinc-plated steel
53	876001-001	4	Ring, retaining, captive, #8
54	852632-006	4	Screw, #6-32 x 3/8, Phillips pan-head, zinc-plated steel
55	881101-002	4	Foot, rubber, vibration mounting
56	None	4	Insert, #6-32 x 0.150
57	852832-008	2	Screw, #8-32 x 1/2, Phillips pan-head, zinc-plated steel
58	865150-008	2	Washer, split-lock, #8, zinc-plated steel
59	865100-008	2	Washer, flat, #8, zinc-plated steel
60	None	8	Insert, #8-32 x 0.312
61	None	10	Insert, #4-40 x 0.135
62	305094	1	Label, voltage select
63	820102-006	2	Fuse, glass, slow-blow, 250V, 3.0A

Spares:

301043-001	AC panel/filter board, gray	(items 31, 32, 33, 34,
301043-002	AC panel/filter board, white	36, 37 and 38)
301049-001	Bottom case, gray	(items 2 thru 9, 48, 54,
301049-002	Bottom case, white	55, 56, 60 and 61)
306076	Capacitor	(items 41, 45 and 46)
306106	Control panel cable	(item 14)
301035-001	Control panel, gray	(item 1)
301035-002	Control panel, white	
306107	Fan	(item 27)
306077	Logic/analog board set	(item 18)
816100-000	Transformer, CSA/UL	(item 26)
816104-000	Transformer, VDE/CSA/UL	(item 26)

Other assemblies:

305098	Cover, high voltage, filter PCB, with label	(items 25 and 62)

361006 ASSY BASE w/ FOAM 535/635

361005 ASSY, BASE/CONT PNL 535/635

361007 ASSY, CONTROL PNL

Table C-13. Bottom Case Parts List (continued)

Item	Part Number	Quantity	Description
28	852440-006	2	Screw, #4-40 x 3/8, Phillips pan-head, zinc-plated steel
29	865150-004	2	Washer, split-lock, #4, zinc-plated steel
30	865100-004	2	Washer, flat, #4, zinc-plated steel
31	857424-004	2	Screw, #4-24 x 1/4, Phillips pan-head, self-tapping, type B
32	~~800313-000~~	1	Switch, ac power on/off 600322-000
33	~~301057-001~~	1	~~Panel, ac power, gray~~
	~~301057-002~~	1	Panel, ac power, white 364013-002
34	805600-001	1	Receptacle, ac input, 1.5mm panel
35	305092	1	Label, caution
36	800312-000	1	Switch, voltage select, two position (includes nut)
37	800312-000	1	Nut, voltage select switch (includes switch)
38	~~306040~~	1	~~Filter PCB assembly~~
39	852440-004	2	Screw, #4-40 x 1/4, Phillips pan-head, zinc-plated steel
40	865340-004	2	Washer, lock, external star #4
41	~~306076~~	1	~~Capacitor assembly, 18,000 microfarad (includes washers and screws)~~
42	857620-008	4	Screw, #6-20 x 1/2, Phillips pan-head, self-tapping, type B
43	817516-001	4	Bracket, cable tie mount, 0.140
44	817500-007	2	Tie wrap, 0.184 - 0.19 x 11
45	~~306076~~	2	~~Washer, capacitor~~ (includes capacitor and screws)
46	~~306076~~	2	~~Screw, capacitor~~ (includes capacitor ~~and washers~~)
47	~~304045-001~~	1	Panel, rear cover, gray
	304045-002	1	Panel, rear cover, white
48	~~305097-001~~	1	~~Bottom case~~
49	~~305077~~	1	Label, FCC 305509
50	817513-000	4	Clip, cable retainer with adhesive backing

306106 S/A, CBL CONT PNL

Table C-13. Bottom Case Parts List

Item	Part Number	Quantity	Description
1	~~301035-001~~	1	~~Control panel assembly, gray~~
	~~301035-002~~	1	Control panel assembly, white 306030
2	~~305039~~	1	Acoustic foam, top, right, bottom case
3	~~305038~~	1	Acoustic foam, top, left, bottom case
4	~~305141~~	1	Acoustic foam, bottom case
5	~~305037~~	1	Acoustic foam, side, right, bottom case
6	~~305034~~	1	Acoustic foam, side, left, bottom case
7	~~305031~~	1	Acoustic foam, horizontal, front, bottom case
8	~~305032~~	1	Acoustic foam, vertical, front, bottom case
9	~~305033~~	1	Acoustic foam, slope, front, bottom case
10	852440-003	3	Screw, #4-40 x 3/16, Phillips pan-head, zinc-plated steel
11	865150-004	3	Washer, split-lock, #4, zinc-plated steel
12	865100-004	3	Washer, flat, #4, zinc-plated steel
13	~~303030~~	1	Shield, EMI, logic/analog
14	306106	1	Control panel cable assembly
15	~~301048~~	1	Intelli-card assembly 301309
16	852440-004	5	Screw, #4-40 x 1/4, Phillips pan-head, zinc-plated steel
17	865340-004	5	Washer, lock, external star, #4
18	~~306077~~	1	Logic/analog board set
19	852832-036	4	Screw, #8-32 x 2-1/4, Phillips pan-head, zinc-plated steel
20	865150-008	4	Washer, split/lock, #8, zinc-plated steel
21	865100-008	4	Washer, flat, #8, zinc-plated steel
22	~~303195~~	1	Bracket, grounding w/ground label
23	852832-004	4	Screw, #8-32 x 1/4, Phillips pan-head, zinc-plated steel
24	865150-008	4	Washer, split-lock, #8, zinc-plated steel
25	~~303029~~	1	Cover, high-voltage, filter PCB
26	~~816104-000~~	1	Transformer, VDE/CSA/UL
	~~816100-000~~	1	Transformer, ~~CSA/UL~~ 816118-000
27	306107	1	Fan assembly

365013 SHIELD, ESD, CONT PNL

365016 BEZEL, W/ BLK PAINT

366000 ASSY, FILTER BD

386010-001 ASSY, XFMR

306320 S/A, CAPACITOR ASSY

700120-Rev 0

Bottom case exploded-vie

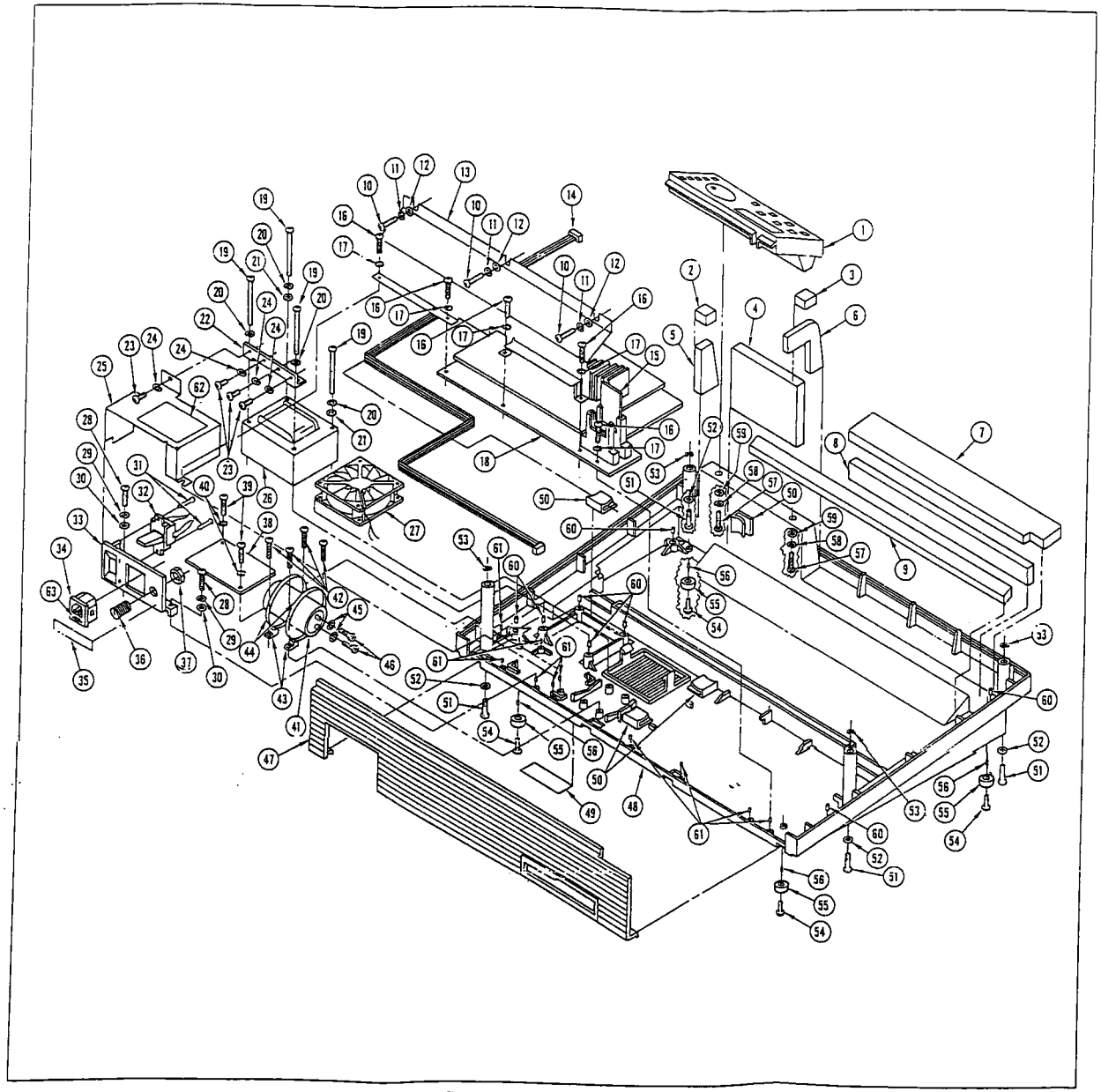


Figure C-13. Exploded-View, Bottom Case

Table C-15. Top Case, Bottom, Parts List (continued)

Other assemblies:

301066-001	Paper support assembly, gray	(items 15 thru 21)
301066-002	Paper support assembly, white	(items 15 thru 21)
301053-001	Paper support, gray	(items 15, 16 and 18)
301053-002	Paper support, white	(items 15, 16 and 18)
301038-001	Top case assembly, gray	(items 1, 2 and 5)
301038-002	Top case assembly, white	(items 1, 2 and 5)
301051-001	Top cover assembly, gray	(items 7 thru 14 and 22)
301051-002	Top cover assembly, white	(items 7 thru 14 and 22)

301532 ASSY, PAPER SUPRT W/TAPE
301223-002 S/A, PAPER SUPRT W/ACST

361008 ASSY, TOP W/FOAM
305030 SCALE, PAPER
305307
305308
305311
305312
305313
305316
305317
305318

361009 S/A TOP-535/635
301541 S/A, SLEEVE/SCREW
364011 ENCL, TOP

Table C-15. Top Case, Bottom, Parts List

Item	Part Number	Quantity	Description
1	None	4	Insert, #8-32 x 0.312
2	304046	4	Sleeve, top case
3	~~305048~~	1	Acoustic foam, top case, right
4	~~305047~~	1	Acoustic foam, top case, left
5	~~304040-001~~	1	~~Top case, gray~~
	~~304040-002~~	1	Top case, white
6	305046	1	Acoustic foam, top case, front
7	~~305054~~	1	Acoustic foam, top cover, right rear
8	301062	1	Magnet assembly
9	~~305053~~	1	Acoustic foam, top cover, left rear
10	~~305052~~	1	Acoustic foam, top cover, center
11	~~305051~~	1	Acoustic foam, top cover, right front
12	~~305050~~	1	Acoustic foam, top cover, center front
13	~~305049~~	1	Acoustic foam, top cover, left front
14	~~305026-001~~	1	Top cover, gray
	~~305026-002~~	1	Top cover, white
15	~~305056~~	1	Acoustic foam, paper support, rear
16	~~305055~~	1	Acoustic foam, paper support, front
17	~~305011~~	1	Support, paper support, right
18	~~304044-001~~	1	Paper support, gray
	~~304044-002~~	1	Paper support, white
19	~~305012~~	1	Support, paper support, left
20	~~304059-001~~	1	Guide, paper support, right, gray
	~~304059-002~~	1	Guide, paper support, right, white
21	~~304056-001~~	1	Guide, paper support, left, gray
	~~304056-002~~	1	Guide, paper support, left, white
22	~~305173~~	1	Label, checking ribbon alignment

Spares:

301050-001	Top case, gray	(items 1 thru 6)
301050-002	Top case, white	(items 1 thru 6)

Top case, bottom exploded-view

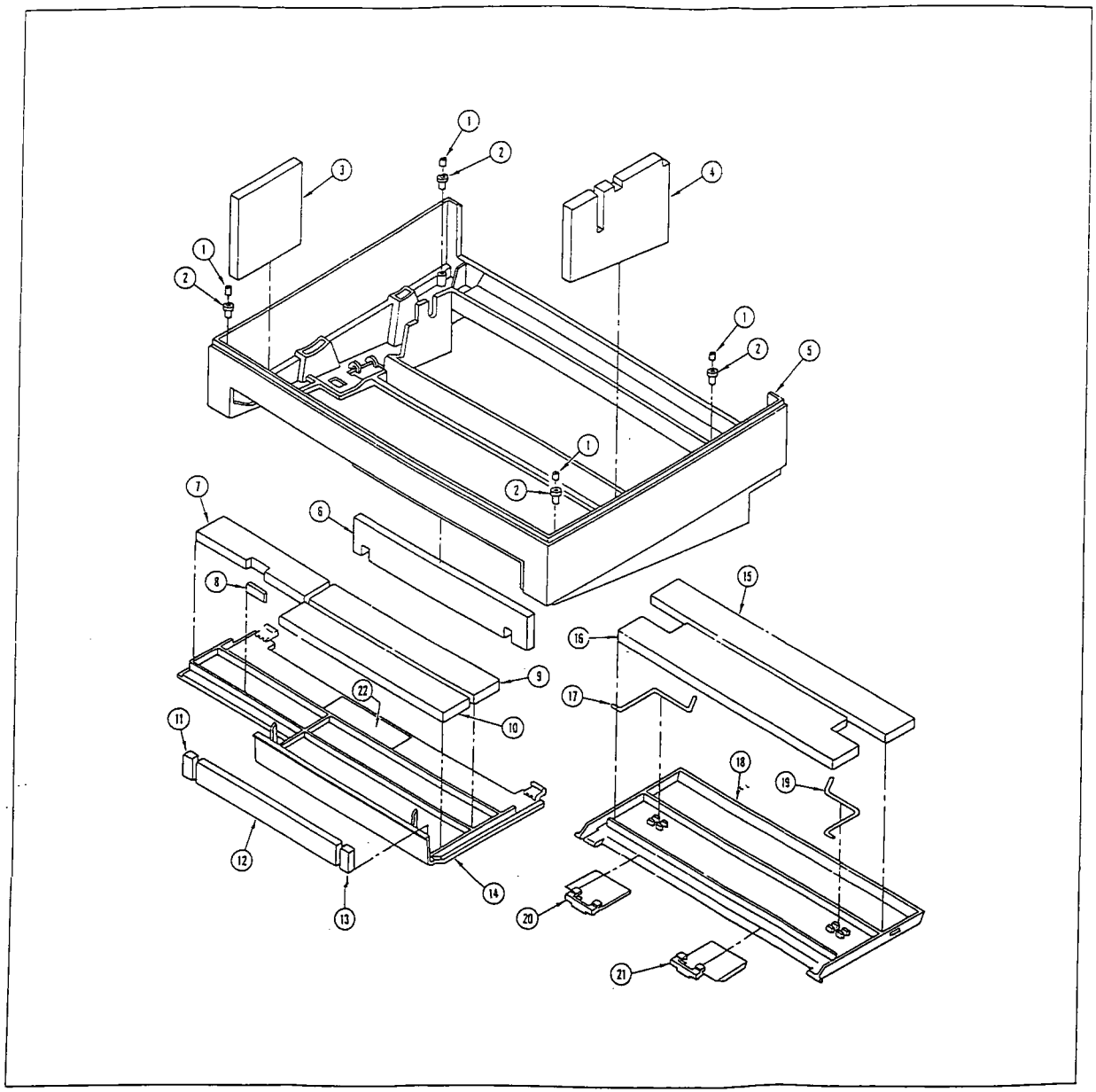


Figure C-14. Exploded-View, Top Case, Bottom

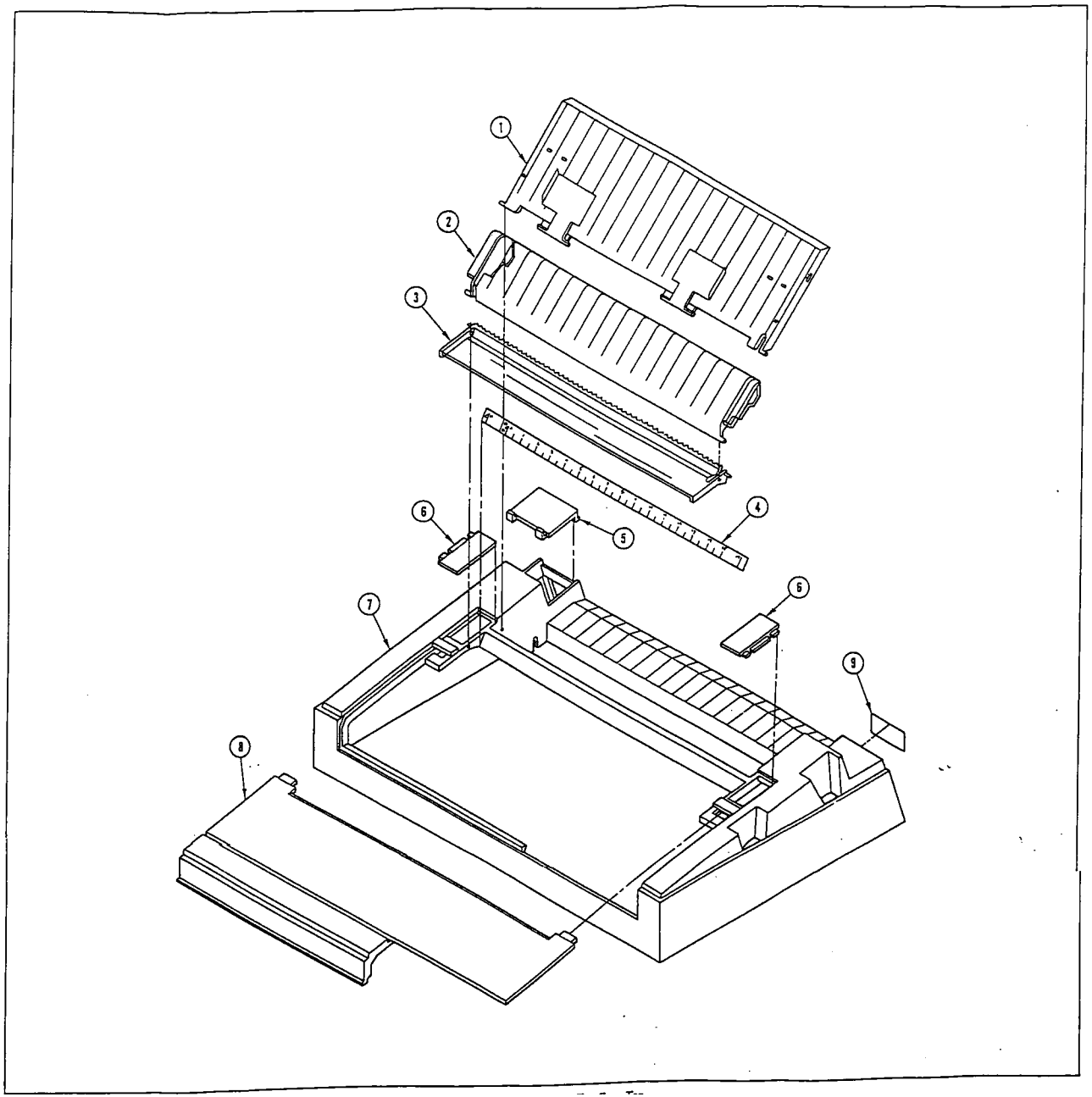
Table C-15. Top Case, Top, Parts List

Item	*Part Number*	*Quantity*	*Description*
1	301066-001	1	Paper support assembly (gray)
	301066-002	1	Paper support assembly (white)
2	304086	1	Window, acoustic
3	305198	1	Window, platen
4	305030-001	1	Scale, paper (gray)
	305030-002	1	Scale, paper (white)
5	304041-001	1	Cover, Intelli-card (gray)
	304041-002	1	Cover, Intelli-card (white)
6	304038-001	2	Cover, platen access (gray)
	304038-002	2	Cover, platen access (white)
7	301050-001	1	Top case (gray)
	301050-002	1	Top case (white)
8	301051-001	1	Top cover (gray)
	301051-002	1	Top cover (white)
9	305163	1	Label, serial no., UL/CSA

Spares:

301050-001	Top case, gray	(item 7)
301050-002	Top case, white	(item 7)

Top case, top exploded-view



D Schematics

This appendix provides system wiring and schematic diagrams for Accel-500 printer electronics.

System Wiring

System wiring

Table D-1 describes the recommended cable routing. Figure D-1 shows the pin-to-pin wiring of the cable assemblies, including assembly names, connector numbers, pin numbers, signal names, and wire colors. Figure D-2 shows where the connectors are located on each circuit board.

Table D-1. Recommended Cable Routing

Recommended cable routing

Cable	*Recommended Routing*
AC power receptacle	Direct to on/off switch and transformer grounding bracket
Bail solenoid	Through tie-wrap below bail solenoid, along lower left side of printer chassis toward rear of printer, through next tie-wrap on lower left side of printer chassis, through hole in left side of printer chassis, through two more tie-wraps on bottom of printer chassis over logic board, to J4 header on analog board
Capacitor	Direct to J3 header on analog board

Table D-1. Recommended Cable Routing (continued)

Cable	*Recommended Routing*
Carriage	Through clamp on bottom of carriage, looped around toward floor of printer chassis between metal shields, through clamp on floor of printer chassis, plugged into connectors on floor of printer chassis, along bottom of printer chassis, through four clamps on bottom of printer chassis, to J8 and J10 headers on analog board
Carriage motor	Through tie-wrap on lower left side of printer chassis, along lower left side of printer chassis toward rear of printer, through next tie-wrap on lower left side of printer chassis, along lower left side of printer chassis, through third tie-wrap on lower left side of printer chassis, through hole in left side of printer chassis, through two more tie-wraps on bottom of printer chassis over logic board, to J1 header on analog board
Carriage sensor	Through hole in left side of printer chassis near carriage sensor mounting tabs, through tie-wrap on lower left side of printer chassis, along lower left side of printer chassis toward rear of printer, through next tie-wrap on lower left side of printer chassis, through hole in left side of printer chassis, through two more tie-wraps on bottom of printer chassis over logic board, to J3 header on logic board

Table D-1. Recommended Cable Routing (continued)

Cable	*Recommended Routing*
Control panel	Below control panel, through clamp on inside front edge of bottom case, beneath printer chassis, along bottom case toward rear of printer, through clamp on bottom case, along bottom case toward left side of printer, through clamp on bottom case, along bottom case toward rear of printer, to J6 header on logic board
Fan	Along bottom case toward rear of printer, through clamp on bottom case, direct to J6 header on analog board
Microshift solenoid	Around right side of microshift solenoid, around front edge of carriage board, through two tie-wraps of carriage cabling harness, to JP4 header on carriage board
Multicolor ribbon switch	Below carriage, through hole in front side of carriage, through two tie-wraps of carriage cabling harness, to JP8 header on carriage board
On/off switch	Direct to ac power receptacle and J1 location on filter board
Paper sensor	Over main carriage shaft down to carriage board, along carriage board next to printhead receptacle, to JP5 header on carriage board
Platen motor	Through two tie-wraps on bottom of printer chassis over logic board, to J7 header on analog board

Table D-1. Recommended Cable Routing (continued)

Cable	*Recommended Routing*
Print gap switch	Along lower right side of printer chassis toward back of printer, through tie-wrap on lower right side of printer chassis, through hole in right side of printer chassis, under filter board shield, through tie-wrap on bottom of printer chassis over filter board shield, along bottom of printer chassis, through tie-wrap on bottom of printer chassis over logic board, to J9 header on logic board
Ribbon home switch	Through tie-wrap on left side of carriage, through hole in front side of carriage, through two tie-wraps of carriage cabling harness, to JP6 header on carriage board
Ribbon lift motor	Through hole in front side of carriage, through two tie-wraps of carriage cabling harness, to JP3 header on carriage board
Tractor switch	Through hole in right side of printer chassis, under filter board shield, through tie-wrap on bottom of printer chassis over filter board shield, along bottom of printer chassis, through tie-wrap on bottom of printer chassis over logic board, to J9 header on logic board
Transformer	Direct to J3 header on filter board and J3 header on analog board
Voltage select switch	Direct to J2 location on filter board

System wiring diagram

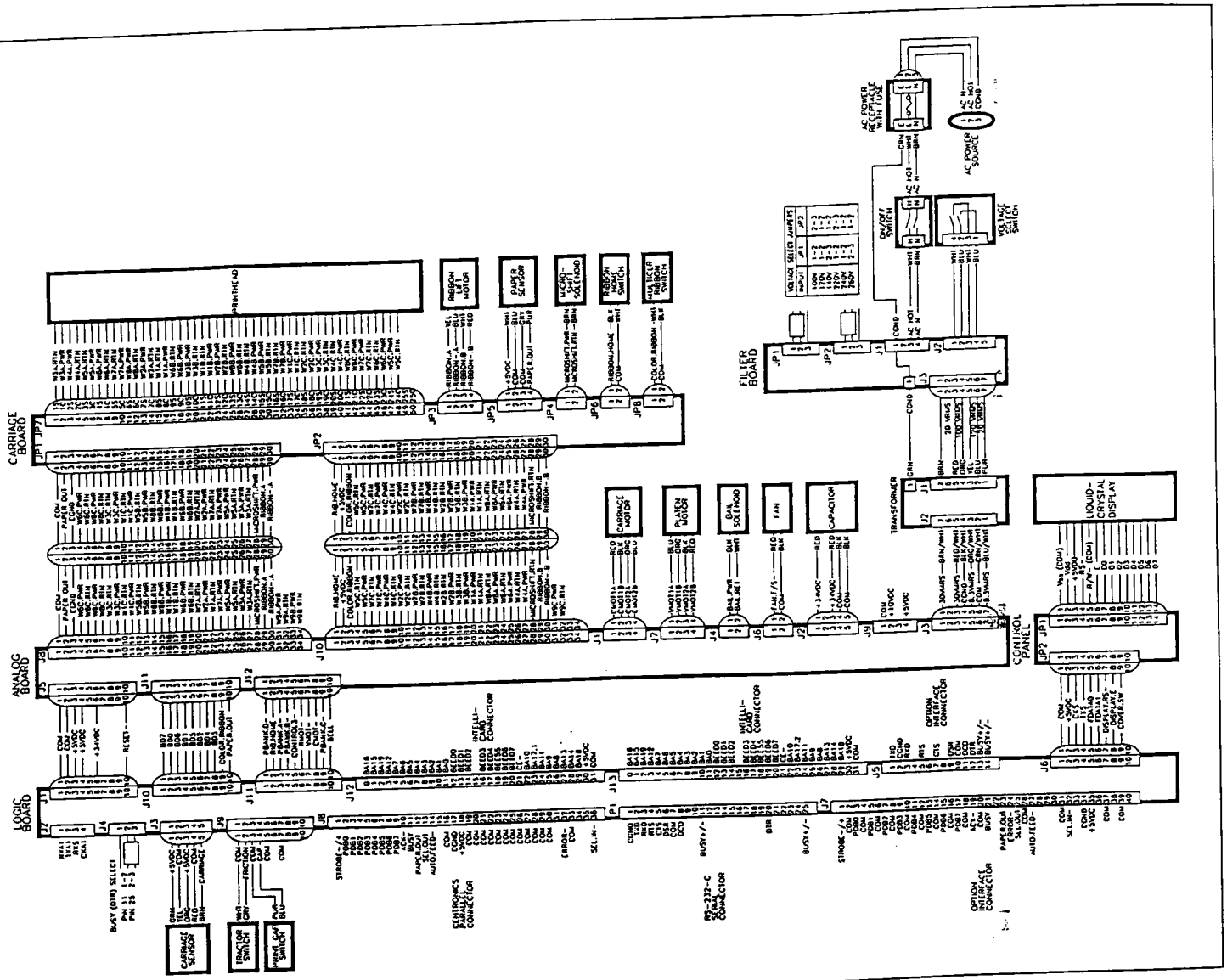


Figure D-1. System Wiring Diagram

Connector locations

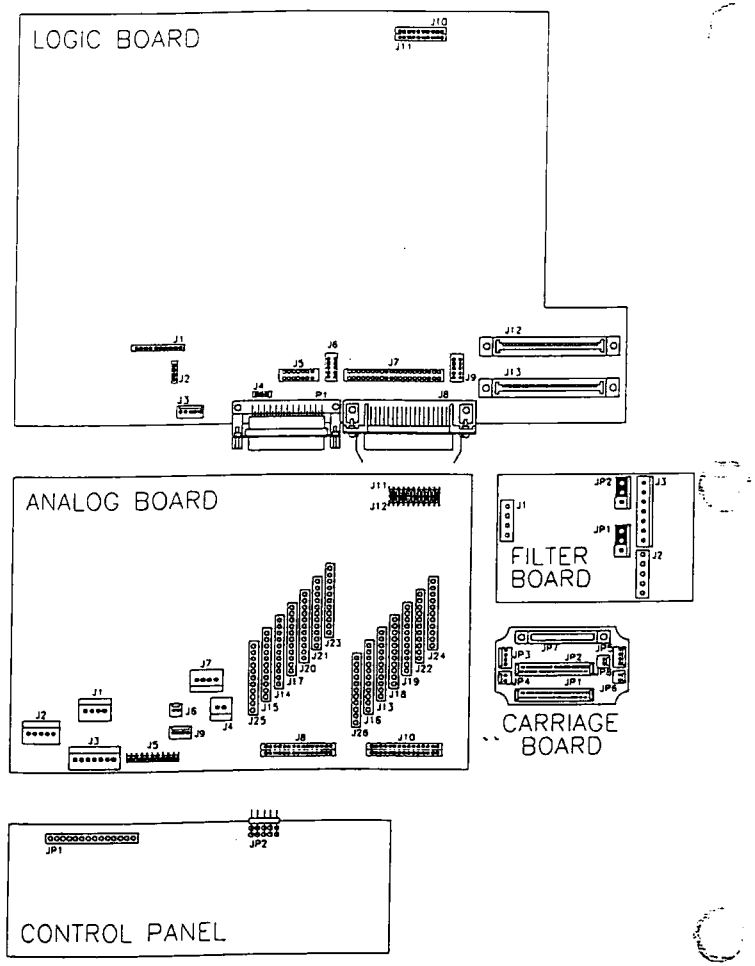


Figure D-2. Connector Locations

Assembly Diagrams

Figures D-3 through D-8 provide the following assembly diagrams:

Figure No.	*Description*
D-3	Filter board assembly
D-4	Logic board assembly
D-5	Analog board assembly
D-6	Control panel assembly
D-7	Carriage board assembly
D-8	Printhead driver board assembly

Filter board assembly

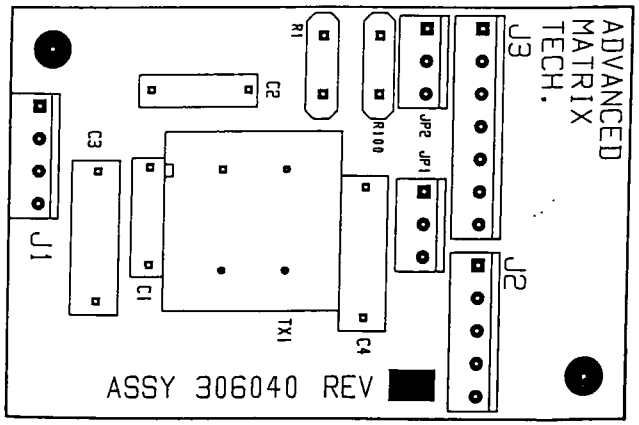


Figure D-3. Filter Board Assembly

Logic board assembly

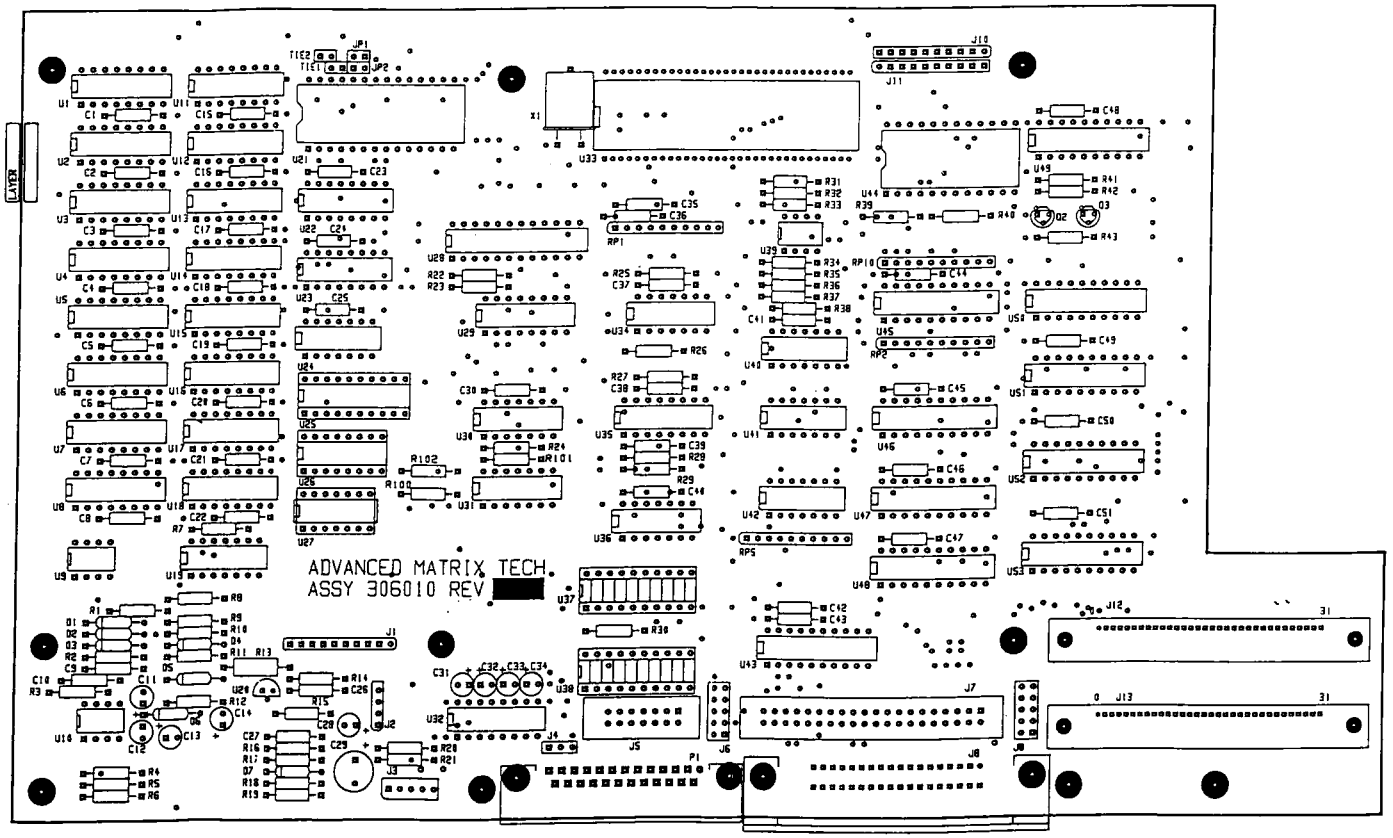


Figure D-4. Logic Board Assembly

Assembly Diagrams

Figures D-3 through D-8 provide the following assembly diagrams:

Figure No.	*Description*
D-3	Filter board assembly
D-4	Logic board assembly
D-5	Analog board assembly
D-6	Control panel assembly
D-7	Carriage board assembly
D-8	Printhead driver board assembly

Filter board assembly

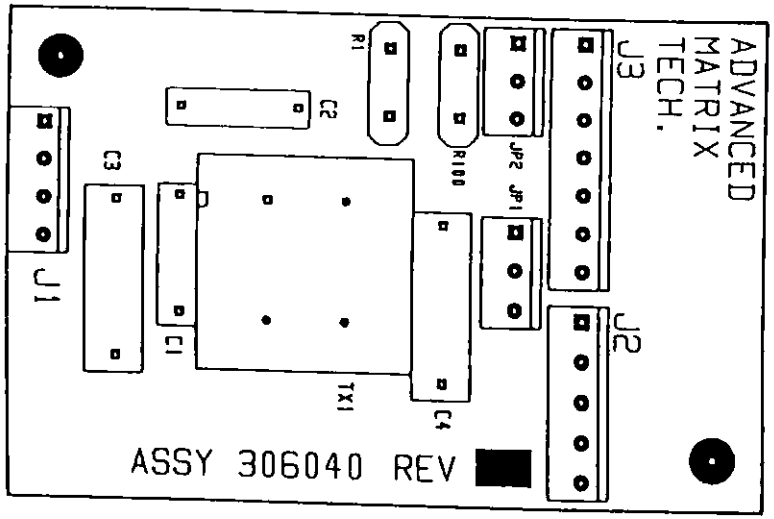


Figure D-3. Filter Board Assembly

ilc
ird
embly

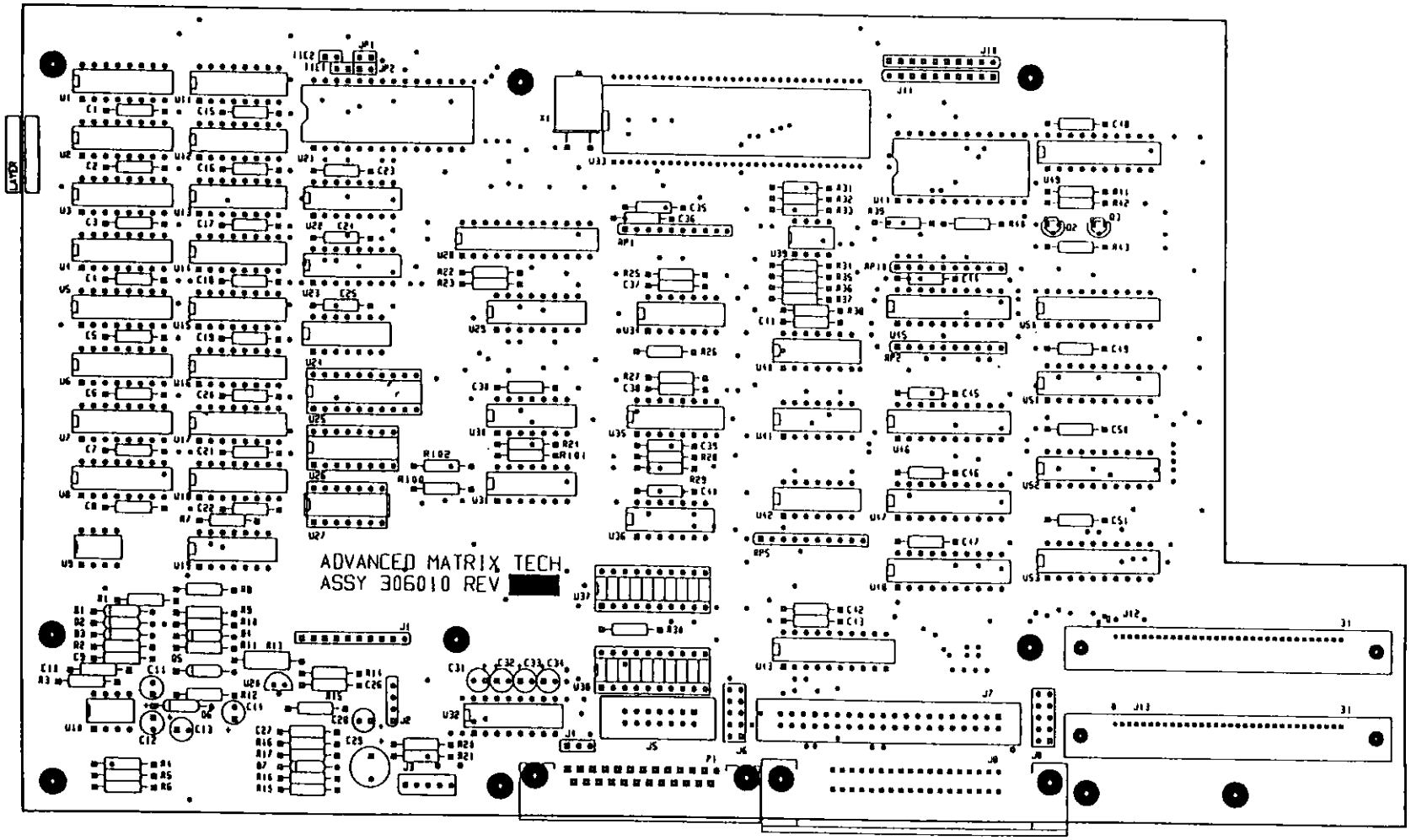


Figure D-4. Logic Board Assembly

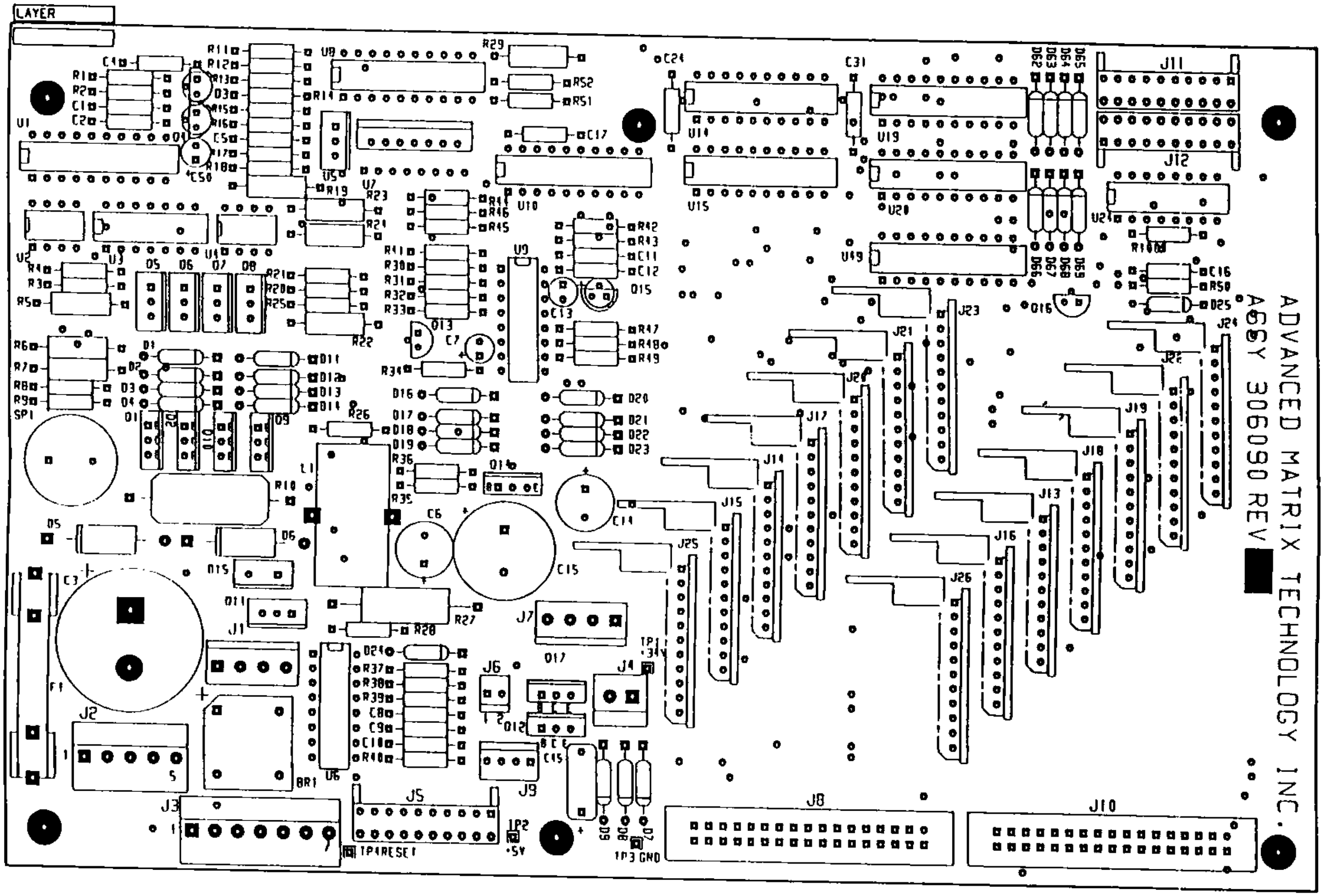


Figure D-5. Analog Board Assembly

Control panel assembly

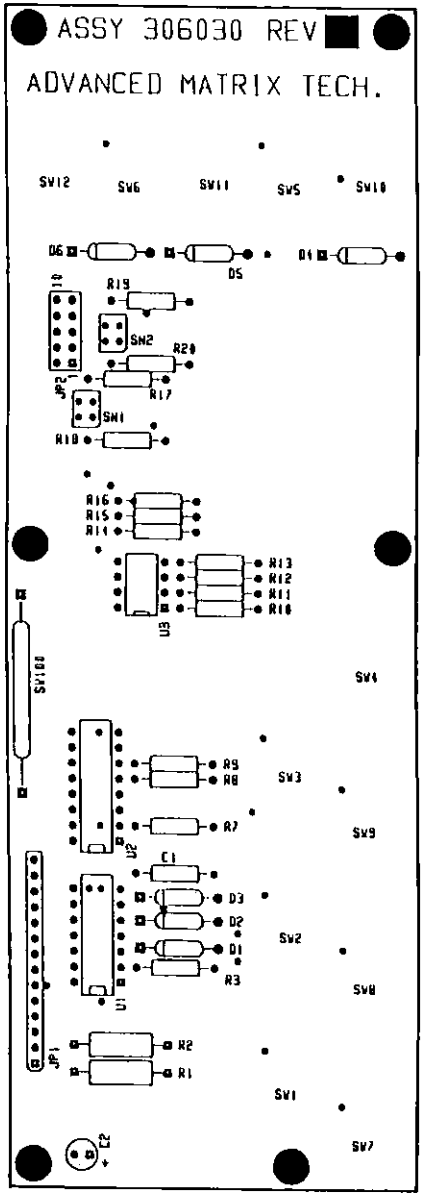


Figure D-6. Control Panel Assembly

Carriage board assembly

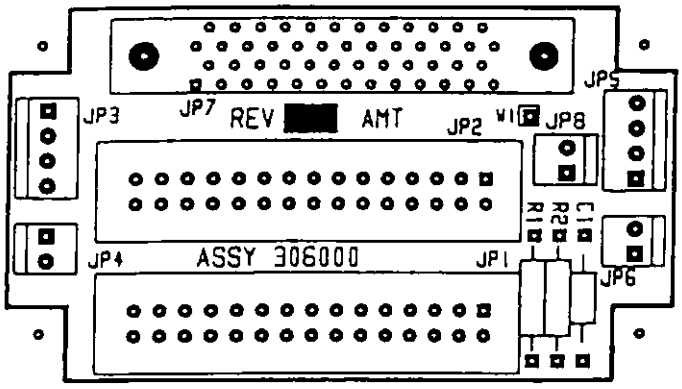


Figure D-7. Carriage Board Assembly

Printhead driver board assembly

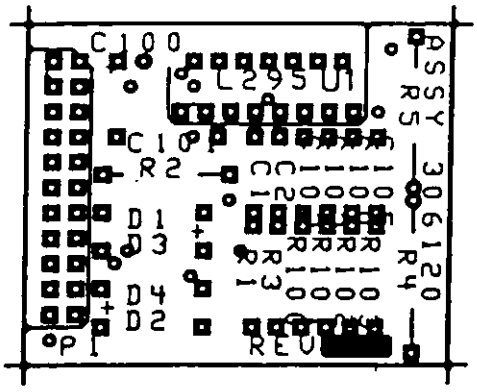


Figure D-8. Printhead Driver Board Assembly

Logic Symbology

Logic symbology

The logic symbols used in AMT schematics conform closely to those set forth in MIL-STD-806 or ANSI Y32.14-1973. Small-scale integration (SSI) circuits are represented by their function symbol. Medium-scale integration (MSI) and large-scale integration (LSI) devices, such as shift registers, RAMs, EEROMs, etc., are represented by rectangles with function labels. Since both positive and negative logic conventions can appear in a single diagram, the negation symbol (-) is used to distinguish between "low" true and "high" true signals.

Most logic symbols are drawn with inputs on the left and outputs on the right. Major signal flows are usually from left to right, top to bottom.

Schematic Diagrams

Schematic diagrams

Figures D-9 through D-15 provide the following schematic diagrams:

Figure No.	*Description*
D-9	Primary AC wiring
D-10	Filter board
D-11	Logic board
D-12	Analog board
D-13	Control panel
D-14	Carriage board
D-15	Printhead driver board

The schematic diagrams in this guide represent the latest version of each circuit board at the time of publication. AMT reserves the right to change schematic diagrams at any time without notification.

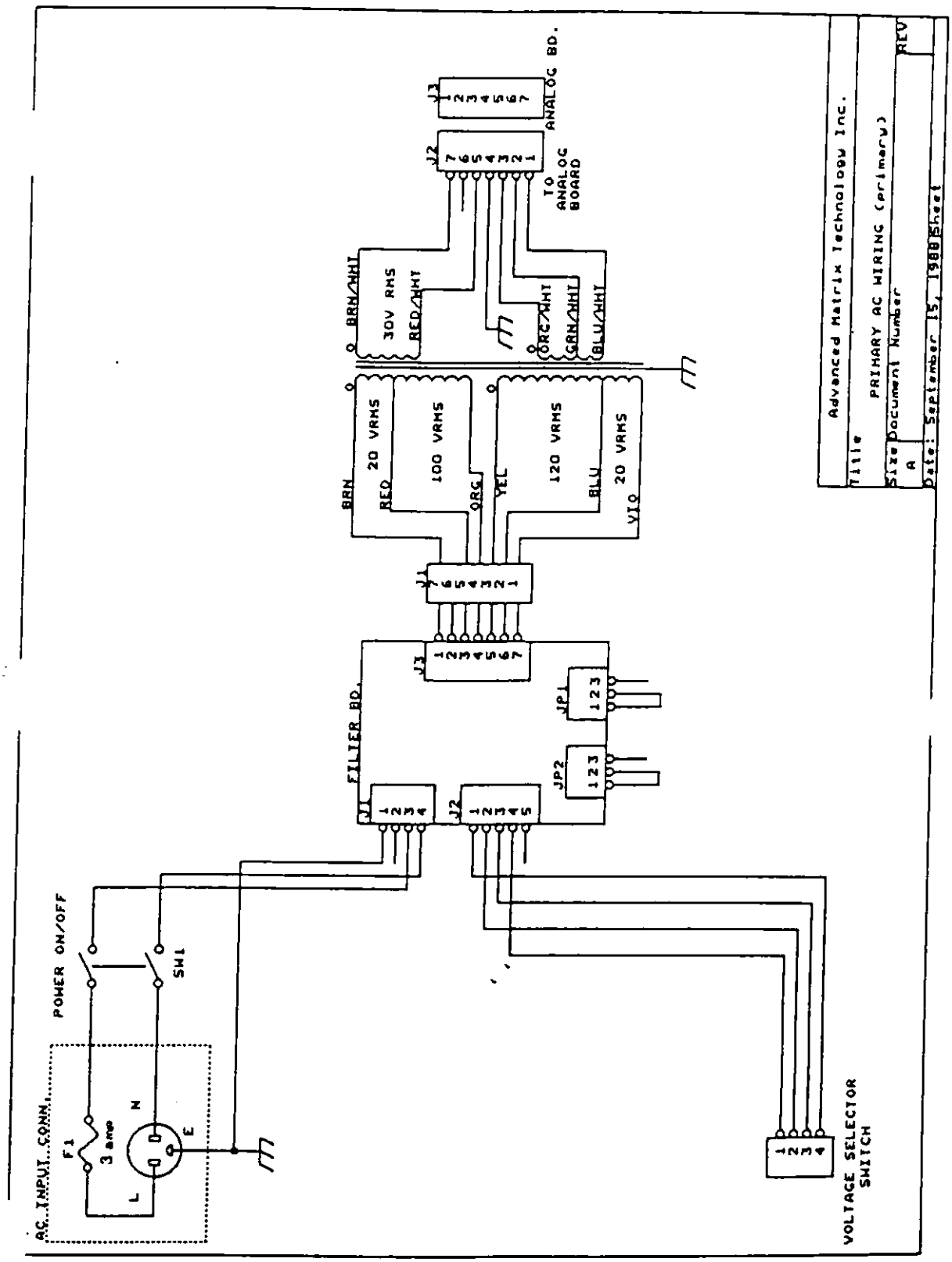


Figure D-9. Primary AC Wiring Schematic

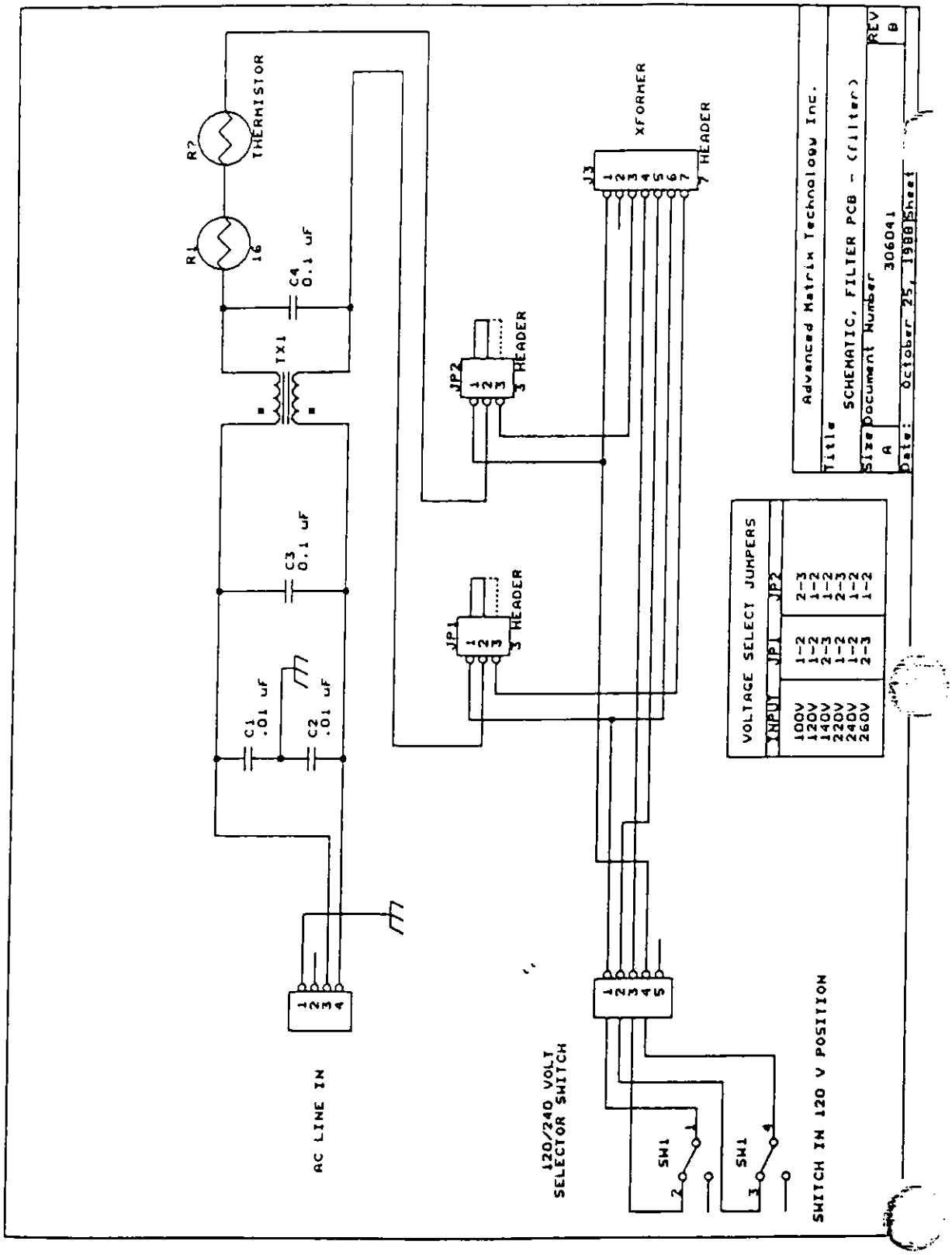


Figure D-10. Filter Board Schematic

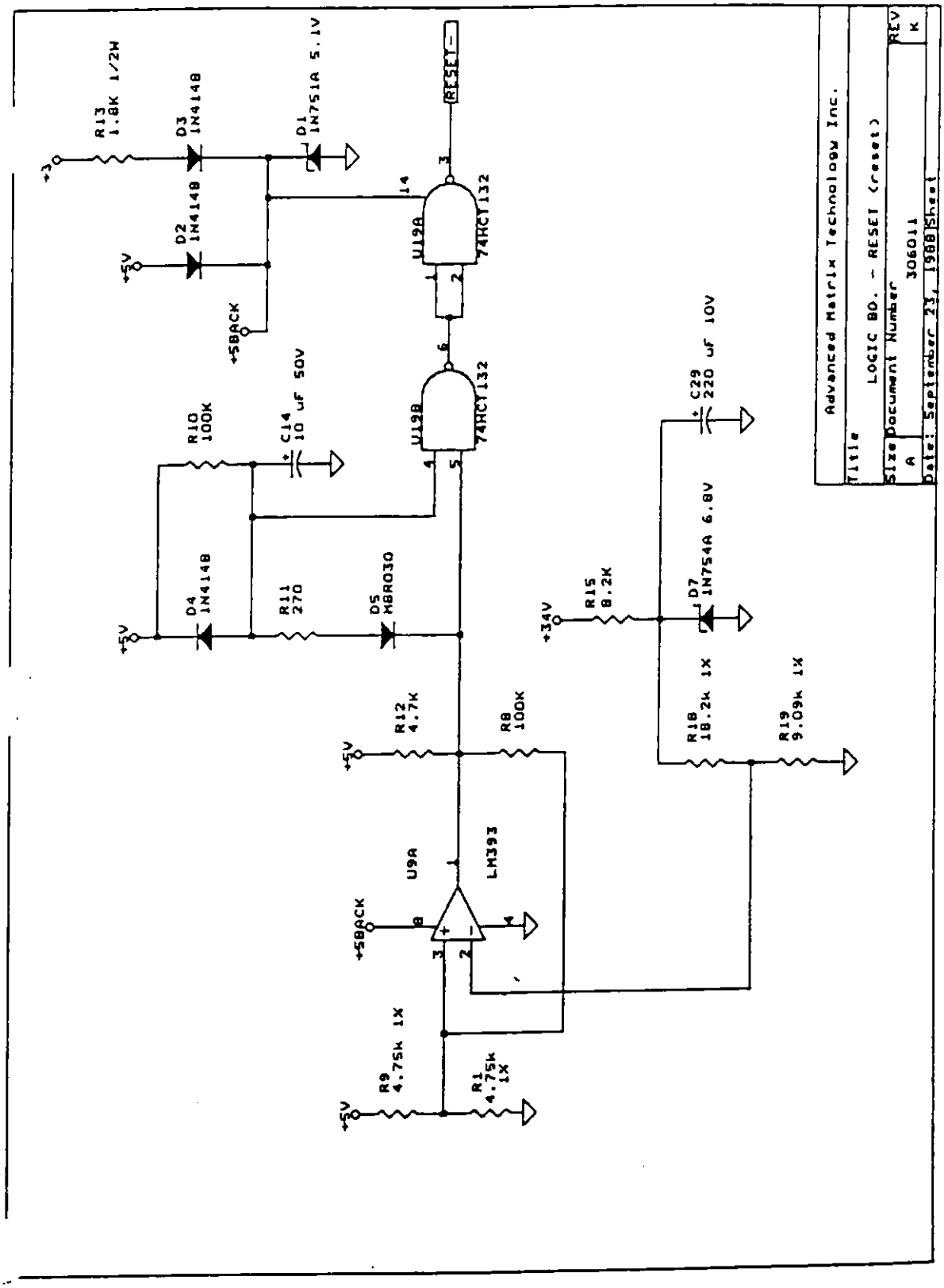


Figure D-11. Logic Board Schematic–Reset (1 of 13)

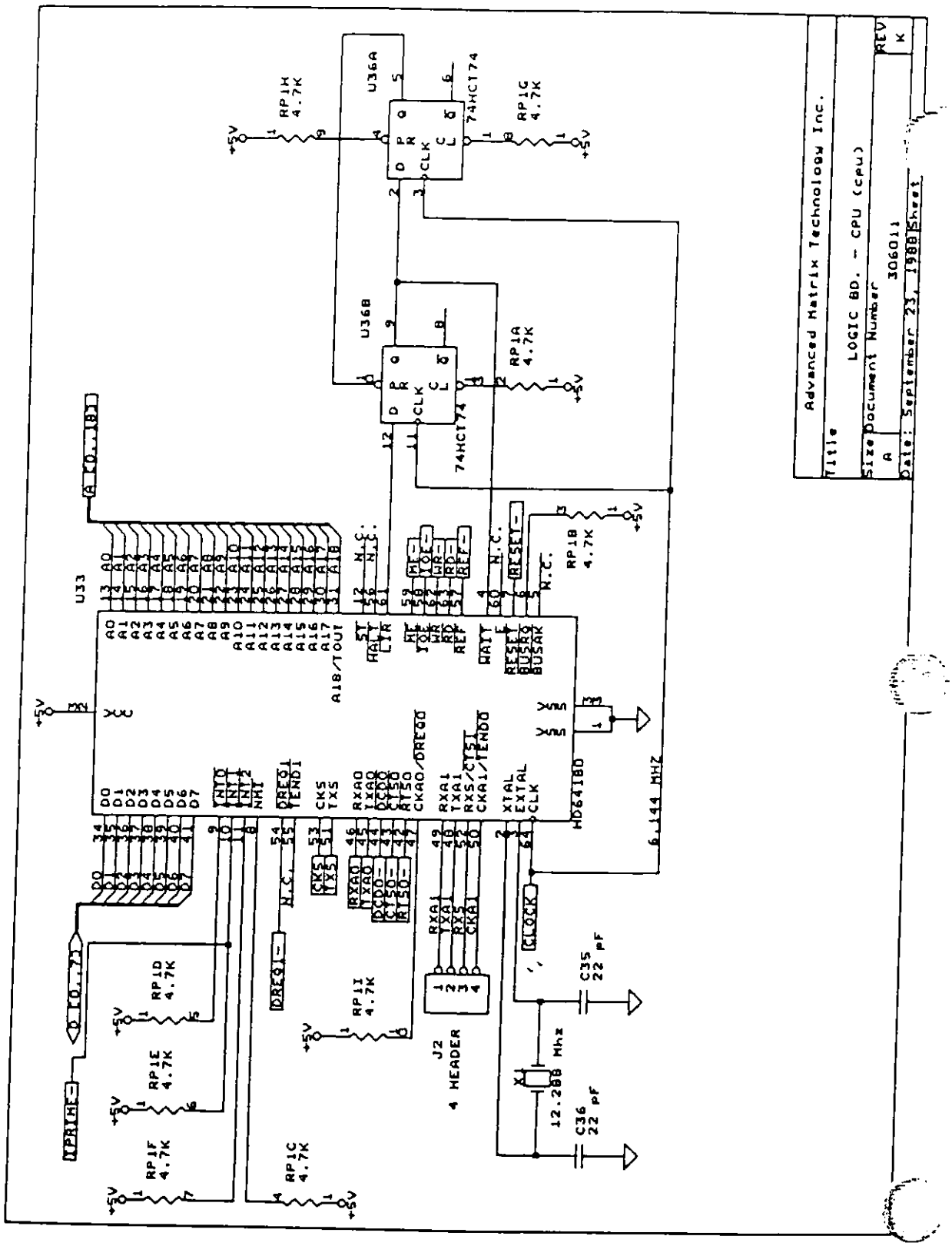


Figure D-11. Logic Board Schematic–CPU (2 of 13)

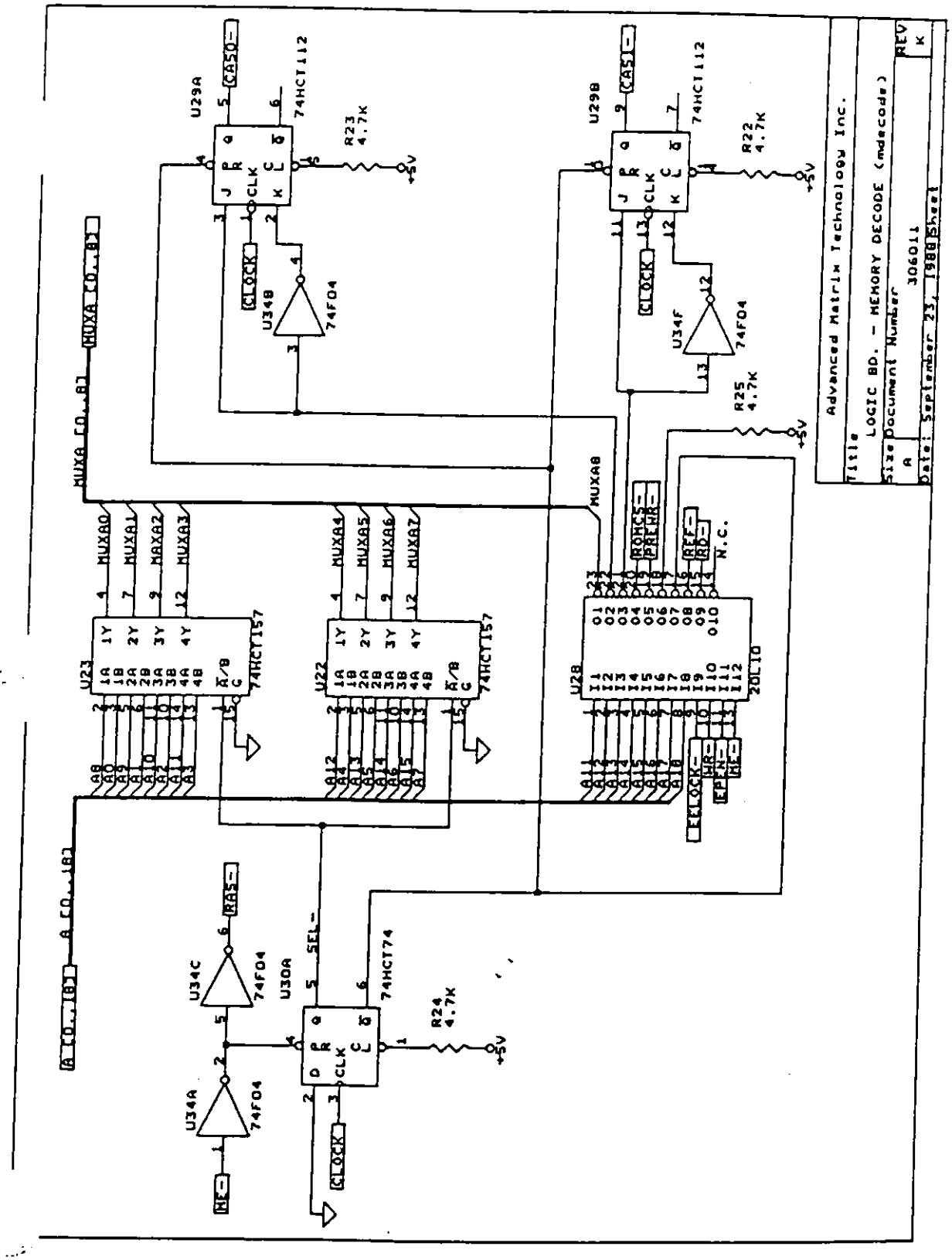


Figure D-11. Logic Board Schematic–Memory Decode (3 of 13)

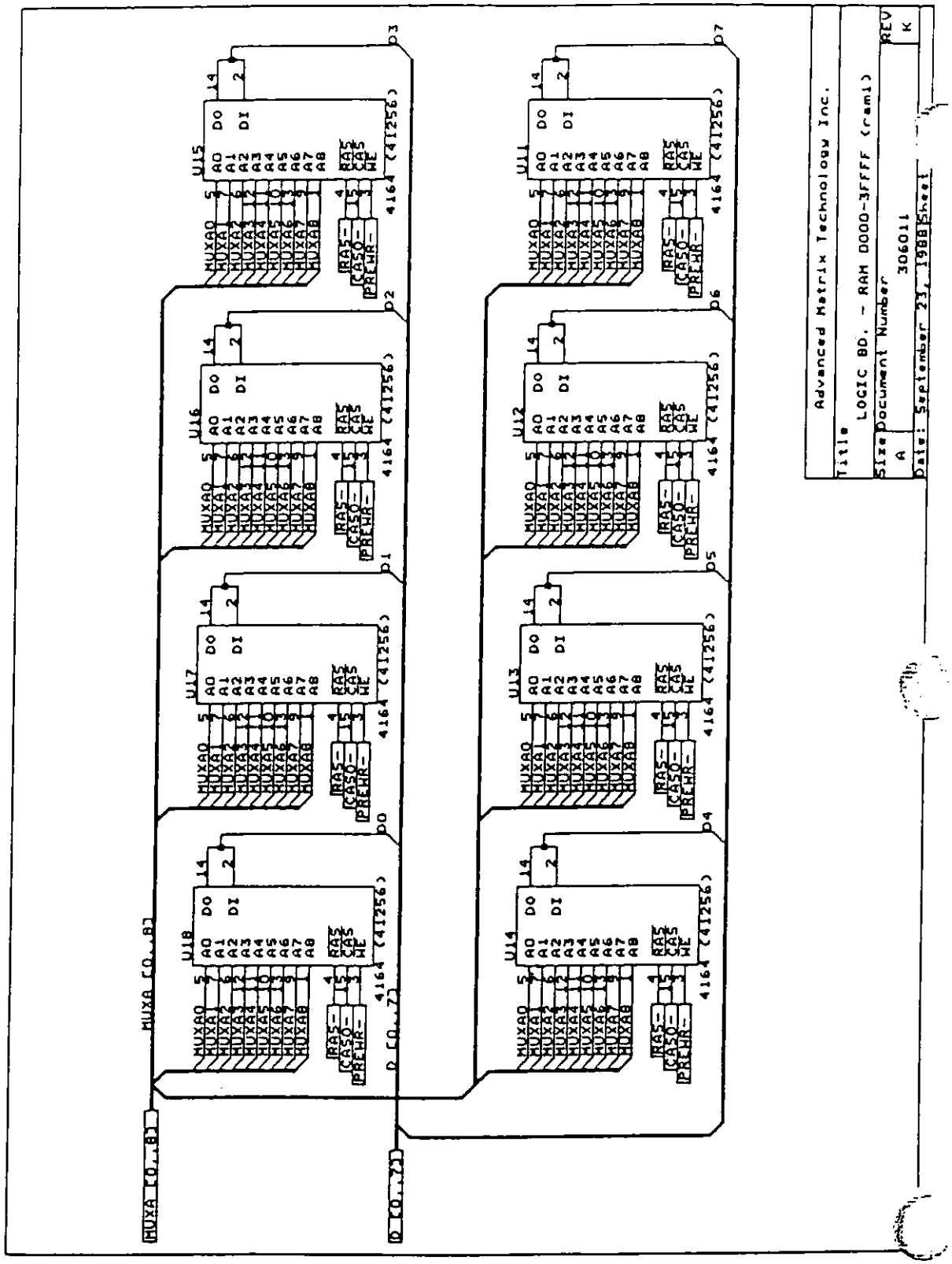


Figure D-11. Logic Board Schematic--RAM 0000-3FFF (4 of 13)

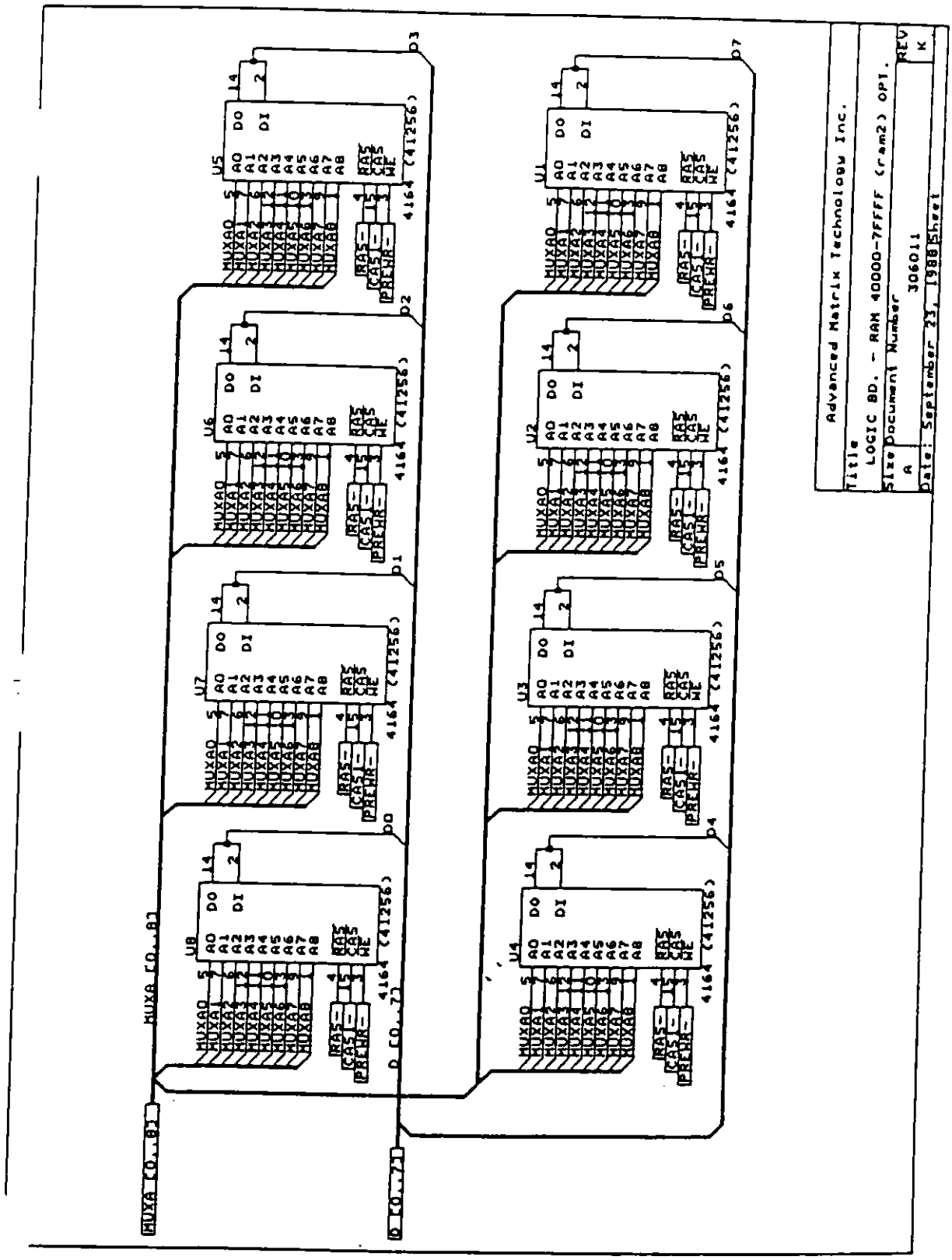


Figure D-11. Logic Board Schematic–RAM 4000-7FFF (5 of 13)

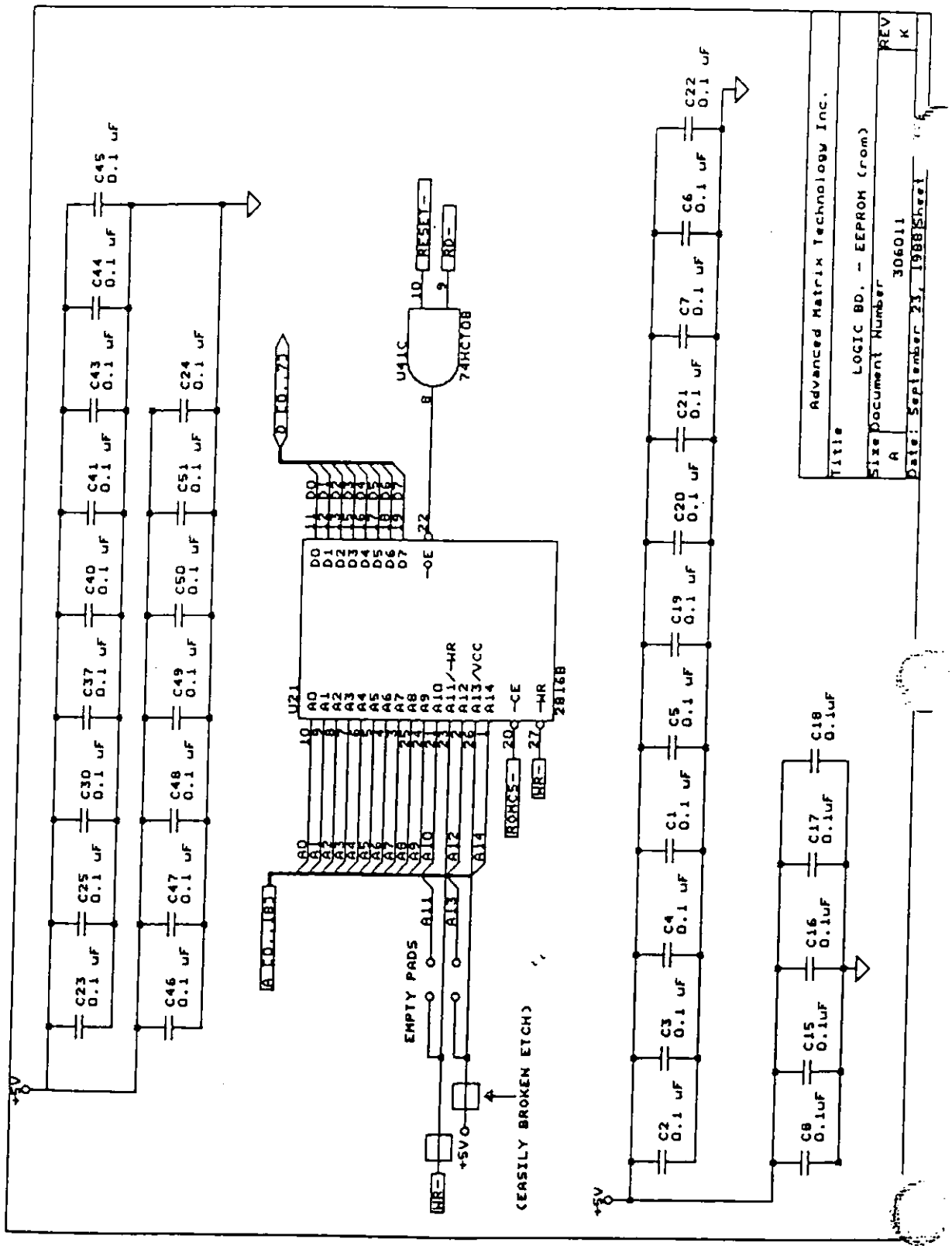


Figure D-11. Logic Board Schematic–EEPROM (6 of 13)

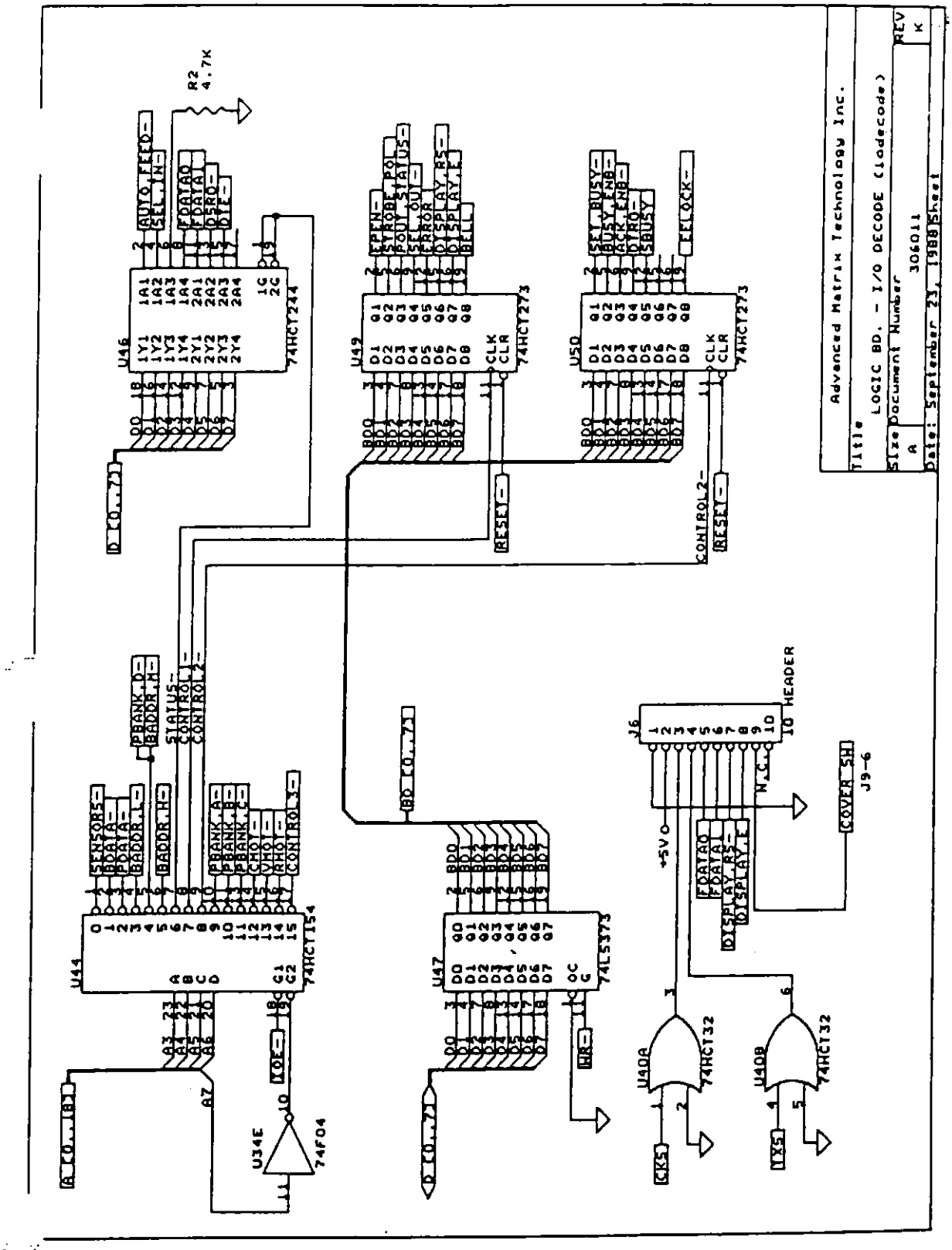


Figure D-11. Logic Board Schematic–I/O Decode (7 of 13)

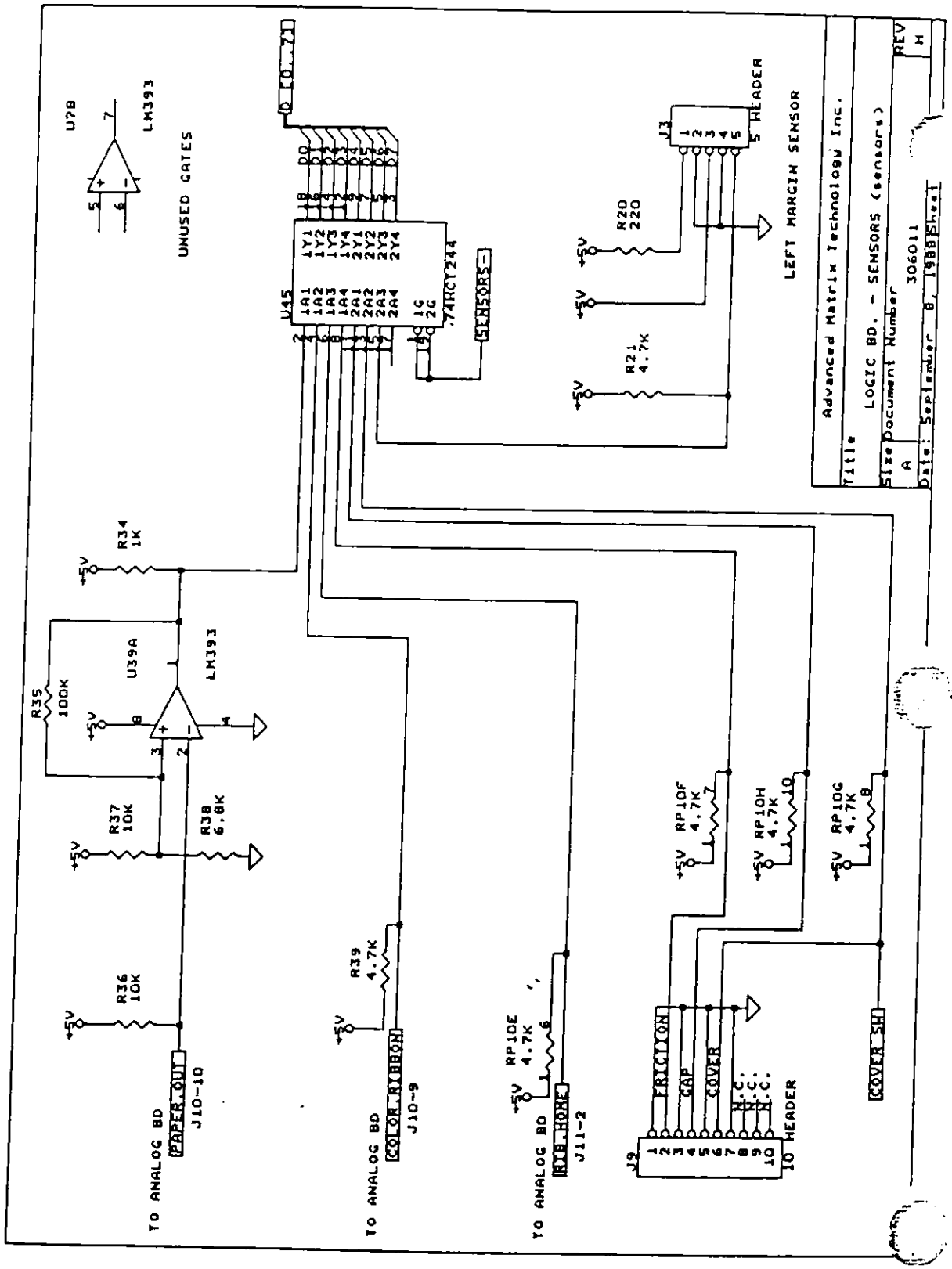


Figure D-11. Logic Board Schematic–Sensors (8 of 13)

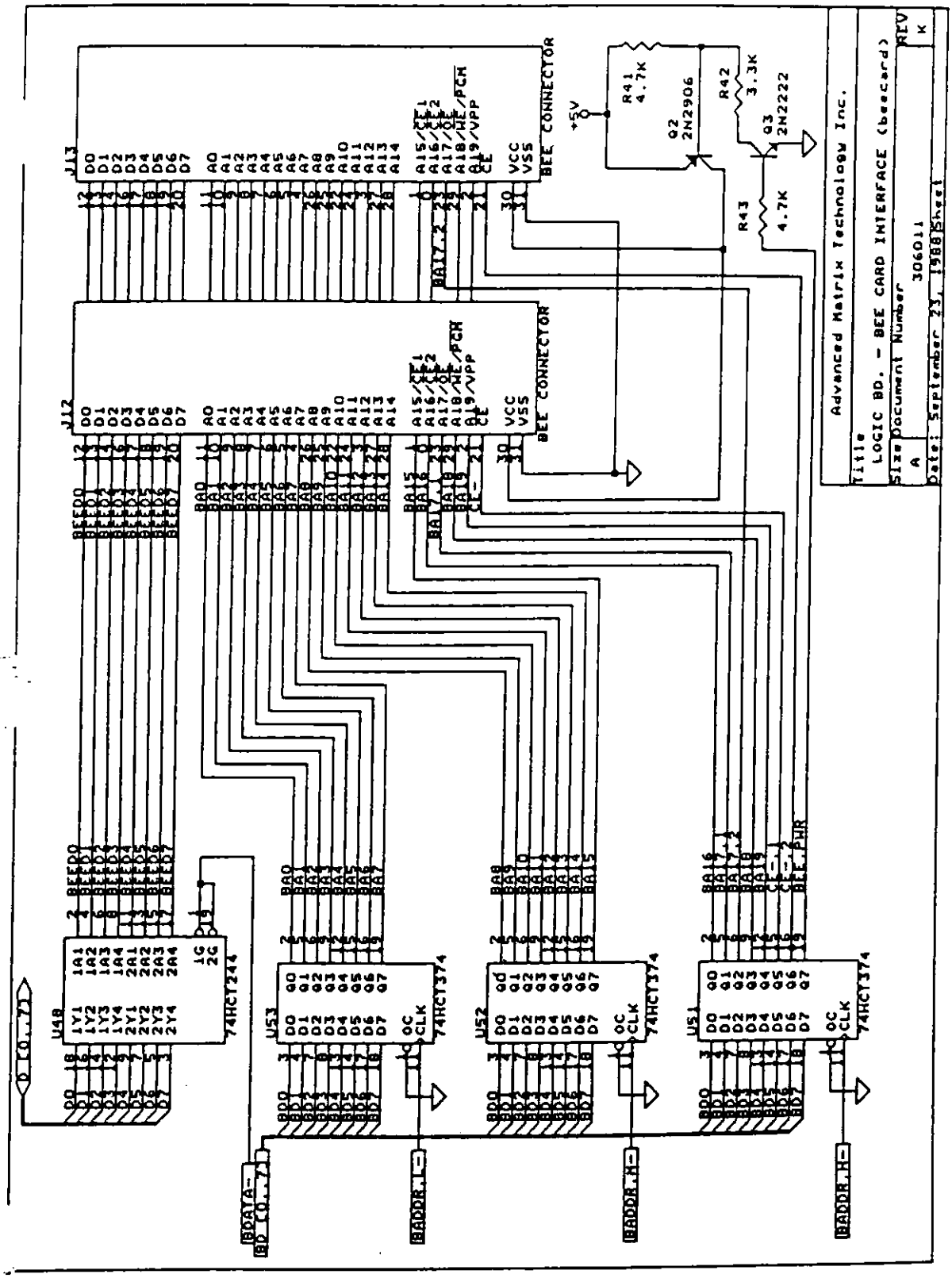


Figure D-11. Logic Board Schematic–Intelli-Card Interface (9 of 13)

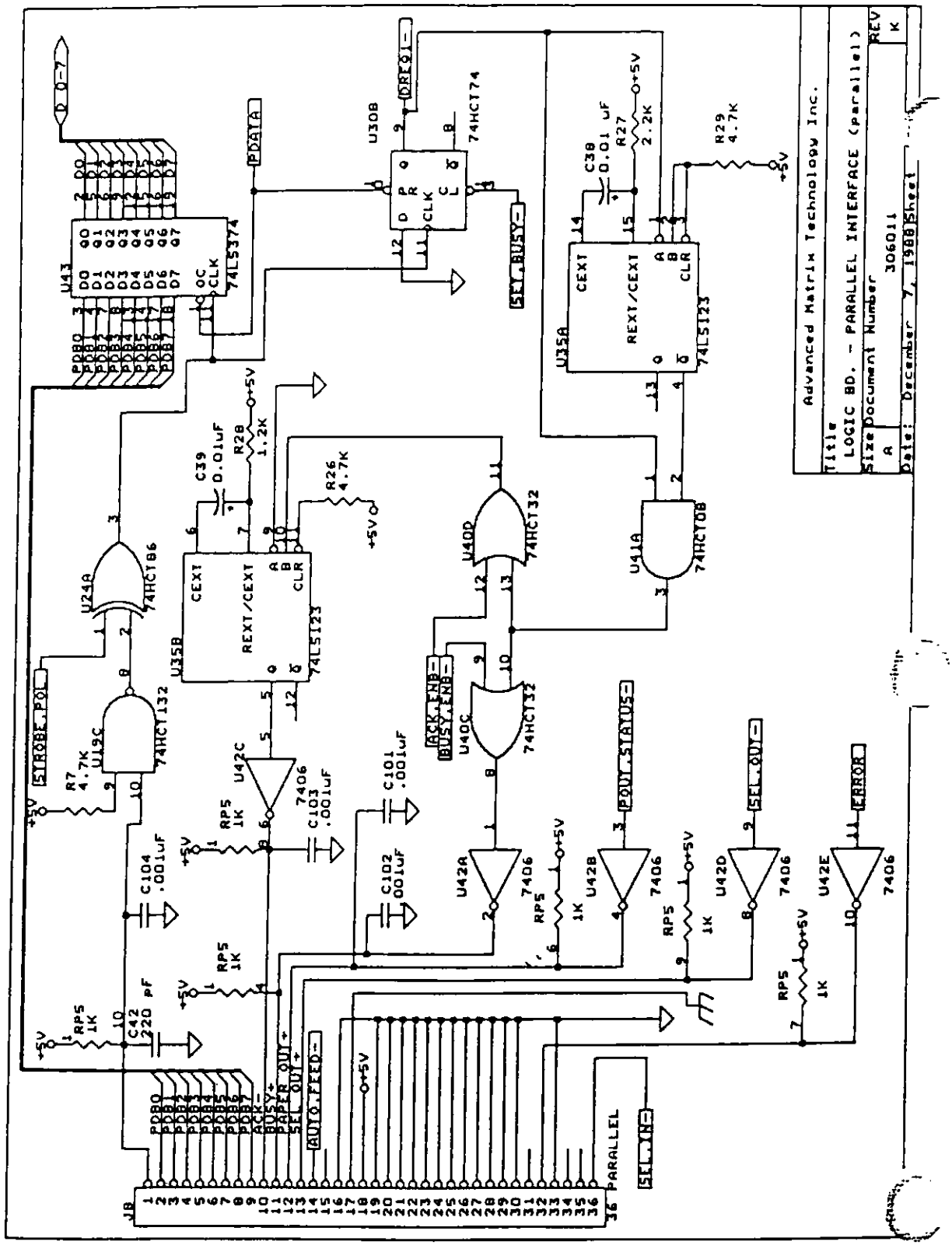


Figure D-11. Logic Board Schematic–Parallel Interface (10 of 13)

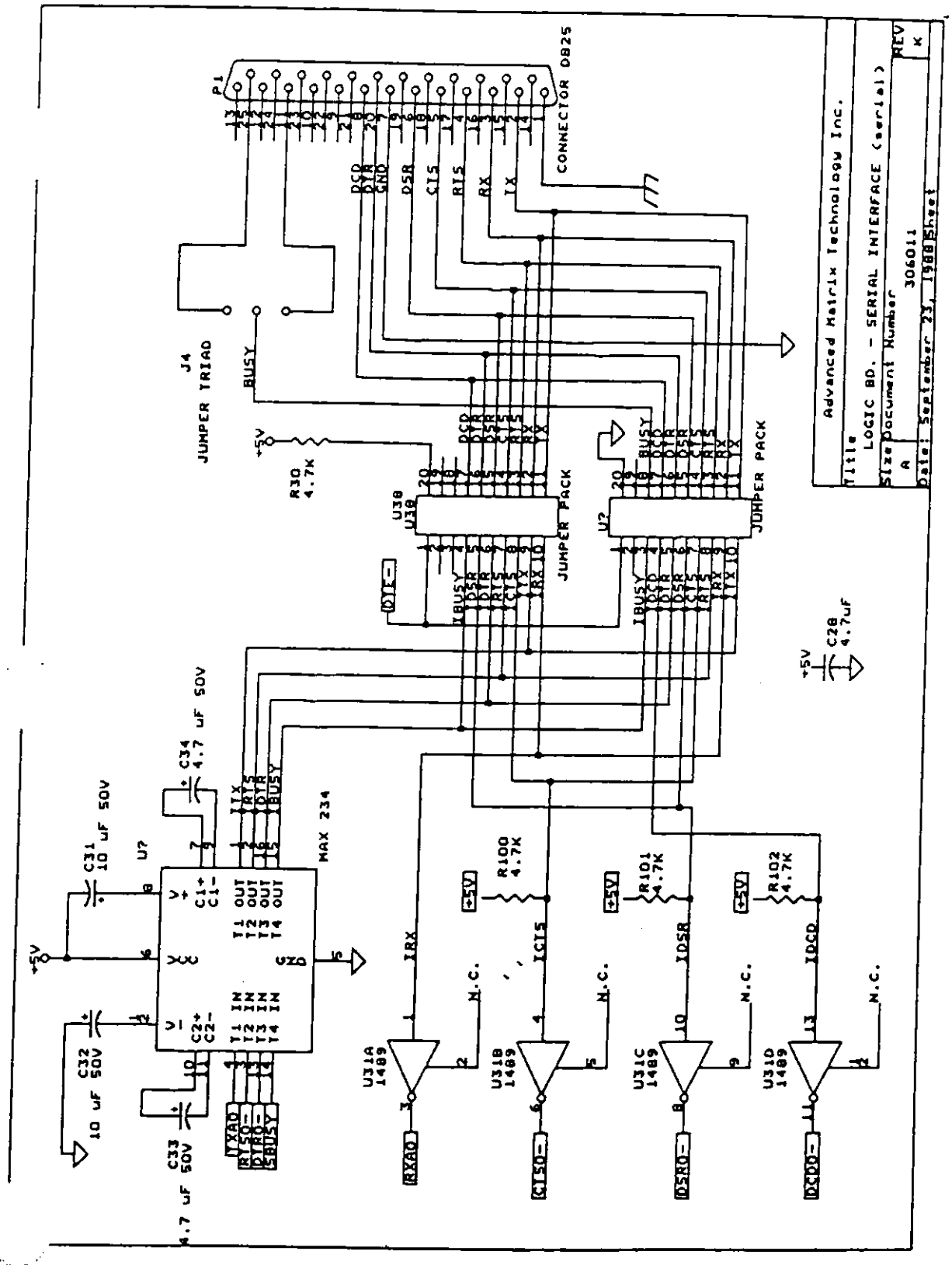


Figure D-11. Logic Board Schematic--Serial Interface (11 of 13)

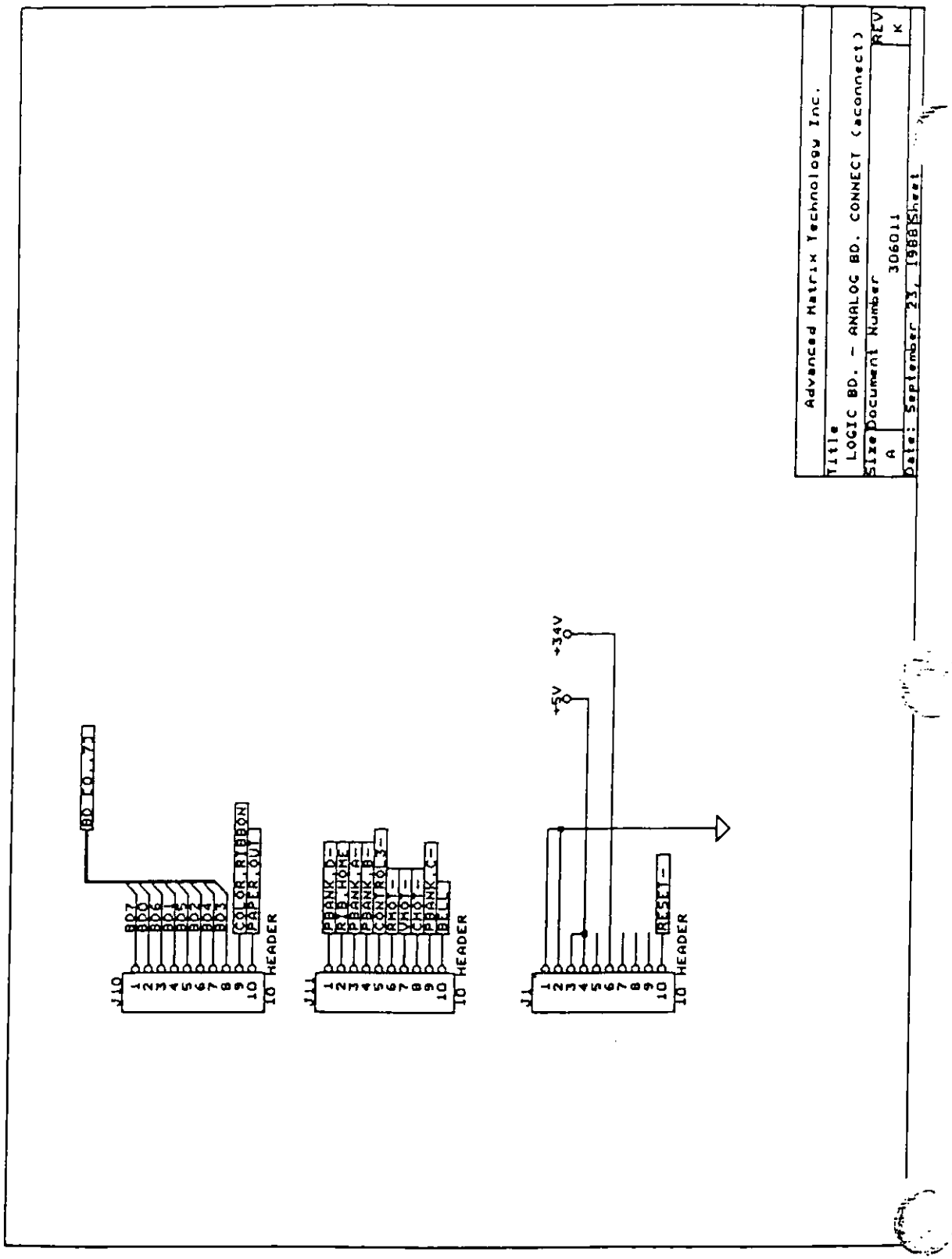


Figure D-11. Logic Board Schematic–Analog Board Connect (12 of 13)

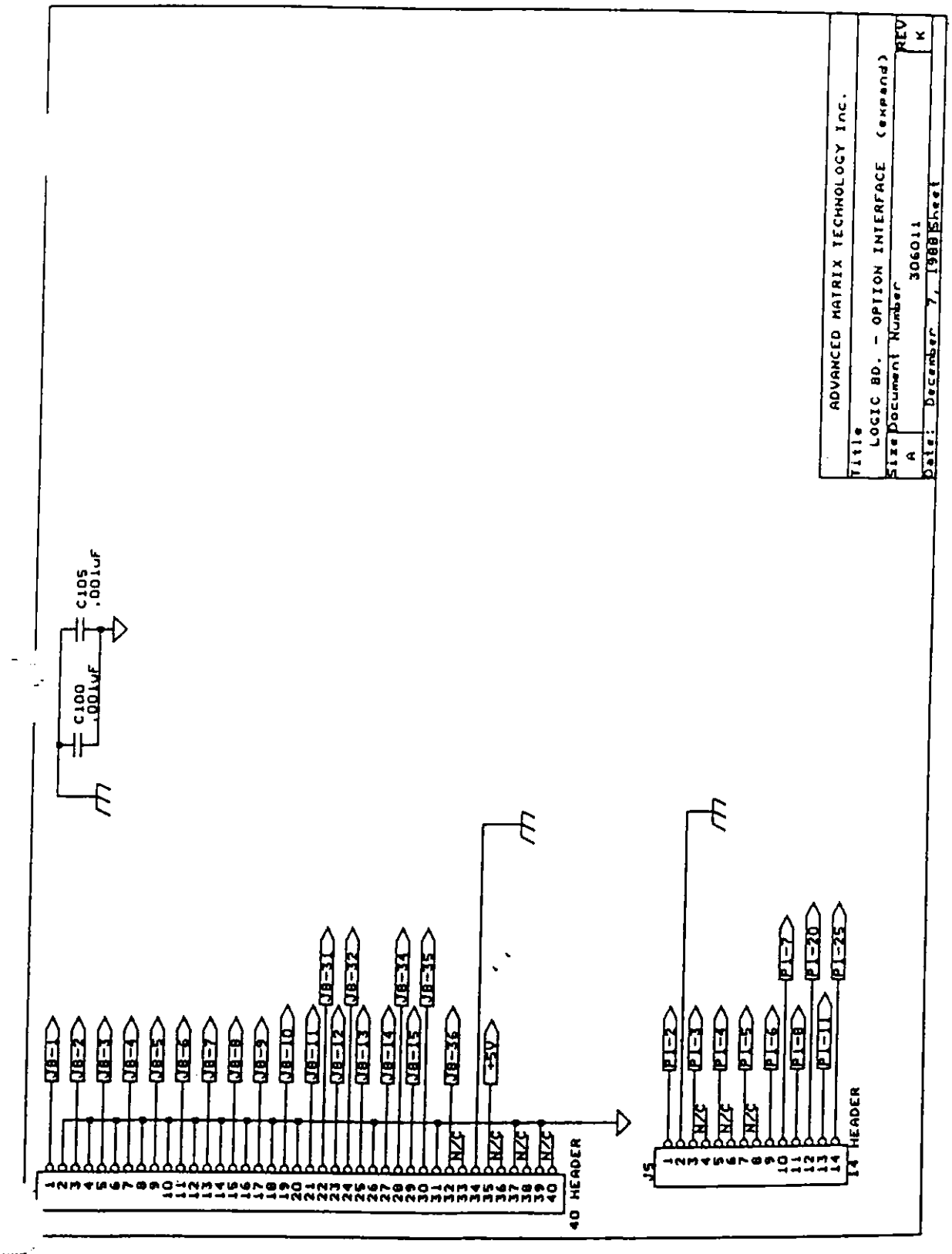


Figure D-11. Logic Board Schematic–Optional Interface (13 of 13)

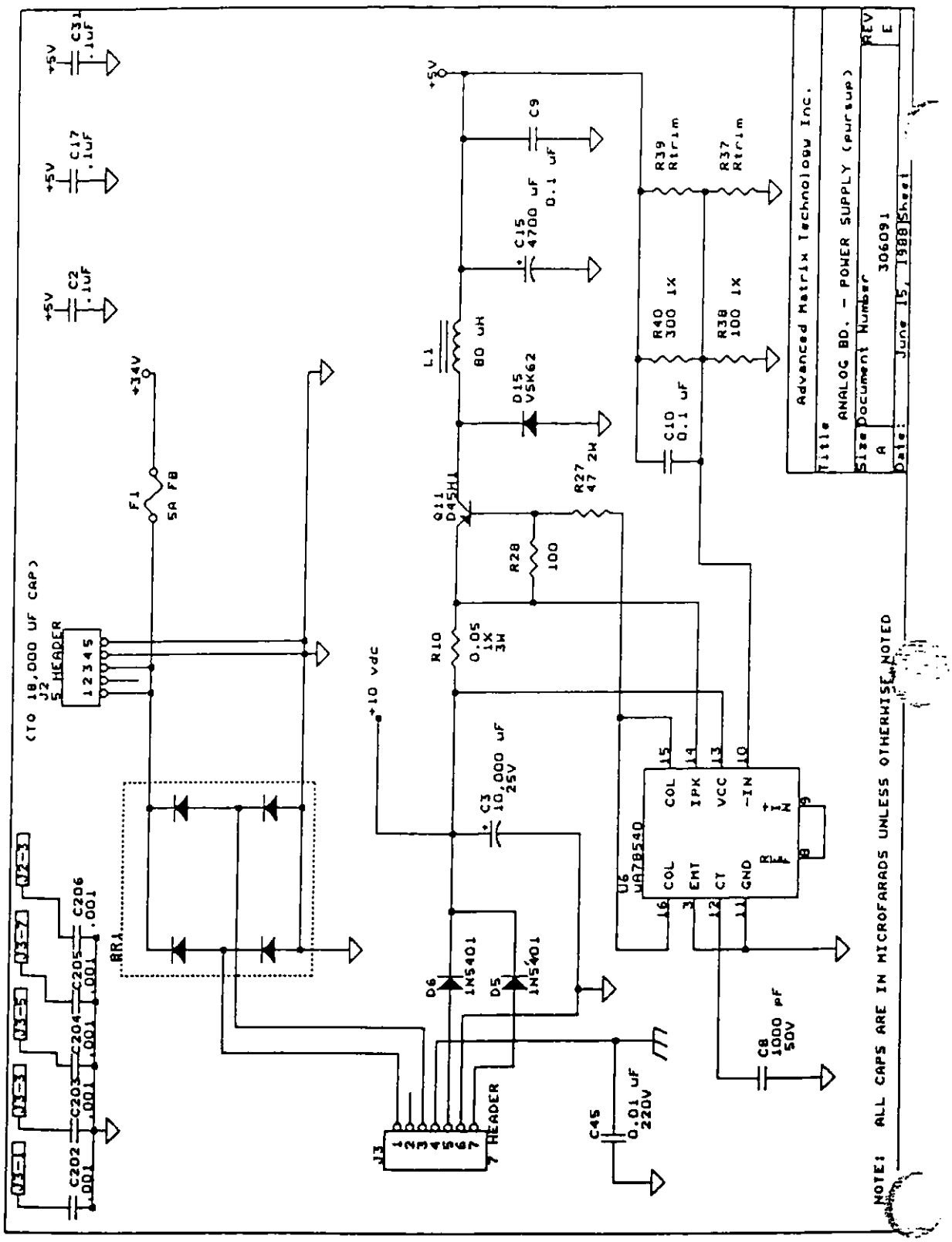


Figure D-12. Analog Board Schematic–Power Supply (1 of 12)

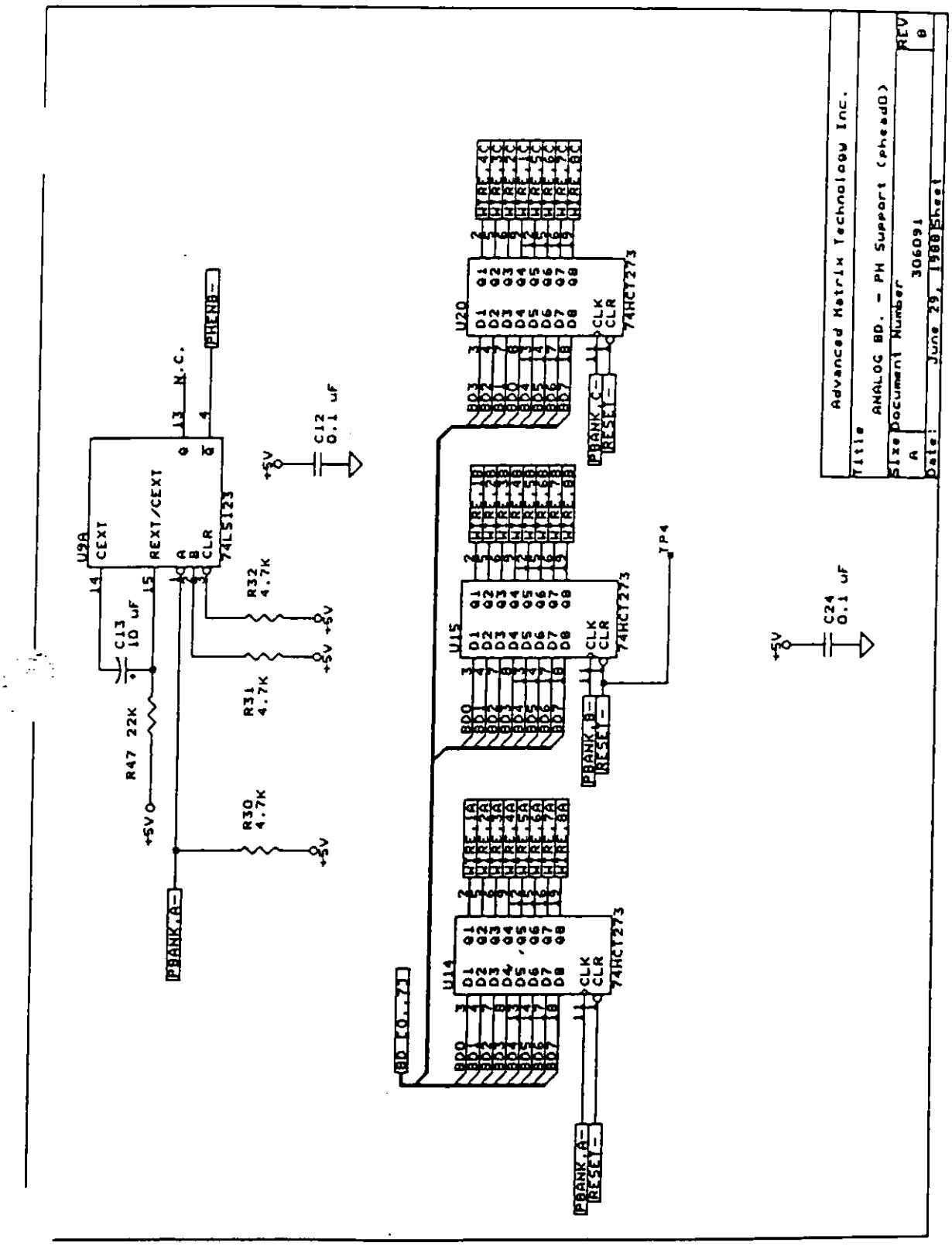


Figure D-12. Analog Board Schematic--Printhead Support (2 of 12)

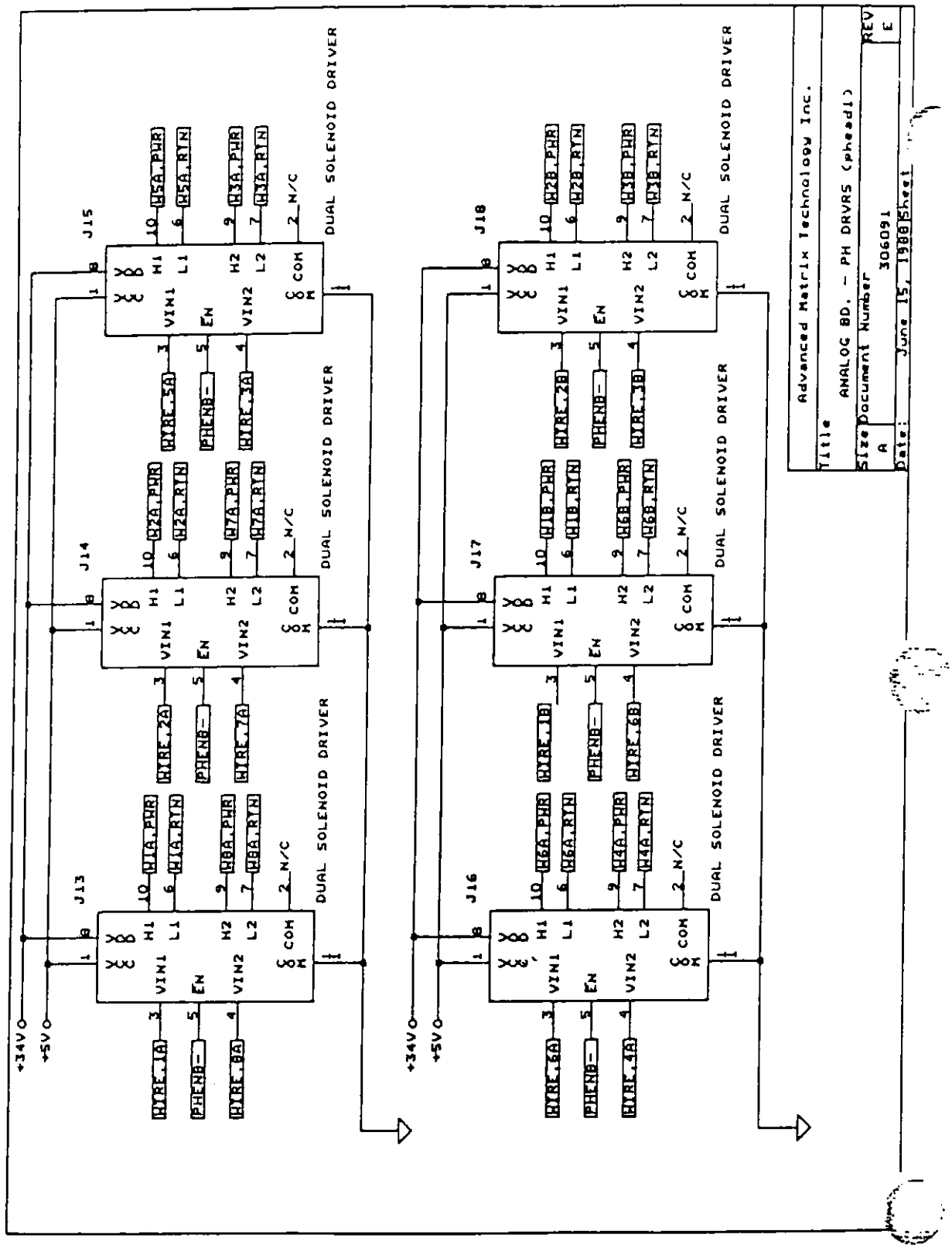


Figure D-12. Analog Board Schematic–Printhead Drivers (3 of 12)

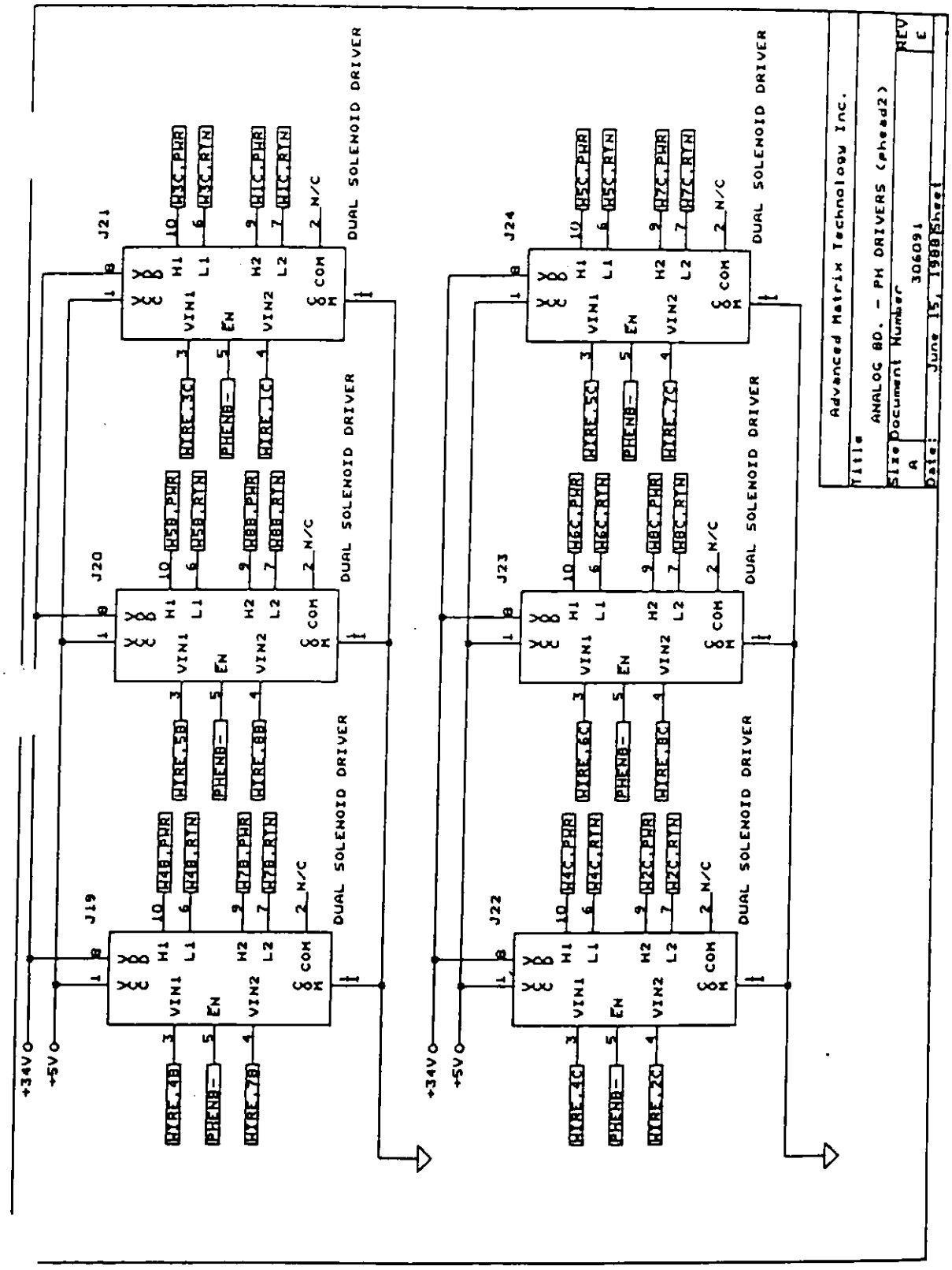


Figure D-12. Analog Board Schematic–Printhead Drivers (4 of 12)

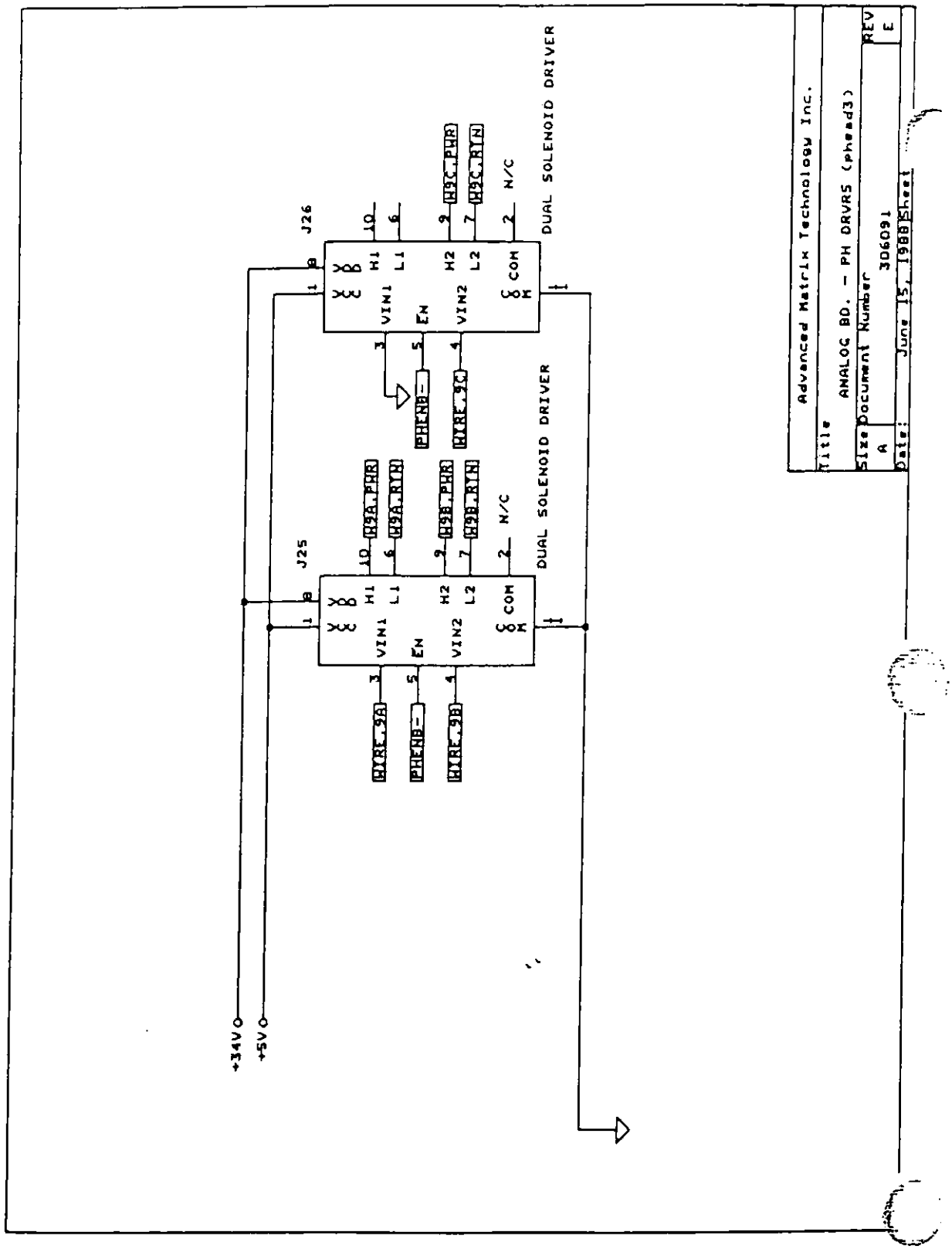


Figure D-12. Analog Board Schematic–Printhead Drivers (5 of 12)

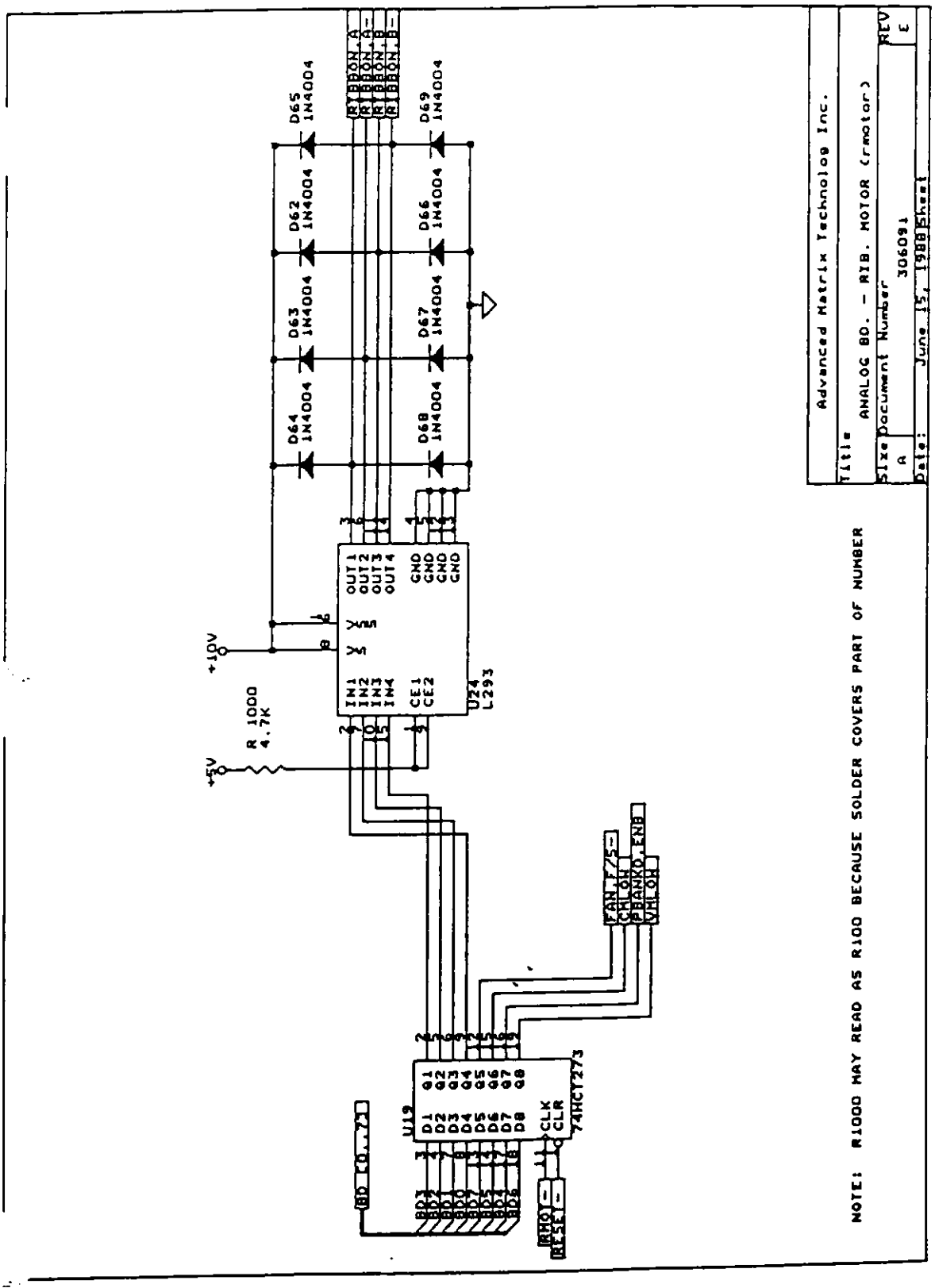


Figure D-12. Analog Board Schematic–Ribbon Lift Motor (6 of 12)

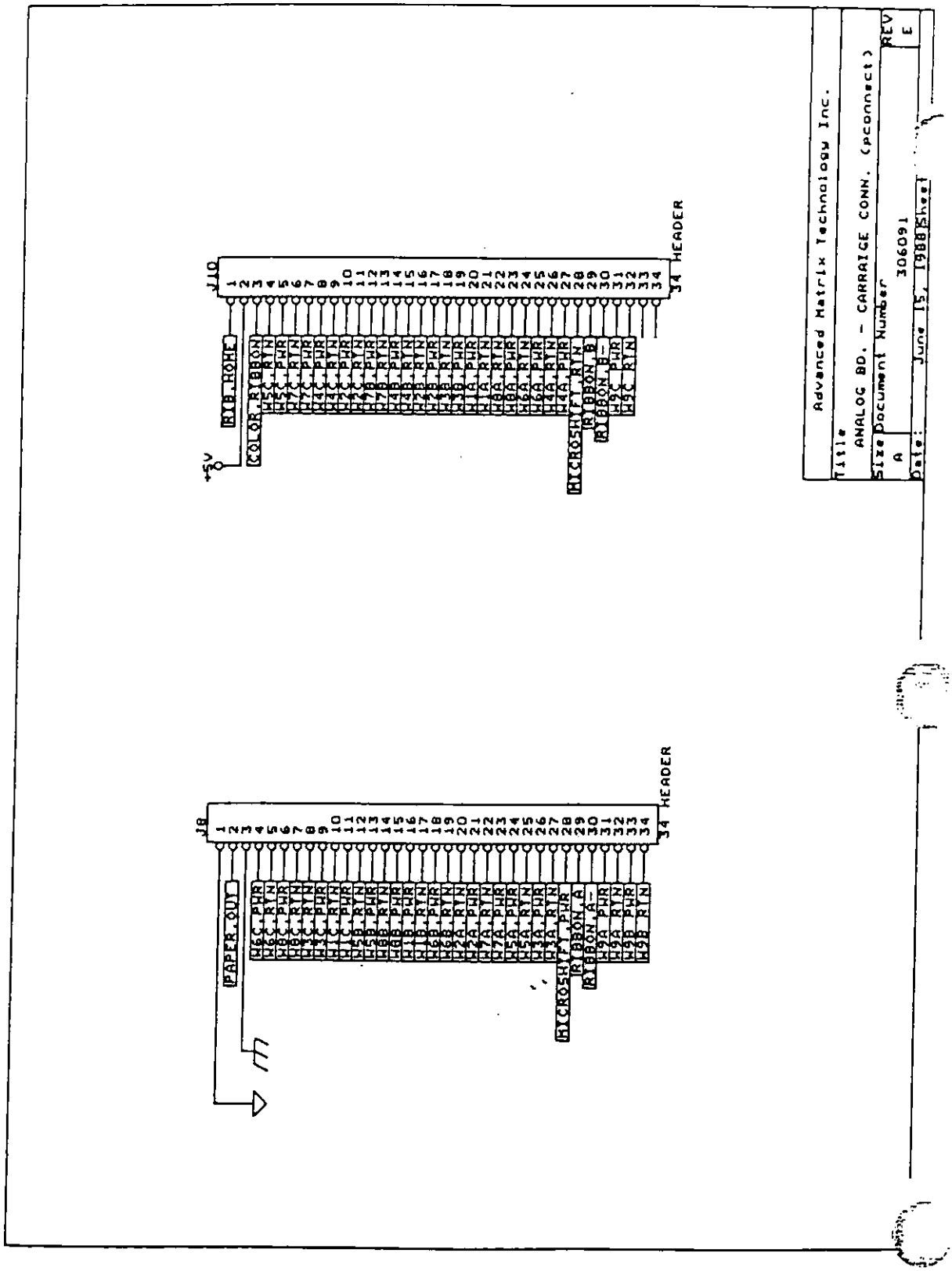


Figure D-12. Analog Board Schematic–Carriage Connect (7 of 12)

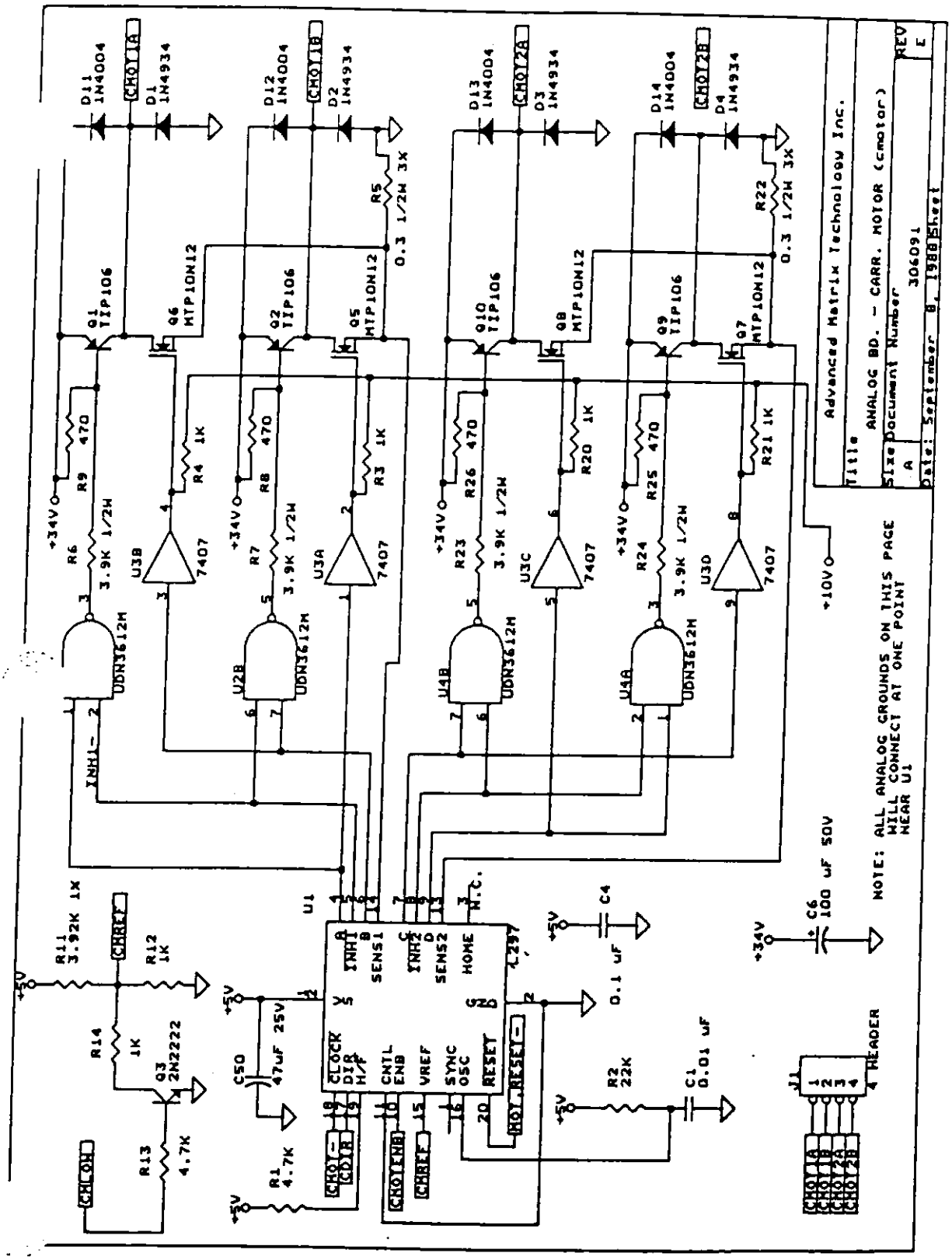


Figure D-12. Analog Board Schematic–Carriage Motor (8 of 12)

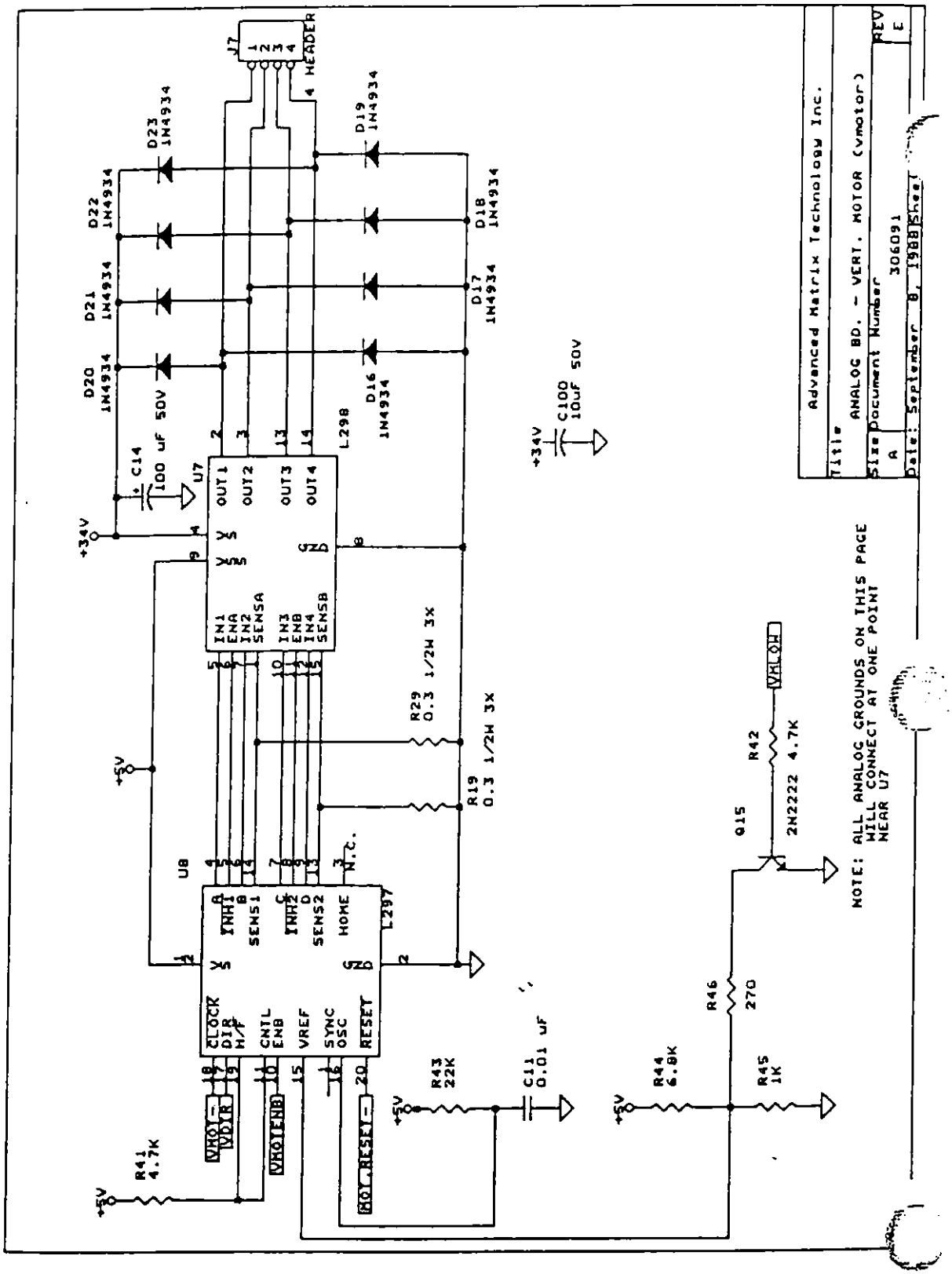


Figure D-12. Analog Board Schematic–Platen Motor (9 of 12)

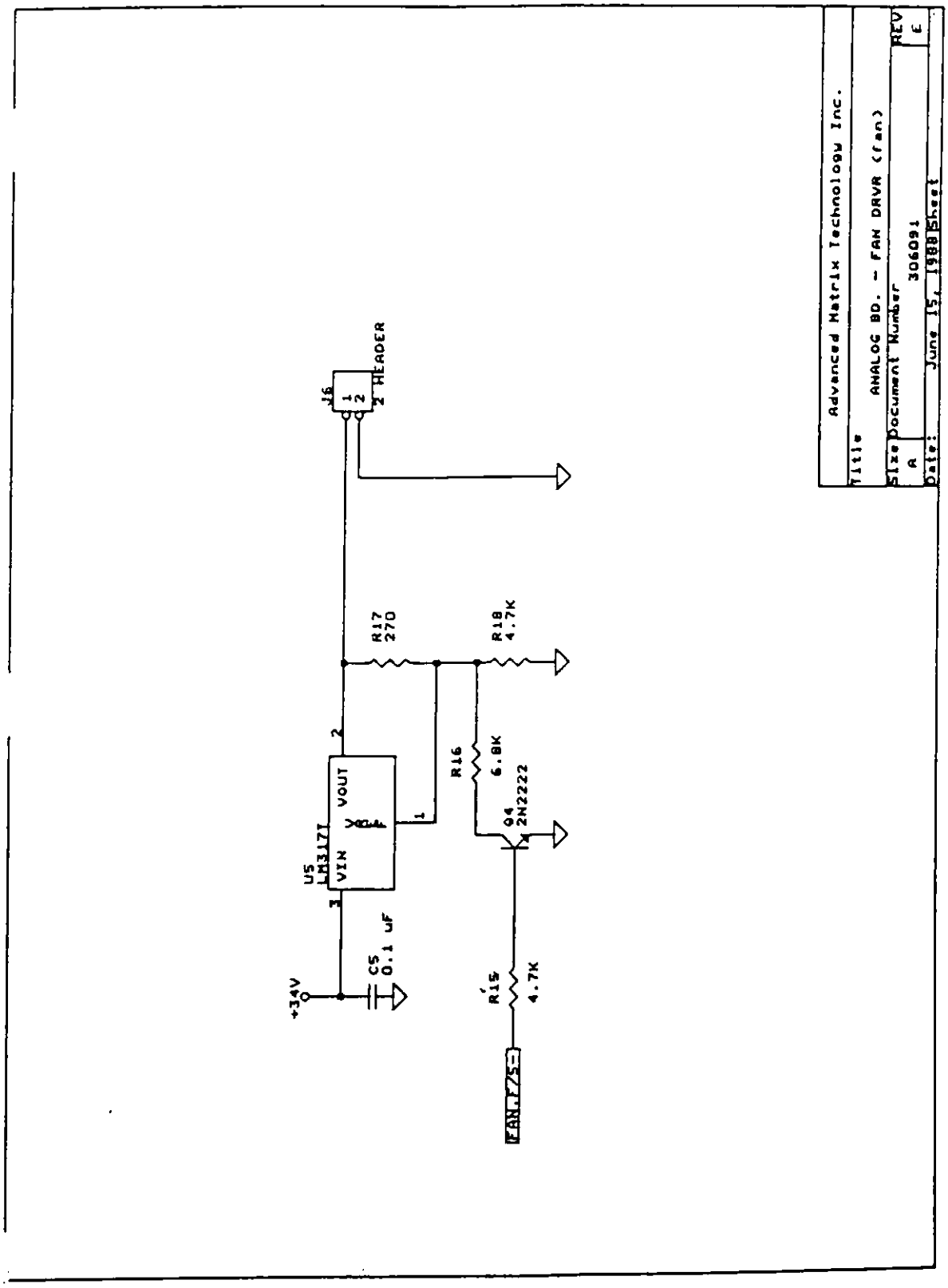


Figure D-12. Analog Board Schematic–Fan Driver (10 of 12)

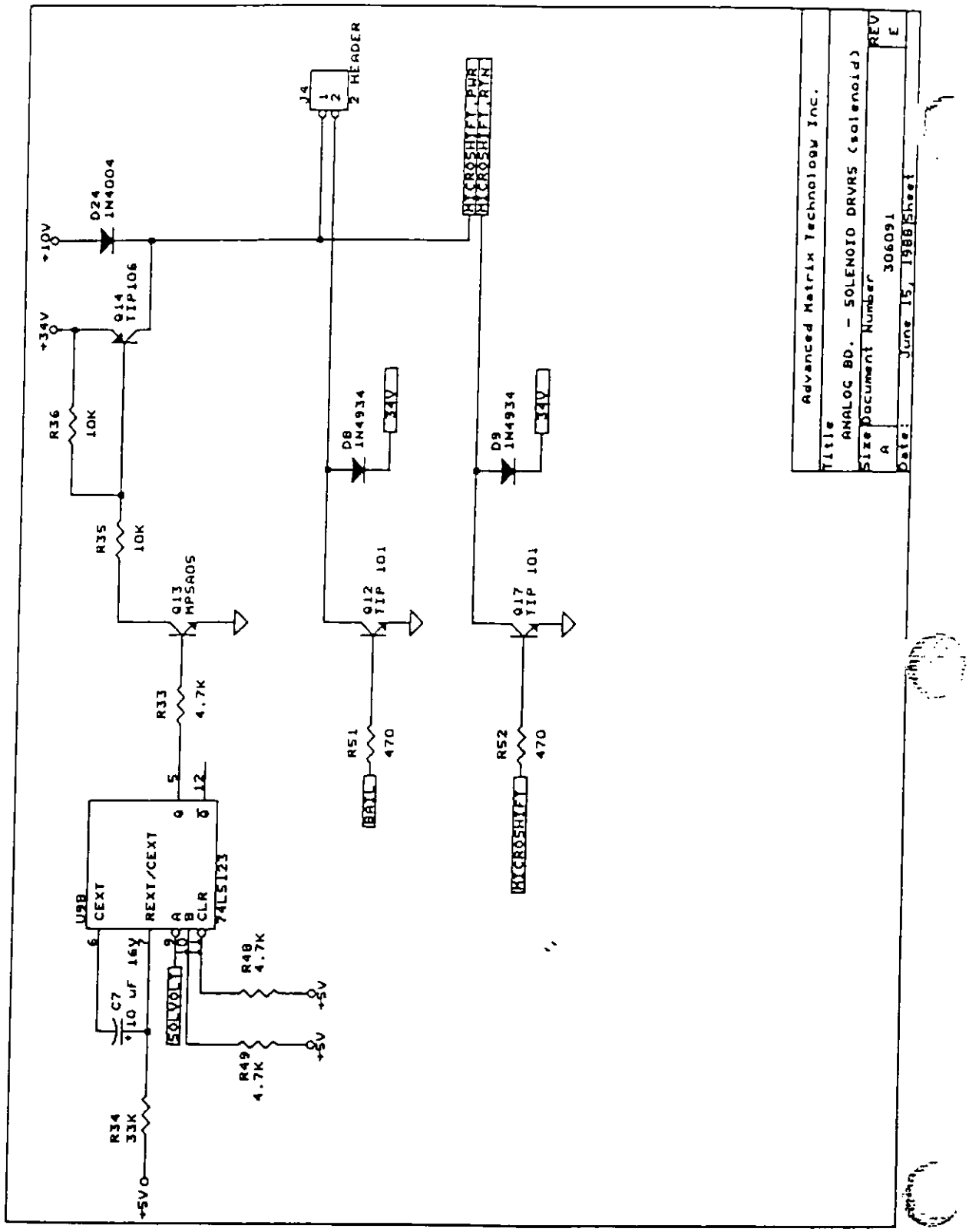


Figure D-12. Analog Board Schematic–Solenoid Drivers (11 of 12)

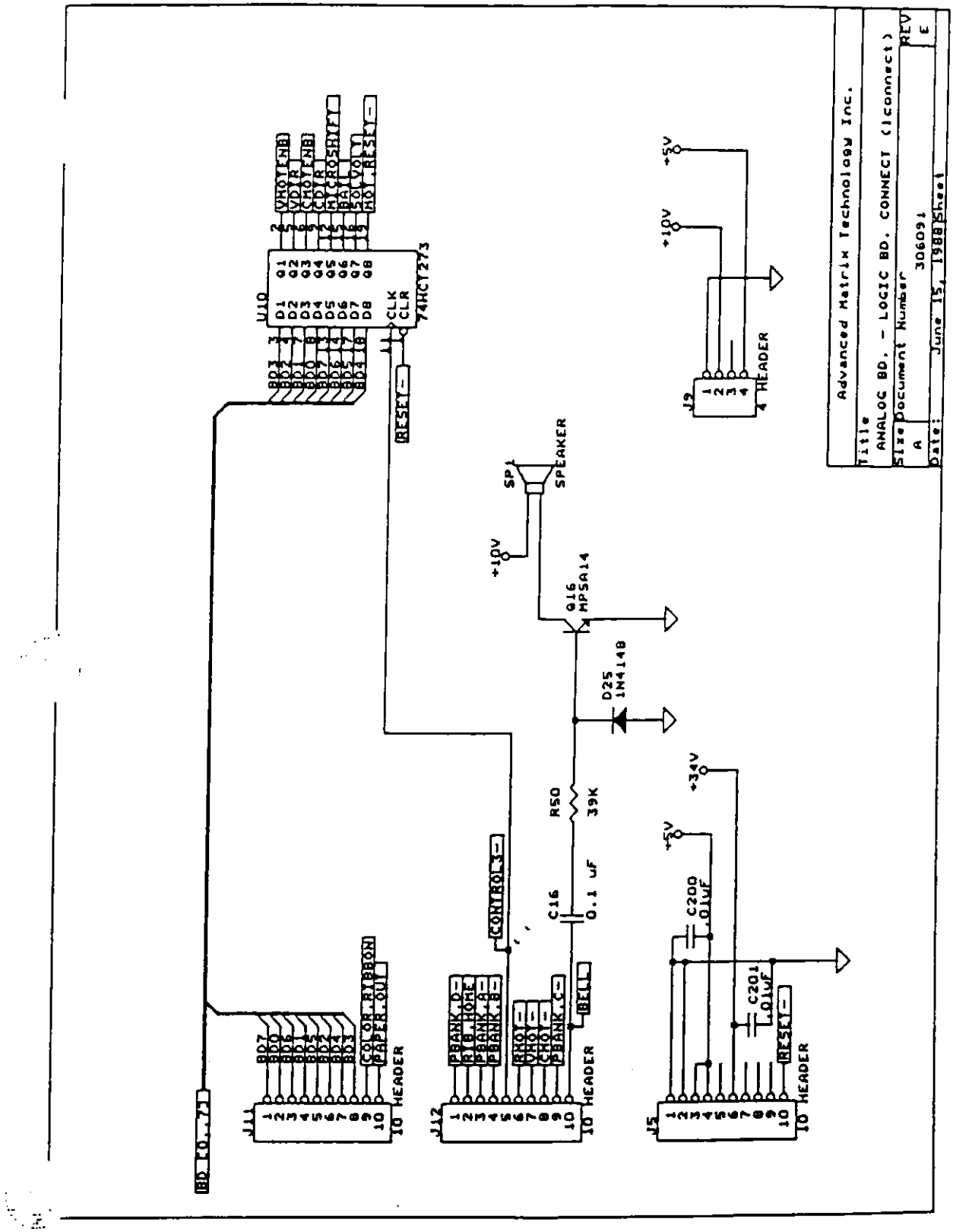


Figure D-12. Analog Board Schematic–Logic Board Connect (12 of 12)

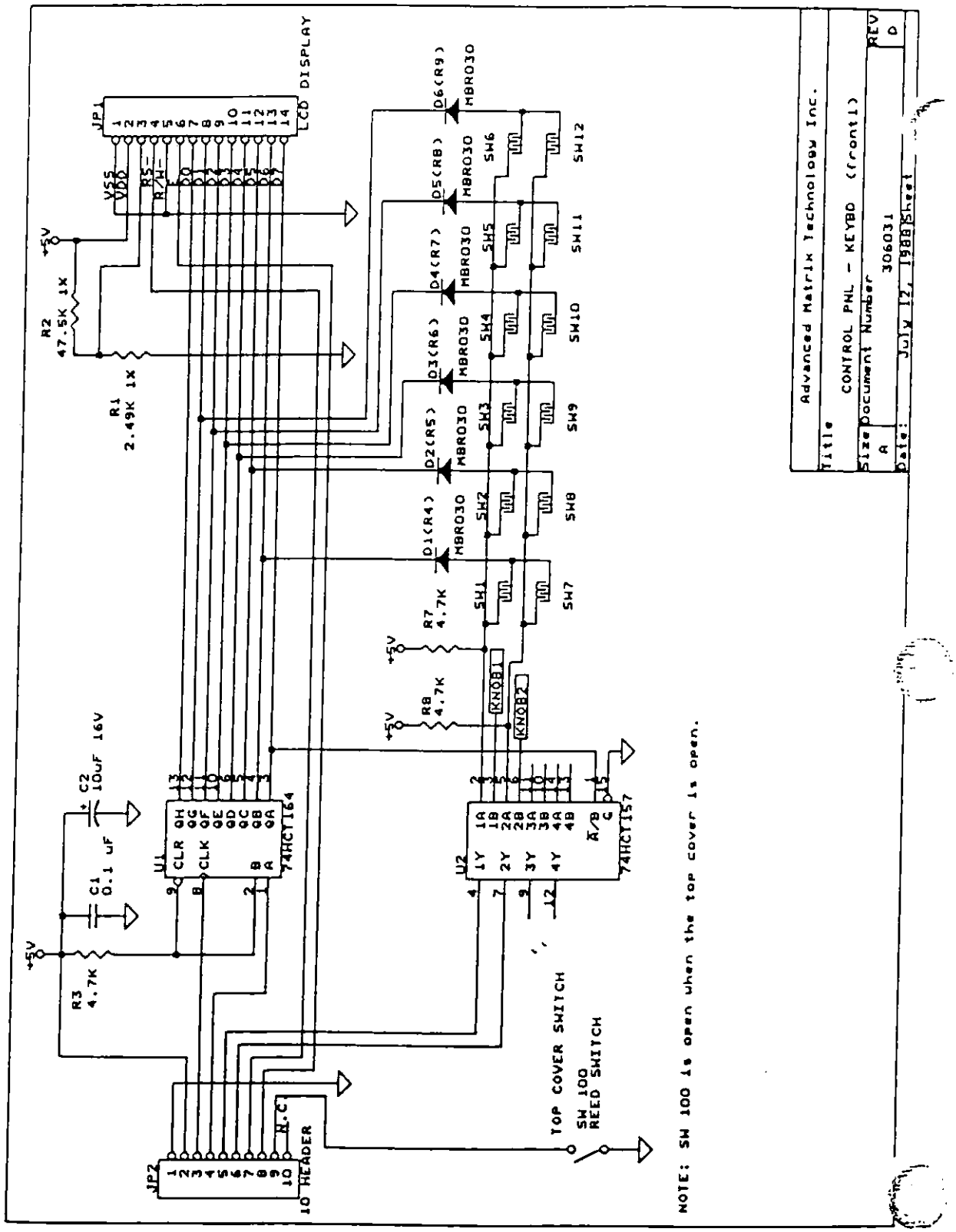


Figure D-13. Control Panel Schematic--Keyboard (1 of 2)

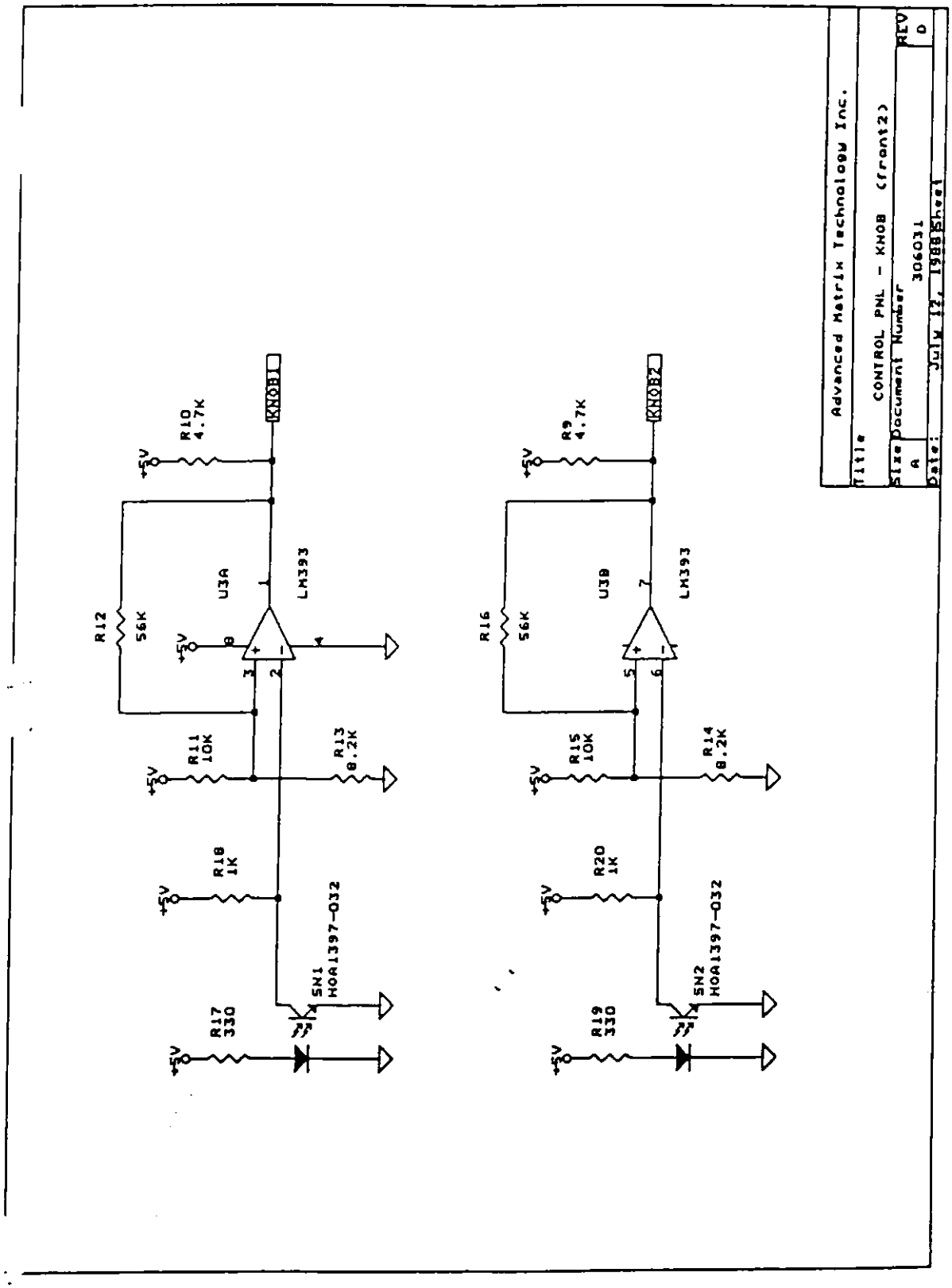


Figure D-13. Control Panel Schematic--Select-Dial (2 of 2)

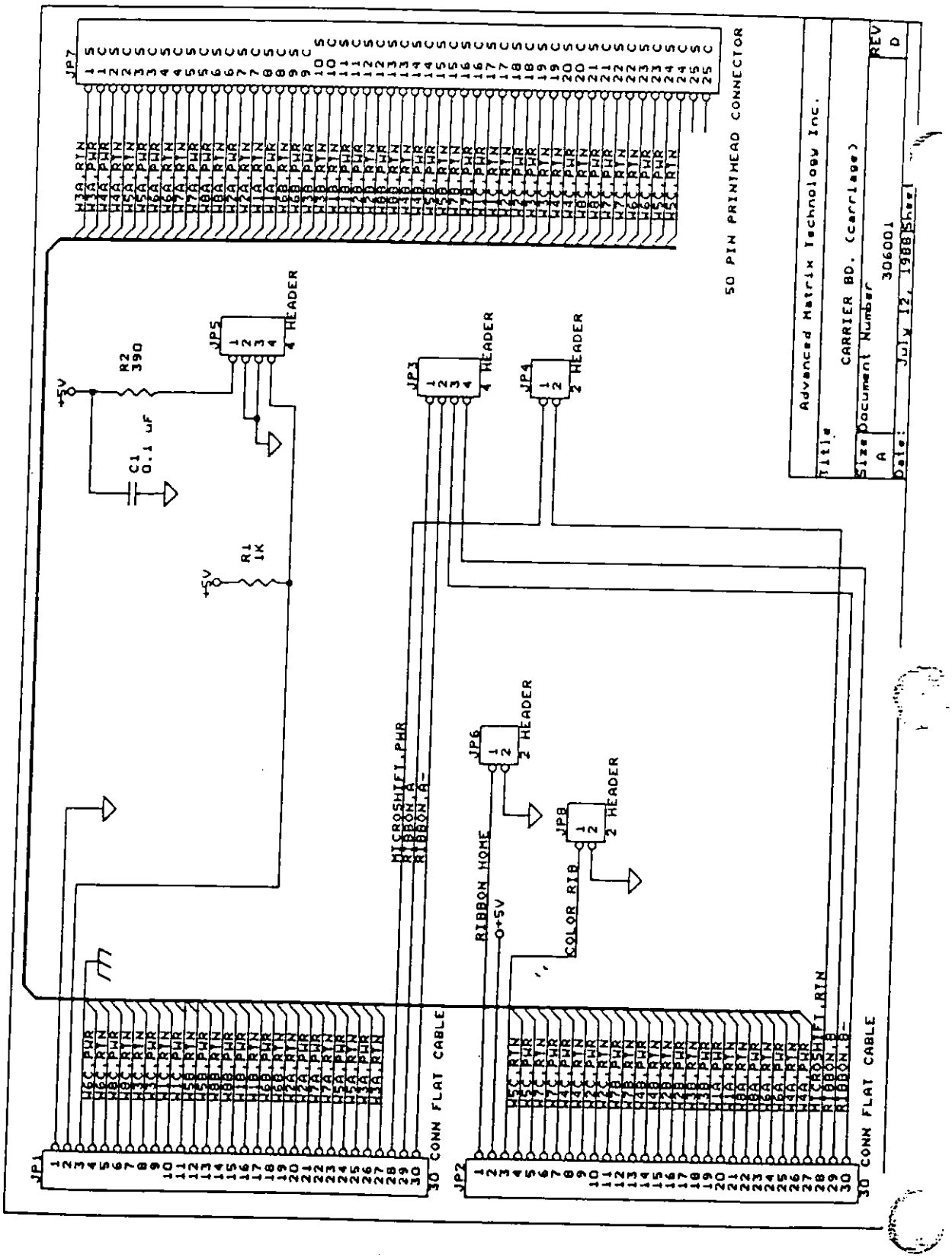


Figure D-14. Carriage Board Schematic

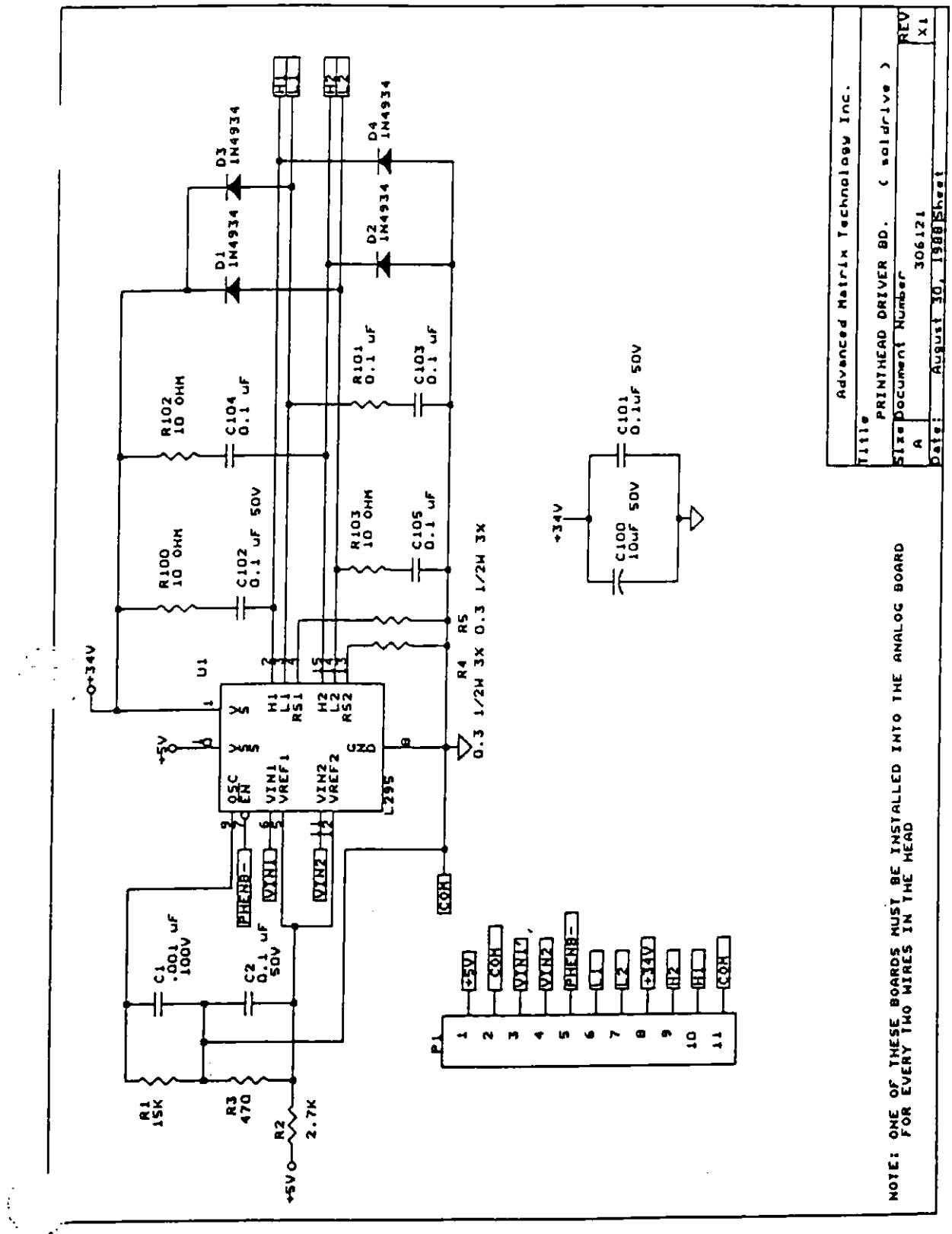


Figure D-15. Printhead Driver Board Schematic

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