Qume

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Manual

SPRINT 11 PLUS
Field Maintenance

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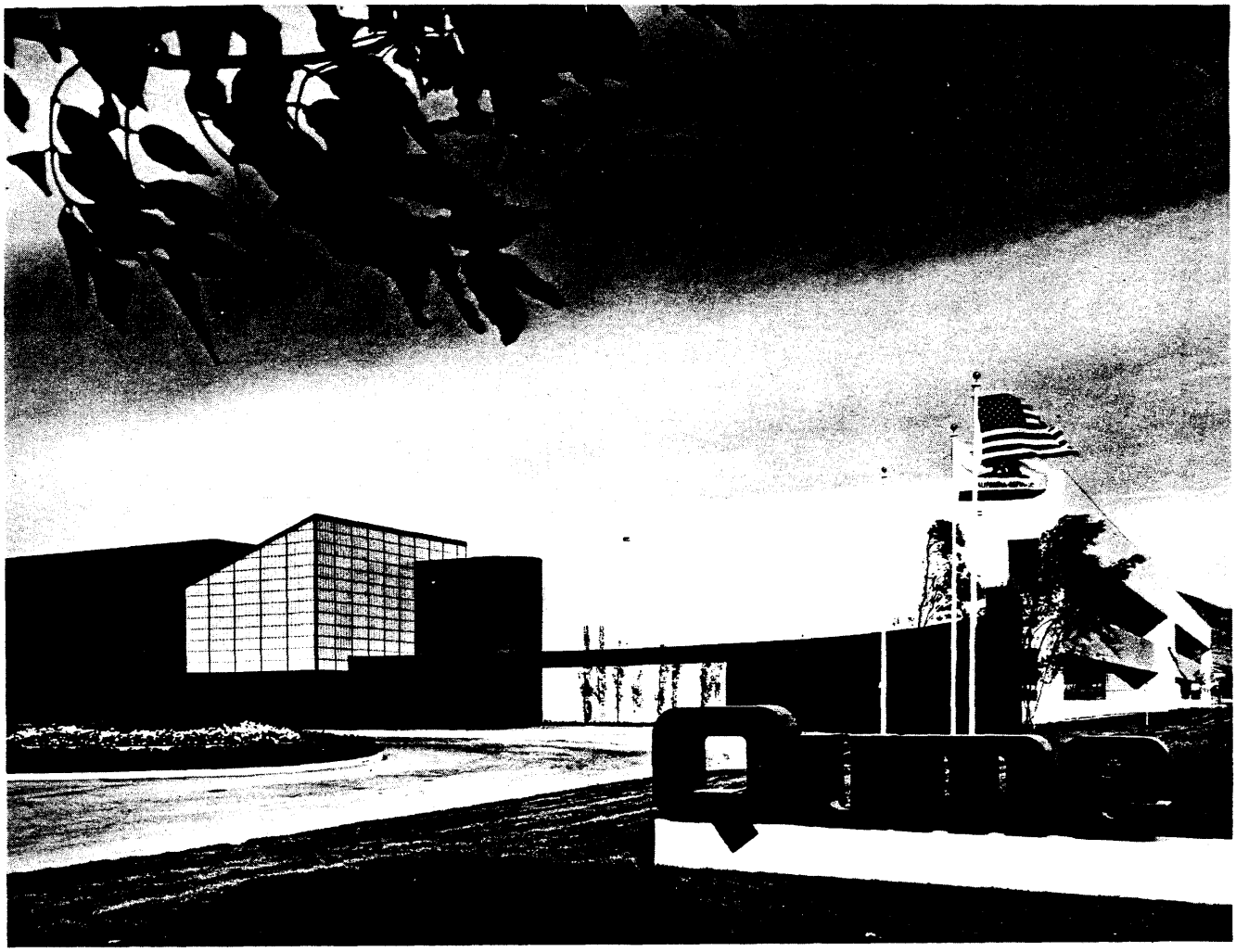

FOREWORD

The SPRINT 11 PLUS™ Field Maintenance Manual is one of a group of publications for the SPRINT 11 PLUS printer. Although all the publications in this group describe the SPRINT 11 PLUS printer, each manual addresses a unique audience. Thus, some subjects appear in several publications, with the text being more or less technically detailed as required for the intended reader.

The following is a list of SPRINT 11 PLUS printer related publications:

Title	Publication Number
SPRINT 11 PLUS Operator Manual	32026
Supplies Catalog	38012
Printers and Accessories Catalog	33032

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INTRODUCTION

SCOPE OF MANUAL

This manual is intended to provide service information for the SPRINT 11 PLUS™ family of Qume printers. Maintenance procedures for the following printer models are covered in this manual:

SPRINT 11/40™ PLUS Printer - 40 characters per second
SPRINT 11/55™ PLUS Printer - 55 characters per second

Operating instructions are provided in the Qume Operator Manual supplied with each printer.

PRODUCT DESCRIPTION

The SPRINT 11 PLUS family of printers, shown in Figure 1-1, is designed for interfacing to a host computer system via THE QUME CONNECTION™ plug-in modules. Any QUME CONNECTION module may be used with any SPRINT 11 PLUS printer model.

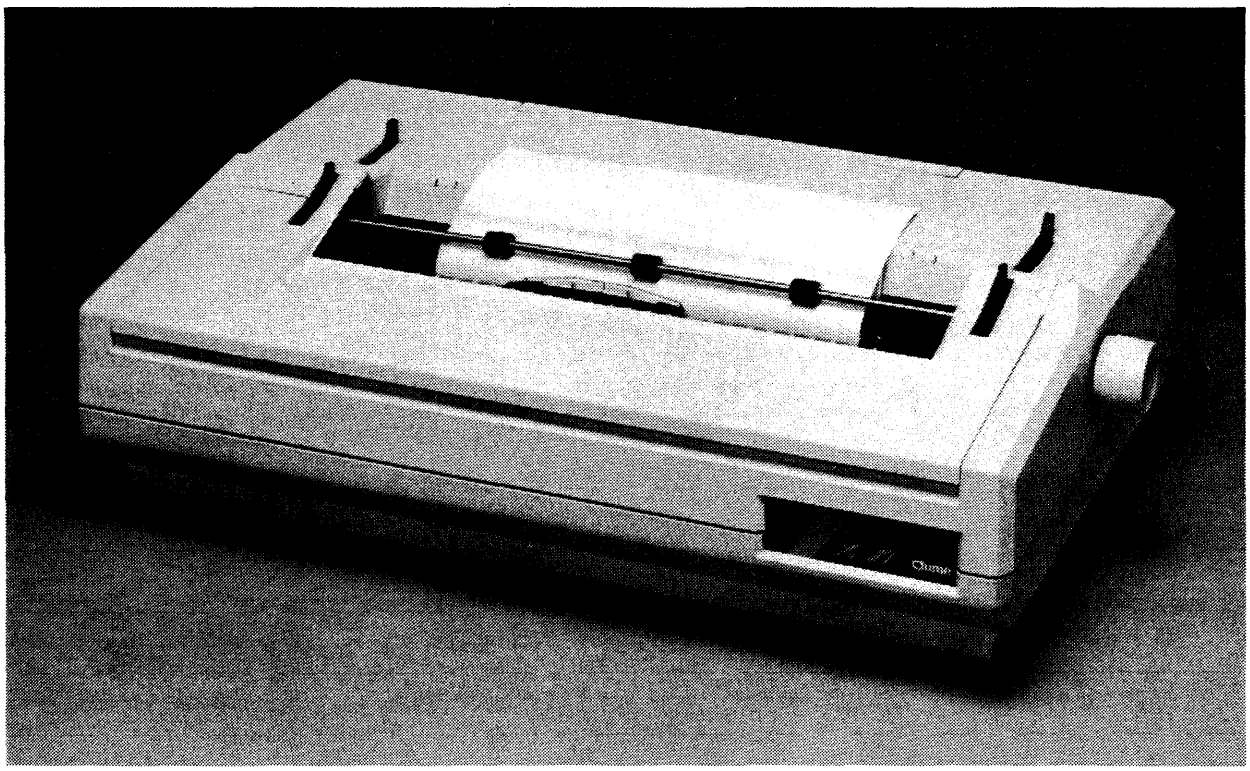

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Figure 1-1. The SPRINT 11 PLUS Printer

A QUME CONNECTION module is necessary for printer operation. Each QUME CONNECTION module is supplied with an interface manual which describes how to set up and use that particular module.

The SPRINT 11/40 PLUS and SPRINT 11/55 PLUS printer models are very similar in mechanical structure, and no apparent external differences exist between the two models. The following list identifies component differences between the two models:

	S11/40	S11/55
Paper Feed Motor/Gear Drive Plate Assy	P/N 84356-01	P/N 87701-02
Carriage Motor/Encoder Assembly	P/N 84661-11	P/N 84661-12
Platen Assy	P/N 84359-01	P/N 86623-02

Maintenance procedures for all models are nearly identical. Where there are specific procedural differences, they are noted in the text.

SAFETY CAUTIONS AND WARNINGS

Safety instructions appear throughout this manual. Both **WARNING** and **CAUTION** indications denote a hazard.

> A **WARNING** identifies a procedure which if incorrectly performed could result in injury or loss of life.
>
> A **CAUTION** identifies a procedure which if incorrectly performed could result in damage or destruction of part or all of the equipment.

Do not proceed beyond a **WARNING** or **CAUTION** unless the prescribed conditions are fully understood and met.

ACCESSORIES AND SUPPLIES

The following are the available accessories and supplies for the SPRINT 11 PLUS printer. Accessories and supplies for Qume printers are listed and described in greater detail in the Printers and Accessories Catalog, Reorder No. 33032.

Accessories

Bidirectional Forms Tractor

The Bidirectional Forms Tractor (Qume Part Number 87446-01) accepts and drives continuous forms paper (with standard one-half inch hole spacing). The tractor can adjust to a maximum paper width of 15 inches. Easily installed and removed by an operator, the bidirectional tractor precisely moves paper up or down. A paper out detect sensor that plugs into the SPRINT 11 PLUS printer is available as an option for use with the Bidirectional Forms Tractor.

Paper Handling System

Used with continuous forms paper and the Bidirectional Forms Tractor, the Paper Handling System (Qume Part Number 87673) neatly collects the printed forms while ensuring that paper is smoothly fed into the printer.

Qume Single Bin Sheetfeeder Sheetfeeder

The Qume Single Bin Sheetfeeder (Qume Part Number 86760-01) is a platen driven mechanical device that requires no electrical power and that is capable of feeding up to 200 cut sheets of 20 pound paper to the printer without operator assistance. The Qume Single Bin Sheetfeeder also neatly collects all pages output from the printer. Easily installed and removed by an operator, the sheetfeeder accepts paper measuring from 8 to 12 inches wide and from 8 to 14 inches long.

Supplies

Ribbons

Two types of black ribbons are available: Qume Fabric IV continuous loop ribbon (Qume Part Number 84144-01) and Qume Multistrike IV carbon film ribbon (Qume Part Number 83100-01). The continuous loop fabric ribbons provide the best durability, while the carbon ribbons offer the optimum in print quality. Refer to the Qume Supplies Catalog, Reorder No. 38012 for additional information about Qume ribbons.

Printwheels

Over one hundred different Qume printwheels are available in either monospacing (WP) or proportional spacing (WPS) in a variety of type styles. WP printwheels are designed to be used with a fixed amount of horizontal spacing (pitch) for each character. The designations 10, 12, or 15 that are appended to the name of each WP printwheel indicate the pitch (number of characters printed per inch). In fixed spacing printing, thin letters such as "i" or "t" are given the same amount of space as the wider characters "W" or "M". Although 10 and 12 pitch printwheels are the most popular, 15 pitch printwheels provide excellent results for specialized applications such as spreadsheet-type accounting programs. With a 15 pitch printwheel, you can print out 132 character-per-line formats in less than nine inches of space.

WPS printwheels are designed such that character width differs from one character to another. These printwheels require variable carriage displacement (horizontal spacing) proportional to the width of the characters. Printing with proportional spacing makes the appearance of the text more aesthetically pleasing since each letter receives the exact space proportional to its width.

The SPRINT 11 PLUS printer provides a WPS operating mode (DIP switch or software command selectable) that produces automatic proportional spacing when used with a WPS proportional spacing printwheel; your computer does not have to perform any special preprocessing of data. Special sequence printwheels,

such as the Deutschland WPS, require that the Twintellect® switch be on. Detailed descriptions of all Qume printwheels can be found in Qume Supplies Catalog, Qume publication 38012.

INSTALLATION

Installation consists of:

1. Unpacking the printer.
2. If necessary, changing the AC input voltage. Normally, printers are configured at the factory for the correct AC voltage range (115 or 220/240 volts nominal).
3. Installing the QUME CONNECTION interface module in the printer.
4. Testing the printer.
5. Connecting and configuring the printer and QUME CONNECTION module to the host computer system.

Unpacking the Printer

Unpacking instructions are provided with each printer. Follow them carefully.

CAUTION

Both the metal shipping strap on the bottom of the printer and the plastic carriage restraint installed on the carriage rail must be removed. These two unpacking steps are particularly important to avoid damage to the printer.

Save the Qume packaging carton and material. If it is ever necessary to ship the printer to a Qume Service Depot, the printer must be shipped in the original Qume container or you will be billed for a new shipping container when the printer is returned to you. Consult Qume's Printer Products Service and Spares Catalog (Reorder 37102) for more information.

Changing the AC Input Voltage Range

WARNING

THE AC POWER CORD MUST BE DISCONNECTED BEFORE THE TOP COVER ASSEMBLY IS REMOVED. LETHAL VOLTAGES ARE PRESENT ON THE POWER SUPPLY PRINTED CIRCUIT BOARD.

The printer is normally shipped from the factory with the power supply configured for the AC voltage range specified by the customer. To change the AC input voltage range, a jumper and fuse on the power supply printed circuit board must be changed.

The power supply PCB can be accessed by removing the four screws holding the printer's mechanical assembly to the bottom cover, lifting the mechanical assembly, then removing the power supply board to change the jumper and fuse. An alternate method of removing the power supply is to remove the main PCB (including all the connectors) along with the metal ESD shield behind the main PCB.

The following procedure describes how to remove the power supply by lifting the mechanical assembly and how to change the AC input voltage:

1. Make sure the printer's AC power switch is off, remove the AC power cord, and remove the operator access panel and top cover assembly. (Refer to the Top Cover Removal procedure in this manual).

2. Remove the four screws on the bottom cover holding the mechanical assembly. Remove the operator access cover interlock bracket on the left side of the printer. All cables may be left connected.

3. Remove connectors P1, P2, and P5 to the power supply.

4. Lift the mechanical assembly to access the power supply. Loosen the power supply board and remove the power supply from under the mechanical assembly.

5. On the power supply board, jumper JP-1 (a piece of #18 gauge wire) is installed for 93-132 Vac operation and removed for 190-264 Vac operation. Figure 1-2 illustrates the location of the jumper.

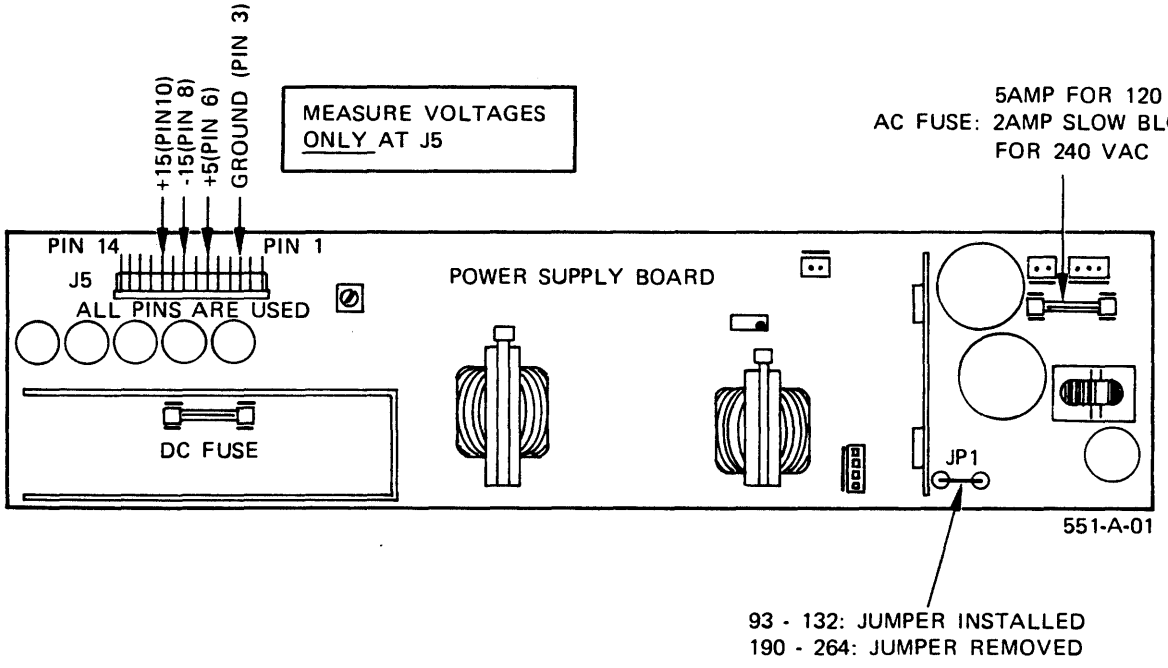

Figure 1-2. Changing the AC Input Voltage

6. In addition to altering jumper JP-1, two AC fuses must be changed:

   On the power supply board, fuse F1 (located near jacks J1 and J2) should be 5 amp/3AG fast blow for 93-132 Vac operation and 2 amp/3AG slow blow for 190-264 Vac operation.

   On the rear of the printer, the operator accessable fuse should be 5A/3AG for 115 Vac, or 3A/3AG for 230 Vac.

   The cooling fan operates on 115 Vac, supplied by the power supply, and is not affected by changing the AC input voltage.

7. Reinstall the power supply board, connect the three plugs, and reinstall the mechanical assembly and interlock switch. Make sure all cables are properly routed and not pinched.

Installing The QUME CONNECTION Module

Before operation can begin, the SPRINT 11 PLUS printer requires that a QUME CONNECTION interface module be installed. Selection of a QUME CONNECTION module depends upon the type of computer interface required (e.g., RS-232-C, IEEE 488, Centronics™, Sprint 3™, etc.).

All QUME CONNECTION modules plug into a 50-pin edge-board connector on the rear of the printer. The rated printer speed has no effect on the QUME CONNECTION module operation.

Connecting and Configuring the QUME CONNECTION module and Printer to the Computer

The QUME CONNECTION module should now be connected and configured to the host computer system. Each QUME CONNECTION module is supplied with an interface manual which describes the functions of all of the DIP switches on both the QUME CONNECTION module and the printer. Not all of the printer DIP switches are used with every QUME CONNECTION module.

There are DIP switches on most QUME CONNECTION modules and DIP switches on all SPRINT 11 PLUS printers--one set on the rear of the printer and one set behind the front panel (the operator access panel must be removed for access). There are no DIP switches which require access to the inside of the printer. The printer covers should only be removed by qualified service personnel.

Testing the Printer

Test the printer after the QUME CONNECTION module is installed. The QUME CONNECTION need not be connected to the host computer system for this test procedure. The general testing procedure is to first check out the basic functions of the printer, then perform a Printer Self-Test (an internal diagnostic program). If the printer successfully completes all of the following testing procedures, any problems encountered with the computer-printer system are probably in the interface circuit or computer system.

Before proceeding, install a ribbon cartridge, a printwheel, and a sheet of paper at least 11 inches wide. Ensure that the operator access panel is in place.

1. Connect the AC power and turn on the printer power. The fan should be running and the printer should perform the following initialization sequence:

   - The carriage moves to the left.
   - The printwheel rotates.
   - The Ready lamp is ON and the Attend lamp is OFF. The audible alarm (buzzer) sounds momentarily when the power is first turned on.

2. Push the Pause switch. The Ready lamp should blink; the Attend lamp should be off. A blinking Ready lamp always indicates that the printer is in the Pause mode. Push the Pause switch again to return to normal operation. Lamp conditions are discussed in Section 4 of this manual.

3. Verify that opening the operator access panel causes the Ready lamp to blink, the Attend lamp to turn on, and the audible alarm to momentarily sound. Whenever a condition occurs which causes the Attend lamp to turn on and the alarm to sound, the printer enters the Pause mode (blinking Ready lamp) until you press the Pause switch again to resume printer operation. Communication with the computer (via the QUME CONNECTION module) continues during the Pause mode until the receive buffer is filled (unless a QUME CONNECTION Sprint 3 module is installed).

4. Push the Form Feed switch. The paper should move to the next top of form. The distance the paper moves depends upon the settings of the DIP switches behind the front panel. The factory set distance is 11 inches. NOTE: This test will not work if you have a Qume Single Bin Sheetfeeder (equipped with a Paper Out/Paper Jam sensor) installed.

5. Load a sheet of paper into the printer, and run the Printer Self-Test (refer to the Self-Test section in this manual). While the Form Feed switch is held on, turn on the power to the printer. The printer should begin continuous printing of 96 characters in a barber pole swirl. To stop the test turn off the printer power, or hold in the FORM FEED switch until the end of a line is encountered. When power is turned back on, normal printer operation resumes.

A successful Printer Self-Test means the SPRINT 11 PLUS printer is probably OK. Any further trouble is most likely with the QUME CONNECTION module, the interface to the computer, or the computer.

Most QUME CONNECTION modules support an additional printer diagnostic routine called Terminal Self-Test. This test is executed by the QUME CONNECTION interface module. Refer to the QUME CONNECTION user/interface manual to determine if the module supports Terminal Self-Test. That manual also contains a description of the Terminal Self-Test.

If you are able to execute both a Printer Self-Test and a Terminal Self-Test, the QUME CONNECTION module has been tested and any further problems are probably with the interface to the computer or with the computer.

SECTION 2
PRINTER SYSTEM FUNCTIONS

This section gives a general overview of printer operation. Read this section before you begin troubleshooting.

The electronics in the SPRINT 11 PLUS printer support one main functon: controlling the electromechanical printing operations. The QUME CONNECTION module electronics communicate with the host computer system and send the SPRINT 11 PLUS printer the commands and characters for printing. The QUME CONNECTION module also monitors the printer DIP switches and front panel indicators and controls.

With the exception of the power supply and motor encoders, all circuits in the SPRINT 11 PLUS printer are located on the main printed circuit board. This board is easily replaced or raised above the printer for servicing. The QUME CONNECTION module has its own printed circuit board and plugs into a 50-pin PCB edge connector on the main PCB.

A simplified block diagram of the SPRINT 11 PLUS printer is shown in Figure 2-1. Refer to the diagram for the following general discussion of the printer operation. Although each QUME CONNECTION module has a different interface to the host computer system, the interface from the QUME CONNECTION to the SPRINT 11 PLUS printer is always the same.

The QUME CONNECTION module sends the printer either (1) a character for printing, or (2) motion information (e.g., paper movement or carriage movement).

There are two microcomputers (master and slave) in the printer which control the electromechanical functions of printing. The master microcomputer moves the carriage according to carriage escapement information received from the QUME CONNECTION module. The slave microcomputer rotates the printwheel motor to the location that has the proper character, drives the print hammer coil with an intensity proportional to the character size, and advances the ribbon proportional to the character width. For most printing, the master and slave microcomputers have look-up tables in ROM that provide printwheel location, ribbon advancement requirements, and hammer intensity values for each character. For special printwheels with nonstandard sequences of characters, hammer, ribbon, and printwheel information may be supplied externally through the QUME CONNECTION module in an External Program Mode. Refer to the QUME CONNECTION Interface Manual for a description of this programming capability.

The function of the QUME CONNECTION module is to communicate with and accept data from the host computer system and present it in the proper form to the SPRINT 11 PLUS printer. Some QUME CONNECTION modules are able to transmit status and handshaking information back to the host computer. Refer to the specific QUME CONNECTION Interface Manual for a more complete functional description of your particular module.

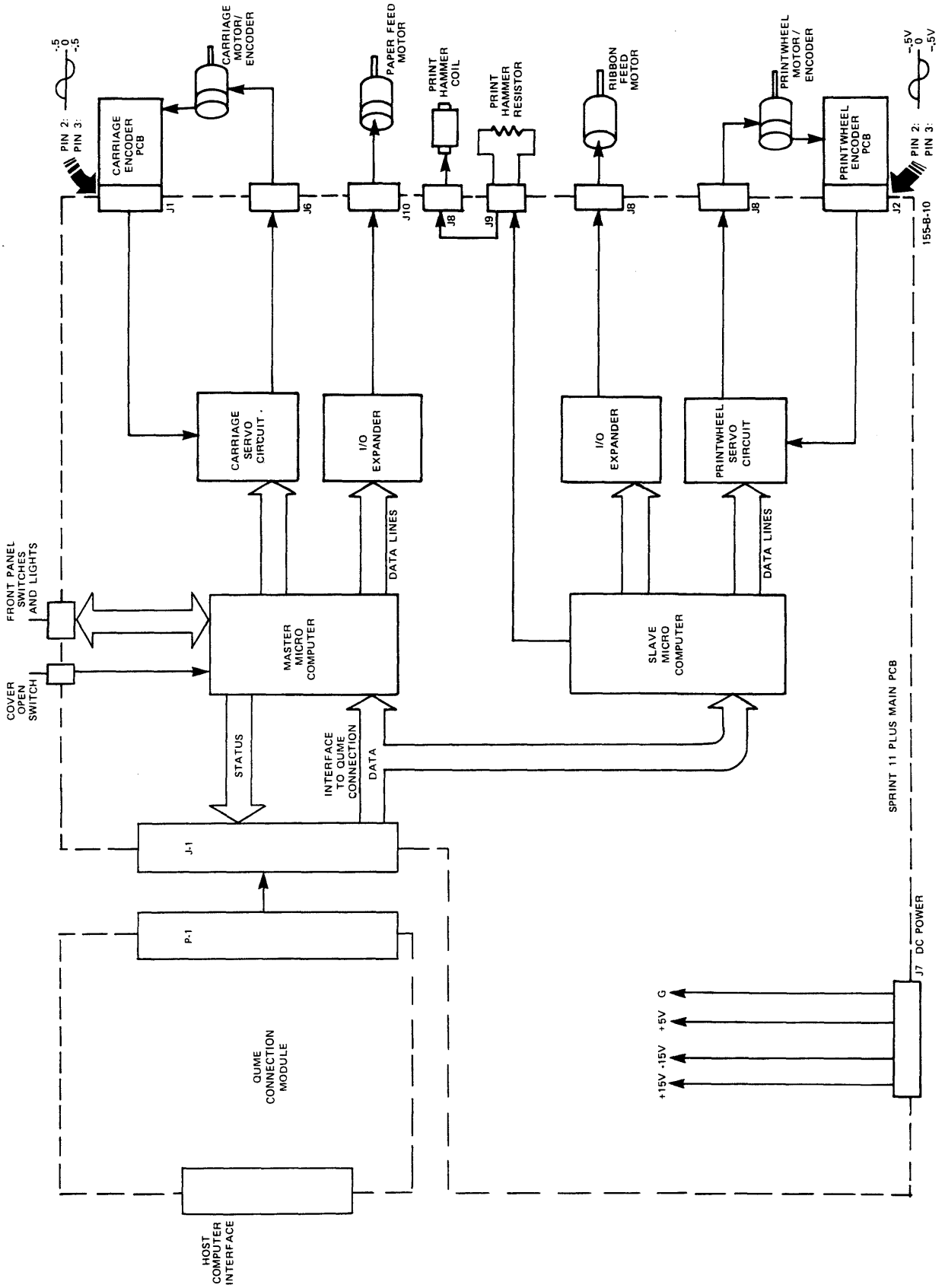

Figure 2-1. The SPRINT 11 PLUS System Block Diagram

SERVO SYSTEMS

Carriage and printwheel motions in the SPRINT 11 PLUS printer are controlled by two nearly identical but independent servo systems. Figure 2-2 illustrates the basic components of the printer's servo systems. A servo system is a closed loop where a controlling circuit sends commands to a device for execution. Through a feedback path, the controlling circuit monitors the resulting response of the device and sends modified commands if the device's response is inaccurate.

A motion command is received by the servo microcomputer for appropriate action. The microcomputer selects the motor direction (carriage left or right), the servo mode (velocity mode to move the motor; position mode to hold the motor stationary), and then issues a digital command corresponding to the velocity at which the motor should move.

This digital distance command is sent to the velocity/position control circuit. Here, a digital-to-analog converter (DAC) produces a representative command voltage from the digital distance command. At the same time a true velocity voltage of opposite magnitude is derived from the speed of the motor in the amplifier/tachometer clock circuit. This true velocity voltage is sent to the velocity/position control circuit where it is summed with the command voltage from the DAC to produce a difference voltage. If the motor is moving too slow, the command voltage will be greater than the true velocity reference voltage. The difference voltage is then amplified by the error amplifier within the velocity/position control circuit and sent to the motor drive amplifier to apply power to the motor, thus raising the speed. When the motor is at the correct speed, the true velocity reference voltage will be the same magnitude, but opposite sign, as the command velocity voltage. A zero difference voltage will hold the motor stationary.

An optical encoder mounted on the carriage (or printwheel) motor shaft generates sine wave signals whose frequency is proportional to motor speed. The amplifier/tachometer/clock circuit shapes the sine wave signals into position feedback voltage, tachometer voltage, and clock pulses. (These clock pulses can be thought of as count or motion pulses and are not to be confused with the microcomputer clock pulses.)

As the motor moves, the clock pulses are sent back to the microcomputer, which counts the pulses and computes the carriage position. At the same time the encoder sine waves are converted into a corresponding true velocity reference voltage for summing with the command voltage.

When the carriage or printwheel approaches the new location, the microcomputer issues commands to slow then stop the motor at the new position. The servo circuit is placed into position mode by the microcomputer and the motor held in place by the position feedback. Any attempt to displace the motor will result in the error amplifier issuing an opposing voltage command to the motor.

In the SPRINT 11 PLUS printer, the carriage and printwheel servo circuits are controlled by the Master and Slave microcomputers, respectively. These microcomputers and associated circuits are located on the main PCB.

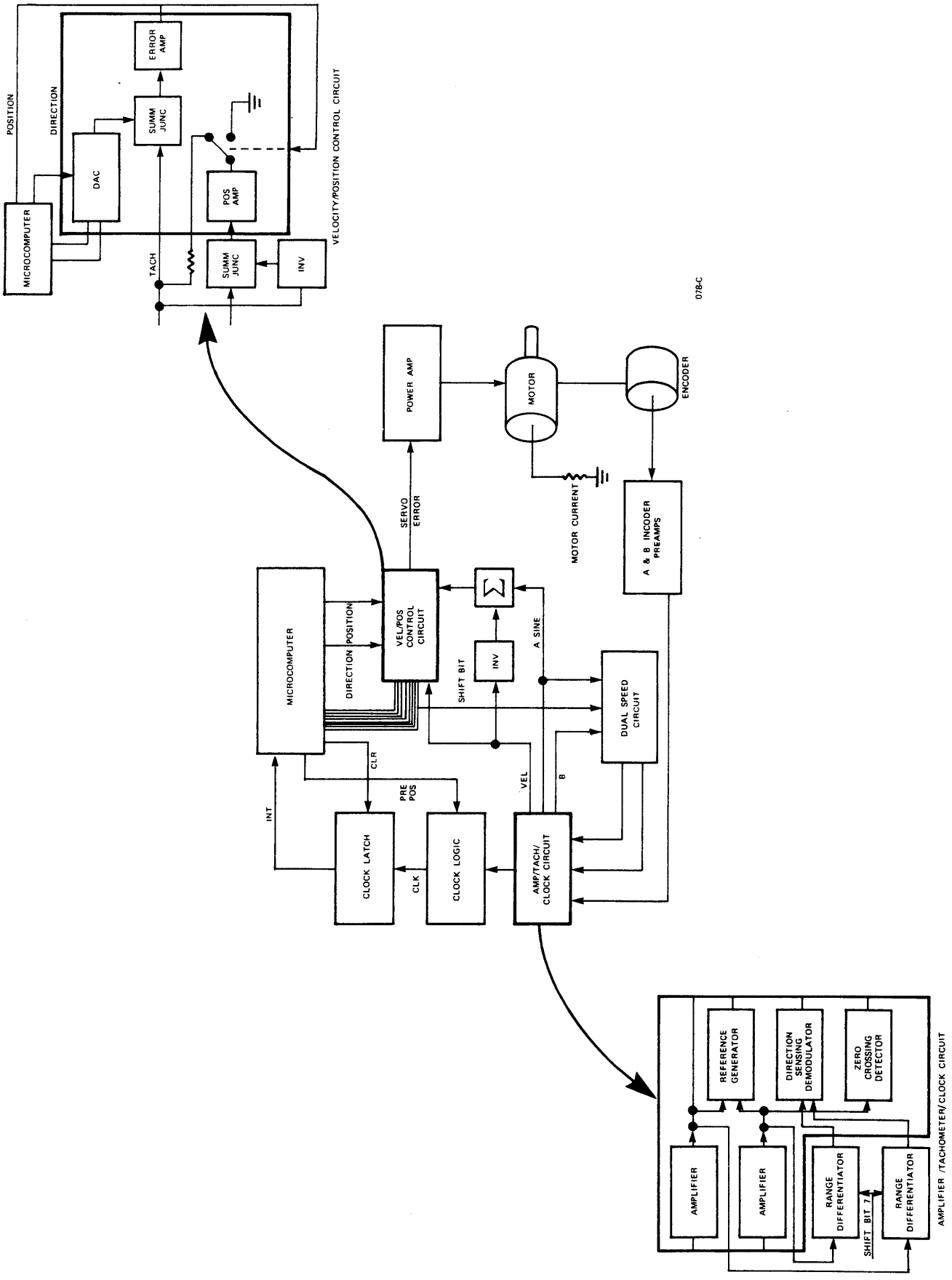

Figure 2-2. Servo System

CARRIAGE MOTION FUNCTION

The carriage servo system includes the carriage motor/encoder assembly, carriage encoder PCB, and carriage drive circuitry (including fuse F-1) on the main PCB

Carriage motion occurs in response to commands from the master microcomputer. The operation of the servo system was described in the Servo System section of this manual. During normal operation, if a motion command is issued to the carriage servo but no motion is detected, a CHECK condition occurs automatically and the power transistors are disabled. During Restore, the carriage servo circuit moves the carriage assembly to the left to seek the limit of travel. When the carriage is stopped by the left side of the printer frame, it moves a small distance to the right. The master microcomputer then resets its carriage position counter to zero to establish the leftmost legal printing position (column zero). The relative carriage position is computed from clock pulses produced by the carriage motor encoder.

The carriage servo may be manually disabled by switch S-1 on the main PCB. Attempting to operate the printer with the carriage disabled will place the printer in CHECK (except during Restore), since no clock pulses will be produced and the Master Microcomputer will detect no carriage motion.

The carriage encoder PCB is factory compensated to match the particular encoder output of the carriage motor/encoder. The carriage drive motor/encoder assembly and carriage encoder PCB should be replaced as a unit.

PRINTWHEEL MOTION FUNCTION

The printwheel servo, functionally similar to the carriage servo circuit, is controlled by the slave microcomputer on the main PCB. The operation of the servo system was previously described in the SERVO SYSTEM section of this manual.

The clock pulses from the printwheel motor encoder provide relative printwheel location information, i.e., the number of positions the printwheel has moved between two locations. To determine the absolute printwheel location, the microcomputer synchronizes an internal counting register to a physical position on the printwheel called "index". At position zero or "index" (which is at lower case "w" on a 96 character WP printwheel), a pulse is produced and the absolute location counter is reset to zero.

The printwheel motor is moved to position zero (index) under the following conditions:

1) At power up
2) During a Restore
3) At the end of a print sequence (i.e., when the microcomputer receives no characters to print for 200 milliseconds)
4) At the beginning of a print sequence if the printwheel is not already at position zero.

During a print sequence as the printwheel moves, the slave microcomputer searches for the index signal where position zero should be. If an index pulse is not found, the print sequence is interrupted and the printwheel motor is rotated while the slave microcomputer searches for an index pulse. After the index is found, the print sequence continues.

Under normal conditions the printwheel should not move freely with power applied to the printer. If the printwheel moves freely, the printer is either in CHECK or there is a problem in the motor or associated drive circuit in the servo system.

Switch S-2 on the main PCB disables drive to the printwheel motor. Attempting to operate the printer with the printwheel drive disabled will cause the printer to go into CHECK, since no clock pulses will be produced and the microcomputer will detect no motion. However, during a Restore the microcomputer searches for index only and not for clock pulses. Consequently, during a Restore sequence the printer will not go into Check even though the printwheel circuit does not produce clock pulses.

The printwheel encoder PCB is factory compensated to match the particular encoder on the printwheel motor/assembly. The printwheel motor/encoder and printwheel encoder PCB should be replaced as a unit.

PAPER FEED FUNCTION

The paper feed mechanism is designed to move paper bidirectionally under system or operator control. The paper is retained around a platen by feed rollers and the paper bail rollers. A two phase stepper motor drives the platen in increments of 1/48 inch by means of a belt driven idler gear (40 cps printers) or an intermediate idler gear and the platen drive gear (55 cps printers).

Paper feed commands are processed by the master microcomputer on the main PCB and, at the correct time, signals are issued to the paper feed drive circuitry to operate the paper feed motor. A separate drive circuit controls each phase of the paper feed motor, which is fused through F-3 on the main PCB.

Form feeding can be commanded by the host system or from the printer's front panel by pressing the Form Feed switch.

There is no manual disable switch for the paper feed motor. Whenever power is applied to the printer, the paper feed circuits are enabled. If one phase of the paper feed circuit is defective, the detents can still be felt. However, when the printer attempts to advance the paper (e.g., in response to Form Feed switch activated), the paper feed mechanism may chatter or move the paper backward.

Poor vertical registration may be caused by misadjustment of the paper feed belt tension or a loose idler gear. Refer to the Print Quality section for an example of this problem. If the mechanical adjustments are correct but the paper feed mechanism appears to be malfunctioning, the paper feed motor or drive circuitry on the main printed circuit board may be defective.

If the printer successfully performs a Printer Self-Test with good vertical registration, paper feed problems are most likely in the host computer or printer interface.

RIBBON FEED FUNCTION

Ribbon feed is under control of the slave microcomputer on the main PCB. Whenever the printer is commanded to print, the ribbon feed motor is stepped to advance the ribbon a specific programmed amount.

The ribbon feed system includes the ribbon feed motor, drive belt and gears, take up clutch, and ribbon drive circuits on the main PCB.

Before troubleshooting the ribbon feed system, install a known good ribbon cartridge. Some ribbon problems are not obvious. Improperly stored ribbons can be the cause of various print quality problems.

During a line of printing, the ribbon motor should be turning to advance the ribbon. Run the Self-Test or have the host system send lines of characters to the printer and watch the ribbon motor to see if it is driving the ribbon mechanism. To perform this test, a good ribbon must be installed, and the operator access panel interlock switch must be defeated to enable printing.

PRINT HAMMER FUNCTION

Printing takes place when both printwheel and carriage motion have stopped. A digital pulse from the slave microcomputer turns on a driver circuit which fires the hammer. The length of the pulse determines the intensity of the hammer fire.

The print hammer may be disabled by switch S-3 on the main PCB. Disabling the hammer is useful for testing and troubleshooting when there is no paper or platen in the printer; the Self-Test routine will be successfully executed (without printing) with this switch in the hammer disable position.

POWER SUPPLY

WARNING

LETHAL VOLTAGES ARE PRESENT ON THE POWER SUPPLY PRINTED CIRCUIT BOARD. THE AC POWER CORD MUST BE DISCONNECTED BEFORE THE TOP COVER ASSEMBLY IS REMOVED. DO NOT ATTEMPT TO MEASURE ANY VOLTAGE ON THE POWER SUPPLY.

An internal power supply provides 5 Vdc and positive and negative 15 Vdc to the SPRINT 11 PLUS printer and the QUME CONNECTION module. A 115 Vac cooling fan (supplied by the power supply) always runs when the printer AC power is on.

The printer may be configured to operate at 115 or 230 Vac input voltages. Refer to the Installation section in this manual for instructions on changing the power supply AC input configuration.

The power supply monitors current through its three outputs. If a short or high current condition occurs, the bus is shut down. (Both 15 volt buses are shut down even if only one is shorted). When the short is removed, the supply bus returns to normal voltage if no fuses were blown by by the original short.

SECTION 3
BASIC MAINTENANCE

When properly maintained, Qume printers will give excellent service for many years. This section describes the cleaning, lubrication, and adjustment check procedures necessary to maintaining your printer in optimum condition. The following table summarizes basic maintenance requirements.

Table 3-1. Basic Maintenance Summary

OPERATOR -- As required	FIELD SERVICE -- As required during basic or corrective maintenance	FIELD SERVICE -- Once every year or 2000 operating hours, whichever occurs first	FIELD SERVICE -- Once every two years or 4000 operating hours whichever occurs first	FIELD SERVICE -- **Not normally required** unless environments, application, or supplies require	
X	X				Clean Card Guide
X	X				Clean Printwheel
X	X				Clean Covers
X	X				Clean Platen, Feed Rollers, Paper Bail Rollers
			X		Lubricate Platen Sleeve Bearings
			X		Lubricate Paper Feed Idler Gear Stud (55 cps model)
	X				Lubricate Feed Roller Shafts
		X			Clean and lubricate Carriage Guide Shafts
		X			Lubricate Carriage Guide Shaft Felt Wipers
				X	Clean Print Hammer (Harsh environments only)
				X	Lubricate Drive Belt Pulley
X					Check print quality

NOTES:

1. These basic maintenance procedures are designed to assure the proper operation of printers used in normal operating environments. Printers used in harsh operating enviroments, exceptionally demanding applications, or with certain paper or ribbon supplies, may require different or more frequent basic maintenance servicing.

2. Use only the cleaners, solvents, lubricants, tools, and supplies that are recommended by Qume.

3. Clean plastic parts only with a low residue cleaner; never use a solvent-based cleaner that may destroy the plastic parts.

CLEANING

Covers

The operator can clean the covers, when necessary, with a soft cloth or tissue moistened with a low residue cleaner.

Printwheel and Plastic Card Guide

These parts are normally cleaned by the operator as required, or by the service technician during normal basic maintenance.

If required, a printwheel may be cleaned by:

1. Removing it from the printer
2. Soaking it in a low residue cleaner
3. Carefully removing any ink or other foreign matter with a medium stiffness brush.
4. Thoroughly rinsing and drying the printwheel prior to reinstallation.

If required, the plastic card guide may be cleaned while installed in the printer by removing the platen. Use a soft cloth or tissue mostiened with a low residue cleaner.

Platen, Feed Rollers, Paper Bail Rollers

As required (depending on operating environment, application, supplies, etc.), clean the platen, feed rollers, and paper bail rollers with Fedron platen cleaner. Fedron is a strong solvent; do not let it come in contact with plastic parts, and use only in a well ventilated work area.

It is important that the platen be cleaned with an approved platen cleaner (such as Fedron brand). The platen must offer a specific resiliency to the print hammer. Platen cleaner not only cleans but restores the resiliency of the platen. Other petroleum solvents may clean the platen, but will also cause the platen to harden; and printer performance will be degraded.

Remove the operator access panel, platen, and cradle assembly from the printer. (Refer to the appropriate removal procedures in this manual). Moisten a soft cloth with Fedron platen cleaner and wipe all dirt, ink, and other accumulated soil from the platen, feed rollers, and paper bail rollers.

Metal Parts

Clean metal parts with a safe degreasing agent (such as isopropyl alcohol or Freon).

Print Hammer

Print hammers do **not** require cleaning or lubrication under normal operating conditions. Printers used in harsh operating environments, or with certain types of paper and ribbons, may require hammer cleaning.

1. Disconnect power from the printer. Remove the operator access panel and the ribbon cartridge. Unplug the connector on the hammer coil.

2. Remove the rear hammer armature stop and allow the hammer armature to pivot toward the front of the printer (toward the operator).

3. Carefully holding onto the hammer spring so it will not be lost, remove the print hammer from the hammer guide by sliding it out toward the front of the printer. Remove and retain the spring.

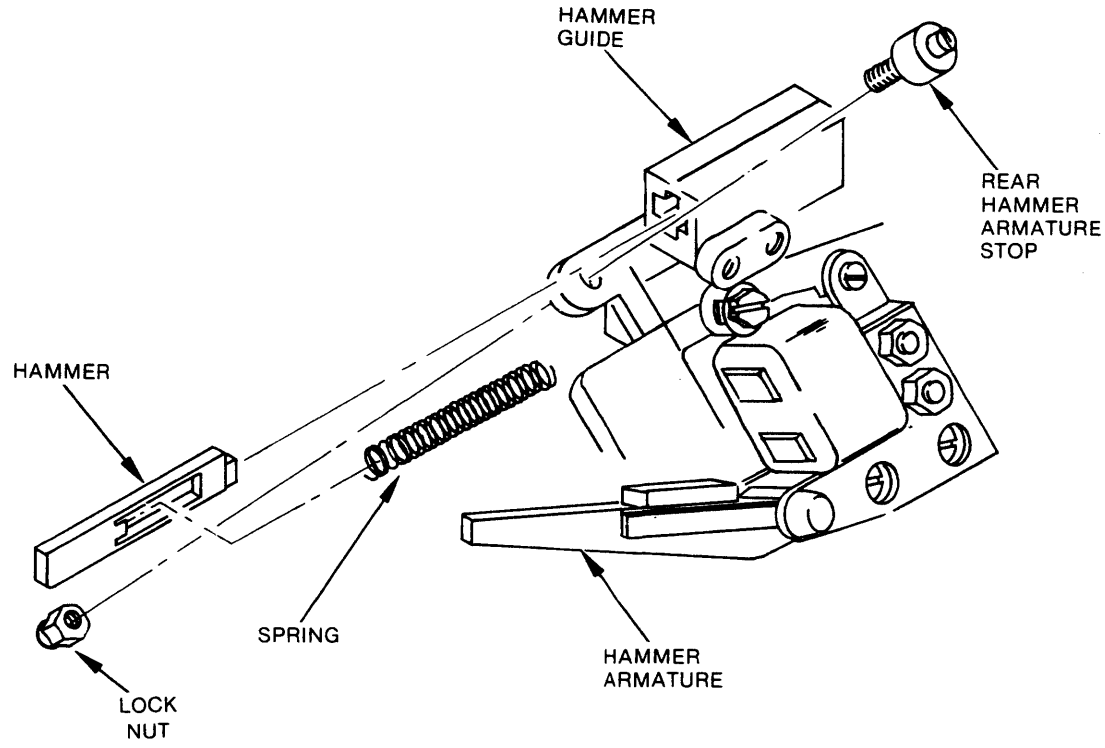

Figure 3-1. Print Hammer Cleaning

4. Clean both the hammer and the inside of the hammer guide with isopropyl alcohol or Freon solvent. Use a cotton swab moistened with solvent to clean the hammer guide. DO NOT USE SPRAY SOLVENTS.

5. Carefully replace the spring inside the hammer and install the hammer into the hammer guide. Note that the face of the hammer is wedge-shaped. Install the hammer with the wide end of the wedge up.

6. Pivot the hammer armature against the print hammer coil and reinstall the rear hammer armature stop and locknut. Reconnect the hammer coil connector.

7. Adjust the rear hammer armature stop (refer to the Print Hammer Armature Rear Stop adjustment procedure).

8. Replace the ribbon cartridge and the operator access panel.

9. Print several lines of text and inspect for proper print quality. Make any additional printer adjustments which may be necessary to obtain correct print quality. Refer to the Adjustments section.

LUBRICATION

Carriage Drive Shaft and Felt Wipers

Once every year or 2000 operating hours, lubricate the left and right hand felt wipers on the rear carriage guide shaft with approximately 10 drops of Tellus #46 oil each. The wipers are retained next to the carriage by the wiper brackets. You do not need to remove the felt wipers to lubricate them.

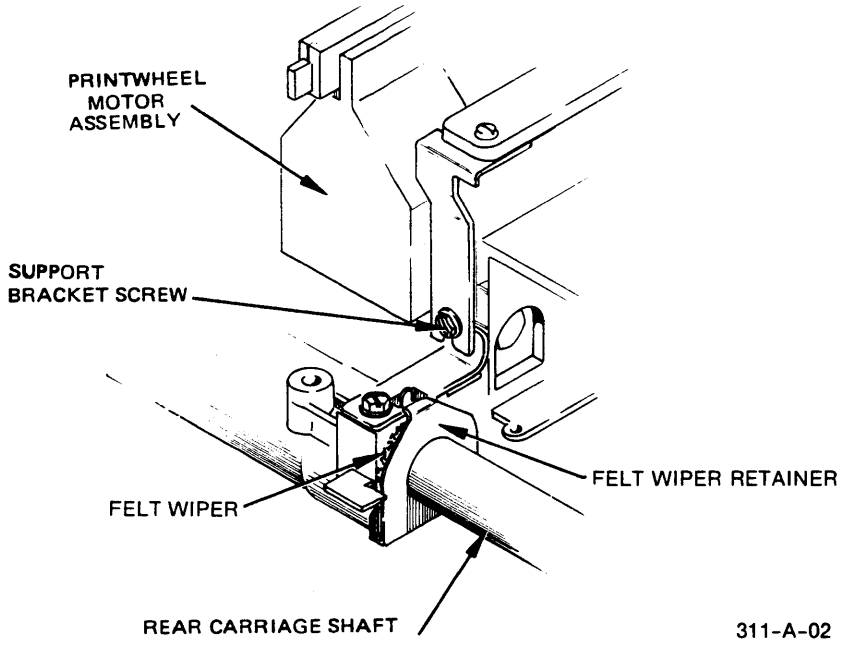

Figure 3-2. Carriage Drive Shaft Felt Wiper Lubrication

When an excessive build-up of contamination occurs, replace the felt wipers and lubricate them (refer to Felt Wiper Removal and Replacement procedure). Felt wiper replacement is seldom necessary under normal operating conditions.

Carriage guide shaft cleaning, felt wiper lubrication, and felt wiper replacement may be required on a more frequent basis depending on operating environment or supplies (e.g., type of paper used).

Platen Sleeve Bearings

Every two (2) years or 4000 operating hours, lubricate the left and right hand platen locator sleeves with two drops of Tellus #46 oil. Place the lubricant at the sleeve ends and ensure that it flows down to the shaft. Rotate the sleeves to distribute the oil evenly. Wipe off any excess oil and avoid oil contact with the platen. The illustration shows only the locator sleeve at the right platen end.

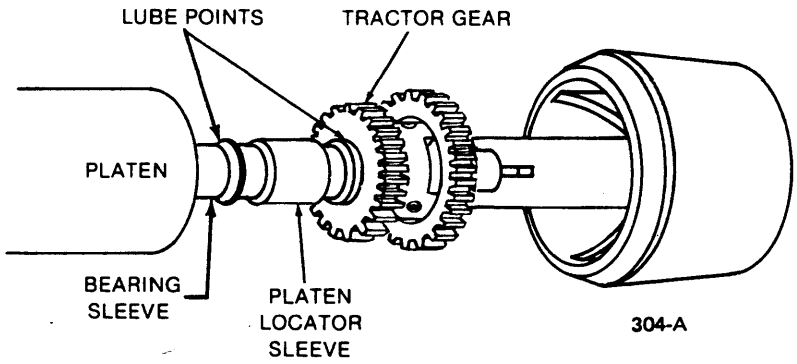

Figure 3-3. Platen Sleeve Bearing Lubrication (55 cps model shown)

Paper Feed Idler Gear Stud (55 cps models)

Once every year or 2000 operating hours, lubricate the felt washer behind the paper feed idler gear with ten drops of Tellus #46 oil. Wipe off any excess oil. **Do not** lubricate the paper feed idler gear. This gear provides self-lubrication throughout its life cycle.

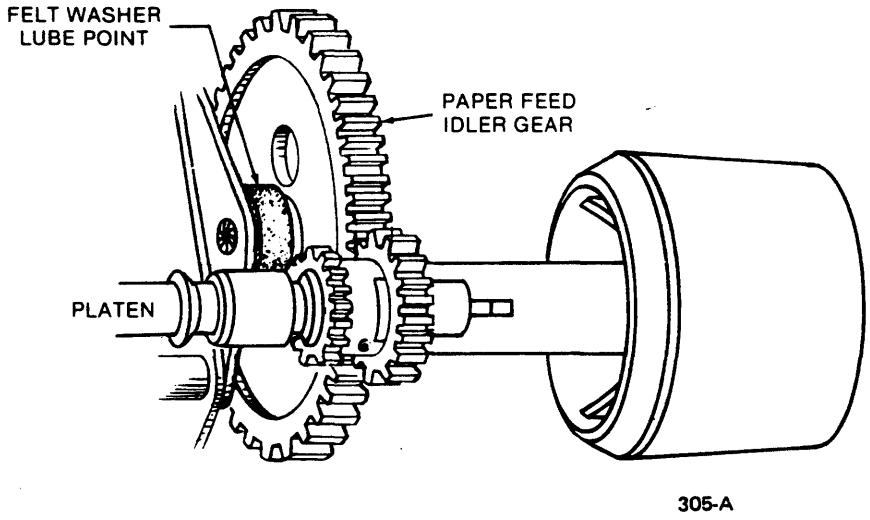

Figure 3-4. Paper Feed Idler Gear Stud Lubrication

PRINT QUALITY CHECK

During a basic maintenance inspection, or emergency service call, the following adjustment check should be performed. Note that print quality problems are not always caused by mechanical misadjustment. Ribbon or printwheel problems, or electronic malfunction may also cause poor print quality. Refer to the Print Quality Problems section in this manual for a complete discussion and examples of print quality problems.

Check for proper print quality as follows:

1. Make sure that the printwheel and ribbon installed on the printer are not defective or worn.

2. Make sure that the Multicopy Select lever is in the full forward position (toward the operator) for single sheet printing, or in the appropriate position for multisheet printing.

3. Print several lines of mixed characters and text, using the full width of the print line. This print strike-up should include:

   Several lines of text in both upper and lower case

   Tall, symmetrical characters, e.g., / ( ) I

   Wide, symmetrical characters, e.g., O H M W

   Lower case, descending characters, e.g., g y q p

   Underscores in groups of at least five

   Punctuation marks, e.g., quotation mark, apostrophe, period, comma

   A line containing every character on the printwheel. Run the PrinterSelf-Test to print all of the characters on the printwheel.

4. Inspect the print strike-up. All characters, numerals, and symbols should print with equal ink density on their left and right sides, and on top and bottom.

   The quality of characters printed on the left side of the platen should be identical to the quality of characters printed on the right side.

5. If necessary, perform the appropriate adjustment as described in the Corrective Maintenance - Adjustments section.

SECTION 4
TROUBLESHOOTING

Troubleshooting and repair of Qume printers is simple and straightforward. These printers are designed to be repaired quickly and accurately by diagnosing and replacing a defective subassembly or field replaceable component, and performing the appropriate cleaning, lubrication, and adjustment procedures.

There are two types of problems which may occur with the printer:

1. Mechanical problems. These are problems requiring adjustment or replacement of various mechanical parts inside the printer. Poor print quality is frequently caused by mechanical problems.

2. Electronic problems. These are problems associated with either communications with the host computer, or with electrical control of the printing operations.

   Servicing of the electronics consists of replacing:

   The main PCB for most printer electronics problems,
   The QUME CONNECTION module for most host computer communications problems,
   The power supply PCB for voltage problems, or
   The printwheel or carriage encoder printed circuit boards at when time the printwheel or carriage motor/encoder assembly is replaced.

NOTE

These troubleshooting procedures assume the printer had been working properly. For installation and set-up information refer to the QUME CONNECTION Interface Manual and the SPRINT 11 PLUS Operator Manual.

VISUAL INSPECTION

1. Remove power to the printer. Before attempting any troubleshooting, visually inspect the printer for mechanical obstructions or other obvious physical problems which would interfere with printer operation. Look for paper clips, staples, and other foreign matter inside and around the carriage assembly. The carriage should slide freely along the guide rails and the printwheel should rotate easily. Make sure that the QUME CONNECTION module is securely plugged into the printer.

2. Before trying to print, install a ribbon and printwheel of known good quality. A defective ribbon and/or printwheel may not be obvious.

3. Observe the status of the Ready and Attend lamps on the front panel. They can help isolate an electronic problem. The following table describes the conditions associated with the front panel lamps.

Table 4-1. Front Panel Indicator Lamps

CONDITION	READY LAMP	ATTEND LAMP
Normal printer operation	ON	OFF
Printer in PAUSE condition and operator attention required: ribbon out, paper out, cover off	BLINKS	ON
Printer in PAUSE condition; operator attention not required	BLINKS	OFF
Printer in Check	OFF	ON

In summary, the Ready lamp is on during normal printer operation and is blinking when the printer is in the Pause mode. The printer enters the Pause mode whenever operator attention is required or whenever the Pause switch is pressed. When the printer is in the Check condition, the Ready lamp is Off.

The Attend lamp is on whenever operator attention is required or whenever the printer is in Check.

TROUBLESHOOTING PROCEDURE

The general troubleshooting procedure is to isolate the problem to the SPRINT 11 PLUS printer, the QUME CONNECTION module, or the computer. Running the Self-Test will help isolate the problem to the printer or computer system. Successful execution of the Terminal Self-Test (if available on your particular QUME CONNECTION module) means the printer is probably working properly. Printer Self-Test (on all SPRINT 11 PLUS printers) tests the electrical and mechanical functions of the printer. If the problem is in the printer, determine whether the problem is related to print quality (and most likely mechanical in nature), or is electronic.

If the printer shows any sign of activity, start at step 3.

If the printer works, but the print quality is poor, refer to the Print Quality section in this manual.

1. Turn on the printer and observe what happens. If the printer shows no sign of activity, check the cooling fan. When AC line power is applied and the printer is turned on, the fan should run. Make sure the electrical outlet is supplying power. Plug a lamp or small appliance into the outlet to be sure.

2. If the outlet is live but the printer remains dead, check the printer AC line fuse next to the power switch on the rear of the printer.

3. Turn on the printer power and observe what happens. The printer should go through the following initialization sequence (called Restore): (1) the printwheel should rotate (the printwheel stops at lower case w on a 96 character WP printwheel); (2) the carriage should move to the left side of the printer frame; (3) the alarm should sound momentarily; if the alarm sounds continuously, there is probably a problem in the QUME CONNECTION electronics; (4) the Ready lamp should turn on, and the Attend lamp should be off.

   Press the Form Feed switch. This should cause the platen to turn.

WARNING

THE AC POWER CORD MUST BE DISCONNECTED BEFORE THE TOP COVER ASSEMBLY IS REMOVED. LETHAL VOLTAGES ARE PRESENT ON THE POWER SUPPLY PRINTED CIRCUIT BOARD.

4. TURN THE POWER OFF AND UNPLUG THE AC POWER CORD. Remove the top cover (there are two screws under the operator access cover, behind the front panel on each side of the printer; and two screws located on the rear of the printer). Check the two fuses on the power supply. Fuse F-1 is a 5 amp fuse in the AC line (2A for 230 Vac); fuse F-2 is a 5 amp fuse in the +5 Vdc supply bus. If either of these fuses is blown, use only an exact replacement. Under no circumstances should a larger fuse be installed. If a replacement fuse blows, the power supply is probably defective.

   Replace the complete power supply board (see Power Supply Removal). The power supply is not field serviceable and requires special equipment to service. There are places on the power supply where the 115 Vac (or 230 Vac) is not isolated from ground. Do not poke around on this board looking for problems.

5. If the power supply fuses are OK, reconnect the AC power cord and turn on the power. Carefully measure the DC voltages on the Main PCB. DO NOT TOUCH THE POWER SUPPLY PCB. The main PCB test points are located just under the large, flat heat sink and are labeled. The following table lists the test points and correct voltages.

Table 4-2. DC Voltage Test Points on Main PCB

Test Point	DC Voltage	Correct Range
TP-1	Ground	
TP-2	+15	+13.5 to +16.5
TP-3	-15	-13.5 to -16.5
TP-4	+5	+4.95 to +5.15

If the three supply voltages are correct, proceed to Step 5.

If one or more voltages are not correct, refer to the Power Supply Troubleshooting section in this manual before proceeding.

6. If the DC voltages are correct, turn off the printer, unplug the AC power cord, and check the DC fuses (while power is disconnected from the printer). Fuses F-1 (5A, 125V-Carriage Drive motor), F-2 (2A, 125V-Printwheel motor), and F-3 (5A, 125V-Paper Feed motor) are located on the main PCB. F-1 is located near the center and bottom of the main PCB beneath J-5.

   (These fuses are easily checked with the main PCB raised. The board is held by two fasteners which loosen from the rear of the printer. Use the lower holes on the PCB to raise the board to the service position. Be careful not to damage or loosen the DIP header and cable attached to the DIP socket on the solder side of the PCB.)

   The picofuses will sometimes show continuity but still be defective. Replace a suspected fuse with a new picofuse of the same rating.

7. If DC voltages are correct and the fuses check OK, then the main PCB, the printwheel motor/encoder assembly, or the carriage drive motor/encoder assembly are suspect.

8. Run the Printer Self-Test (see Running the Self-Test for details). If the Printer Self-Test can be successfully executed, most of the circuitry on the main PCB is functioning correctly.

   Servo problems (carriage or printwheel) may be caused by the electronics on the main PCB or by trouble in one of the motor encoders (physically located on the motor shafts). If either the carriage or printwheel motor/encoder assemblies are replaced, the encoder PCB for that motor must also be replaced. Therefore, isolate servo trouble to either the electronics on the main PCB, or to one of the motor/encoder PCB's.

   An oscilloscope is required for this procedure.

   First, switch the printwheel and carriage servo amplifiers to disable. The switches are located and labelled on the main printed circuit board.

   Turn on power to the printer. The carriage and printwheel should move freely (remove the ribbon and tilt the printwheel motor back to turn the printwheel easily).

   Each encoder board has two outputs, A and B, which may be measured at pins 2 and 3, respectively, on connector P-1 on the encoder board. Connect a scope probe to one (or both, if you have a dual channel scope) of the encoder outputs. The top board is the carriage encoder PCB; the bottom board is the printwheel encoder PCB. Watch the encoder output on the scope as you move the corresponding motor (slide the carriage back and forth or rotate the printwheel hub--do not touch the spokes). Each output should be a clean sine wave, 1.0 volt peak to peak centered at zero volts. The frequency of the sine wave is proportional to the motor speed.

   If you cannot get 1.0 volt P-P at both encoder outputs, there is a problem in the servo from the encoder board back to the motor/encoder. Both of encoder PCB and motor must be replaced together.

If you can get the correct waveforms at the encoder board outputs, the problem is probably on the main PCB. Check the waveforms at the TP-1 testpoints. Testpoints 3 and 6 are carriage testpoints; testpoints 2 and 8 are printwheel testpoints. At these testpoints you should see the same waveform as on the encoder boards, but at 15 volts peak-to-peak. These are outputs of U-33 and U-8, integrated circuits on the main PCB which process the servo encoder signals.

Turn off the printer power and restore the carriage and printwheel servo disable switches to the normal position.

SELF-TEST

The SPRINT 11 PLUS printer includes an internal diagnostic routine called Printer Self-Test. Some QUME CONNECTION interface modules have an additional diagnostic routine called Terminal Self-Test. These tests exercise the printer's basic electronic and mechanical functions. Both routines can be initiated via the front panel switches (Pause or Form Feed). Before initiating any type of Self-Test, ensure that there is a good ribbon, a printwheel, and paper installed in the printer. (The paper should be at least 11 inches wide.)

Printer Self-Test

The Printer Self-Test is executed by the master microcomputer in the SPRINT 11 PLUS printer and exercises the printing mechanism and supporting electronics. A successful completion of this Self-Test indicates that all the circuitry after the printer control microcomputer is functioning properly. Printer Self-Test can be run while the printer is isolated from the host computer.

To initiate Printer Self Test, turn on the power to the printer while pressing the Form Feed switch. The printer will perform an initialization sequence (Restore) and then begin continuously printing lines of all of the characters on the printwheel in a "barber pole" swirl. Part of a sample Printer Self-Test is shown in Figure 4-1.

Printing will continue until power is turned off or until the Form Feed switch is pressed and held as the printer completes a line of characters.

Terminal Self-Test

The Terminal Self-Test is executed by some QUME CONNECTION modules. The Terminal Self-Test is a more extensive diagnostic test than Printer Self-Test. Terminal Self-Test is executed entirely by the QUME CONNECTION module microcomputer. Not only are the printing mechanisms exercised, but the

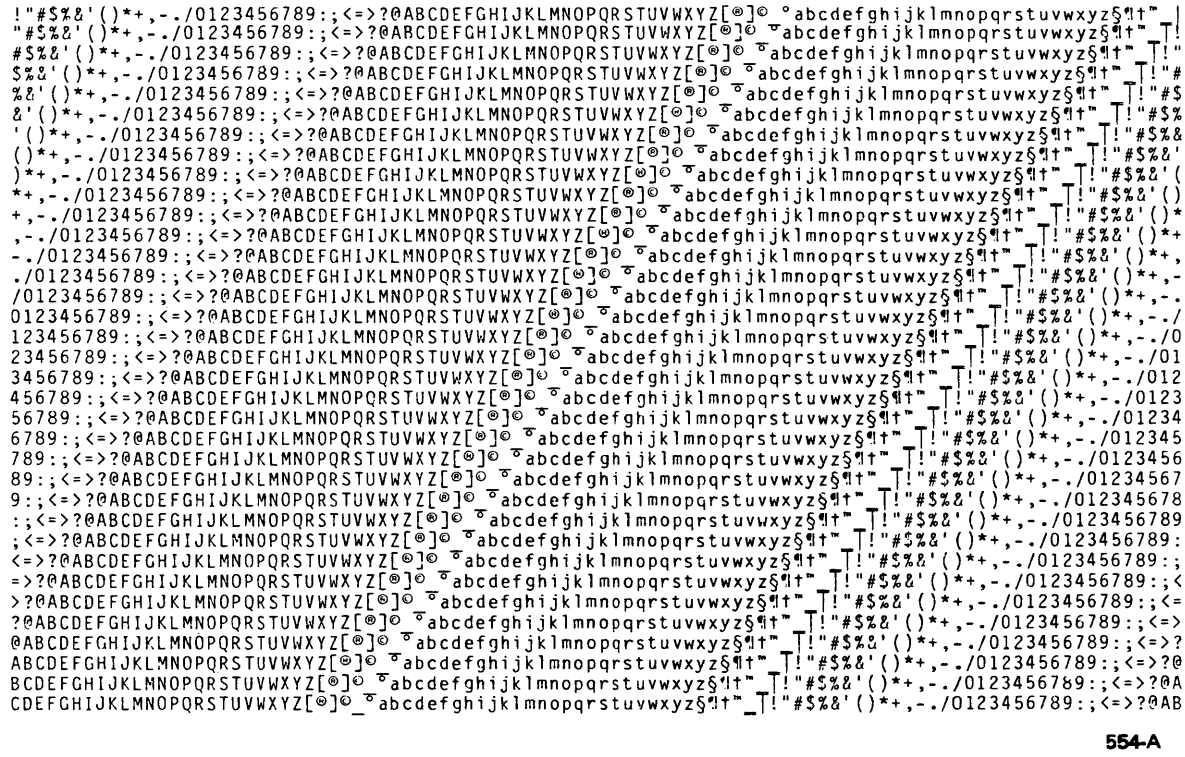

Figure 4-1. "Barber Pole" Printout from Printer Self-Test

printer microcomputer and supporting circuits are also tested. Hence, successful completion of a Terminal Self-Test indicates that the both the SPRINT 11 PLUS printer and QUME CONNECTION module are functioning properly. Refer to the QUME CONNECTION Interface Manual for more information on the Terminal Self-Test.

PRINTER SENSORS (Operator access cover interlock, ribbon out)

All SPRINT 11 PLUS printers have an operator access panel interlock switch and ribbon out sensor. The following table lists the sensors and their location in the printer:

SPRINT 11 PLUS Sensors

Sensor	Location
Ribbon out	On carriage assembly
Operator access panel interlock	On left side frame

Operator Access Panel Switch

When the operator access panel is removed, the Ready lamp blinks slowly, the Attend lamp illuminates, an audible alarm sounds momentarily, and printing stops (any commands received and not executed are buffered). The carriage will remain in position while the operator access panel is off.

Ribbon Out Sensor

When the ribbon supply is exhausted, the lamp blinks slowly, an audible alarm sounds momentarily, and printing stops (any commands received and not executed are buffered).

Paper Out Sensor

A connector for a paper out sensor is installed on each SPRINT 11 PLUS printer. The paper out sensor is available on Qume's Sheet Feeder or Bidirectional Forms Tractor accessories. Refer to the manuals for those products for operating information.

PRINTER INITIALIZATION (Restore)

The Restore function initializes the printer and is performed when power is applied to the printer or when the printer receives a Restore command from the QUME CONNECTION module.

Four actions occur during the Restore sequence:

1. The carriage moves quickly to the left until it is stopped by the left sideframe of the printer. Then the carriage moves right a small distance to establish column zero, the leftmost printable position.

2. The printwheel rotates until the index signal (position zero) from the printwheel encoder is detected, then stops, placing the printwheel servo in its starting position (over "w" on a 96 character WP printwheel, over TM on a 96 character WPS printwheel.

3. The ribbon is advanced slightly to take up slack.

4. All internal microcomputers are reset to their initialization parameters and their buffers cleared; the printer assumes a power-up condition.

Failure to complete this sequence indicates a problem in one of the functional areas.

Restore is the only way to return the printer from the CHECK condition.

CHECK CONDITION

The CHECK condition indicates that the printer has sensed a problem. The printer is in Check only when the Ready lamp is Off and the Attend lamp is On. The printer is not in Check if the Ready lamp is blinking. A blinking Ready lamp indicates that the Pause switch has been pressed or that operator attention is required (e.g., the operator access panel is open, the ribbon cartridge has been removed, or the paper out sensor has detected an out of paper condition).

During CHECK all of the following occur:

The carriage, printwheel, and hammer circuits are disabled. The carriage and printwheel can easily be moved by hand with power applied to the printer;

The Ready lamp is turned OFF and the Attend lamp is turned ON.

An audible alarm sounds momentarily;

The printer goes into CHECK if, after issuing a motion command, the internal microcomputer detects no printwheel or carriage motion, or if a motion command cannot be completed (except during Restore). When the printer is in CHECK, only a Restore (power up or Restore command) will clear the condition. If the cause of CHECK is still present, the printer returns to the CHECK condition.

The printer is <u>not</u> in CHECK when the operator access panel is open, when the ribbon cartridge has been removed, or if the optional paper out sensor detects paper out. Closing the operator access panel and/or replacing the ribbon cartridge will return the printer to normal operation again once the Pause condition is cleared (press the Pause switch). If the carriage cannot be moved by hand while power is applied to the printer, the printer is not in CHECK.

During the Restore sequence, the printer will not go into CHECK if no carriage or printwheel motion is detected. The internal microcomputer in the printer determines the left-most printing position by moving the carriage to the left until the limit of travel (left side of the printer frame) is reached. Thus, during Restore, interrupted carriage motion is interpreted as the left end of travel.

SECTION 5
SUBASSEMBLY REMOVAL AND REPLACEMENT

The following procedures are to be used as a guide when removing printer subassemblies for service or replacement. Read the complete procedure before removing any subassembly. Refer to the appropriate assembly drawing in the Illustrated Parts Breakdown section for parts location as needed.

Always disconnect the power and data cable from the printer before performing any removal procedure.

CAUTION

Despite safeguards, it may be possible to plug in some connectors incorrectly, either by inserting them in backwards, or plugging them into the wrong receptacle. Before removing a connector, always note its proper position.

After performing the replacement procedure, verify proper operation by turning the printer ON and performing a Printer Self-Test as needed.

Removal and replacement procedures for the following subassemblies are described in this section:

1. Index Card Guide
2. Felt Wiper
3. Top Cover
4. Front Panel
5. Feed Rollers
6. Drive Belt
7. Carriage Assembly
8. Paper Feed Motor
9. Carriage Drive Motor
10. Fan
11. Main PCB
12. Power Supply Assembly
13. Mechanical Assembly

INDEX CARD GUIDE

The index card guide is routinely cleaned while installed in the printer. The ribbon cartridge, printwheel, and platen are removed and the card guide is cleaned with a soft cloth using a mild soap or dishwashing detergent. If the card guide must be replaced, proceed as follows:

Removal:

1. Open the operator access panel.

2. Remove the ribbon and printwheel. Leave the printwheel motor assembly tilted away from the platen.

3. Remove the card guide by pulling forward on the spring metal card guide latches while gently lifting up on the card guide.

Replacement is the reverse of the removal procedure. Check the card guide adjustments. (Refer to the Card Guide Adjustment procedure.)

FELT WIPERS

Removal:

1. Disconnect the AC power cord from the printer.
2. Open the operator access panel and remove the ribbon.
3. Remove the left and right hand wiper retainers to gain access to the two felt wipers on the rear guide shaft (refer to Felt Wiper Lubrication procedure for illustration).

Replacement:

1. Lubricate and replace the felt wipers as necessary (refer to the Felt Wipers lubrication procedure).
2. Install the wiper retainers.
3. Replace the ribbon and close the operator access panel.
4. Connect the AC power cord and turn the unit ON to verify proper operaion.

TOP COVER

WARNING

THE AC POWER CORD MUST BE DISCONNECTED BEFORE THE TOP COVER ASSEMBLY IS REMOVED. LETHAL VOLTAGES ARE PRESENT ON THE POWER SUPPLY PRINTED CIRCUIT BOARD.

Removal:

1. Disconnect the AC power cord.
2. Remove the operator access panel.
3. Remove the two screws inside the front of the printer (under the operator access panel) and the two screws on the rear of the printer.
4. Pull the platen knob off the platen shaft.
5. Lift up the top cover.

Replacement:

1. Set the top cover back in place on the bottom cover assembly.
2. Attach the two rear cover screws.
3. Attach the two inside cover screws at the front of the printer.
4. Replace the platen knob and operator access panel.

FRONT PANEL

Removal:

1. Open the operator access panel.
2. Disconnect the two front panel connectors.
3. Remove the two screws that attach the front panel to the bottom cover assembly and lift out the front panel.

Replacement is the reverse of the removal procedure.

FEED ROLLERS

Removal:

1. Remove the top cover. (Refer to the Top Cover Removal procedure.)

WARNING

THE AC POWER CORD MUST BE DISCONNECTED BEFORE THE TOP COVER ASSEMBLY IS REMOVED. LETHAL VOLTAGES ARE PRESENT ON THE POWER SUPPLY PRINTED CIRCUIT BOARD.

2. Remove the platen and the cradle assembly. (The cradle may be laid to the rear, over the platen assembly brace, but be careful not to damage the two cradle springs).
3. Remove the front feed rollers first. Gently spread one of the feed roller arm assemblies enough to remove the front feed roller. Remove the second front feed roller in the same manner. See illustration below.
4. To remove the rear feed roller, first remove the associated front feed roller. Pivot the rear feed roller up and forward about ninety degrees. Gently spread the feed roller arm assembly enough to remove the rear feed roller. Remove the second rear feed roller in the same manner.

Replacement:

1. To replace the front and rear feed rollers, simply reverse the procedure in steps 3 and 4 above. Remember that the rear feed rollers must be re-installed before their associated front feed rollers.
2. Replace the cradle assembly (be sure to connect the cradle springs to the studs on the platen brace) and the platen.
3. Replace the top cover.

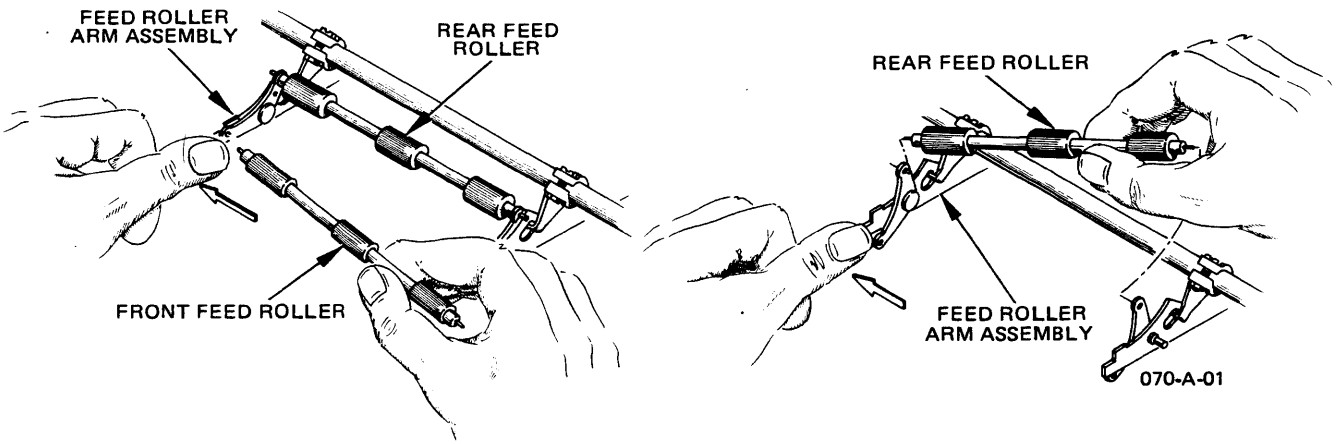

Figure 5-1. Feed Roller Removal

CARRIAGE DRIVE BELT

Removal:

1. Remove power to the printer.

WARNING

THE AC POWER CORD MUST BE DISCONNECTED BEFORE THE TOP COVER ASSEMBLY IS REMOVED. LETHAL VOLTAGES ARE PRESENT ON THE POWER SUPPLY PRINTED CIRCUIT BOARD.

2. Remove the top cover. (Refer to the Cover Removal procedure.)
3. Remove the ribbon and the printwheel. Leave the printwheel motor assembly tilted away from the platen.
4. Loosen the drive belt tension adjusting nut (on the right side) to remove tension from the drive belt.
5. Loosen the screws on the right and left hand belt cleats on each side of the carriage assembly that secure the drive belt ends.
6. Remove the drive belt.

Replacement:

1. Before replacing the drive belt, clean and lubricate the rear carriage guide shaft felt wipers and the carriage guide shafts if necessary. (Refer to the appropriate lubrication procedures in the Preventive Maintenance section).

2. Replace the drive belt by routing it around the carriage motor pulley and drive belt idler pulley, and through the slot on each side frame.

3. Replace the ends of the drive belt, one at a time, on the carriage and secure them by tightening the belt cleats.

4. Perform the drive belt tension adjustment (refer to the Drive Belt Tension adjustment procedure).

5. Replace the ribbon and printwheel.

6. Replace the top cover.

CARRIAGE ASSEMBLY

Removal:

1. Disconnect the AC power cord and remove the top cover.

2. Remove the ribbon, printwheel and platen. Tilt the printwheel motor assembly away from the platen.

3. Remove the carriage harness and detach connector P9 from the main PCB. Note the routing of the carriage harness and cable and the orientation of the connector.

4. There are two motor encoder printed circuit boards plugged into the main PCB. They are located on the left side of the main PCB, as viewed from the operator's position. The bottom PCB is the printwheel motor encoder PCB. Unplug this board from the main PCB and unplug the carriage harness cable from the encoder PCB. Mark the top of the connector--it can be installed incorrectly. Each encoder PCB is an integral part of a particular carriage assembly and is compensated at the factory for that printwheel motor. Replacement of the carriage assembly must include the new encoder PCB which is supplied with the printwheel motor.

5. On the bottom of the printer, loosen the left two screws and remove the two screws holding the mechanical subassembly.

6. Slowly lift the right side of the mechanical subassembly and push the harness cable to the left to release it from the clamp. Pull the harness cable out slowly and note the proper routing.

7. Loosen the drive belt tension adjusting nut (on the right side) to remove tension from the drive belt.

8. Release the belt end from the right-hand belt cleat.

9. Loosen the two locking plate screws on each side frame holding down the rear guide shaft (nearest the platen). Loosen the screw that secures the grip rings on the guide shaft to the side frame. Slide the rear guide shaft toward the drive belt tension adjusting nut until the left end is free. Tilt the left end of the shaft up and out.

10. Maneuver the rear guide shaft out of its mounting holes and lift out the carriage assembly and rear guide shaft together. Pull the carriage assembly off the spherical front bearing, leaving the bearing on the front guide shaft.

11. Slide the rear guide shaft out of the carriage assembly's sleeve bushing.

12. Reinstall the printwheel encoder PCB on the carriage harness cable. This encoder board will not be used.

Replacement is the reverse of the removal. Be sure the cables are correctly routed. Use new cable ties to secure the wires.

PAPER FEED MOTOR

Removal:

1. Remove power to the printer.

WARNING

THE AC POWER CORD MUST BE DISCONNECTED BEFORE THE TOP COVER ASSEMBLY IS REMOVED. LETHAL VOLTAGES ARE PRESENT ON THE POWER SUPPLY PRINTED CIRCUIT BOARD.

2. Remove the top cover. (Refer to the Top Cover Removal procedure.)

3. Remove the platen.

4. Disconnect the paper feed motor connector P10 from the main PCB.

5. Remove the two screws underneath the printer that secure the right side of the mechanical subassembly to the bottom cover.

6. Remove the three screws, washers, and spacers that hold the paper feed motor assembly to the side frame. The bottom screw can be removed by lifting up the right side of the mechanism.

7. Remove the paper feed motor from its assembly.

Replacement:

1. Replace the paper feed motor on its assembly.

2. When installing the paper feed motor assembly onto the printer side frame, attach the bottom screw, washer, and spacer first.

3. Install the other two spacers, washers and screws.

4. Install the platen.

5. Connect P10 to the main PCB.

6. Install the two screws underneath the printer holding down the right side of the mechanical subassembly.

7. Perform the paper feed belt and idler gear adjustment for the 40 cps model (refer to the Paper Feed Belt and Idler Gear adjustment procedure) or the paper feed idler gear adjustment for the 55 cps model.

8. Replace the top cover.

CARRIAGE DRIVE MOTOR

Removal:

1. Remove power to the printer.

WARNING

THE AC POWER CORD MUST BE DISCONNECTED BEFORE THE TOP COVER ASSEMBLY IS REMOVED. LETHAL VOLTAGES ARE PRESENT ON THE POWER SUPPLY PRINTED CIRCUIT BOARD.

2. Remove the top cover. (Refer to Top Cover Removal procedure.)

3. There are two motor encoder printed circuit boards plugged into the main PCB. They are located on the left side of the main PCB, as viewed from the operator's position. The top PCB is the carriage drive motor encoder PCB. Unplug this board from the main PCB. Each encoder PCB is an integral part of a motor/encoder assembly and is compensated at the factory for that carriage drive motor. Replacement of the carriage drive motor must include the new encoder PCB which is supplied with the carriage drive motor assembly.

4. Disconnect the carriage motor connector P6 from the main PCB. Note the proper routing of this cable.

5. Loosen the drive belt tension adjusting nut (on the right side) to remove tension from the drive belt.

6. Loosen, but do not remove, the four screws holding the carriage drive motor in its mounting bracket. Slip the motor out of the mounting bracket and remove it from the printer.

Replacement:

1. To replace the carriage drive motor, first replace it in its mounting bracket; then tighten the four screws that hold the motor in place.
2. Slip the drive belt over the motor pulley.
3. Connect the new encoder PCB to the main PCB, and connect the carriage motor connector P7 to the main PCB.
4. Adjust the drive belt tension.
5. Replace the top cover.

FAN

Removal: (All SPRINT 11 PLUS printers use a 115 Vac fan)

1. Remove power to the printer.

WARNING

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2. Remove the top cover. (Refer to the Top Cover Removal procedure.)
3. Unfasten the right corner of the main PCB from its bracket.
4. Disconnect connector P2 from the power supply PCB.
5. Remove the two screws that hold the fan to its mounting bracket. Push the main PCB forward to gain access to the back screw.
6. Lift the fan from the printer.

Replacement:

1. Position the fan back in place.
2. Attach the rear screw first and tighten it just enough to hold the fan in place.
3. Attach the other screw and tighten both screws down.
4. Connect P3 to the power supply PCB.
5. Fasten the right corner of the main PCB back in place on its bracket.
6. Replace the top cover.

MAIN PRINTED CIRCUIT BOARD

Removal:

1. Disconnect the AC power cord, disconnect the serial data connector, and remove the top cover. (Refer to the Top Cover Removal procedure.)

2. Pull out on the two fasteners that hold the main PCB in place and push the board away from its brackets. The board may be raised and fastened on two lower holes on the PCB for servicing. Note that the bottom of the PCB rests in a groove when mounted normally.

3. Unplug the two encoder PCBs from the main PCB. Note the orientation of the connectors and the encoder boards.

4. Remove all connectors from the main PCB as required. Note the proper routing of each cable and the exact orientation of each connector. It is helpful to make a diagram of your printer's specific connector configuration. The Interconnect Diagram included in Section 10 provides the general orientation of each connector. Note that some pins are not used.

P9	Hammer Resistor
P10	Paper Feed Motor
P4	Cover Interlock Switches
P5	Front Panel
P7	Carriage Motor
P8	Hammer Coil/Ribbon Motor/Printwheel Motor
P5	DC Power
S3	DIP Switch Header (Front Panel)

5. Remove the ground strap on the main PCB by unfastening the nut and starwasher on the back of the board.

Replacement:

1. Attach all the connectors removed in step 4.

2. Connect the ground strap back on the board. The strap is connected to the component side of the PCB.

3. Reposition the main PCB back over the two fasteners. The bottom of the board fits into a slot in the bottom cover of the printer. If the PC board does not align with the fasteners it probably is not correctly seated in the slot. Make sure the ground strap is away from the fan blades after the board is fastened.

4. Reconnect the two encoder PCBs.

5. Replace the top cover.

POWER SUPPLY ASSEMBLY

WARNING

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The power supply board may be removed either by removing the mechanical assembly from the bottom cover and lifting the power supply out the front, or by removing the main PCB and ESD shield behind the main PCB. Removing the main PCB, however, requires disconnecting all plugs to the main PCB.

Removal (from the front):

1. Disconnect the AC power cord.
2. Remove the top cover. (Refer to the Top Cover Removal procedure.)
3. Disconnect the following connectors from the power supply PCB:

P1	AC Power Input
P2	Fan
P5	DC Power

4. Remove the four screws holding the mechanical assembly to the bottom cover. Remove the interlock switch on the left side.
5. Remove the mechanical assembly to allow access to the power supply, and gently pry the power supply loose from the bottom cover. The plastic fasteners must be pinched to permit removal of the PCB.
6. Slowly pull the power supply assembly out of the printer, under the mechanical assembly.

Replacement is the reverse of the removal.

MECHANICAL ASSEMBLY

Removal:

1. Disconnect the AC power cord.
2. Remove the top cover. (Refer to the Top Cover Removal procedure.)
3. Raise the Main PCB up on the fasteners to allow access to the connectors. Disconnect all connectors from the mechanical assembly that plug into the main PCB. Carefully note the orientation of the connectors. (Refer to the Main P.C. Board Removal procedure for a list of connectors by description and number.)

4. Disconnect the ground strap that is attached to the right side frame.

5. Remove the four screws that secure the mechanical assembly to the bottom cover.

6. Remove the mechanical assembly.

Replacement is the reverse of the removal. Clean out the bottom cover before reinstalling the mechanical assembly.

SECTION 6
ADJUSTMENTS

Very few mechanisms in the Qume SPRINT 11 PLUS printer will require adjustment until a worn part must be replaced. Always use the specified tools, lubricants, and test equipment. After making any adjustments, perform the adjustment check listed in the Preventive Maintenance section.

The only adjustment not recommended for normal field service is the Printwheel Hub adjustment. Three special Qume tools (listed in the Tools, Cleaners, Lubricants section) are needed to make this infrequently required adjustment. Qume recommends that the printwheel hub be adjusted only at the depot service level and then only by personnel trained in the proper use of the tools.

The following adjustments are covered in this section:

Paper Feed Belt and Idler Gear (40 cps models)

Paper Feed Idler Gear (55 cps models)

Platen Locator Sleeve (Tractor Gear)

Platen Height and Depth

Card Guide

Ribbon Support Plate

Ribbon Drive Gear Adjustment

Carriage Drive Belt Tension

Print Mechanism Adjustments:

- Print Hammer Height and Angle
- Print Hammer Armature Assembly (Penetration)
- Print Hammer Armature Front Stop
- Print Hammer Armature Rear Stop
- Printwheel Hub

Power Supply Voltages

PAPER FEED BELT AND IDLER GEAR (40 cps models)

The paper feed belt and idler gear are adjusted for proper tension and minimum backlash. Under normal conditions of service, adjustments are necessary only if parts are replaced in the paper feed gear train. Adjust the belt and idler gear as follows:

1. Remove power to the printer.

WARNING

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2. Remove the top cover (see Top Cover Removal Procedure).

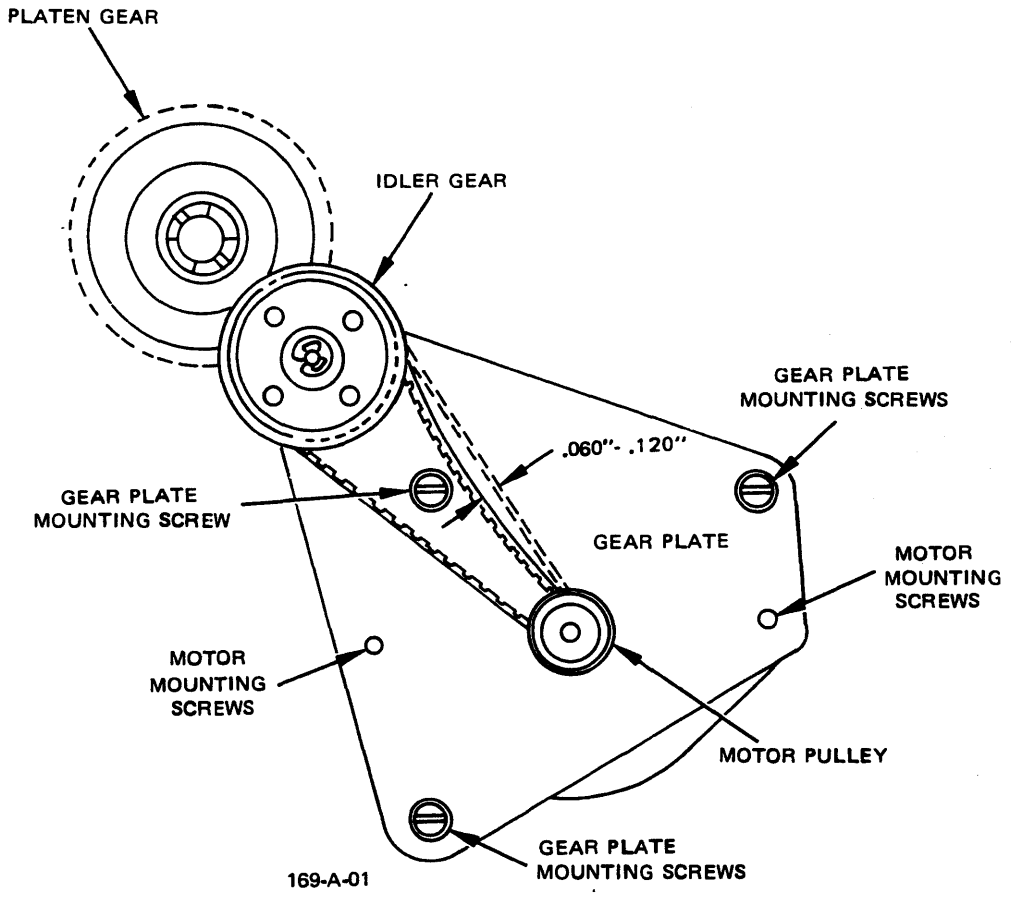

Figure 6-1. Paper Feed Belt and Idler Gear Adjustments - 40 cps models

3. Check the paper feed belt tension by lightly depressing the center of the belt. It should deflect 0.060" to 0.120" (see the following illustration). If the belt is too tight, it will cause a bind between the idler gear and motor pulley. If the belt is too loose, poor vertical registration can result.

4. To adjust belt tension, slightly loosen the two motor mounting screws with a 1/4" wrench. Move the motor assembly as needed and tighten the screws.

5. The backlash between the idler gear and platen gear should be minimum without any binds. To adjust gear backlash, loosen the gear plate mounting screws and move the gear plate assembly until there is both minimum backlash and no binds. Tighten the mounting screws.

PAPER FEED IDLER GEAR (55 cps models)

Adjust the paper feed idler gear for no backlash and no bind in the paper feed gear train (paper feed motor gear, paper feed idler gear, platen drive gear) as follows:

1. Disconnect the AC power cord from the printer.

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2. Remove the top cover (refer to Top Cover Removal Procedure).

3. Loosen the screws marked "A" and "B" with a 1/4" screwdriver just enough to allow adjustment. Screw "A" can be accessed through the hole in the paper feed idler gear.

4. Move the paper feed idler gear and its mounting plate so that the idler gear teeth just touch the bottom of both the paper feed motor gear and the platen drive gear.

5. Tighten screws "A" and "B".

6. To check for the "no backlash" condition, hold the paper feed idler gear and try to rotate the platen drive gear. No motion should be felt.

7. To check for the "no bind" condition, remove the E-ring that retains the paper feed idler gear on its mounting stud. If there is "no bind" between any of the gears, the paper feed idler gear will slide on and off its mounting stud freely. Install the E-ring.

8. Adjust the idler gear mounting plate until you obtain both conditions (no backlash and no bind) in the paper feed gear train.

9. Install the top cover and reconnect the AC power cord.

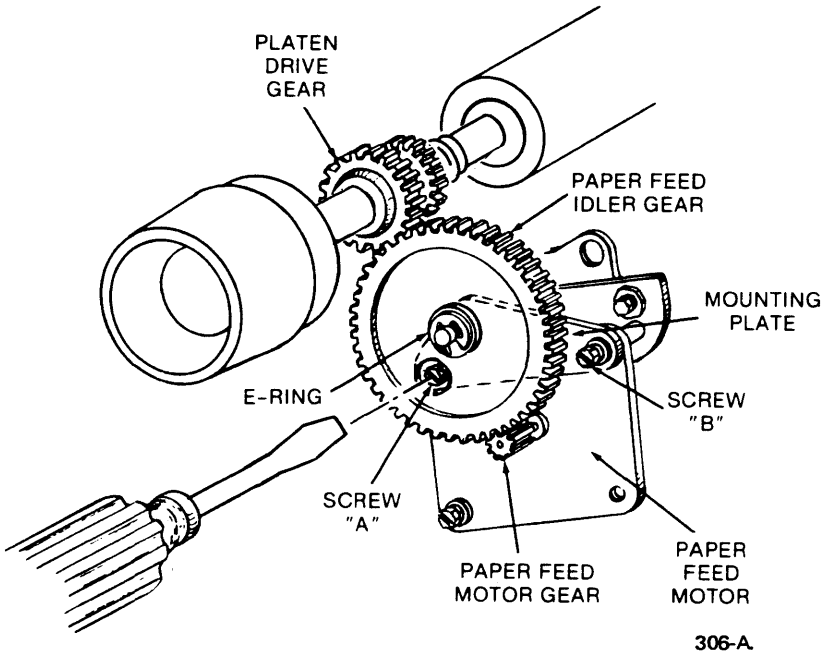

Figure 6-2. Paper Feed Idler Gear Adjustment - 55 cps models

PLATEN LOCATOR SLEEVE (Tractor Gear)

Adjust the tractor gear on the right end of the platen for a maximum platen locator sleeve end play of 0.001" to 0.003" and no bind. A 0.004" gauge should not fit. Use a 0.072" six flute spline wrench to loosen the collar set screws.

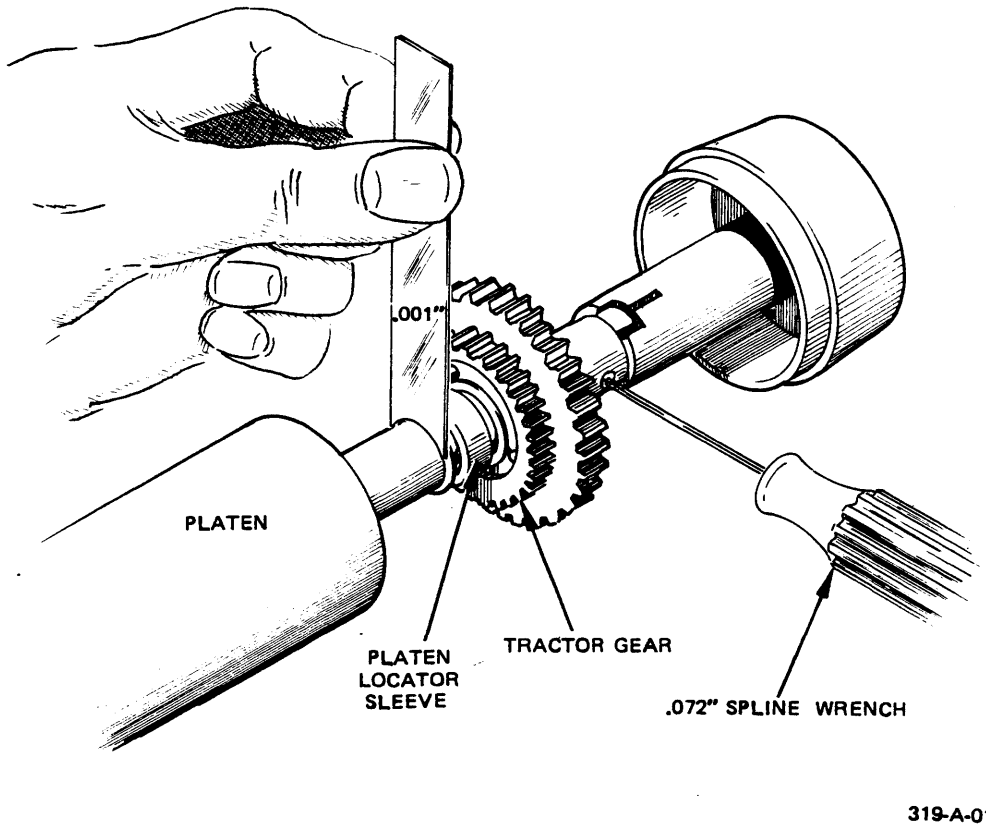

Figure 6-3. Platen Locator Sleeve (Tractor Gear) Adjustment

PLATEN HEIGHT AND DEPTH

The position of the platen within the printer is very important for optimum print quality as well as for correct paper feed. Before attempting any adjustments, perform the Print Quality Adjustment Check procedure (listed in the Preventive Maintenance section). Inspect the print strike-up and determine whether the platen height or depth is incorrect. Check print quality at both ends of the platen. Refer to the Print Quality Problems section for examples of problems caused by platen misadjustment. If necessary, adjust the platen height and depth as follows:

1. Remove power to the printer.

WARNING

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2. Remove the top cover assembly (refer to the Top Cover Removal and Replacement procedure).

3. Make all adjustments and adjustment checks with the Multicopy Select Lever in the full forward position (toward the operator).

4. Remove the ribbon cartridge, printwheel, and card guide. Return the printwheel to its locked down position.

5. Move the carriage assembly to the extreme right side of the printer.

6. Install the combo gauge on the printer. It straddles the carriage assembly and uses the front carriage guide shaft and the printwheel hub as reference points to measure the platen's position. Be careful that the position of the print hammer assembly does not interfere with positioning the combo gauge onto the printwheel hub. If necessary, loosen the two mounting screws on the print hammer assembly and move it down out of the way.

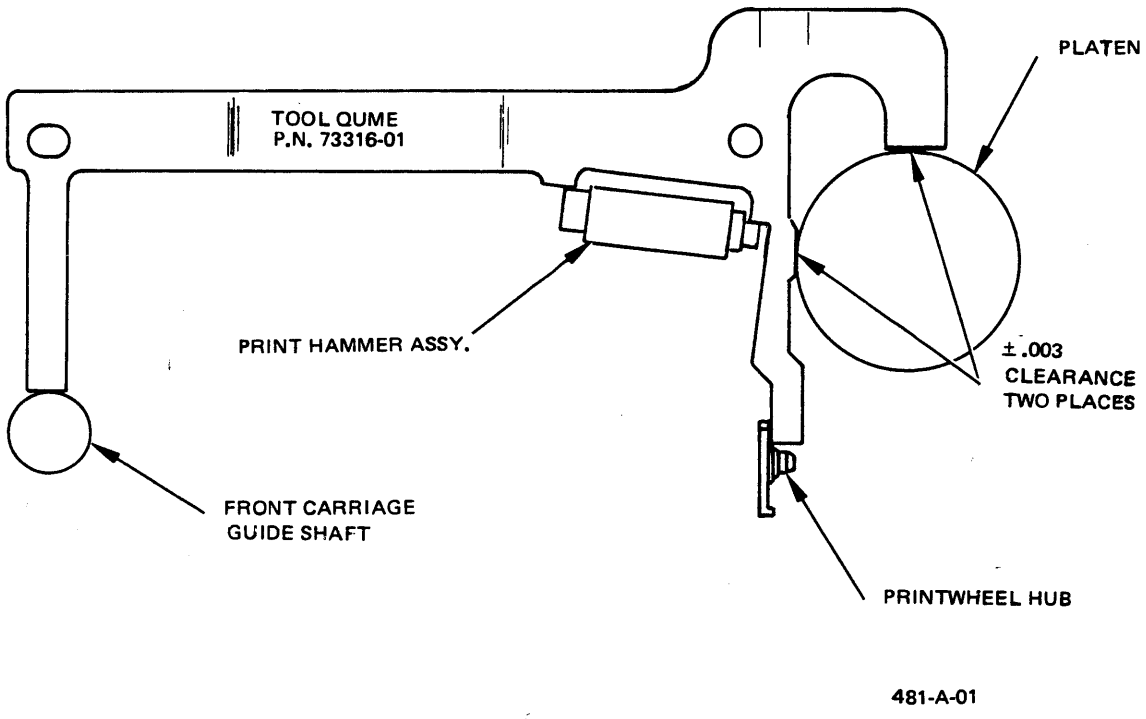

Figure 6-4. Platen Height and Depth Adjustments Using Combo Gauge

7. On both the right and left hand sides of the platen carrier assembly there are two adjustable eccentrics. The rear platen eccentric is used to adjust the platen's depth (front to rear position) and the front platen eccentric is used to adjust the platen's height.

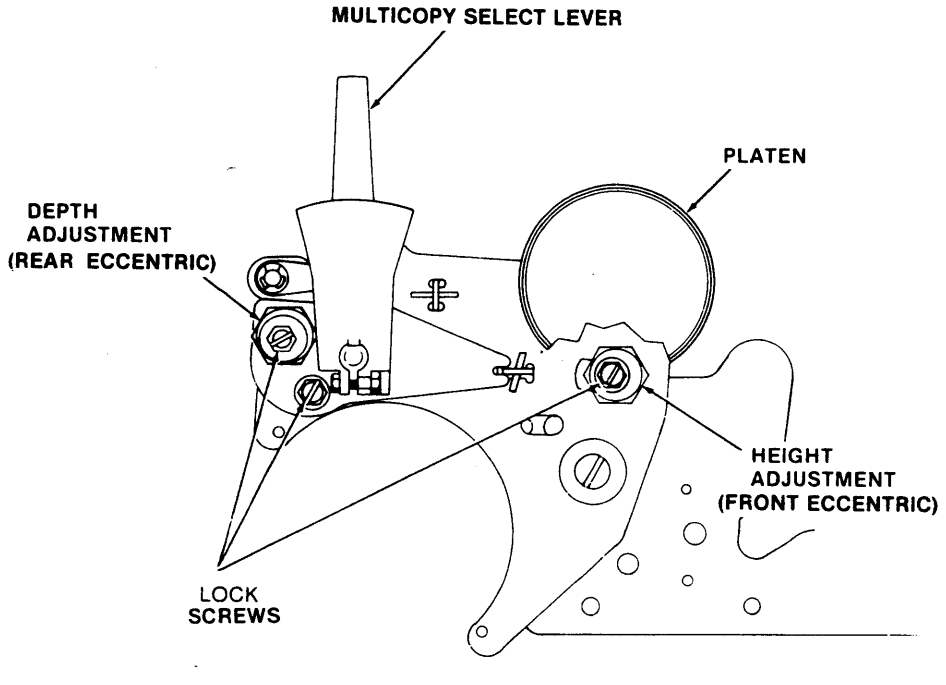

Figure 6-5. Platen Height and Depth Adjustment

8. Adjust the right hand height eccentric by loosening its lock screw and rotating the eccentric with a 5/8" open end wrench until the top surface of the platen just touches the combo gauge (± 0.003"). Tighten the lock screw.

9. Adjust the right hand depth eccentric by loosening the two lock screws and rotating the eccentric with a 5/8" open end wrenchs until the platen's front surface just touches the combo gauge (± 0.003"). Tighten the lock screws.

10. Remove the combo gauge. Move the carriage assembly to the printer's extreme left side. Reinstall the combo gauge.

11. Make the left hand platen height and depth adjustments in the same way as you did for the right hand side (steps 8 and 9).

12. Because of the interrelationship between these eccentrics and the platen carrier assembly, changing one eccentric's position will slightly affect one or more of the others. Before proceeding, ensure that the platen depth and height are correct on both ends of the platen.

13. If in step 6 you had to loosen the print hammer assembly, adjust the print hammer height and angle, and check all other print hammer related adjustments (refer to the appropriate adjustment procedures).

14. Install the card guide, printwheel, and ribbon cartridge.

15. Turn the printer on and perform the Print Quality Adjustment Check (listed in the Preventive Maintenance section).

16. Replace the top cover assembly.

CARD GUIDE

The plastic card guide provides horizontal and vertical reference marks for text alignment. Adjust the card guide position as follows:

1. Turn the printer off and remove the operator access panel.

2. Remove the ribbon cartridge and printwheel.

3. Ensure that the Multicopy Select Lever is in its full forward position (toward the operator).

4. Loosen the card guide bracket mounting screws and adjust the card guide bracket front to rear so that the card guide just touches the front surface of the platen (see the illustration below). As you move the Multicopy Select Lever to the rear, a clearance between the card guide and the platen should result by the time you have moved the Multicopy Select Lever back two notches. Ensure that the card guide is parallel to the platen and that there is no interference between the card guide bracket and the front feed rollers.

5. Adjust the card guide up or down, and right to left by loosening the 3/16" hex head screws that secure the two card guide channels and card guide latches to the card guide bracket. Power up the printer, insert paper, and print three lines of upper case I. Align the card guide to the printed I's using the reference lines on the card guide.

6. Check the ribbon guide finger adjustment (refer to the Ribbon Guide Finger adjustment procedure) and re-adjust as necessary.

7. If, in step 5, you changed the ribbon guide finger adjustment, check the front to rear position of the card guide and adjust if necessary (see step 4).

8. Replace the printwheel, ribbon cartridge, and operator access panel.

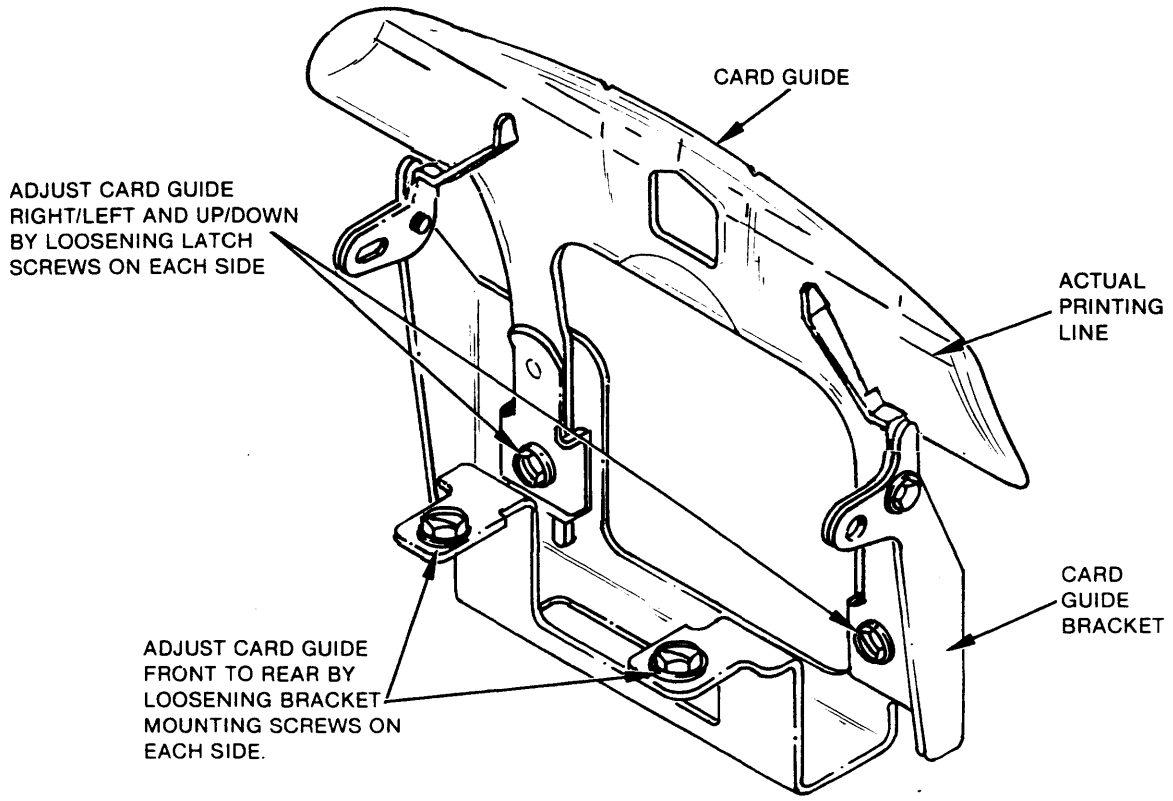

Figure 6-6. Card Guide Adjustment

RIBBON SUPPORT PLATE

The ribbon support plate determines ribbon height. It normally will not need adjustment. An adjustment may be needed if the ribbon is tracking too high or too low relative to the printline. First check that the ribbon cartridge is not the cause of the problem. Adjust the ribbon support plate as follows:

1. Ensure that the platen depth and height, card guide front to rear, and ribbon guide finger adjustments are correct (refer to the appropriate adjustment procedures).

2. Using a Qume Multistrike IV ribbon, print a line of underscores.

3. Remove the ribbon cartridge. Observe that the underscore struck the ribbon 0.050 ± 0.020" from the bottom edge of the ribbon.

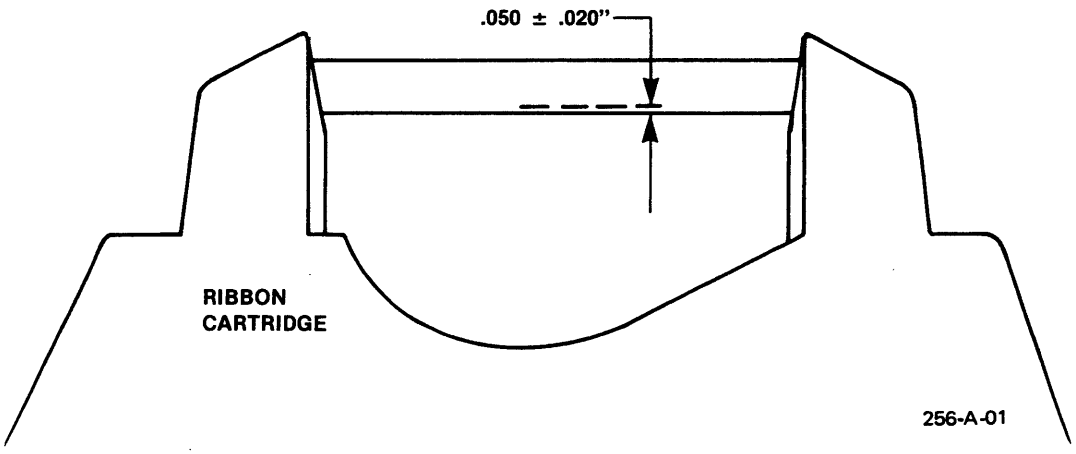

Figure 6-7. Ribbon Height Adjustment

4. If the above condition is not met, adjust the ribbon support plate:

5. Remove power to the printer. Remove the operator access panel and the printwheel.

6. Locate and loosen the screw holding the ribbon support plate bracket (see the illustration). Loosen the locknuts on the support plate up-stop and down-stop screws using a 1/4" wrench.

7. With a screwdriver, turn the down-stop eccentric to move the support plate up or down as required, then tighten the down-stop locknut. Snug the up-stop against the support plate, and tighten its locknut. The support plate should not move up or down.

8. Tighten the support bracket screw. Install the printwheel and ribbon cartridge. Check ribbon alignment as in steps 2 and 3. Readjust the support plate if necessary.

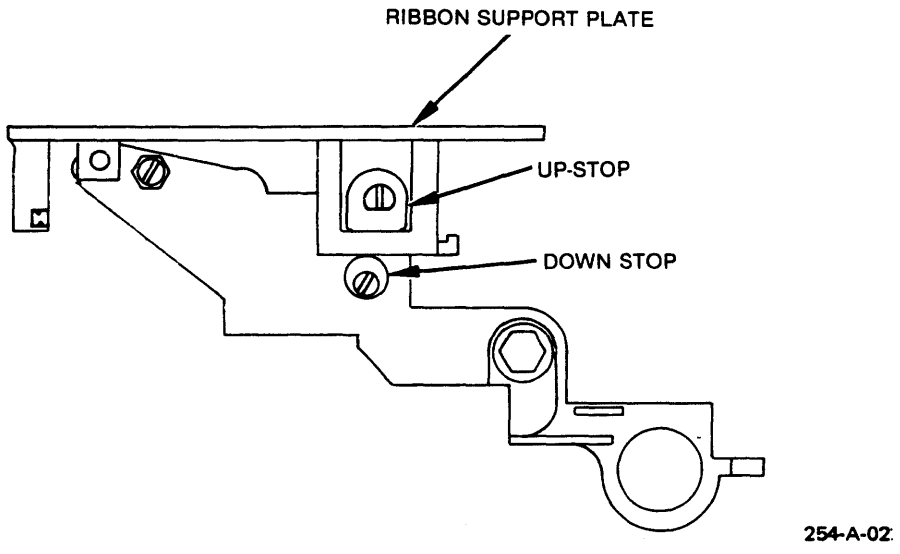

Figure 6-8. Ribbon Support Plate Adjustment

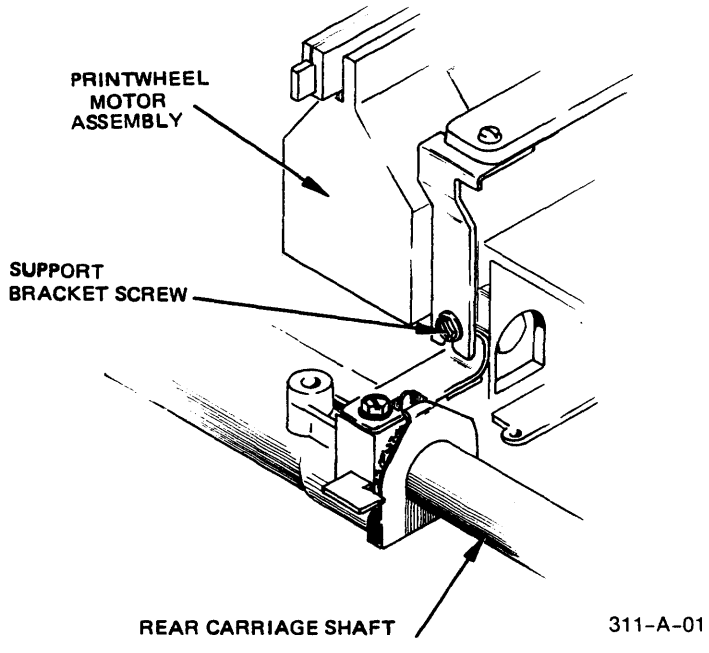

Figure 6-9. Ribbon Support Plate Fastening

RIBBON DRIVE GEAR ADJUSTMENT

The drive gear on the ribbon motor must rotate freely while meshing with the larger gear on the ribbon clutch. At the same time, only a minimum of backlash is allowable. If necessary, loosen the two ribbon motor mounting screws and adjust the motor position slightly so the gears mesh and rotate freely without binding.

CARRIAGE DRIVE BELT TENSION

Carriage drive belt tension is adjusted as follows:

1. Remove power to the printer.

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2. Remove the top cover (refer to the Top Cover Removal and Replacement procedure).

3. Move the carriage assembly to the left side frame.

4. At a point six inches from the right side frame, push directly down on the drive belt with one pound of force. A spring scale or a one pound weight will work.

5. At this same point on the drive belt, measure the distance between the top of the drive belt (the upper section) and the printer's bottom structure.

   This distance should be 0.85" $\pm$ 0.05". It can be gauged using the Combo Gauge which has a 0.85 inch step designed into it.

   When the gauge is resting on the bottom structure, the first step of the gauge should be even with the top of the belt (see the following illustration).

6. If the drive belt tension is not correct, turn the drive belt tension adjusting nut clockwise to increase belt tension or counterclockwise to decrease belt tension.

7. After altering drive belt tension, move the carriage assembly back and forth several times before checking for correct tension (steps 3 through 5).

8. Replace the top cover.

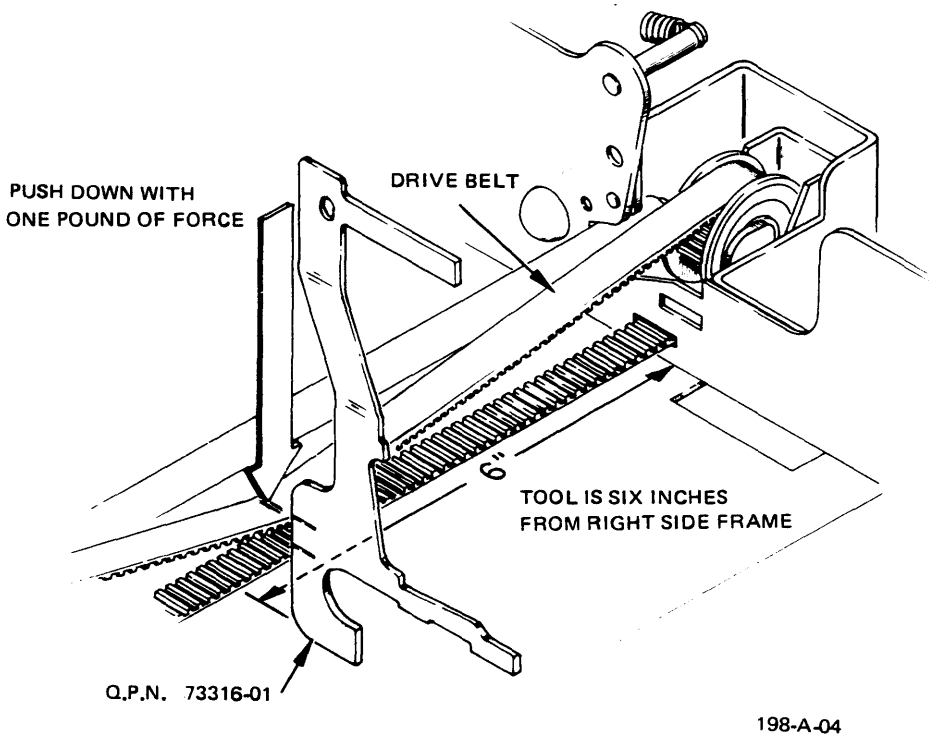

Figure 6-10. Drive Belt Tension Measurement

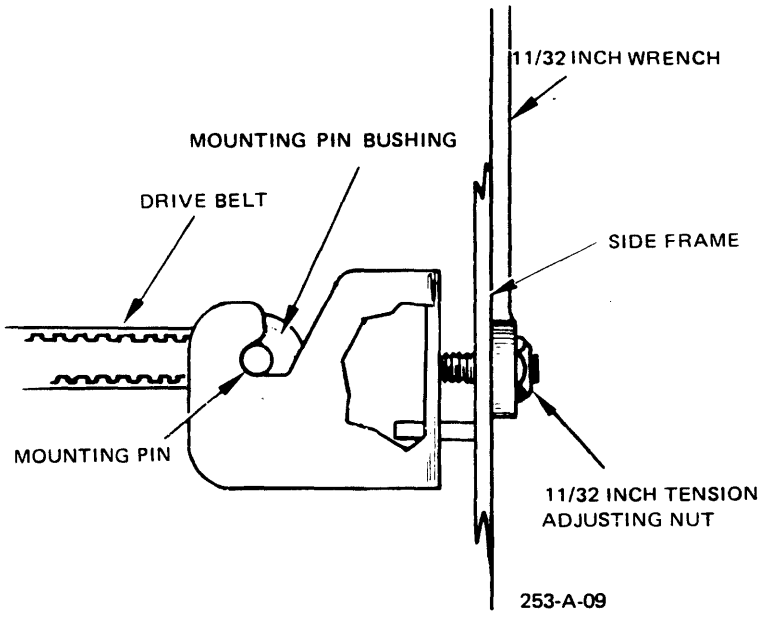

Figure 6-11. Drive Belt Tension Adjustment

PRINT MECHANISM

There are five print mechanism adjustments. If one adjustment is changed, all five must be checked and readjusted as necessary. These five adjustments are interrelated. The printwheel hub adjustment requires additional special tools and Qume recommends that it be performed only at the depot service level by personnel trained in the proper use of the tools.

Before adjusting the print mechanism, ensure that the platen height and depth, and ribbon adjustments are correct (refer to the appropriate adjustment procedures).

Also ensure that the print hammer cleaning procedure has been recently performed (if necessary) or do so prior to adjusting the print mechanism.

Print Hammer Height and Angle

The position of the print hammer is critical for optimum print quality. The following adjustment procedure uses the combo gauge for positioning the print hammer. Final adjustment, based on inspection of a print strike-up, may be necessary.

1. Remove power to the printer.

WARNING

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2. Remove the top cover (refer to the Top Cover Removal and Replacement procedure).

3. Remove the ribbon cartridge, printwheel, platen, and card guide.

4. Return the printwheel motor to the down, locked position.

5. Install the combo gauge as shown below. It straddles the carriage assembly and uses the front carriage guide shaft and the printwheel hub as reference points to measure the print hammer's position.

6. When properly adjusted, the front and rear top surface of the print hammer should just touch the reference areas of the combo gauge. Ensure that the gauge is resting on the printwheel hub and is not being held up by the print hammer.

7. If necessary, loosen the two mounting screws holding the hammer guide to the printwheel motor casting and reposition the hammer guide to meet the conditions in step 6. The hammer guide position is now adjusted.

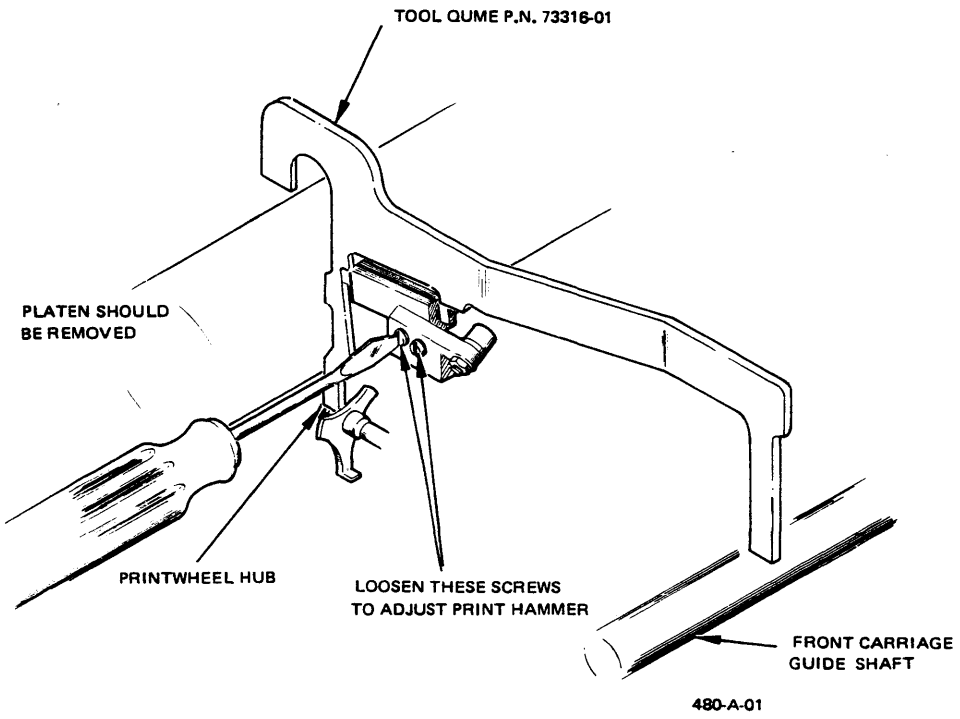


Figure 6-12. Print Hammer Positioning Using Combo Gauge

8. After all other print mechanism adjustments have been made, install the card guide, platen, ribbon cartridge, and printwheel, and perform the Print Quality Adjustment Check (refer to the Preventive Maintenance section). If the tops and bottoms of the characters on the print strike-up are not equally dense, refine the Print Hammer Height and Angle adjustment. If the bottoms of the characters are light, slightly lower the rear of the print hammer (the end farthest from the printwheel), or if the tops of the characters are light, slightly raise the rear of the print hammer. Refer to the Print Quality Problems section for examples of print quality problems caused by misadjusted print hammer angle.

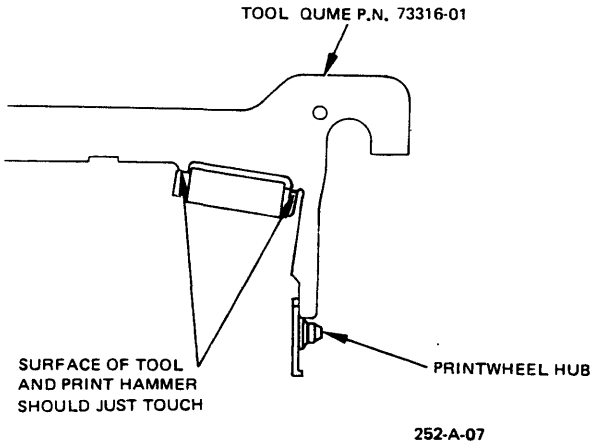


Figure 6-13. Print Hammer Height and Angle Adjustment

Print Hammer Armature Assembly (Penetration)

1. Remove power to the printer. Remove the operator access panel and the ribbon cartridge.

2. Install either the Qume Printwheel Adjustment Tool (Disc), or use a good printwheel to check the print hammer penetration. The special disc provides the most accurate measure of penetration and is recommended.

3. Manually push the hammer armature toward the platen until it contacts the hammer armature coil pole pieces. If the hammer armature cannot touch the coil pole pieces, loosen the lock screw and rotate the eccentric hammer armature front stop out of the way. The front stop will be adjusted next. Hold the armature in this position.

4. The hammer armature penetration is correct when, with the armature held against the coil pole pieces, the print hammer has deflected a printwheel spoke 0.020" to 0.035" (approximately one half the thickness of the printwheel spoke). Check this measurement at several locations around the printwheel. Refer to the following illustrations.

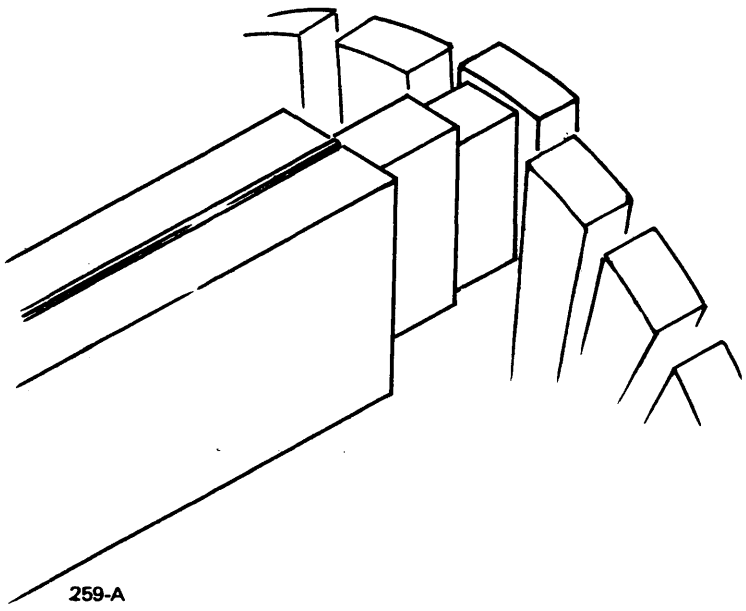


Figure 6-14. Print Hammer Penetration Measurement

5. If the above condition is not met, loosen the three screws that fasten the hammer armature assembly to the printwheel motor casting and adjust the armature assembly front to rear as necessary. Tighten the mounting screws and recheck this adjustment.

6. When making the print hammer armature assembly adjustment at the depot service level, a special Qume tool, Printwheel Adjustment Tool (Disc), Qume Part Number 73298-01, is recommended. This tool replaces the printwheel in the above procedures and is installed with the word "up" toward the platen.

   Align the machined slot in the disk with the hammer. While holding the hammer armature against the pole pieces, observe that the leading edge of the hammer lies between the two edges of the disc. The thickness of the edge of the disc at this slot defines the minimum and maximum allowable print hammer "penetration" of the printwheel.

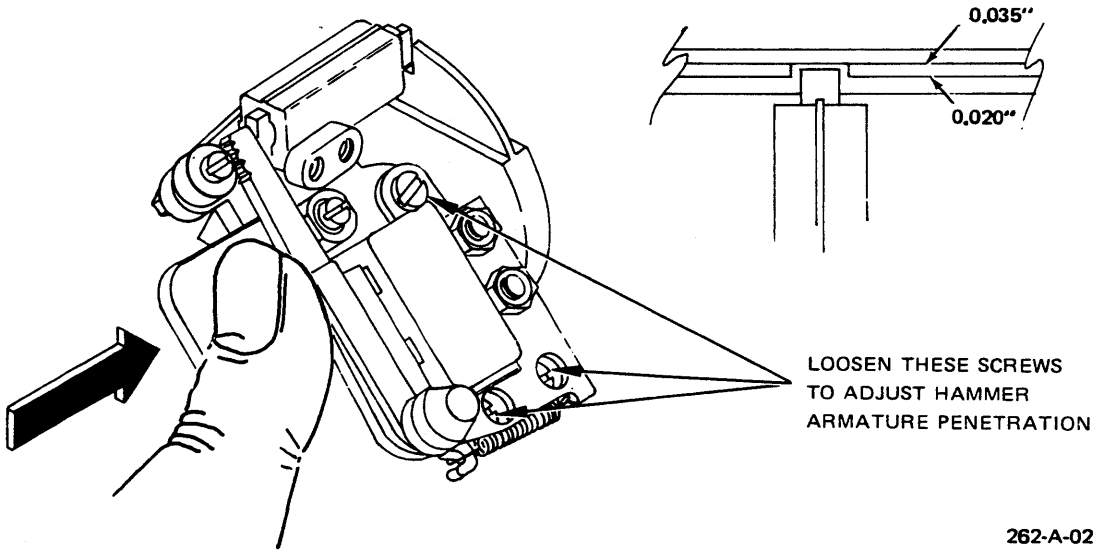


Figure 6-15. Print Hammer Penetration Adjustment

Print Hammer Armature Front Stop

This adjustment limits the long term wear that could result from millions of closings of the hammer armature against the coil pole pieces. Adjust the front stop as follows:

1. Remove power to the printer. Remove the operator access panel and the ribbon cartridge.

2. Ensure that the hammer armature assembly is correctly adjusted.

3. Loosen the lock screw on the eccentric hammer armature front stop.

4. Manually push the hammer armature against the hammer armature coil pole pieces. Hold the armature in this position.

5. Rotate the eccentric front stop until there is a 0.000" to 0.005" clearance between the hammer armature and the front stop.

6. Tighten the front stop lock screw.

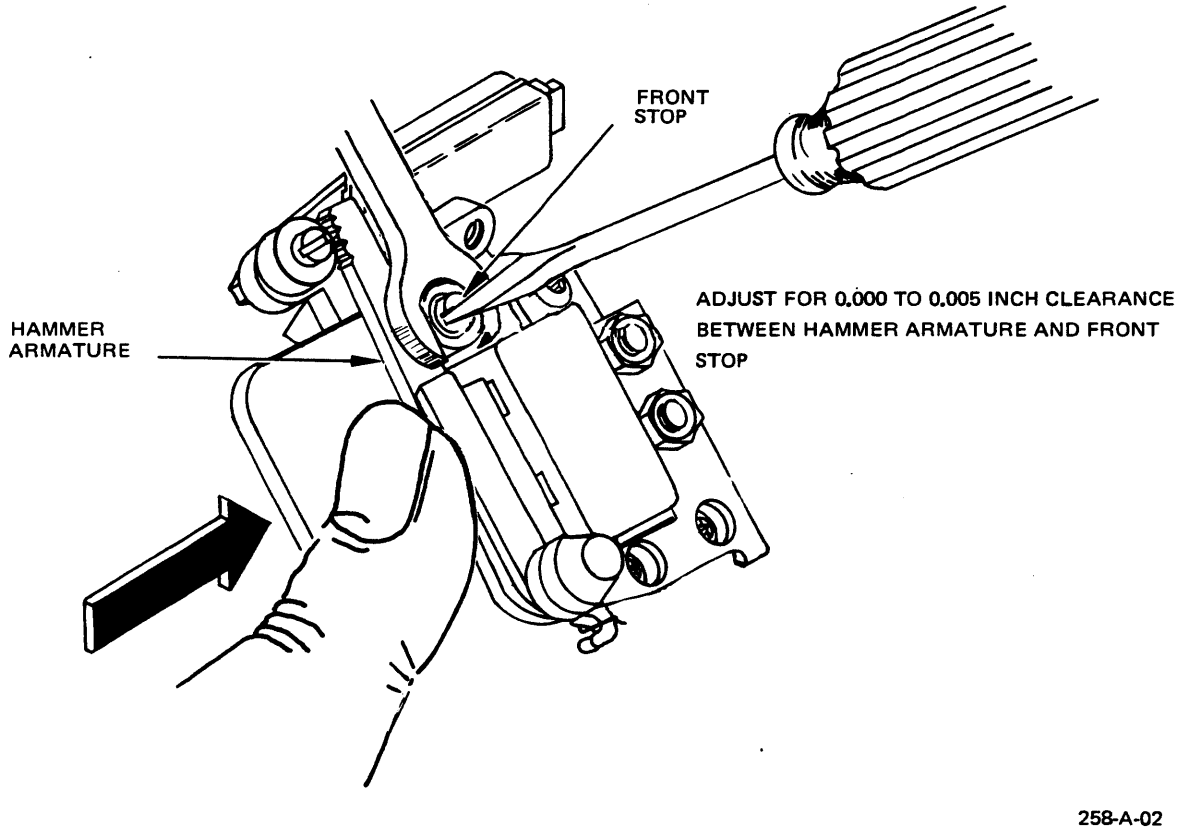


Figure 6-16. Print Hammer Armature Front Stop Adjustment

Print Hammer Armature Rear Stop

This adjustment establishes the rest position of the hammer. A correct rear stop adjustment is essential for optimum print quality. Adjust the rear stop as follows:

1. Remove power to the printer. Remove the operator access panel and the ribbon cartridge.

2. Ensure that the hammer armature assembly and hammer armature front stop adjustments are correct.

3. Loosen the 3/16" locking nut on the eccentric hammer armature rear stop.

4. Manually push the hammer armature against the hammer armature coil pole pieces. Hold the armature in this position.

5. Rotate the eccentric rear stop until there is a 0.065" (0.063" to 0.068") clearance between the hammer armature and the rear stop. NOTE: Installing the Bumper Ring Gauge, Qume P.N. 73046, on the rear stop, and adjusting for no clearance will result in the correct adjustment.

6. Tighten the rear stop lock nut.

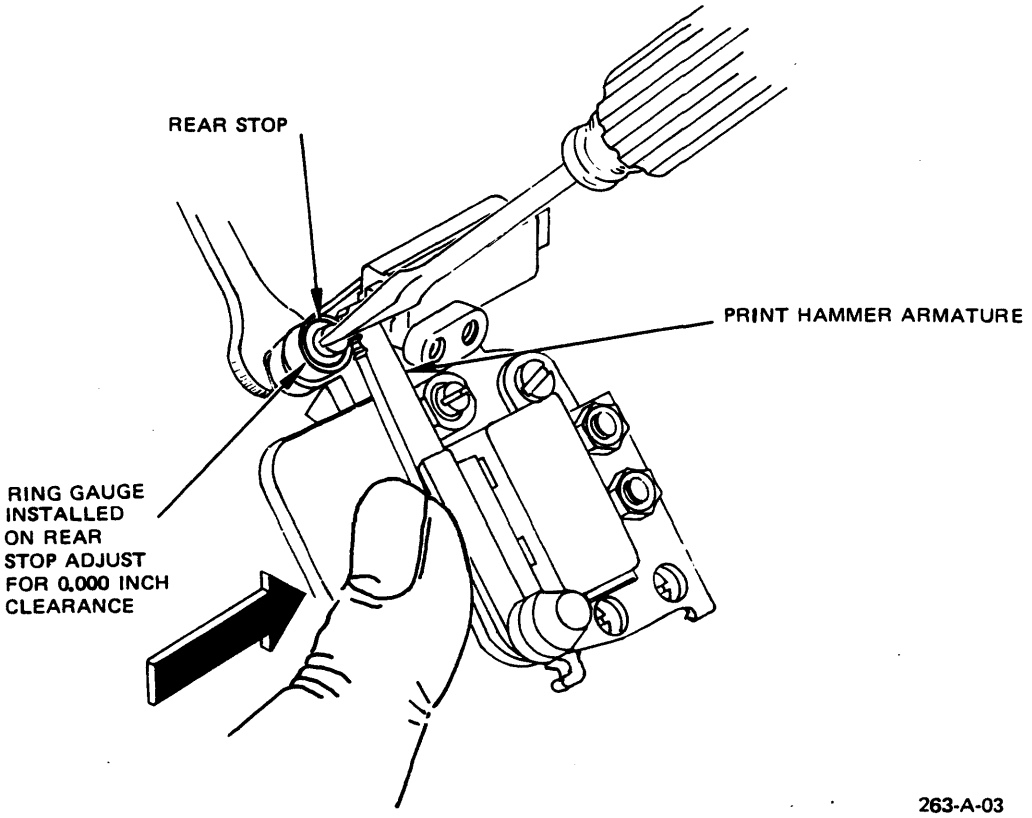


Figure 6-17. Print Hammer Armature Rear Stop Adjustment

Printwheel Hub

This adjustment is infrequently made and Qume does not recommend it be performed by field service level personnel. Three special tools are required (refer to the Tools, Cleaners, Lubricants section). The printwheel hub is adjusted as follows:

1. When the printwheel hub is correctly adjusted, and the printwheel motor is at the index position, the lower case "w" on standard Qume WP printwheels will be positioned exactly in front of the print hammer. (On WPS printwheels, lower case "e" represents the index position.)

   The printwheel motor may be returned to the index position by performing either a power up or commanded restore sequence, or by commanding the printer to print a lower case "w".

2. Return the printwheel motor to its index position by initializing the printer. If the lower case "w" is not positioned exactly in front of the print hammer, the printwheel motor hub must be adjusted.

3. Remove the operator access panel and the printwheel. Tilt the upper carriage assembly back, away from the platen.

4. Using the two Printwheel Adjusting Tools (inner collet, Qume P.N. 80472, and outer collet, Qume P.N. 80471), loosen the printwheel hub outer collet and free the printwheel hub on the printwheel motor shaft. Leave the outer collet loose enough to allow rotating the hub on the shaft, but still tight enough to retain a new position.

5. Install the Printwheel Adjusting Tool (disc), Qume P.N. 73298-01, on the printwheel hub as if it were a printwheel (the side marked "UP" faces away from the printwheel motor).

6. Return the printwheel to the index position by initializing the printer. You may have to do this several times, since the greater weight of the disc will cause it to rotate past the index position.

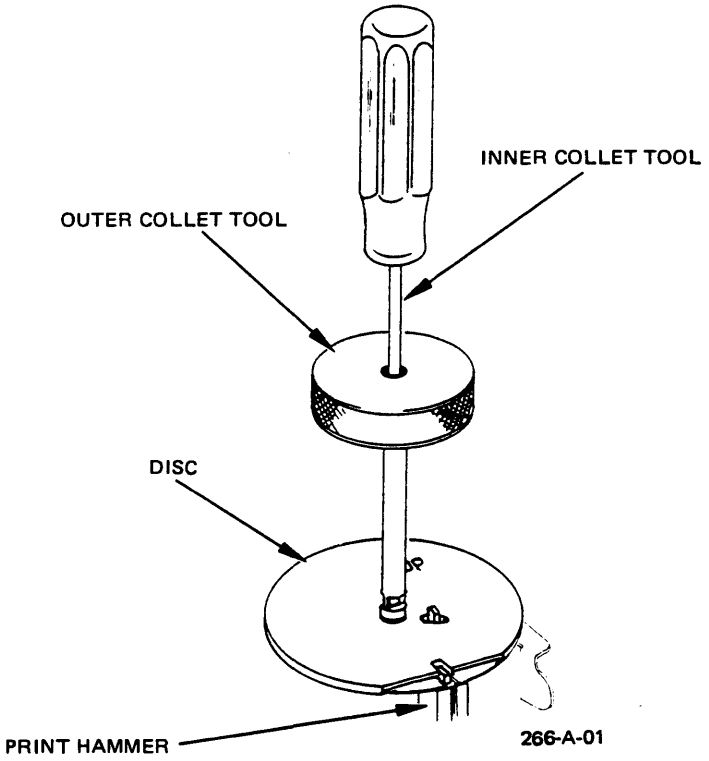


Figure 6-18. Printwheel Hub Adjustment

7. With the printwheel motor at the index position, and the disc installed, the printwheel hub is correctly adjusted when the print hammer, manually pushed toward the disc, cleanly enters the slot in the disc.

8. Hold the printwheel motor shaft stationary at the index position with the inner collet Printwheel Adjustment tool, and correctly position the printwheel hub by rotating the disc so that the print hammer will cleanly enter the slot in the disc.

9. While holding the printwheel motor shaft with the inner collet tool, tighten the outer collet with the outer collet tool.

10. Check the printwheel hub adjustment again; if the hub is still not in exactly the correct position, repeat steps 4 through 9.

POWER SUPPLY VOLTAGES

WARNING

THE AC POWER CORD MUST BE DISCONNECTED BEFORE THE TOP COVER ASSEMBLY IS REMOVED. LETHAL VOLTAGES ARE PRESENT ON THE POWER SUPPLY PRINTED CIRCUIT BOARD.

Adjust the power supply voltages as follows:

1. Remove the top cover (see Top Cover Removal and Replacement Procedure).

2. Power up the printer and, using a digital voltmeter, check the +5 Vdc, +15 Vdc and -15 Vdc outputs at the designated test points on the Main PCB. Do not measure any voltages on the power supply PCB.

Table 6-1. DC Voltage Test Points On Main PCB

Test Point	DC Voltage	Correct Range
TP-1	Ground	
TP-2	+15	+13.5 to +16.5
TP-3	-15	-13.5 to -16.5
TP-4	+5	+4.95 to +5.15

3. Adjust R46 on the power supply PCB to obtain 5.1 Vdc at TP-7 on the Main PCB.

   Both 15 volt supplies are set by R22. Adjust R22 so that the lower of the two 15 volt supplies is 15.5 volts, positive or negative. For example, the -15 supply may be set to -15.5 and the +15 supply will be higher. Or, the +15 supply may be set to +15.5 volts and the -15 supply will be more negative than -15.5 volts.

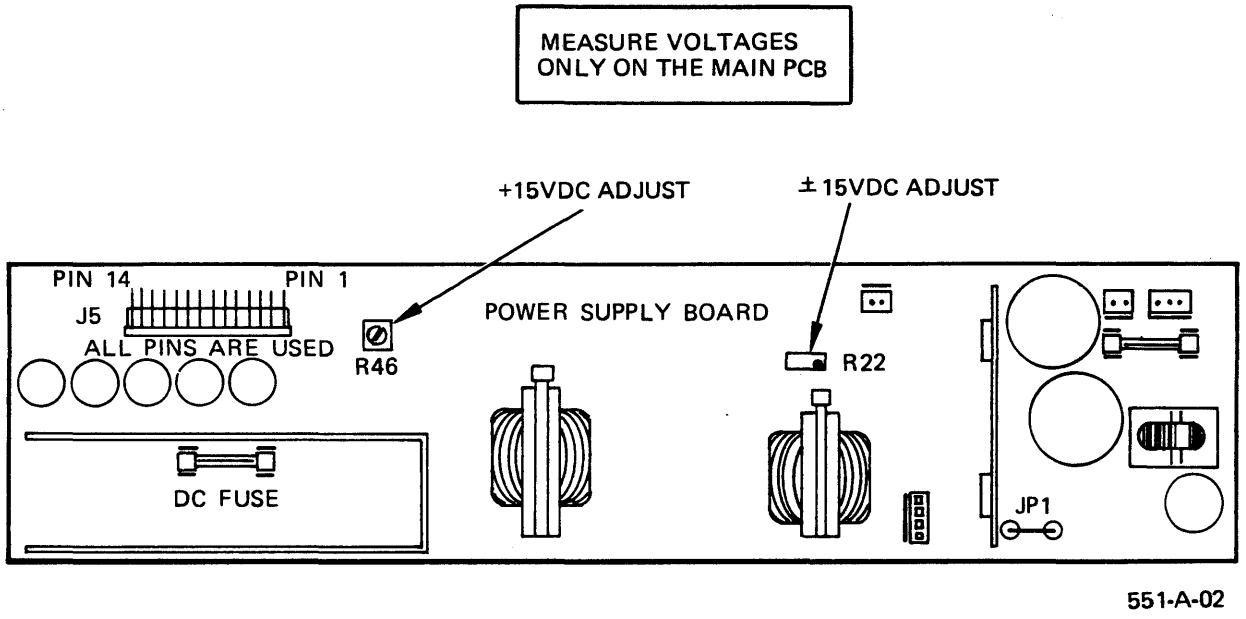


Figure 6-19. Power Supply Voltage Adjustment

SECTION 7
DIAGNOSING PRINT QUALITY PROBLEMS

Printing problems fall into three categories:

1. **Ribbon and printwheel problems** - Missing or light characters, partially printed characters, missing characters.

2. **Printing errors** - Wrong characters, misspellings, missing characters.

3. **Printing quality** - Light or heavy characters, parts of characters light or missing.

RIBBON AND PRINTWHEEL PROBLEMS

When diagnosing print quality problems always inspect the printwheel, ribbon and ribbon drive mechanism first. Remove the old ribbon. Examine the ribbon drive mechanism while the printer is running Self-Test. The ribbon motor should be turning freely and advancing the ribbon.

Install a known good printwheel and ribbon. Check the print quality again before proceeding further. Damaged printwheels and/or improperly stored ribbons can be the cause of various print quality problems.

PRINTING ERRORS

Printing errors are generally caused by electronic problems and can be associated with the host system, the communication or interface circuits, or the printer electronics.

Make sure the host system is sending correct commands to the printer. If the printer successfully completes the Self-Test, including a correct sequence of 96 ASCII characters, the problem is either in the host system, the interface to the printer, or the input command latches on the printer's main PCB.

There are two problems which may appear to be mechanical adjustments but may be related to the printer electronics:

Light printing or no printing, even though the hammer fires - This could be caused by a defective hammer coil or a weak pulse to the hammer coil. It may not be a misadjustment of the hammer armature or penetration.

Sides of characters light or missing or scrambled characters - This may be due to a problem in the printwheel servo system which must position the printwheel so that each charcter lines up exactly in front of the hammer. The problem could be on the main PCB.

PRINTING QUALITY PROBLEMS

Before attempting mechanical adjustments, be aware that the setting of the Multiple Copy Lever can influence apparent print quality. Make sure that the Multiple Copy Lever is set correctly. For normal printing on one sheet of regular bond paper, the lever should be all the way toward the operator. Assuming that the electronics (including the host system) are operating correctly, mechanical adjustments may be necessary. To isolate particular adjustment problems, first determine whether the problem occurs on only one side of the page. If so, the platen height and/or depth may need adjustment. Problems uniform across the page may be platen or hammer misalignment, or a combination or both. Note also that some misadjustments, such as hammer armature front stop too far toward platen, do not necessarily produce printing problems but can cause serious wear on the hammer coil.

The following tables list print quality problems according to both symptoms and misadjustment. Following these tables are pages of print quality problems, classified by symptom. In all the explanations the following physical orientation conventions are observed: the control panel (Form Feed, Pause etc.) is on the front of the printer, the ON/OFF switch on the rear of the printer, and the platen knob on the right of the printer; when the hammer is described as being too low or high, the reference point is that part of the hammer closest to the platen; when the hammer stops are described, the front stop is the stop closest to the platen.

Table 7-1. Print Quality Problems According to Symptom

Problem	Possible Cause	Adjustment
Tops of characters lost or light (both sides)	Hammer angle misadjusted Platen height too low	Hammer angle Platen height
Bottoms pf characters lost or light	Hammer angle misadjusted Platen depth too far back Platen height too high	Hammer angle Platen depth Platen height
Unevern letter spacing	Drive belt tension loose	Drive belt tension
Uneven line spacing	Platen drive belt loose	Platen drive belt
Missing letters	Hammer penetration inadequate	Hammer penetration
Light letters	Hammer armature front stop too far back	Front stop

Table 7-2. Print Quality Problems According to Adjustment

Adjustment	Symptom
Hammer angle	Misadjusted: tops or bottoms of letters lost
Hammer penetration	Inadequate - missing letters
Belt tension	Loose - uneven letter spacing
Platen drive belt	Loose - uneven line spacing
Platen depth	Too far back - lost bottoms of letters
Platen height	Too high - lost bottoms of letters Too low - light or lost tops
Hammer armature front stop	Too far back - light letters Too far forward (toward platen) - damage to hammer coil

The print hammer armature front stop adjustment may not affect print quality. However, if the print hammer armature is stopped by the coil pole pieces and not the front stop (because the front stop is too far in the direction of the platen), damage to the coil pole pieces could result.

This is a sample of text printed with the Prestige Elite 12 ASCII 96 printwheel and Multistrike ribbon. The 12 indicates that the character spacing is 12 pitch. That is, there are 12 equally spaced characters per inch. The character size corresponds to that of Elite typewriter type style, and allows for 158 columns on a standard friction platen. Vertical spacing is set for 6 lines per inch.

ASCII stands for the "American Standard Code for Information Interchange" and it is the standard communications code that is used by the printer's electronics to position the desired character in front of the printing hammer. The 96 indicates that there are 96 characters on the printwheel. A complete printout of all the characters on the printwheel follows:

!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`
abcdefghijklmnopqrstuvwxyz{|}~-

HHH ''' MMM YYY III OOO /// ... ((( ))) ,,, /// qqq MMM """ HHH

GOOD PRINT QUALITY

PRINTING WITH WRONG WPS SWITCH SETTING:

WPS PRINTWHEEL

WPS SWITCH ON:

```
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXY
Z[®]©_°abcdefghijklmnopqrstuvwxyz§¶†™
```

WPS SWITCH OFF:

```
ybGWfpYnQe,#/¶cv"D-UX!M.KP:rGmud$ZBL_)F*A;HV[?ENI+TSJR<O=
'lhjiao6l2(4©z97q†&k03_®5°8§x™%@]tsgw
```

ASCII PRINTWHEEL

WPS SWITCH OFF:

```
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXY
Z[\]^_`abcdefghijklmnopqrstuvwxyz{|}~
```

WPS SWITCH ON:

```
61,AxlZdFHR+38-nbcoeraith;JWY-NyIC=2OG#KQU9D7PX:)VTS4L$5'
BMqzfEs_"/@*%}\^]m[>(`&j<|{?O~v!gu.kw
```

This is a sample of text printed with the Prestige Elite 12 ASCII 96 printwheel and multistrike ribbon. The 12 indicates that the character spacing is 12 pitch. That is, there are 12 equally spaced characters per inch. The character size corresponds to that of Elite typewriter type style, and allows for 156 columns on a standard friction platen. Vertical spacing is set for 6 lines per inch.

ASCII stands for the "American Standard Code for Information Interchange" and it is the standard communications code that is used by the printer's electronics to position the desired character in front of the printing hammer. The 96 indicates that there are 96 characters on the printwheel. A complete printout of all the characters on the printwheel follows:

```
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`
abcdefghijklmnopqrstuvwxyz{|}~
HHH ''' MMM YYY III OOO /// ... ((( ))) ,,, /// qqq MMM """ HHH
```

TOPS OF CHARACTERS LIGHT - RIGHT SIDE OF PAGE

Possible cause: Platen height, right side, too low.
Adjustment: Platen height, right side.

This is a sample of text printed with the Prestige Elite 12 ASCII 96 printwheel and multistrike ribbon. The 12 indicates that the character spacing is 12 pitch. That is, there are 12 equally spaced characters per inch. The character size corresponds to that of Elite typewriter type style, and allows for 156 columns on a standard friction platen. Vertical spacing is set for 6 lines per inch.

ASCII stands for the "American Standard Code for Information Interchange" and it is the standard communications code that is used by the printer's electronics to position the desired character in front of the printing hammer. The 96 indicates that there are 96 characters on the printwheel. A complete printout of all the characters on the printwheel follows:

```
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`
abcdefghijklmnopqrstuvwxyz{|}~

HHH ''' MMM YYY III OOO /// ... ((( ))) ,,, /// qqq MMM """ HHH
```

TOPS OF CHARACTERS LIGHT - EVENLY ACROSS PAGE

Possible cause: Hammer angle misadjusted, and/or
Platen height, both sides, too low.
Adjustment: Hammer angle, and/or platen height.

This is a sample of text printed with the Prestige Elite 12 ASCII 96 printwheel and multistrike ribbon. The 12 indicates that the character spacing is 12 pitch. That is, there are 12 equally spaced characters per inch. The character size corresponds to that of Elite typewriter type style, and allows for 158 columns on a standard friction platen. Vertical spacing is set for 6 lines per inch.

ASCII stands for the "American Standard Code for Information Interchange" and it is the standard communications code that is used by the printer's electronics to position the desired character in front of the printing hammer. The 96 indicates that there are 96 characters on the printwheel. A complete printout of all the characters on the printwheel follows:

!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`
abcdefghijklmnopqrstuvwxyz{|}~¬
HHH ''' MMM YYY III OOO /// ... ((( ))) ,,, /// qqq MMM """ HHH

TOPS OF CHARACTERS LIGHT - LEFT SIDE OF PAGE

(In this example the multiple copy lever is toward operator)
Possible cause: Platen height, left side, too low.
Adjustment: Platen height, left side.

This is a sample of text printed with the Prestige Elite 12 ASCII 96 printwheel and multistrike ribbon. The 12 indicates that the character spacing is 12 pitch. That is, there are 12 equally spaced characters per inch. The character size corresponds to that of Elite typewriter type style, and allows for 158 columns on a standard friction platen. Vertical spacing is set for 6 lines per inch.

ASCII stands for the "American Standard Code for Information Interchange" and it is the standard communications code that is used by the printer's electronics to position the desired character in front of the printing hammer. The 96 indicates that there are 96 characters on the printwheel. A complete printout of all the characters on the printwheel follows:

!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`
abcdefghijklmnopqrstuvwxyz{|}~¬
HHH ''' MMM YYY III OOO /// ... ((( ))) ,,, /// qqq MMM """ HHH

TOPS OF CHARACTERS LIGHT - LEFT SIDE OF PAGE

(In this example the multiple copy lever is away from operator)
Possible cause: Platen height, left side, too low.
Adjustment: Platen height, left side.

This is a sample of text printed with the Prestige Elite 12 ASCII 96 printwheel and Multistrike ribbon. The 12 indicates that the character spacing is 12 pitch. That is, there are 12 equally spaced characters per inch. The character size corresponds to that of Elite typewriter type style, and allows for 158 columns on a standard friction platen. Vertical spacing is set for 6 lines per inch.

ASCII stands for the "American Standard Code for Information Interchange" and it is the standard communications code that is used by the printer's electronics to position the desired character in front of the printing hammer. The 96 indicates that there are 96 characters on the printwheel. A complete printout of all the characters on the printwheel follows:

!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`
abcdefghijklmnopqrstuvwxyz{|}~
HHH ''' MMM YYY III 000 /// ... ((( ))) ,,, /// qqq MMM """ HHH

BOTTOMS OF CHARACTERS LIGHT-RIGHT SIDE OF PAGE

Possible cause: Platen height, right side, too high.
Adjustment: Platen height, right side.

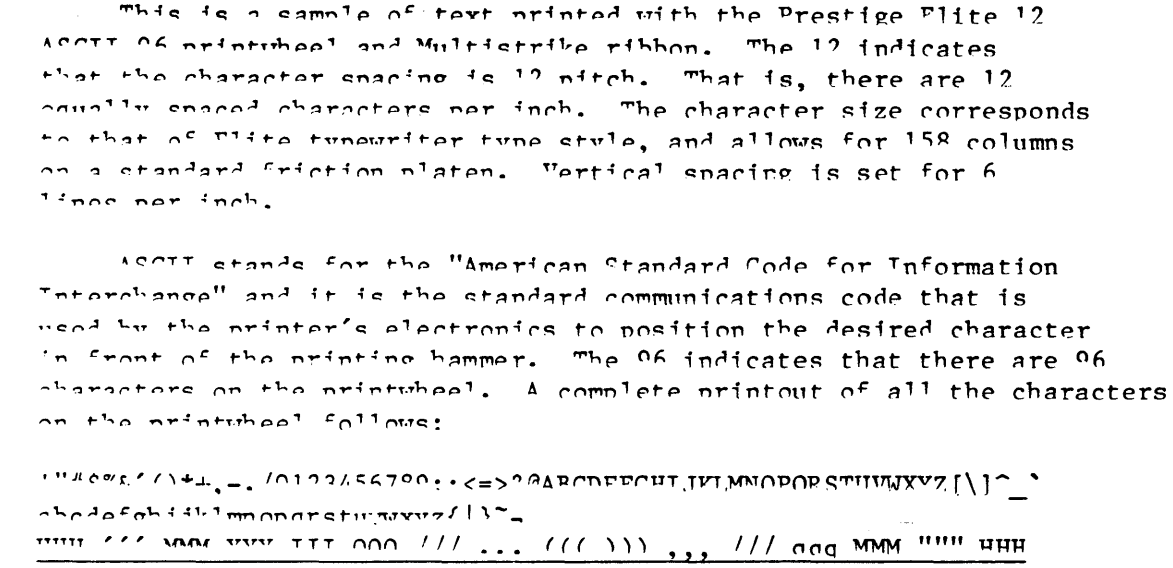
This is a sample of text printed with the Prestige Elite 12 ASCII 96 printwheel and Multistrike ribbon. The 12 indicates that the character spacing is 12 pitch. That is, there are 12 equally spaced characters per inch. The character size corresponds to that of Elite typewriter type style, and allows for 158 columns on a standard friction platen. Vertical spacing is set for 6 lines per inch.

ASCII stands for the "American Standard Code for Information Interchange" and it is the standard communications code that is used by the printer's electronics to position the desired character in front of the printing hammer. The 96 indicates that there are 96 characters on the printwheel. A complete printout of all the characters on the printwheel follows:

!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`
abcdefghijklmnopqrstuvwxyz{|}~
HHH ''' MMM YYY III 000 /// ... ((( ))) ,,, /// qqq MMM """ HHH

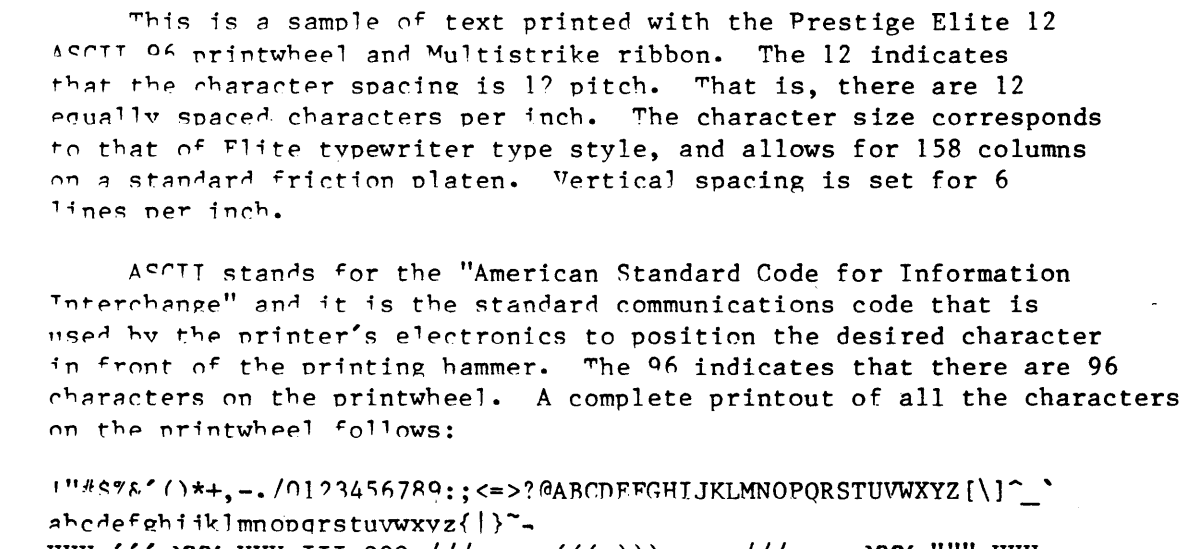
BOTTOMS OF CHARACTERS LIGHT-RIGHT SIDE OF PAGE

Possible cause: Hammer angle unadjusted and/or
Platen height, both sides, too high.
Adjustment: Hammer angle, and/or platen height.



BOTTOMS OF CHARACTERS LIGHT-LEFT SIDE OF PAGE

(In this example the multiple copy lever is away from operator)
Possible cause: Platen height **and** depth, left side, too high.
Adjustment: Platen height, left side; platen depth, left side.



BOTTOMS OF CHARACTERS LIGHT-LEFT SIDE OF PAGE

(In this example the multiple copy lever is toward the operator)
Possible cause: Platen height **and** depth, left side, too high.
Adjustment: Platen height, left side, platen depth, left side.

This is a sample of text printed with the Prestige Elite 12 ASCII 96 printwheel and Multistrike ribbon. The 12 indicates that the character spacing is 12 pitch. That is, there are 12 equally spaced characters per inch. The character size corresponds to that of Elite typewriter type style, and allows for 158 columns on a standard friction platen. Vertical spacing is set for 6 lines per inch.

ASCII stands for the "American Standard Code for Information Interchange" and it is the standard communications code that is used by the printer's electronics to position the desired character in front of the printing hammer. The 96 indicates that there are 96 characters on the printwheel. A complete printout of all the characters on the printwheel follows:

!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`
abcdefghijklmnopqrstuvwxyz{|}~
HHH ''' MMM YYY III 000 /// ... ((( ))) ,,, /// qqq MMM """ HHH

BOTTOMS OF CHARACTERS LIGHT-LEFT SIDE OF PAGE

(In this example the multiple copy lever is away from operator)
Possible cause: Platen height, left side, too high.
Adjustment: Platen height, left side.

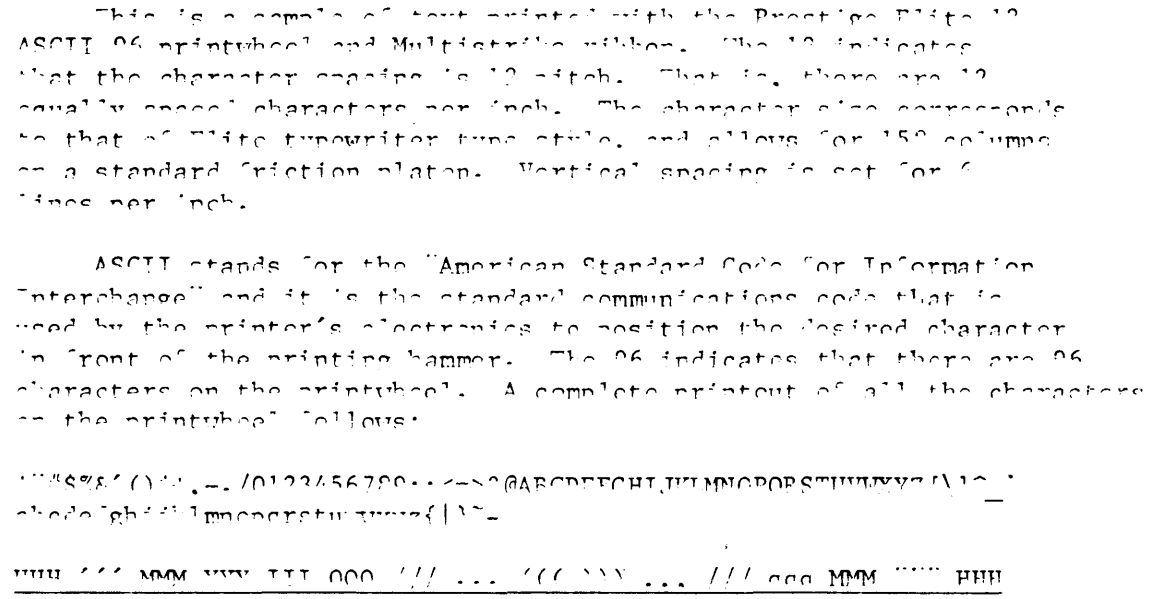
This is a sample of text printed with the Prestige Elite 12 ASCII 96 printwheel and Multistrike ribbon. The 12 indicates that the character spacing is 12 pitch. That is, there are 12 equally spaced characters per inch. The character size corresponds to that of Elite typewriter type style, and allows for 158 columns on a standard friction platen. Vertical spacing is set for 6 lines per inch.

ASCII stands for the "American Standard Code for Information Interchange" and it is the standard communications code that is used by the printer's electronics to position the desired character in front of the printing hammer. The 96 indicates that there are 96 characters on the printwheel. A complete printout of all the characters on the printwheel follows:

!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`
abcdefghijklmnopqrstuvwxyz{|}~
HHH ''' MMM YYY III 000 /// ... ((( ))) ,,, /// qqq MMM """ HHH

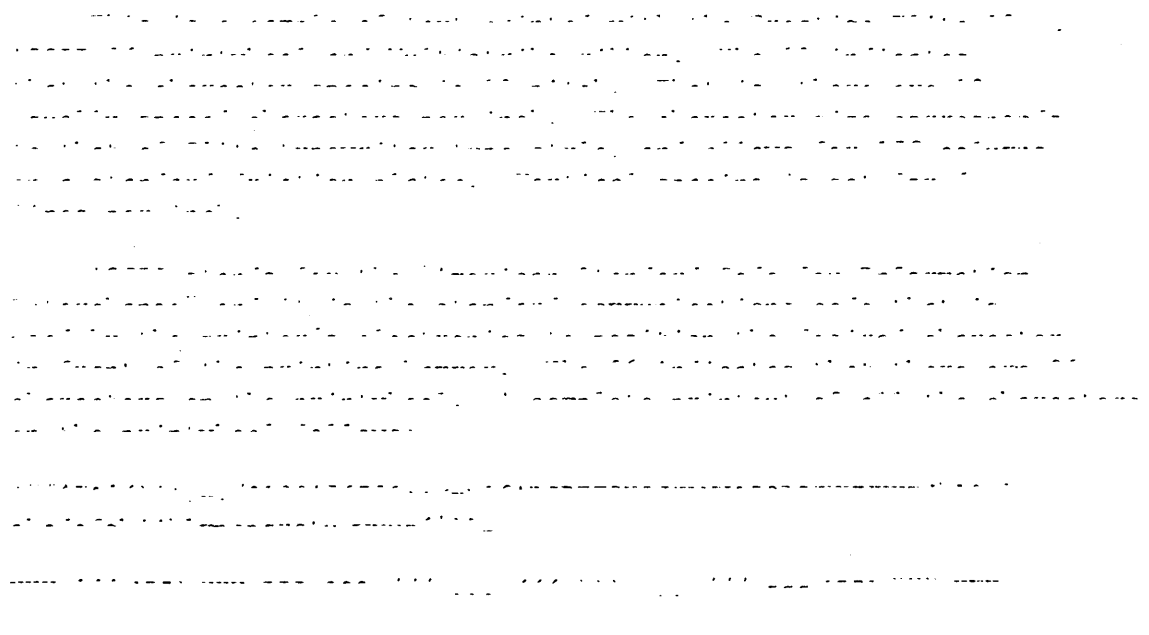
BOTTOMS OF CHARACTERS LIGHT-LEFT SIDE OF PAGE

(In this example the multiple copy lever is toward operator)
Possible cause: Platen height, left side, too high.
Adjustment: Platen height, left side.



BOTTOMS OF CHARACTERS LIGHT-EVENLY ACROSS PAGE

(In this example the multiple copy lever is toward operator)
Possible cause: Platen depth, both sides, too far back (away from operator)
Adjustment: Platen depth



BOTTOMS OF CHARACTERS LIGHT-EVENLY ACROSS PAGE

(In this example the multiple copy lever is away from operator)
Possible cause: Platen depth, both sides, too far back (away from operator)
Adjustment: Platen depth

This is a sample of text printed with the Prestige Elite 12 ASCII 96 r n wheel and Multistri e ribbon. The 12 i d ate that the character spacing is 12 pitch. That is, there are 12 equally spaced characters per inch. The character size corresponds to that of Elite typewriter type style, and allows for 158 columns on a standard friction platen. Vertical spacing is set for 6 lines per inch.

ASCII stands for the "American Standard Code for Information Interchange" and it is the standard communication code that is used by the printer's electronics to position the desired character in front of the printing hammer. The 96 indicates that there are 96 characters on the printwheel. A complete printout of all the characters on the printwheel follo s:

!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`
abcdefghijklmnopqrstuvwxyz{|}~

CHARACTERS LIGHT - EVENLY ACROSS PAGE

Possible cause: Print hammer armature front stop too far back.
Adjustment: Print hammer armature front stop.

T i i a s n l f p i t d i h P e s i e . t 12
A I r l M l i s . i i b o . The l d cate
a t e h r c e pa i i i h. a , t e e e 2
eq all s a e h a t r p r c . Th c a a er ize c rre p nds
t t f E ite p w i t r y e t l , an l w f r 58 nns
a t n r f ic in l t n. e l s ci g i s f r
i e p r c

AS I. t n o h " m ric n t d r C d f r nf r a
In h e" n he n rd m u ca i n c (at i
se b i ri ' e e r s t p s n e i e c ara e
in f f e in n mm . 6 a es t h re a 6
cha a t r o p in he l A o pl t i t ut o l e
th pr h e fo lo

" $% '(* , ./ 1 4 6 9 ; = . A E G I KL O Q S . WX Z \ _
a c e jk m o u w y {| ~

MISSING CHARACTERS

Possible cause: Not enough hammer penetration. In this example the distance between the hammer arm and rear stop is .063" (correct), but **both** hammer arm and stops are too far back (away from platen).
Adjustment: Hammer penetration (first) then stops.

This is a sample of text printed with the Prestige Elite 12 ASCII 96 printwheel and Multistrike ribbon. The 12 indicates that the character spacing is 12 pitch. That is, there are 12 equally spaced characters per inch. The character size corresponds to that of Elite typewriter type style, and allows for 158 columns on a standard friction platen. Vertical spacing is set for 6 lines per inch.

ASCII stands for the "American Standard Code for Information Interchange" and it is the standard communications code that is used by the printer's electronics to position the desired character in front of the printing hammer. The 96 indicates that there are 96 characters on the printwheel. A complete printout of all the characters on the printwheel follows:

!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`
abcdefghijklmnopqrstuvwxyz{|}~

HHH ''' MMM YYY III 000 /// ... ((( ))) ,,, /// qqq MMM """ HHH

UNEVEN CHARACTER SPACING

Possible cause: Loose carriage belt.
Adjustment: Carriage drive belt tension.

This is a sample of text printed with the Prestige Elite 12 ASCII 96 printwheel and Multistrike ribbon. The 12 indicates that the character spacing is 12 pitch. That is, there are 12 equally spaced characters per inch. The character size corresponds to that of Elite typewriter type style, and allows for 158 columns on a standard friction platen. Vertical spacing is set for 6 lines per inch.

ASCII stands for the "American Standard Code for Information Interchange" and it is the standard communications code that is used by the printer's electronics to position the desired character in front of the printing hammer. The 96 indicates that there are 96 characters on the printwheel. A complete printout of all the characters on the printwheel follows:

!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`
abcdefghijklmnopqrstuvwxyz{|}~

HHH ''' MMM YYY III 000 /// ... ((( ))) ,,, /// qqq MMM """ HHH

UNEVEN LINE SPACING

Possible cause: Loose platen gear.
Adjustment: Tighten platen and idler gears.

SECTION 8
TOOLS AND RECOMMENDED SPARE PARTS

COMMON TOOLS

The following tools are required to perform field service level adjustments and removal and replacement procedures on SPRINT 11 PLUS printers:

Open End Wrenches -- 3/16", 1/4", 5/16", 11/32", 3/8", 5/8"
Standard Screwdrivers -- 1/8", 1/4"
Nutdrivers -- 3/16", 1/4", 11/32"
Six Flute Spline Wrench -- 0.072"
Flat Feeler Gauge Set (0.001" to 0.036")
Box Wrench -- 3/8"
6" Steel Ruler
Digital Voltmeter
Sprint Gauge (for carriage drive belt tension measurement)
An assortment of small cable ties (4-6")

SPECIAL TOOLS AND CONNECTORS

The following tools have been designed by Qume. They are required to perform certain basic field service or depot service level adjustments:

Combo Gauge, Qume Part Number 73316-01
Bumper Ring Gauge, Qume Part Number 73046

For certain very infrequently made adjustments at the depot service level, the following special tools are required:

Printwheel Adjustment Tool (Disc), Qume PN 73298-01
Printwheel Adjustment Tool (Inner Collet), Qume Part Number 80472
Printwheel Adjustment Tool (Outer Collet), Qume Part Number 80471.

For a complete Terminal Self-Test diagnostic, a special connector is required:

Standard DB-25P male connector with the following pins jumpered: Pins 2 and 3, Pins 4 and 5, Pins 20 and 6, Pins 23 and 8.

CLEANERS

The following cleaners are required to perform preventive maintenance:

Isopropyl alcohol or other safe degreasing solvent
Low residue cleaner (Formula 409™, mild soap and water, etc.
Fedron platen cleaner

LUBRICANTS

The only lubricant required to perform preventive maintenance is Tellus #46 oil (Shell Oil, Qume Part Number 84191-01).

SPRINT 11 PLUS RECOMMENDED SPARE PARTS

PART NO.	DESCRIPTION	PRINTER CONFIGURATION 11/40	PRINTER CONFIGURATION 11/55	SPARE LEVEL	QTY PER PNTR POPULATION 100	500	1000
80032-03	Cradle Assembly	X	X	A	1	3	5
80136	Bumper, Rear Hammer Armstop	X	X	A	1	3	5
80153	Shaft, Front Feed Roller	X	X	A	2	4	6
80154	Shaft, Rear Feed Roller	X	X	A	2	4	6
80329	Paper Bail Roller Assembly	X	X	A	3	6	12
80334	Cradle Spring	X	X	B	2	4	6
80368-00	Photomodule, EOR Cable Assembly	X	X	A	1	3	5
80714-08	Hammer Assembly	X	X	A	2	6	12
81110-01	Cam Feed Roller	X	X	A	3	6	12
83260-01	Felt, Guide Wipe	X	X	B	4	6	10
83369-01	Ribbon Latch Ext Spring	X	X	B	1	3	5
83443-01	Lever Arm, Feed Roller Shaft	X	X	A	1	3	5
83444-01	Impression Control Lever	X	X	A	1	3	5
83505-02	Pulley Assembly, Timing	X	X	A	1	3	6
83543-01	Thrust Washer	X	X	A	2	6	10
83544-01	Spherical Bearing	X	X	A	1	1	2
84222-01	Ribbon Cassette Latch	X	X	B	1	3	5
84356-01	Paperfeed Motor/Plate Assembly	X		A	1	2	4
84358-01	Platen Assembly	X		A	1	2	4
84377-01	Card Guide	X	X	B	1	2	4
84407-01	Ribbon Rewind Pulley Assembly	X	X	A	1	3	5
84410-10	Hammer Armature Assembly	X	X	A	1	3	5
84633-01	AC Power Switch	X	X	A	2	4	6
84661-11	Carriage Motor/Encoder Assembly	X		B	1	4	7
84661-12	Carriage Motor/Encoder Assembly		X	B	1	4	7
85599-01	Cover Interlock Switch	X	X	A	1	3	5
86623-02	Platen Assembly		X	A	1	2	4
86667-03	Ribbon Gear Assembly, 4T	X	X	A	1	3	5
86672-01	Platen Knob	X	X	A	1	2	4
87409-02	Hammer Drive Resistor	X		A	1	3	5
87409-03	Hammer Drive Resistor		X	A	1	3	5
87437-01	Lever, Paper Bail Left	X	X	A	1	1	2
87438-01	Lever, Paper Bail Right	X	X	A	1	1	3
87489-04	Front Panel Assembly	X	X	A	1	3	5
87701-01	Paperfeed Motor Assembly		X	A	1	2	4
87716-01	Ribbon Feed Motor Assembly, 14T	X	X	A	1	2	4
87766-01	Ribbon Drive Clutch Assembly	X	X	A	1	3	5
87797-XX	Carriage Assembly	X	X	B	1	3	5
87924-01	Timing Belt, Grey	X	X	A	1	3	5
87928-01	Fan Motor Assembly	X	X	A	1	3	5
90884-XX	Logic PCB Assembly	X	X	B	1	3	10
91194-XX	Switching Power Supply Assembly	X	X	B	1	3	6
94096-05	5 Amp Fuse, 115V Assys	X	X	B	2	6	12
94218-002	Picofuse, 2A 125V	X	X	B	2	4	7
94218-005	Picofuse, 5A 125V	X	X	B	2	4	7

SPRINT 11 PLUS RECOMMENDED SPARE PARTS

PART NO.	DESCRIPTION	PRINTER CONFIGURATION 11/40	PRINTER CONFIGURATION 11/55	SPARE LEVEL	QTY PER PNTR POPULATION 100	500	1000
94301-02	Micro Buzzer	X	X	A	1	2	4
94559-200	2 Amp Fuse, 220-240V Assys	X	X	B	2	6	12
94584-01	Res Network, 12 Pin	X	X	A	1	2	4
94585-01	Res Network, 6 Pin	X	X	A	1	3	5

NOTES:

(1) Spare Level Codes:

A = Recommended for Spare Inventory
B = Recommended for Field Service Kit

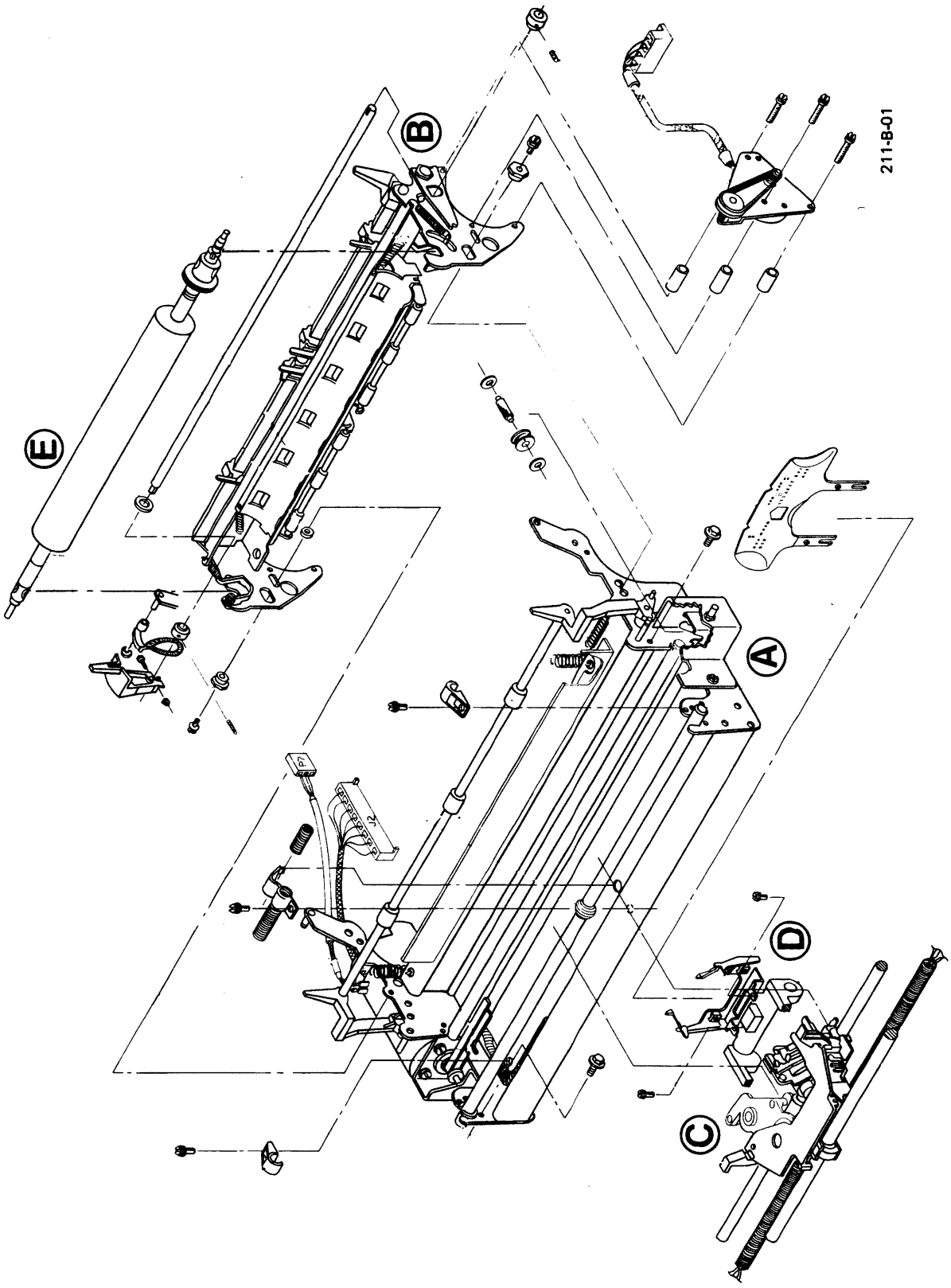
(2) All "B" level spares should also be included in your "A" level inventory.

SECTION 9
ILLUSTRATED PARTS

The Illustrated Parts section contains illustrations and corresponding parts lists for the major SPRINT 11 PLUS printer assemblies. Illustrations provide an assembly guide and may be used for identification of missing or broken parts when repairing a terminal. Some parts may be illustrated for clarity only. Parts not shown or listed are not available.

Although the SPRINT 11/55 PLUS printer is very similar to the SPRINT 11/40 PLUS printer, parts variations between these two printer configurations are reflected in the Illustrated Parts section.

GENERAL STRUCTURE



GENERAL STRUCTURE

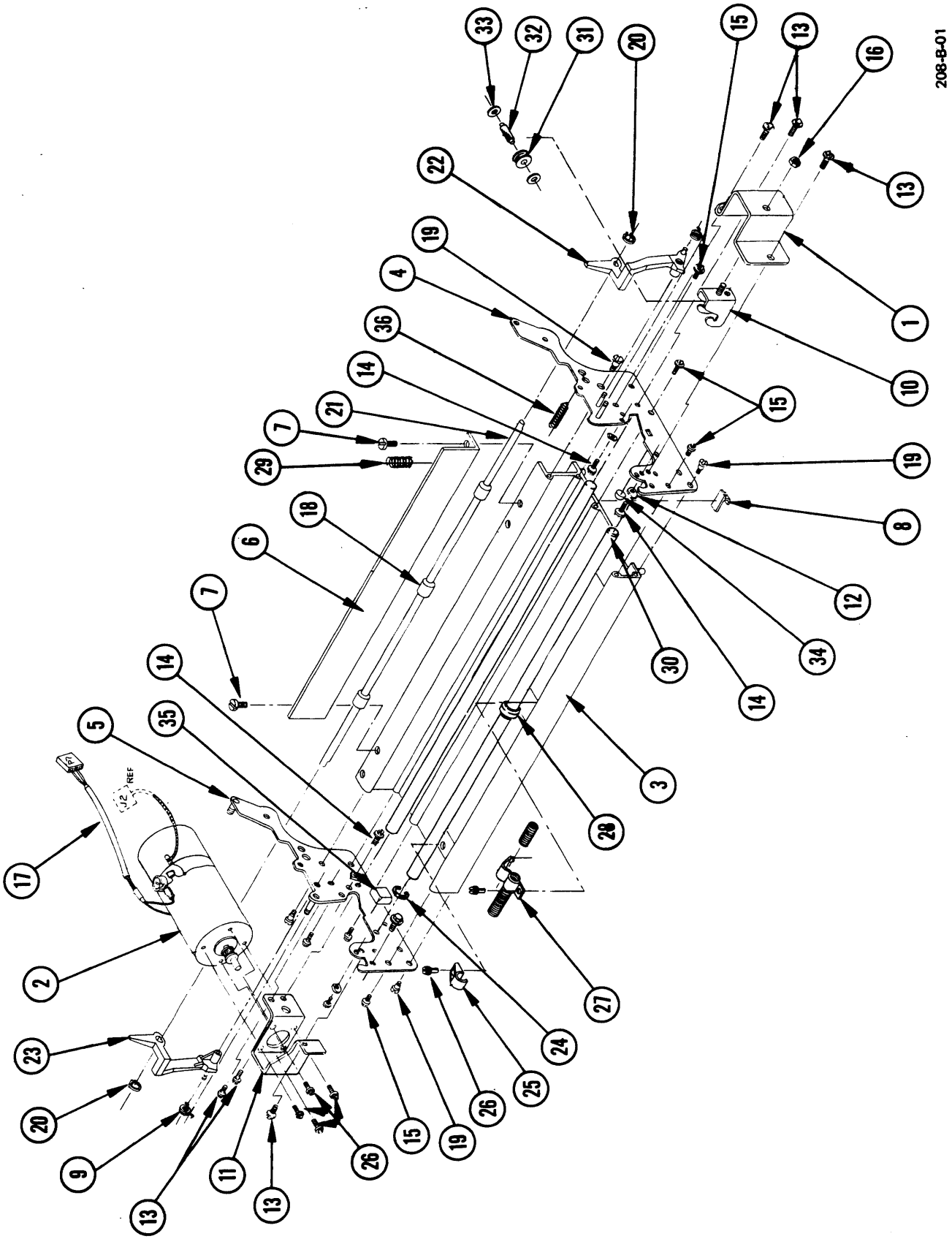
STRUCTURE ASSEMBLY

Item	Part No.	Description
1.	83032-01	Bracket Assembly, Pulley Mounting
2.	84661-11	11/40 Motor/Encoder Assy, Carriage
	84661-12	11/55 Motor/Encoder Assy, Carriage
3.	83098-03	Extrusion Assembly
4.	83318-01	Side Frame Assy, RH
5.	83318-02	Side Frame Assy, LH
6.	87479-01	Guard Plate
7.	85301-01	Screw, 8-32 X .250
8.	94406-04	Cable Clamp
9.	86645-01	Toggle Spring, Paper Bail
10.	83538-01	Bracket, Pulley Adj
11.	84483-01	Bracket, Motor Mount
12.	83568-01	Cam, Carr Shaft Lock
13.	85619-804	Screw, 6-32 X .250
14.	85619-806	Screw, 8-32 X .375
15.	85301-05	Screw, 8-32 X .500
16.	85512-05	Nut, #8 Locking
17.	84768-01	Harness Assembly, Carriage Motor
18.	80329	Roller Assembly
19.	84339-01	Screw, 8-32 X .500
20.	85129-21	Grip Ring Retainer
21.	84115-01	Paper Bail
22.	87438-01	Paper Bail Lever, RH
23.	87437-01	Paper Bail Lever, LH
24.	85129-50	Retainer Ring, Grip
25.	85502-04	Cable Clamp
26.	85619-604	Screw, 6-32 X .250
27.	83488-01	Clamp, Spring Cable
28.	83544-01	Spherical Bearing
29.	83441-01	Spring, Platen Plr
30.	83045-01	Shaft, Carriage Guide
31.	83505-02	Pulley Assy, Timing
32.	83542-01	Bearing, Shaft
33.	83543-01	Thrust Washer
34.	83059-01	Bumper (Note 1)
35.	85152-01	Foot/Bumper (Note 2)
36.	80236	Extension Spring

Notes:

(1) Part of item 4 (also available separately).

(2) Part of item 5 (also available separately).



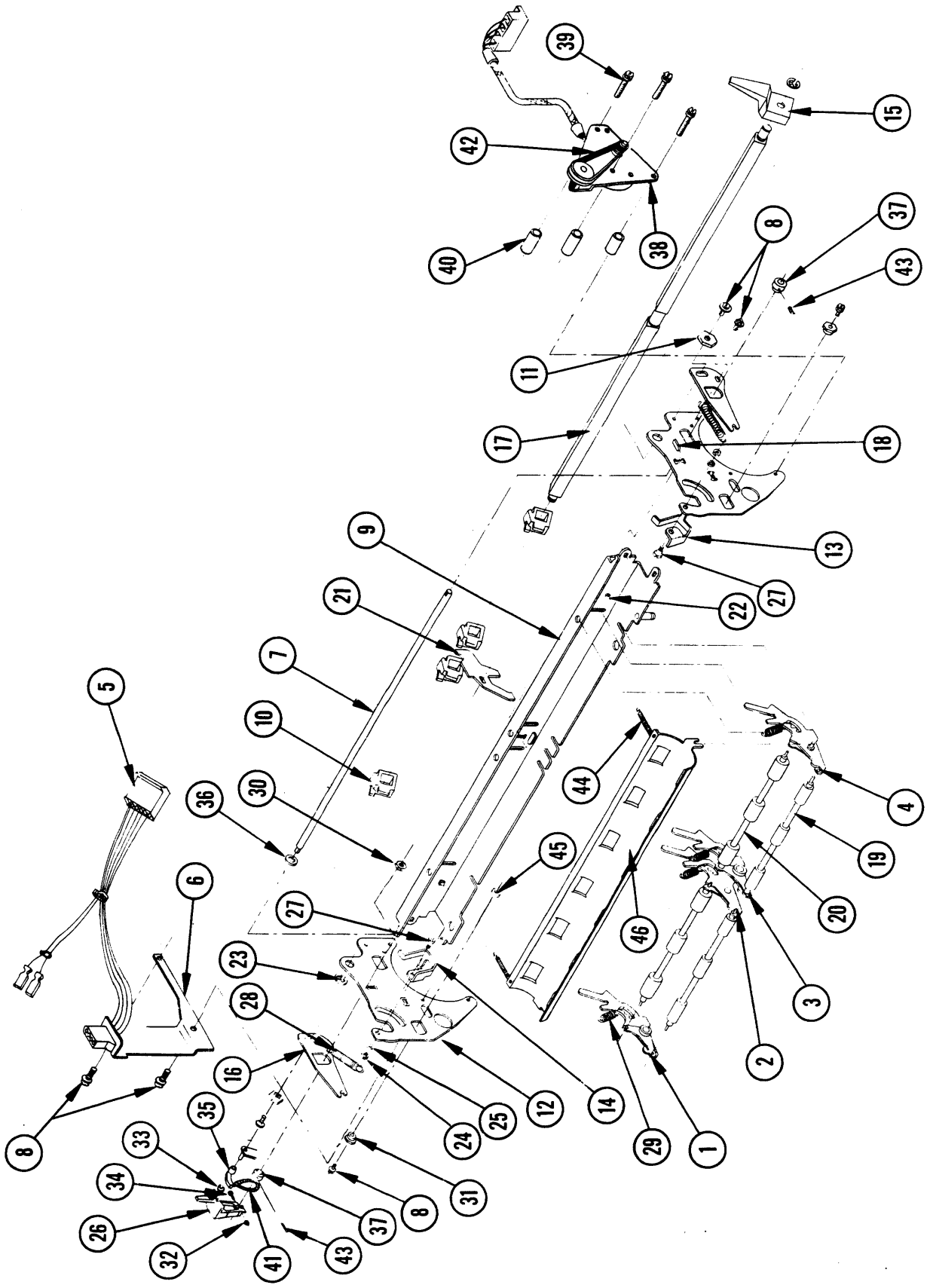
STRUCTURE ASSEMBLY

PLATEN CARRIER ASSEMBLY

Item	Part No.	Description
1.	81104-01	Feed Roller Arm Assy, Outer LH
2.	81105-01	Feed Roller Arm Assy, Inner LH
3.	81106-01	Feed Roller Arm Assy, Inner RH
4.	81107-01	Feed Roller Arm Assy, Outer RH
5.	84725-02	Harness Assembly, OOP/Interlock
6.	87799-01	Out of Paper Bracket
7.	81112-01	Shaft, Impression Cntl
8.	85619-808	Screw, 8-32 X .500
9.	83512-01	Brace Assembly, Pltn
10.	81110-01	Cam, Feed Roller
11.	83096-01	Eccentric, Pltn Rear
12.	83445-01	Platen Frame
13.	84128-01	Platen Latch, Right
14.	84128-02	Platen Latch, Left
15.	83443-01	Lever Arm
16.	83302-01	Plate, Impr Cntl
17.	83442-01	Cam Shaft, Fd Rlrs
18.	80132	Wedge
19.	80153	Shaft, Fr Feed Rlr
20.	80154	Shaft, Rear Feed Rlr
21.	81124-01	Support, Fd Rlr Shaft
22.	85544-01	Cotter Pin
23.	85128-31	E-Ring Retainer
24.	85122-06	Hex Nut, #6-32
25.	85124-06	Lockwasher, #6
26.	83444-01	Lever, Impresssion Cntl
27.	84148-01	Shoulder Screw, Platen Latch
28.	80234	Extension Spring, Platen Latch
29.	83060-01	Ext Spring
30.	85122-08	Full Hex Nut, #8-32
31.	83416-01	Eccentric, Platen Fr
32.	85122-04	Nut, 4-40 Full Hex
33.	85128-18	E-Ring
34.	85619-408	Screw, 4-40 X .500
35.	83300-01	Detent Arm
36.	83440-01	Spacer
37.	83314-01	Cam, Impr Control
38.	84356-01	11/40 Motor/Plate Assy, Paper Feed (Note 1)
	87701-02	11/55 Motor Plate Assy, Paper Feed
39.	85619-820	Screw, 8-32 X .125
40.	80197-04	Spacer
41.	83319-01	Spring, Impr
42.	85437-03	Timing Belt (Note 1)
43.	85206-04	Setscrew, 6-32 X .250
44.	80334	Cradle Spring
45.	83436-01	Spacer
46.	80032-03	Platen Cradle Assy

Notes:

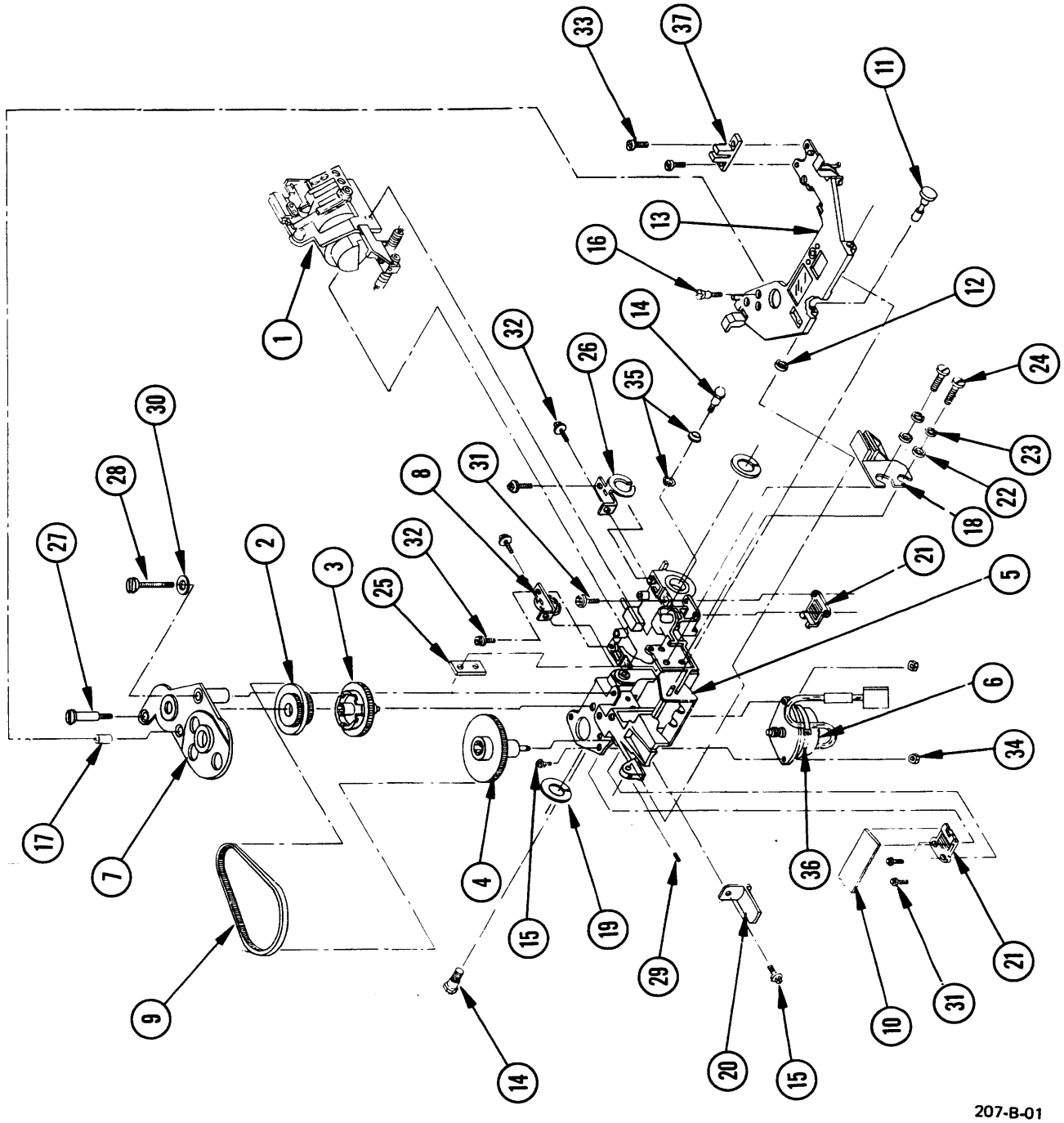
(1) Part of item 38 (also available separately).



PLATEN CARRIER ASSEMBLY

CARRIAGE ASSEMBLY

Item	Part No.	Description
1.	84405-12	Printwheel Motor Assy
2.	87766-01	Clutch Assy, Ribbon Drive
3.	86667-03	Ribbon Clutch, 94T Drive
4.	84407-01	Pulley Assy, Ribbon Rewind
5.	83289-02	Carriage Assy, w/o Stop
6.	87716-01	Ribbon Feed Motor Assy, 14 Tooth
7.	84240-01	Ribbon Drive Plate
8.	83258-01	Bracket, LH Wipe
9.	84243-01	Timing Belt
10.	87924-01	Timing Belt, Grey
11.	84449-01	Lift Pivot
12.	84448-01	Thrust Washer
13.	84455-04	Ribbon Support Assy, w/o Armature
14.	83370-02	Print Motor Pivot
15.	85619-405	Screw, 4-40 X .312
16.	87650-02	Shoulder Screw, 4-40 X 1/.25 X .81
17.	87651-01	Eccentric Spacer
18.	87904-01	Bracket, Ribbon Support Plate
19.	83260-01	Felt, Guide Wipe
20.	84402-01	Bearing Yoke
21.	83160-01	Belt Cleat
22.	85126-06	Washer, #6 Plain
23.	85124-06	Lockwasher, #6
24.	85006-06	Screw, 6-32 X .375
25.	84140-01	Nut Plate
26.	83258-02	Bracket, RH Wipe
27.	87650-01	Shoulder Screw, 4-40 X .94 X .53
28.	85004-14	Screw, 4-40 X .875
29.	85329-06	Screw, 2-56 X .187
30.	85126-04	Washer, #4 Plain
31.	85619-304	Screw, 3-56 X .250
32.	85619-403	Screw, 4-40 X .187
33.	85004-06	Screw, 4-40 X .375
34.	85512-02	Hex Nut, #4-40
35.	85140-01	Washer, Blv Spring
36.	94123	Cable Tie
37.	80368-00	Photomodule, EOR Cable Assembly



CARRIAGE ASSEMBLY

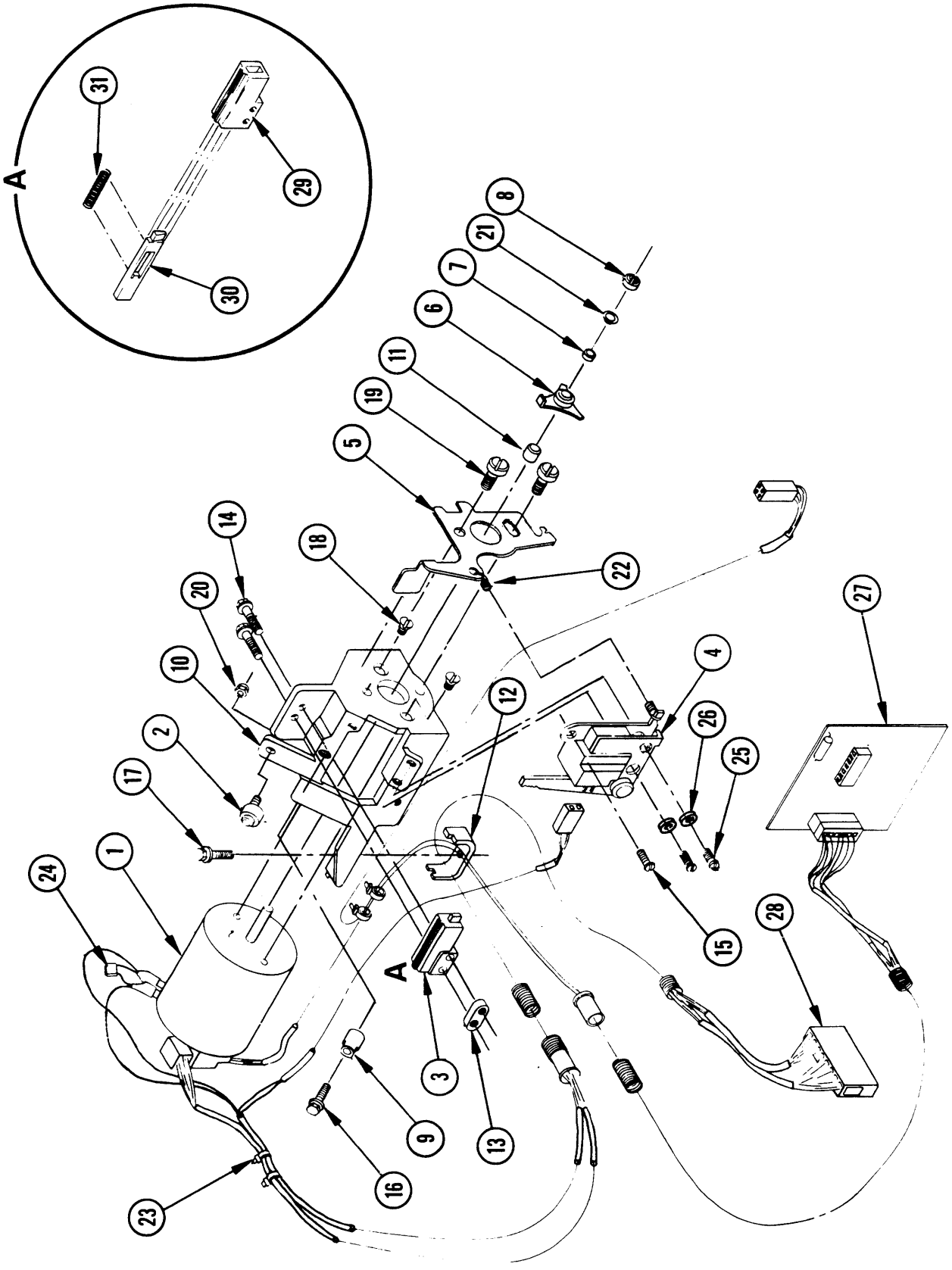
PRINTWHEEL MOTOR ASSEMBLY

Item	Part No.	Description
1.	84663-11	Signal Harness Assy
2.	83605-01	Hammer Armstop Assy
3.	80714-08	Hammer Assembly
4.	84410-01	Hammer Armature Assy
5.	81543-01	Print Motor Latch
6.	80376	Print Disk Hub
7.	80407	Collet, Print Disk Hub
8.	80256	Printwheel Pilot
9.	84239-01	Hammer Armstop Eccentric
10.	83085-01	Motor Casting
11.	81559-01	Spacer, Printwheel Hub
12.	86620-01	Retainer, Cable Shield
13.	80784	Nut Plate
14.	85619-301	Screw, 3-48 X .625
15.	85004-04	Screw, 4-40 X .250
16.	85619-408	Screw, 4-40 X .500
17.	85619-412	Screw, 4-40 X .750
18.	85066-03	Screw, 6-32 X .187
19.	81544	Screw, Print Motor Latch
20.	85137-05	Self Locking Nut
21.	85140-10	Belleville Washer
22.	80304	Spring
23.	94123	Cable Tie
24.	93214	Capacitor, .1uF
25.	85004-08	Screw, 4-40 X .500
26.	85126-04	Washer, #4 Plain
27.	--------	Encoder PCB (Note 1)
28.	--------	Power Harness Assy (Note 2)
29.	84033-01	Hammer Guide
30.	80686-03	Hammer
31.	80713	Spring

Notes:

(1) Part of item 1. Not available separately.

(2) Not available separately. Order complete Printwheel Motor Assy, P.N. 84405-XX.

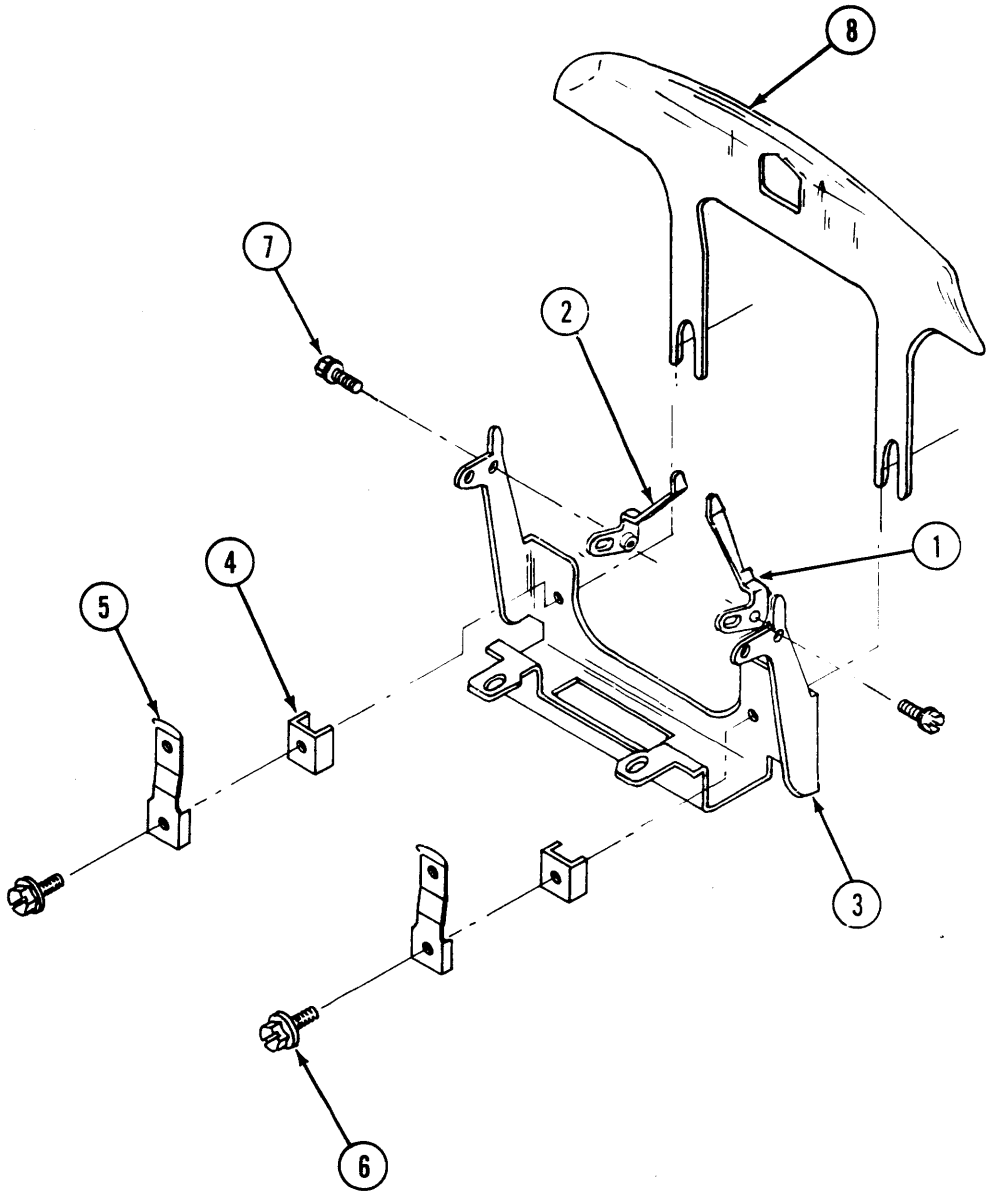


438-A-0

PRINTWHEEL MOTOR ASSEMBLY

CARD GUIDE AND BRACKET ASSEMBLY

Item	Part No.	Description
1.	83125-02	Finger, RH Ribbon
2.	83125-01	Finger, LH Ribbon
3.	83076-01	Card Guide Bracket
4.	83249-01	Channel, Card Guide
5.	83248-01	Card Guide Latch
6.	83022-10	Screw, 3-56 X .250
7.	83022-03	Screw, 3-48 X 3/16
8.	84377-01	Card Guide



278-A-02

CARD GUIDE AND BRACKET ASSEMBLY

ILLUSTRATED PARTS

PLATEN ASSEMBLY

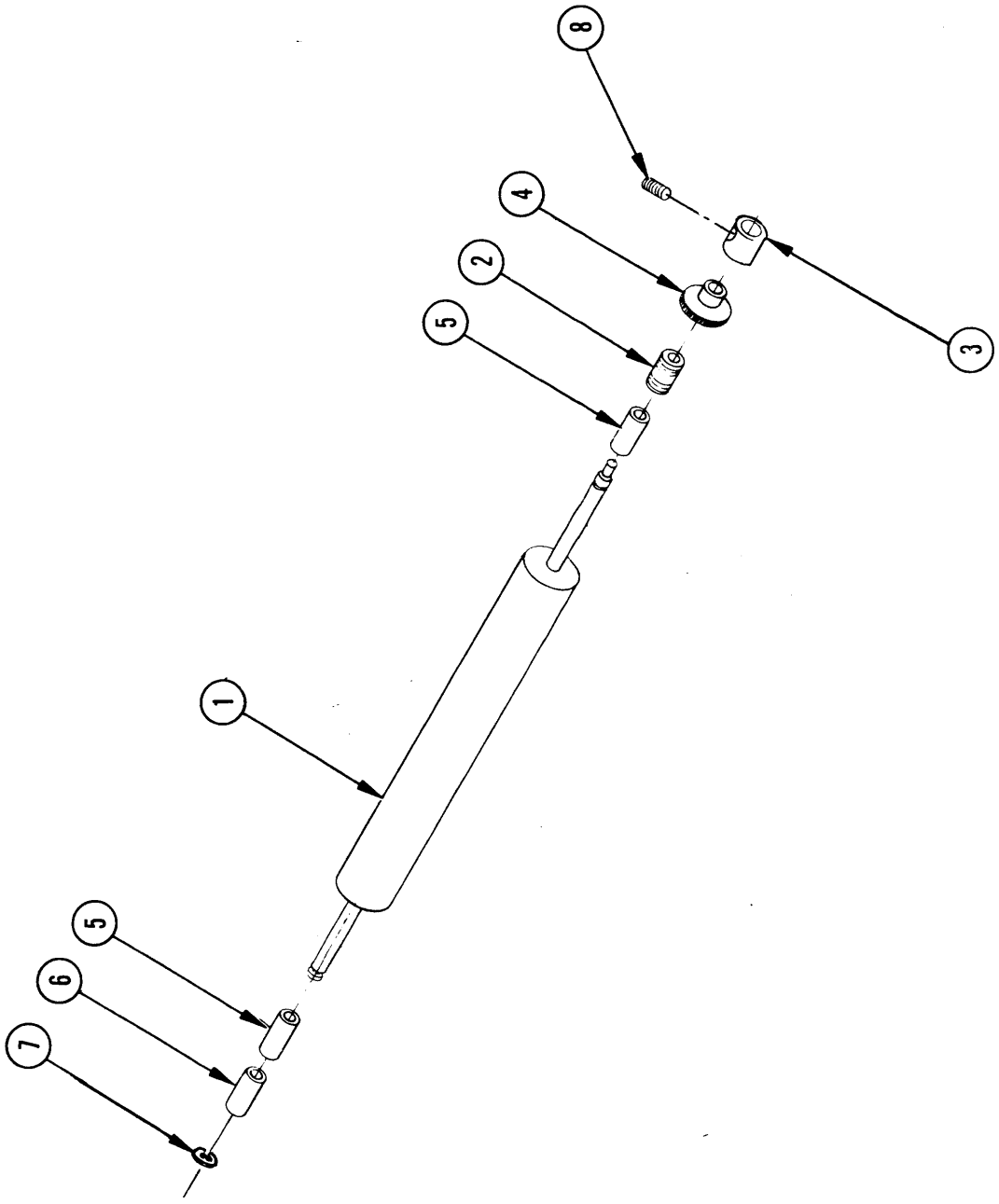
Item	Part No.	Description
1.	84358-01	11/40 Platen Subassembly
	86623-02	11/55 Platen Subassembly
2.	84129-01	Platen Locator Sleeve
3.	84644-01	Sleeve, Platen Knob
4.	84362-01	Gear, Platen/Tractor
5.	80513-01	Platen Spacer
6.	80515	Bearing, Platen Sleeve
7.	85128-37	E-Ring Retainer
8.	85207-03	Screw, 8-32 X .187

Notes:

(1) 11/40 Platen Assembly P/N 84358-01
11/55 Platen Assembly P/N 86623-02

To order the 11/40 platen assembly, order Part No. 84358-01, and the shipping container, Part No. 85256-01.

To order the 11/55 platen assembly, order Part No. 86623-02, and the shipping container, Part No. 85256-01.



439-A-01

PLATEN ASSEMBLY

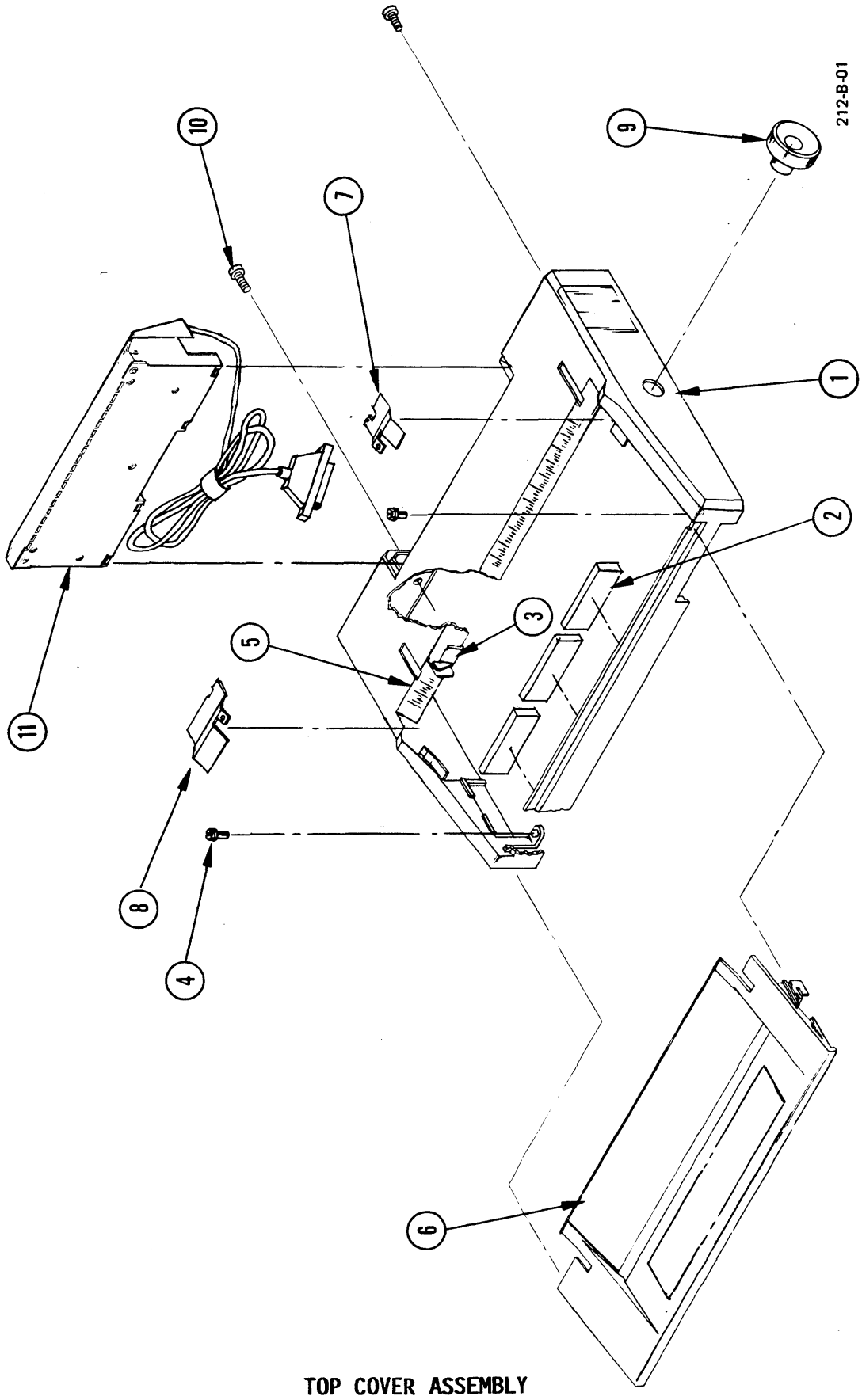
TOP COVER ASSEMBLY

Item	Part No.	Description
1.	84589-01	Top Cover (Note 1)
2.	84346-01	Accoustical Pad
3.	83863-01	Paper Edge Guide
4.	84622-01	Cover Screw, Sltd
5.	84513-01	Scale Label
6.	87887-03	Access Panel Assembly
7.	87707-03	Tractor Door, RH
8.	87708-03	Tractor Door, LH
9.	86672-01	Platen Knob (Note 2)
10.	85436-808	Screw, 8-32 X .500
11.	99350-01	Interface Module Assy, RS232-C/Model 1 (Note 2)
	99350-02	Interface Module Assy, IEEE-488/Model 1 (Note 2)
	99350-03	Interface Module Assy, Centronics/Model 1 (Note 2)
	99350-04	Interface Module Assy, Sprint 3/Model 1 (Note 2)
	99350-06	Interface Module Assy, IBM(PC) Centronics/Model 1 (Note 2)

Notes:

(1) Available through Service and Sprares Department only (discounts available). Color variation may occur if ordered separately.

(2) Not part of Top Cover Assembly; must be ordered separately. (Shown here for illustration purposes only).



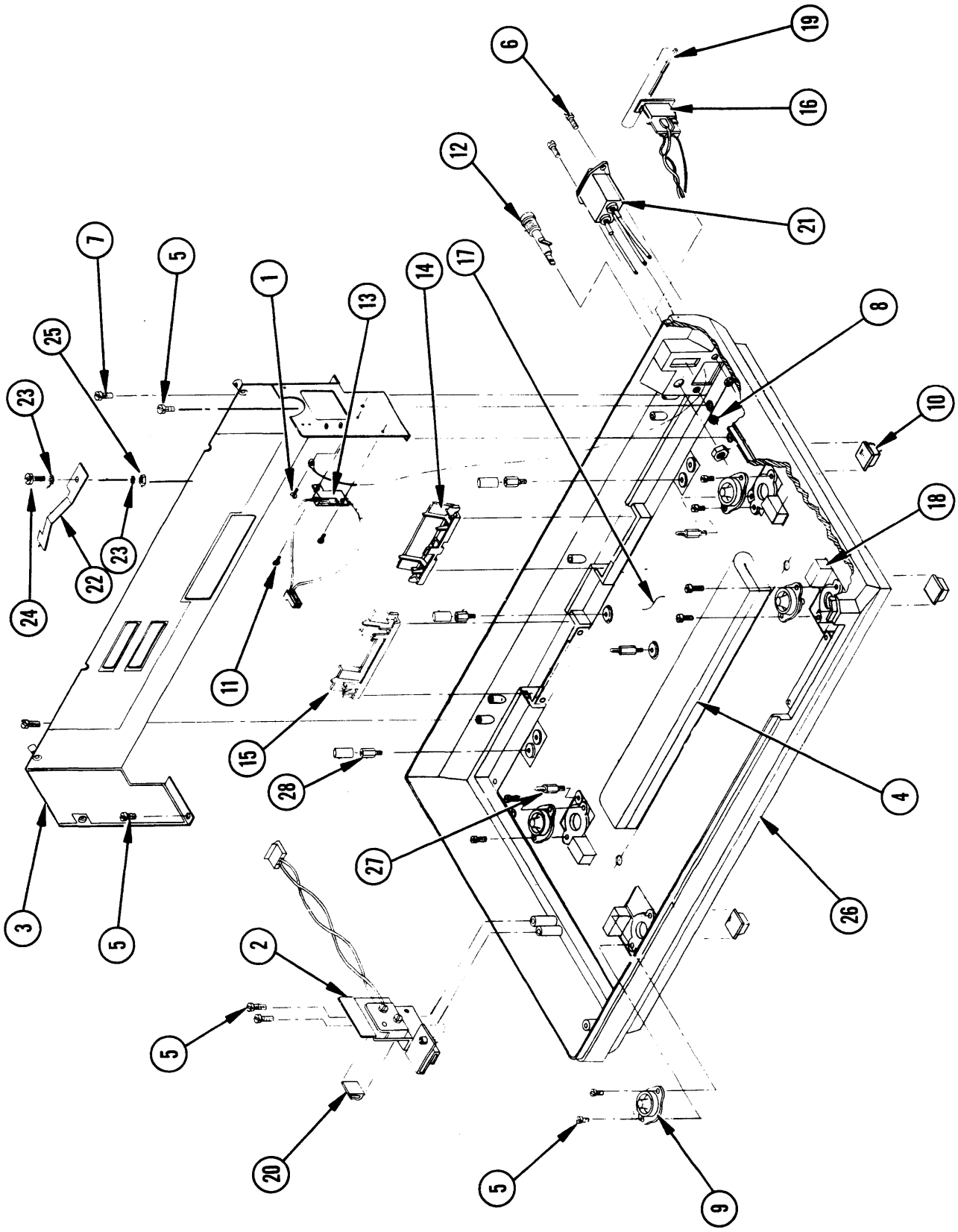
TOP COVER ASSEMBLY

BOTTOM COVER ASSEMBLY

Item	Part No.	Description
1.	83025-09	Screw, 6-32 X .250
2.	84909-01	Interlock Bracket Subassembly (Note 1)
3.	84627-01	Rear Mounting Plate Subassembly
4.	87905-01	Ground Pad Assembly
5.	85006-04	Screw, 6-32 X .250
6.	85006-08	Screw, 6-32 X .500
7.	85007-04	Screw, 8-32 X .250
8.	85122-06	Nut, #6-32 Full Hex
9.	85151	Shock Mount
10.	85152-01	Foot
11.	85577-04	Screw, 4-40 X .250
12.	86133-03	Fuse Holder, Quick Discon
13.	87409-02	Hammer Resistor Assembly
14.	87443-01	Cover, Sheet Feed Port
15.	87471-01	Strain Relief
16.	84633-01	AC Harness Assembly
17.	87749-01	Bottom Shield
18.	87787-01	Overtravel Bumper
19.	94123	Cable Tie
20.	94406-04	Clip, Wire Cable
21.	99188-02	Line Filter Assembly
22.	84666-01	Contact, Rear Shield
23.	85248-04	Star Washer
24.	85004-04	Screw, 4-40 X .250
25.	85122-04	Nut, #4-40 Full Hex
26.	87776-01	Bottom Cover
27.	85361-03	Snapon Standoff
28.	85667-808	Male/Female Standoff

Notes:

(1) Interlock Switch (Not Shown) also available separately: 85599-01



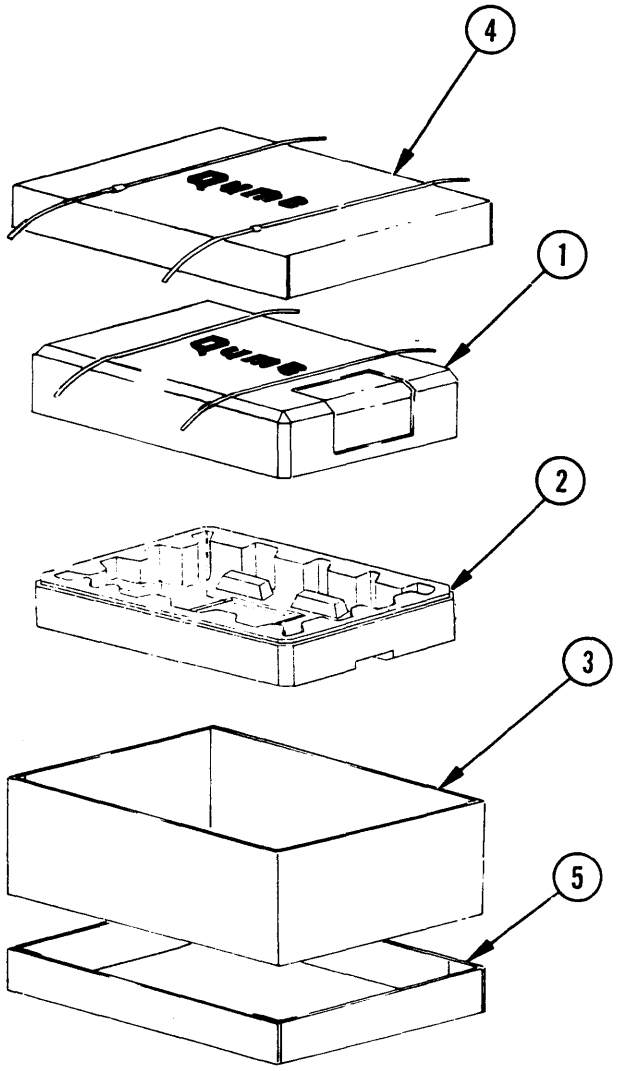
BOTTOM COVER ASSEMBLY

PACKAGING ASSEMBLY

Item	Part No.	Description
1.	84318-01	EPS Shipping Container, Top
2.	84318-02	EPS Shipping Container, Bottom
3.	84307-05	Corrugated Box, Center Sleeve
4.	84306-05	Corrugated Box, Top Cover
5.	84306-005	Corrugated Box, Bottom Cover

Notes:

(1) Repackaging Kit also available: 84601-01



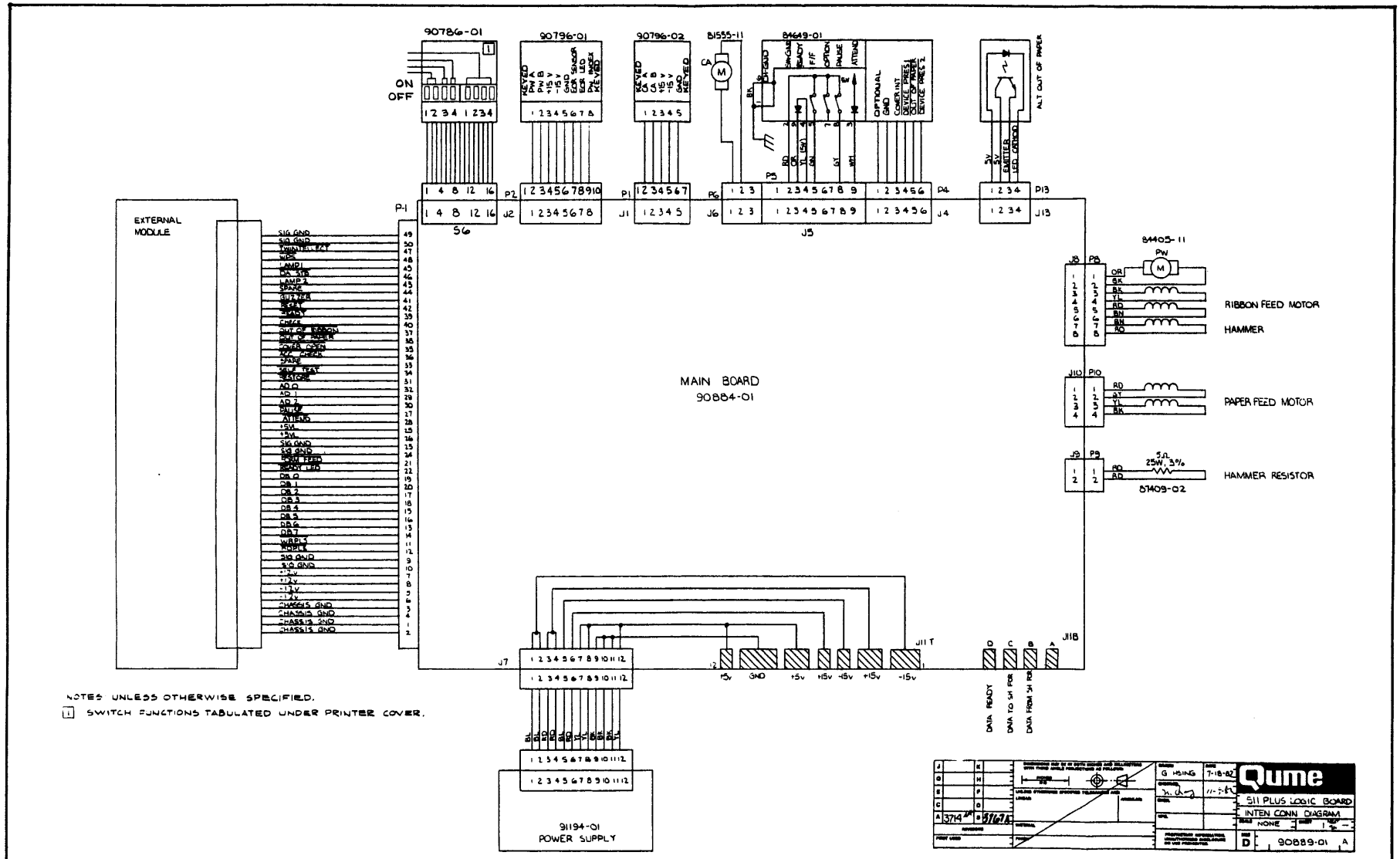
374-A-01

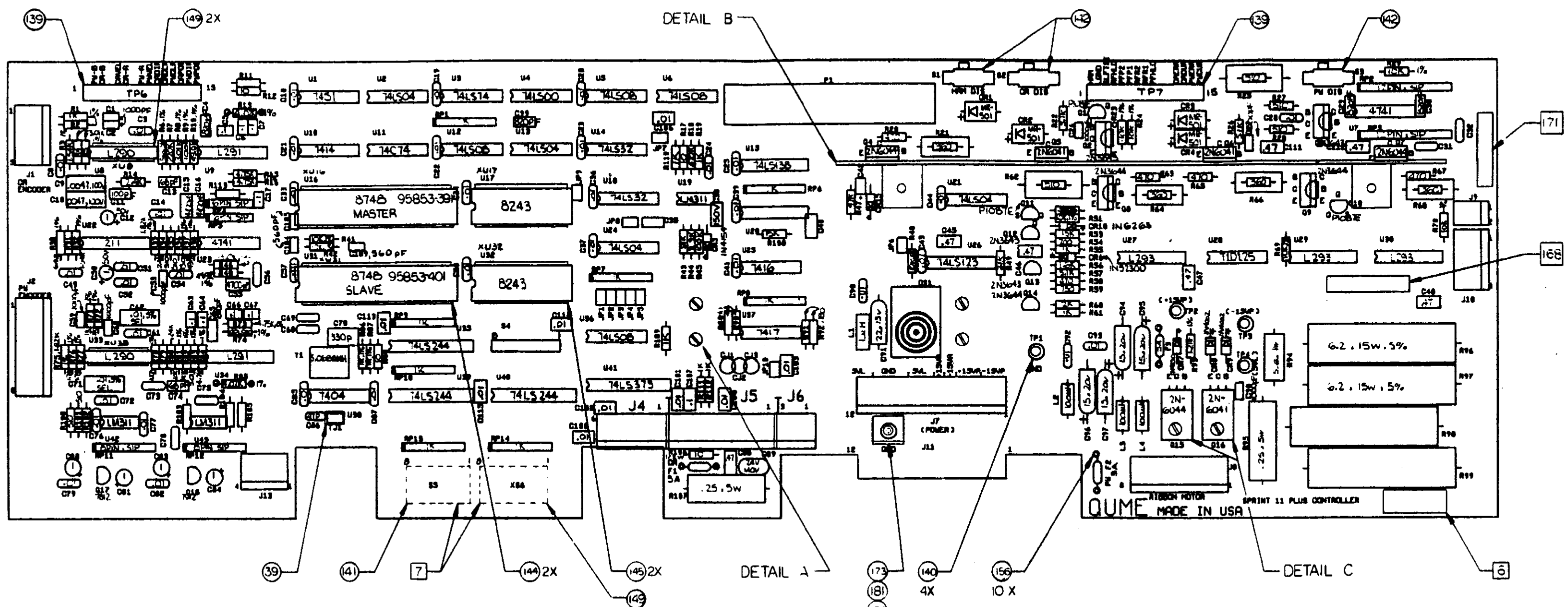
PACKAGING ASSEMBLY

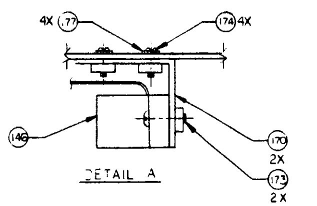
SECTION 10
SCHEMATIC DIAGRAMS

The following schematic diagrams are provided for reference:

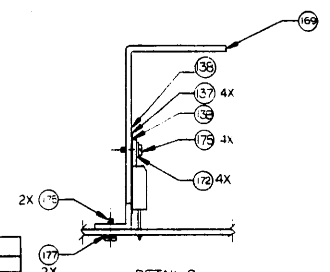
90889	Interconnect Diagram
90884	S11/40 Logic Board Assembly
90884	S11/55 Logic Board Assembly
91194	Power Supply PCB Assembly
90796	Encoder PCB Assembly
90744	Interface Module PCB Assembly, RS232-C/Model 1
90774	Interface Module PCB Assembly, Centronics/Model 1


90786-01
90796-01
90796-02
81555-11
84649-01
ON
OFF
EXTERNAL MODULE
MAIN BOARD
90884-01
S6
J5
84405-11
RIBBON FEED MOTOR
HAMMER
PAPER FEED MOTOR
5Ω 25W, 3%
HAMMER RESISTOR
87409-02
91194-01
POWER SUPPLY
DATA READY
DATA TO SH FOR
DATA FROM SH FOR
NOTES UNLESS OTHERWISE SPECIFIED.
1 SWITCH FUNCTIONS TABULATED UNDER PRINTER COVER.
Qume
511 PLUS LOGIC BOARD
INTER CONN DIAGRAM
90889-01

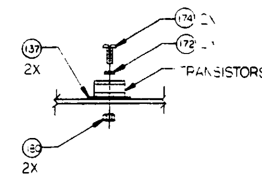




DETAIL A



DETAIL B
Q4,Q5,Q6,Q7

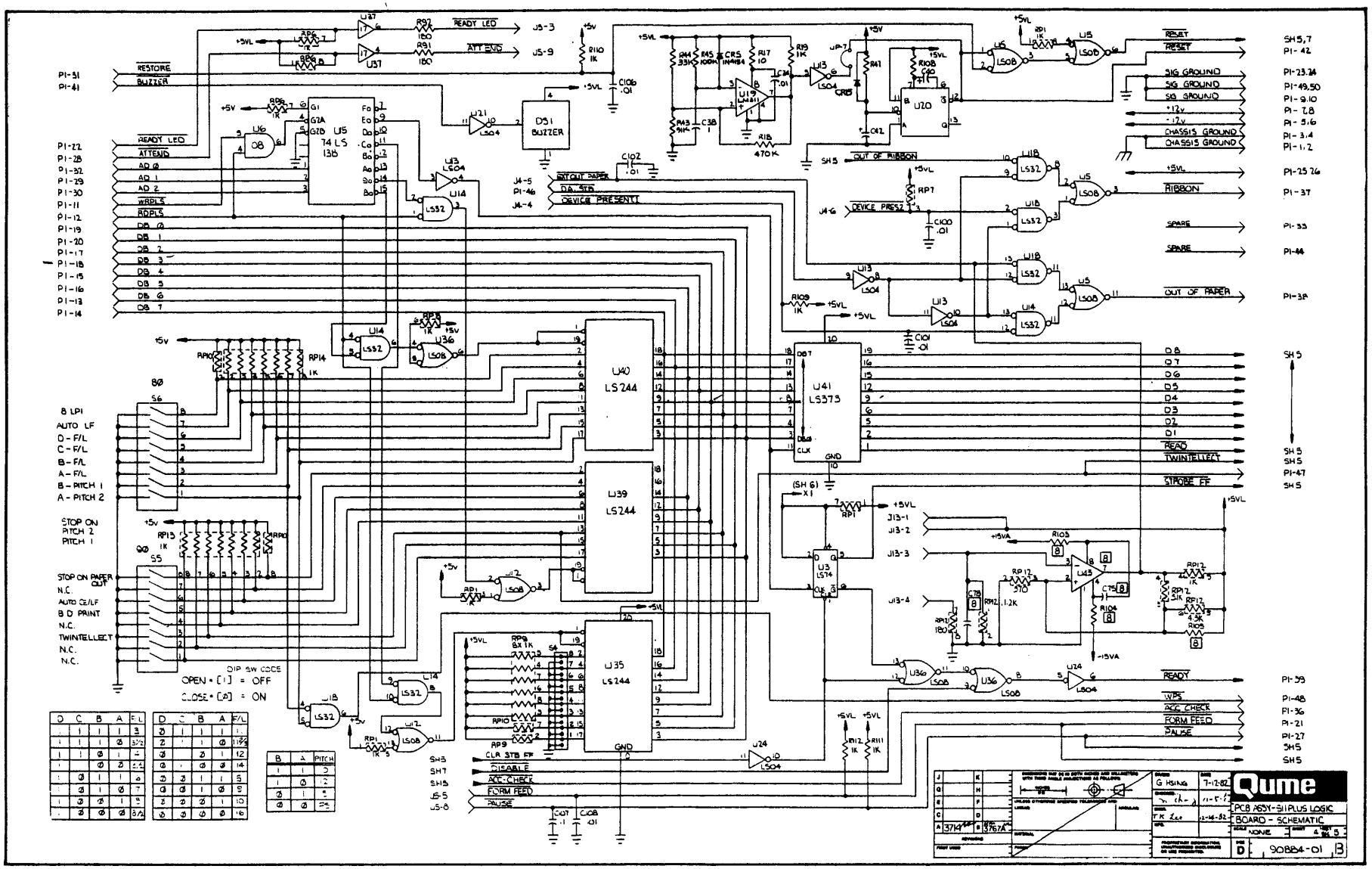


DETAIL C
Q15,Q16

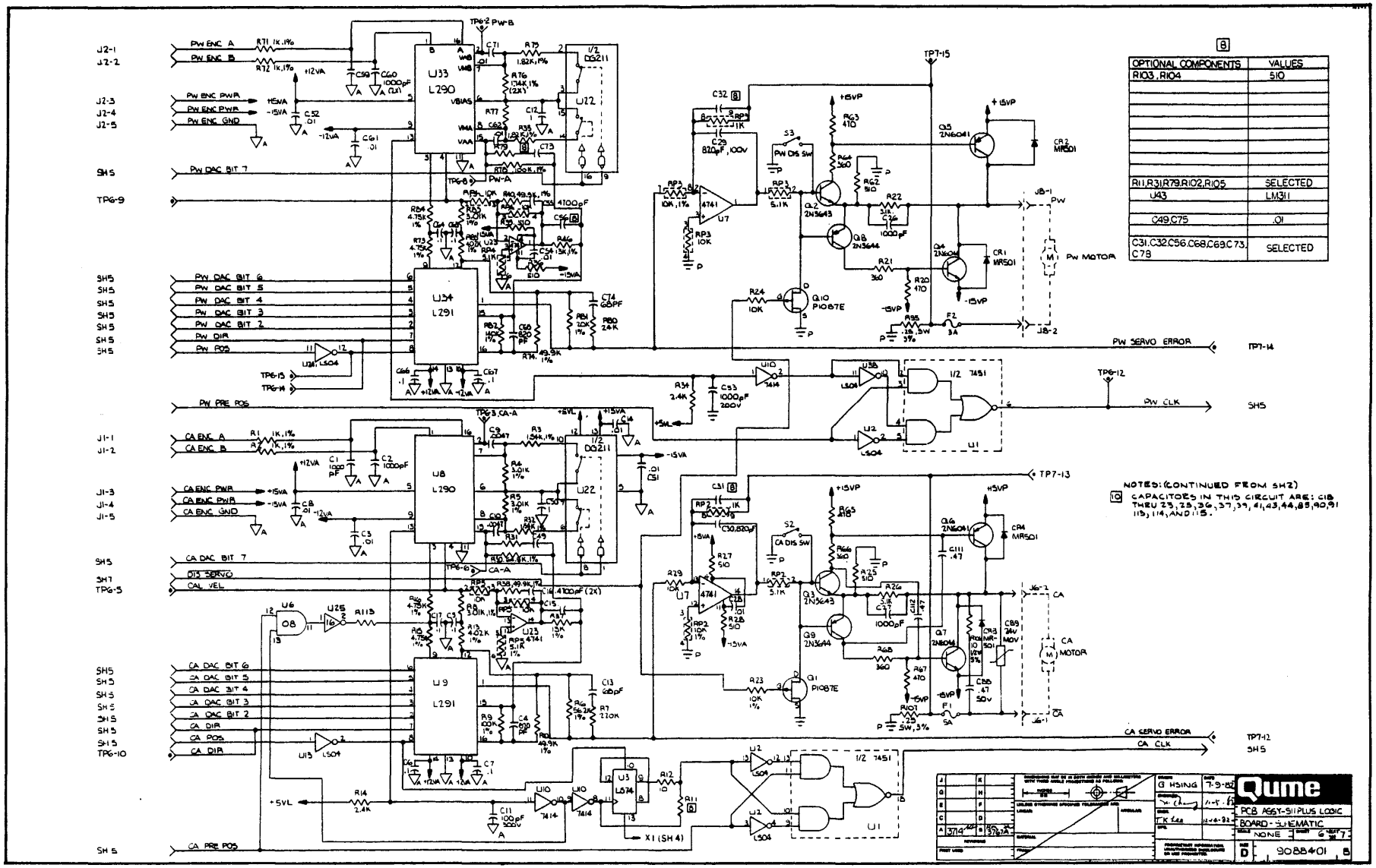
NOTES: UNLESS OTHERWISE SPECIFIED.
1. ALL RESISTANCE VALUES ARE IN OHMS 1/4W 5%
2. ALL CAPACITANCE VALUES ARE IN MICROFARADS
3. ALL 1% RESISTORS ARE 1/8W
4. SCHEMATIC REV B IS VALID FOR ASSY 90883-01 REV B
5. SEE SHEET 3 FOR REWORK INSTRUCTIONS
[6] STAMP APPROPRIATE DASH NO WITH NONCONDUCTIVE INK APPROXIMATELY WHERE SHOWN.
[7] INSERT ITEMS (141), (49) ON SOLDER SIDE OF BOARD
[8] OPTIONAL COMPONENTS. SEE SH 6 OF SCHEMATIC FOR DESIGNATOR TABLE.
9. NOTES CONTINUED ON SCHEMATIC SHEET 6.

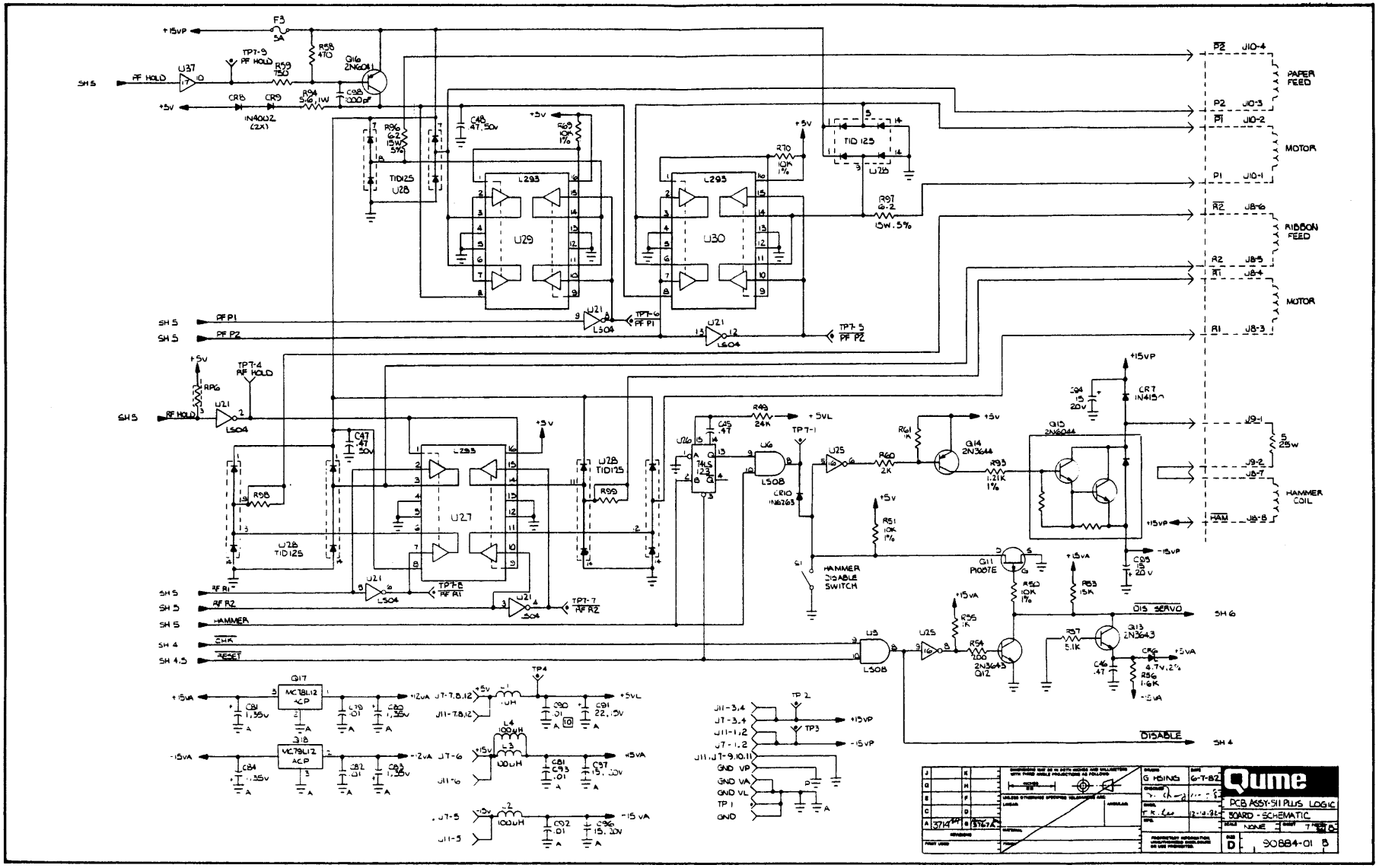
REF. DES.			
LAST USED	NOT USED	LAST USED	NOT USED
C115	C98, C100	TJ1	
RP14		CJ3	
R113	R39, R52	D1	
JP10		DS1	
Q18		F3	
Y1			
L4			
J13	J3, J12		
U43			
TP4			
S6	S4		
CR15	CR11 - CR14		

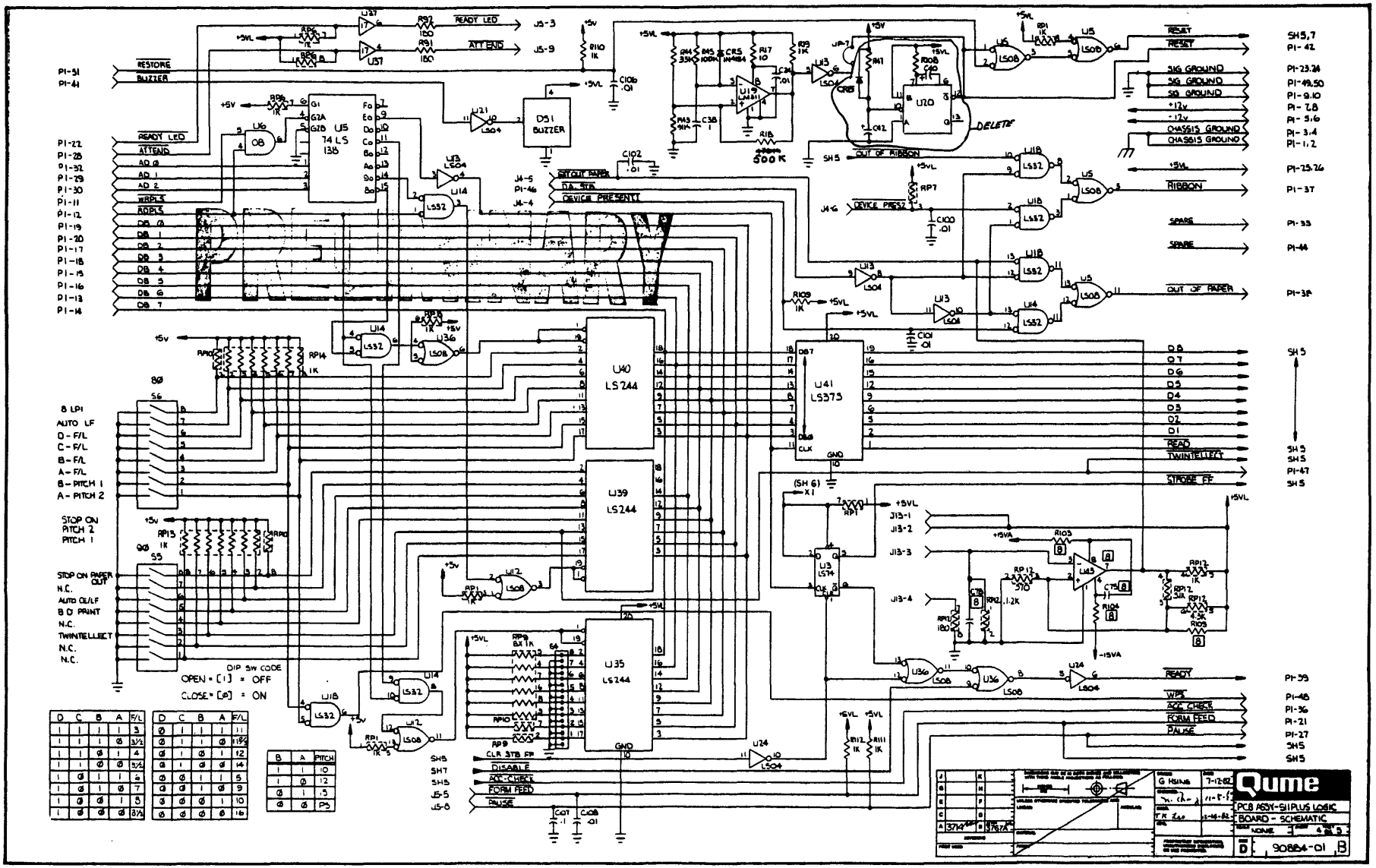
Qume
G HSING 92282
PCB ASSY-S11 PLUS LOGIC
ASSY DWG
SCALE NONE SHEET 2 OF 3
D 90884-01 B

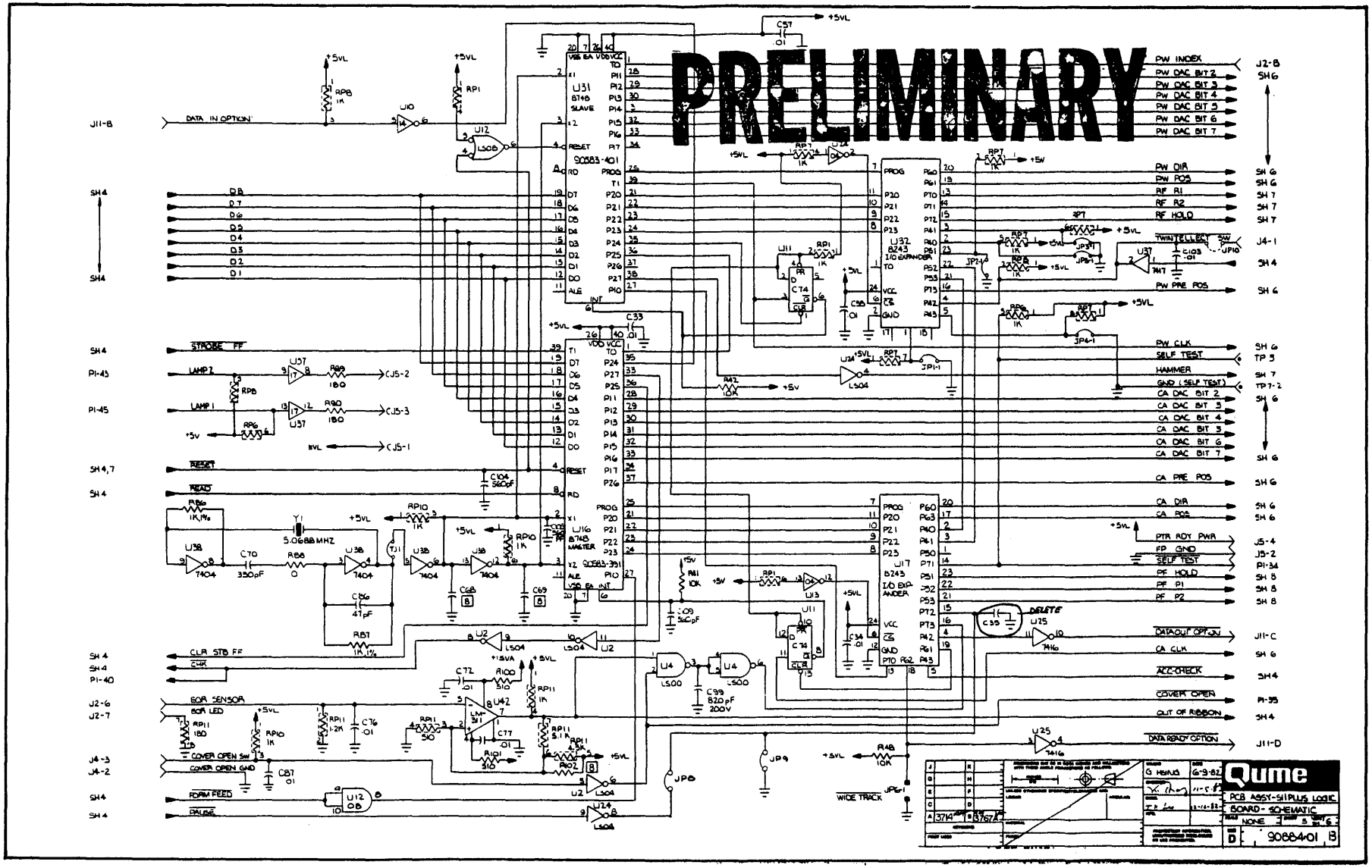

P1-31
P1-41
RESTORE
BUZZER
READY LED
ATTEND
AD Ø
AD 1
AD 2
WRDLS
RDDLS
DB Ø
DB 1
DB 2
DB 3
DB 4
DB 5
DB 6
DB 7
P1-22
P1-28
P1-32
P1-29
P1-30
P1-11
P1-12
P1-19
P1-20
P1-17
P1-18
P1-15
P1-16
P1-13
P1-14
READY LED
ATT END
J5-3
J5-9
DS1 BUZZER
74LS138
U40 LS244
U39 LS244
U35 LS244
U41 LS373
8 LPI
AUTO LF
D - F/L
C - F/L
B - F/L
A - F/L
B - PITCH 1
A - PITCH 2
STOP ON PITCH 2 PITCH 1
STOP ON PAPER OUT
N.C.
AUTO CR/LF
B D PRINT
N.C.
TWINTELLECT
N.C.
N.C.
DIP SW CODE
OPEN = [1] = OFF
CLOSE = [Ø] = ON
OUT OF PAPER
DATA STB
DEVICE PRESENT
DEVICE PRESS
OUT OF RIBBON
RESET
SIG GROUND
SIG GROUND
SIG GROUND
+12v
-12v
CHASSIS GROUND
CHASSIS GROUND
RIBBON
SPARE
SPARE
OUT OF PAPER
D8
D7
D6
D5
D4
D3
D2
D1
READ
TWINTELLECT
STROBE FF
READY
WPS
ACC CHECK
FORM FEED
PAUSE
DISABLE
CLR STB FF
SH 5,7
P1-42
P1-23,24
P1-49,50
P1-9,10
P1-7,8
P1-5,6
P1-3,4
P1-1,2
P1-25,26
P1-37
P1-33
P1-44
P1-38
SH 5
P1-47
P1-39
P1-48
P1-36
P1-21
P1-27
Qume
PCB ASSY-SIIPLUS LOGIC
BOARD - SCHEMATIC
90884-01
B

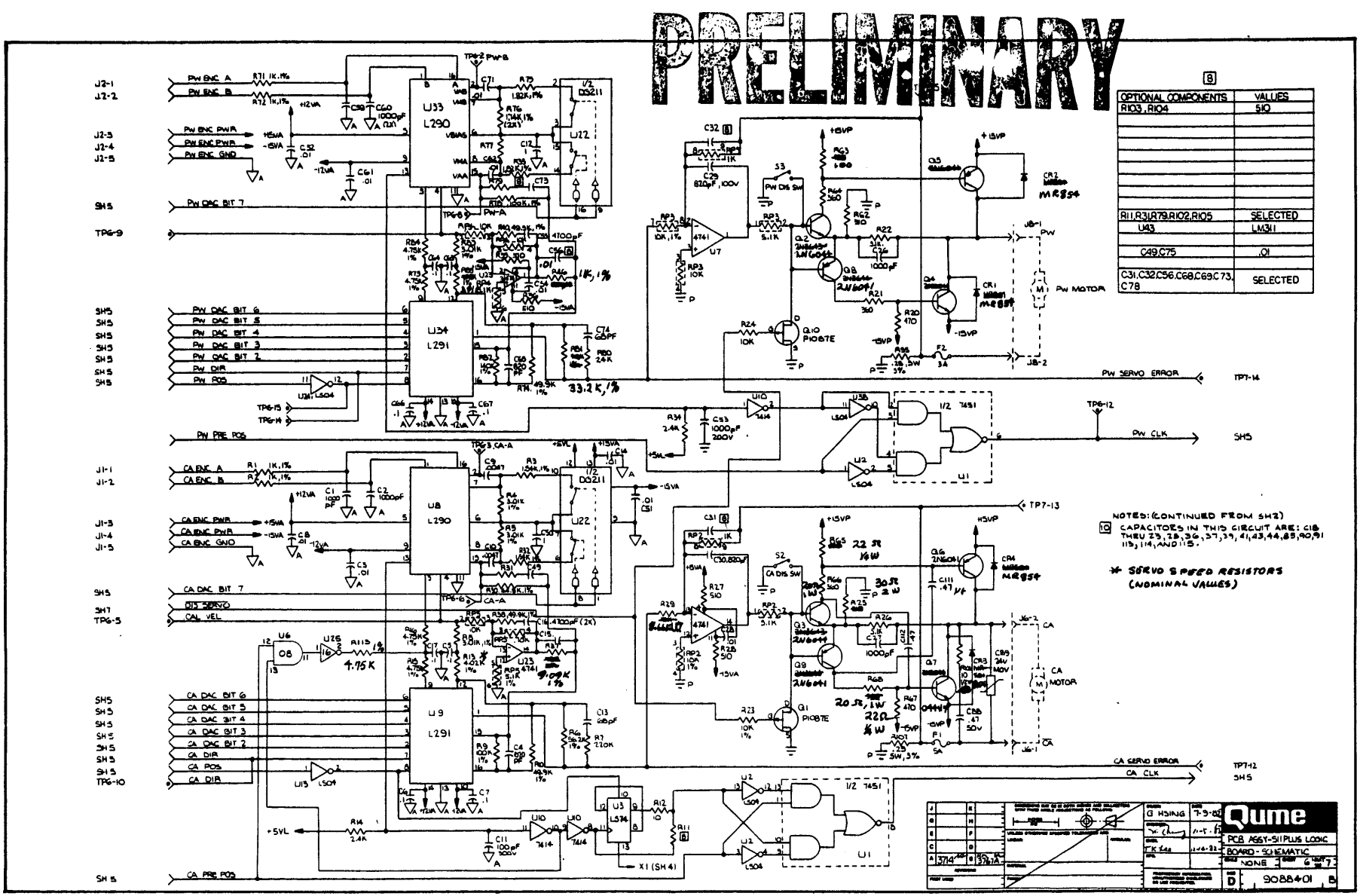
10-7/10-8

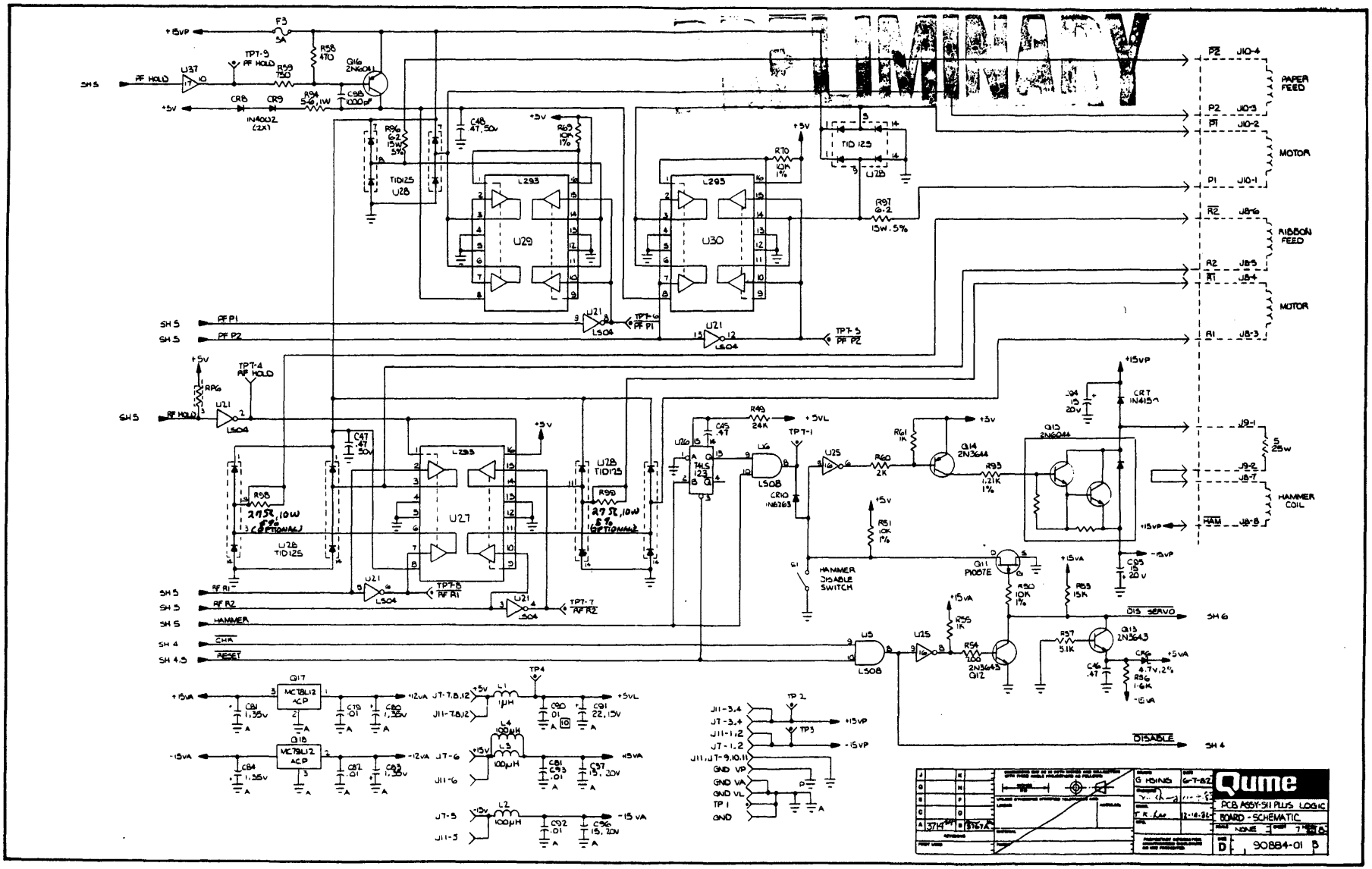

PW ENC A
PW ENC B
PW ENC PWR
PW ENC PWR
PW ENC GND
PW DAC BIT 7
PW DAC BIT 6
PW DAC BIT 5
PW DAC BIT 4
PW DAC BIT 3
PW DAC BIT 2
PW DIR
PW POS
PW PRE POS
CA ENC A
CA ENC B
CA ENC PWR
CA ENC PWR
CA ENC GND
CA DAC BIT 7
DIS SERVO
CAL VEL
CA DAC BIT 6
CA DAC BIT 5
CA DAC BIT 4
CA DAC BIT 3
CA DAC BIT 2
CA DIR
CA POS
CA DIR
CA PRE POS
PW SERVO ERROR
PW CLK
CA SERVO ERROR
CA CLK
PW MOTOR
CA MOTOR
PW DIS SW
CA DIS SW
U33 L290
U34 L291
U8 L290
U9 L291
U22 DG211
U1 1/2 7451
NOTES: (CONTINUED FROM SH2)
10 CAPACITORS IN THIS CIRCUIT ARE: C18 THRU 23, 25, 26, 37, 39, 41, 43, 44, 85, 90, 91, 113, 114, AND 115.
OPTIONAL COMPONENTS | VALUES
R103, R104 | 510
R11, R31, R79, R102, R105 | SELECTED
U43 | LM311
C49, C75 | .01
C31, C32, C56, C68, C69, C73, C78 | SELECTED
G HSING 7-9-82
Qume
PCB ASSY-SII PLUS LOGIC
BOARD - SCHEMATIC
SCALE NONE
SIZE D
9088401 B

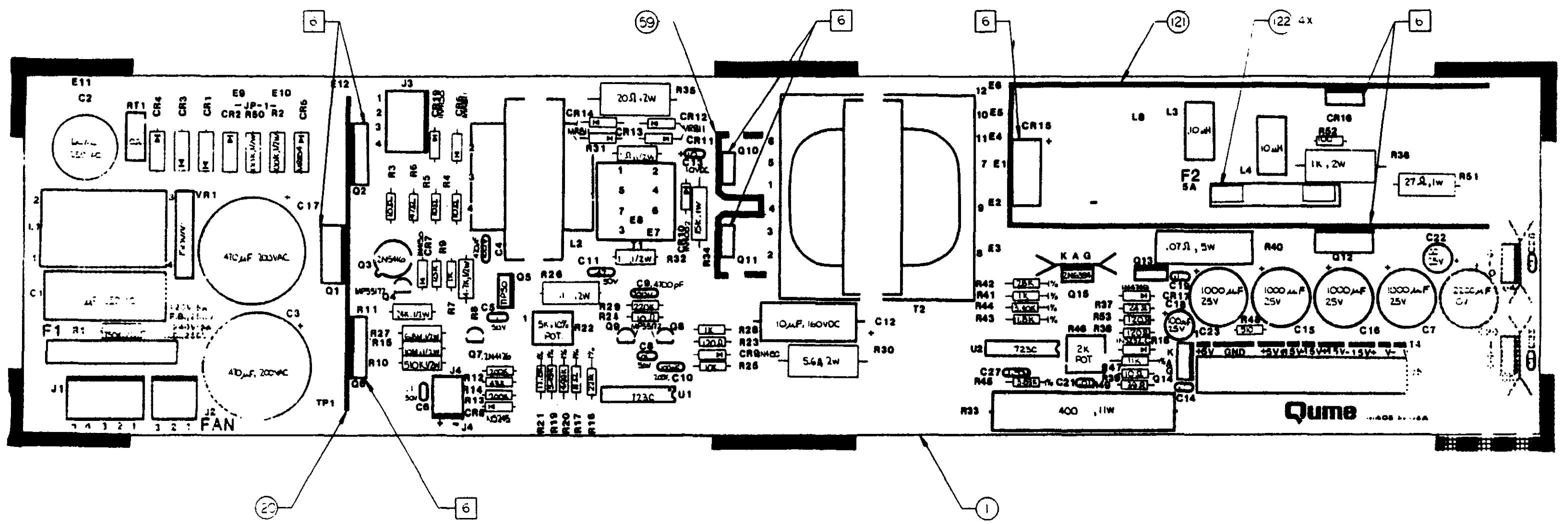

PAPER FEED
MOTOR
RIBBON FEED
MOTOR
HAMMER COIL
HAMMER DISABLE SWITCH
DISABLE
PCB ASSY-511 PLUS LOGIC
BOARD - SCHEMATIC
90884-01 B
Qume


READY LED
ATTEND
RESTORE
BUZZER
DS1 BUZZER
DELETE
500K
OUT OF RIBBON
DEVICE PRESENT
RESET
SIG GROUND
CHASSIS GROUND
RIBBON
SPARE
OUT OF PAPER
U40 LS244
U39 LS244
U35 LS244
U41 LS373
U3 LS74
8 LPI
AUTO LF
D - F/L
C - F/L
B - F/L
A - F/L
B - PITCH 1
A - PITCH 2
STOP ON PAPER OUT
N.C.
AUTO CR/LF
B D PRINT
TWINTELLECT
DIP SW CODE
OPEN = [1] = OFF
CLOSE = [0] = ON
CLR STB FF
DISABLE
ACK CHECK
FORM FEED
PAUSE
READY
WPE
ACK CHECK
FORM FEED
PAUSE
STROBE FF
Qume
PCB ASSY-SIIPLUS LOGIC
BOARD - SCHEMATIC
90884-01


PRELIMINARY
Qume
PCB ASSY-SII PLUS LOGIC
BOARD-SCHEMATIC
NONE
90884-01
B
G HSING
6-9-82
DATA IN OPTION
STROBE FF
LAMP 2
LAMP 1
RESET
READ
CLR STB FF
CLR
EOR SENSOR
EOR LED
COVER OPEN SW
COVER OPEN GND
FORM FEED
PAUSE
5.0688 MHZ
U31 8748 SLAVE
U16 8748 MASTER
U17 8243 I/O EXPANDER
U32 8243 I/O EXPANDER
90583-401
90583-351
PW INDEX
PW DAC BIT 2
PW DAC BIT 3
PW DAC BIT 4
PW DAC BIT 5
PW DAC BIT 6
PW DAC BIT 7
PW DIR
PW POS
RF R1
RF R2
RF HOLD
TWIN TELLBACK SW
PW PRE POS
PW CLK
SELF TEST
HAMMER
GND (SELF TEST)
CA DAC BIT 2
CA DAC BIT 3
CA DAC BIT 4
CA DAC BIT 5
CA DAC BIT 6
CA DAC BIT 7
CA PRE POS
CA DIR
CA POS
PTR RDY PWR
FP GND
SELF TEST
PF HOLD
PF P1
PF P2
DELETE
DATAOUT OPTION
CA CLK
ACC-CHECK
COVER OPEN
OUT OF RIBBON
DATA READY OPTION
WIDE TRACK


PRELIMINARY
PW ENC A
PW ENC B
PW ENC PWR
PW ENC GND
PW DAC BIT 7
PW DAC BIT 6
PW DAC BIT 5
PW DAC BIT 4
PW DAC BIT 3
PW DAC BIT 2
PW DIR
PW POS
PW PRE POS
PW SERVO ERROR
PW CLK
PW MOTOR
CA ENC A
CA ENC B
CA ENC PWR
CA ENC GND
CA DAC BIT 7
CA DAC BIT 6
CA DAC BIT 5
CA DAC BIT 4
CA DAC BIT 3
CA DAC BIT 2
CA DIR
CA POS
CA PRE POS
CA SERVO ERROR
CA CLK
CA MOTOR
OPTIONAL COMPONENTS
VALUES
R103, R104
510
R11, R31, R79, R102, R105
SELECTED
U43
LM311
C49, C75
.01
C31, C32, C56, C68, C69, C73, C78
SELECTED
NOTES: (CONTINUED FROM SH2)
CAPACITORS IN THIS CIRCUIT ARE: C18 THRU 23, 28, 36, 37, 39, 41, 43, 44, 88, 90, 91 113, 114, AND 115.
SERVO SPEED RESISTORS (NOMINAL VALUES)
Qume
PCB ASSY-SII PLUS LOGIC
BOARD - SCHEMATIC
9088401


PAPER FEED
MOTOR
RIBBON FEED
MOTOR
HAMMER COIL
HAMMER DISABLE SWITCH
DISABLE
PCB ASSY-311 PLUS LOGIC
BOARD - SCHEMATIC
90884-01 B



NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL RESISTANCE VALUES ARE IN OHMS 1/4W
2. ALL CAPACITANCE VALUES ARE IN MICROFARADS
3. ALL % RESISTORS ARE 1/8W
4. LAST USED REF DESIGNATIONS
   R53, C27, CR19, Q15, L4, T2, F2, U2, E12, VR1, JP1
5. NOT USED REF DESIGNATIONS R8, R31, C24
6. ... DESIGNATIONS ARE FOR REFERENCE ONLY AS THEY ARE PART OF A ... ASSEMBLY
7. FLAME RETARDENT RESISTOR
8. INDICATES FLYING LEADS FROM COMPONENT TO SOLDER POINT ON PCB.
9. SEE DASH NUMBER TABLE

G HSING 8-31-82

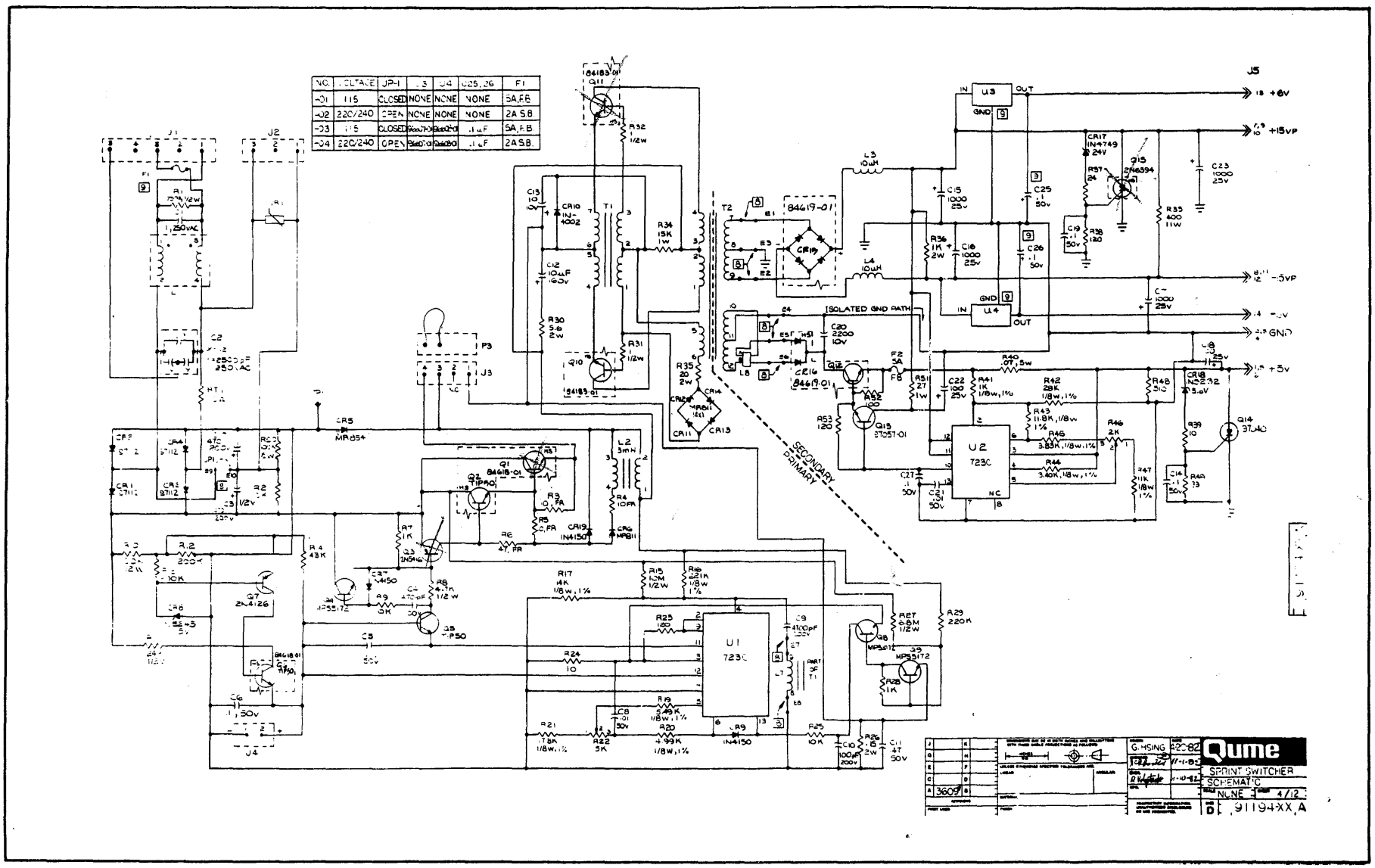
Qume

SPRINT SWITCHER ASSY.

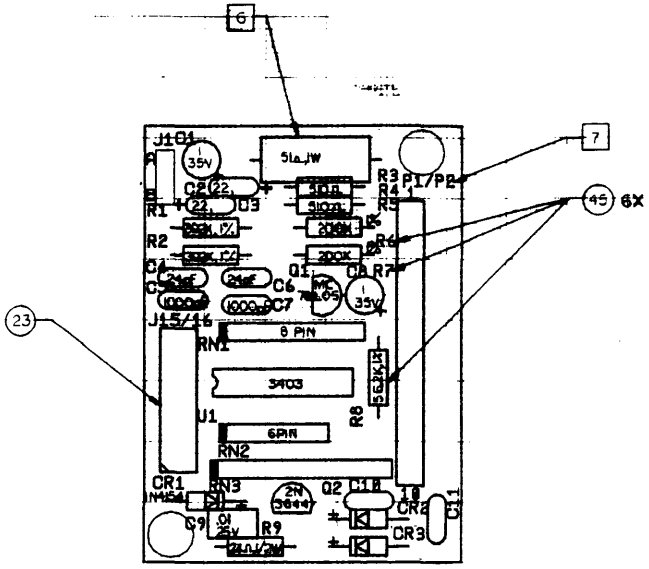
3609

2/1 2/12

D 91194-XX,A



NO.	VOLTAGE	JP-1	J3	J4	J25, 26	F1
-01	115	CLOSED	NONE	NONE	NONE	5A, F.B.
-02	220/240	OPEN	NONE	NONE	NONE	2A S.B.
-03	115	CLOSED	[illegible]	[illegible]	.1 uF	5A, F.B.
-04	220/240	OPEN	[illegible]	[illegible]	.1 uF	2A S.B.



NOTES: UNLESS OTHERWISE SPECIFIED

1 ALL RESISTANCE VALUE ARE IN OHM, 1/4W, 5%

2 ALL CAPACITANCE VALUE ARE IN MICOFARADS

3 ALL 1% RESISTORS ARE 1/8W

4 SCHEMATIC REV A IS VALID TO ASSY 90796-01 REV A, 90796-02 REV A

5 PARTS WITH NO VALUE, REFER TO PARTS LIST.

[6] MARK WITH DASH NO. REV LETTER USING NON-CONDUCTIVE INK.

[7] ~~FOR-01 INSTALL ITEM (8) ON P1-1 AND P1-7.~~
FOR-02 INSTALL ITEM (8) ON P2-1 AND P2-10

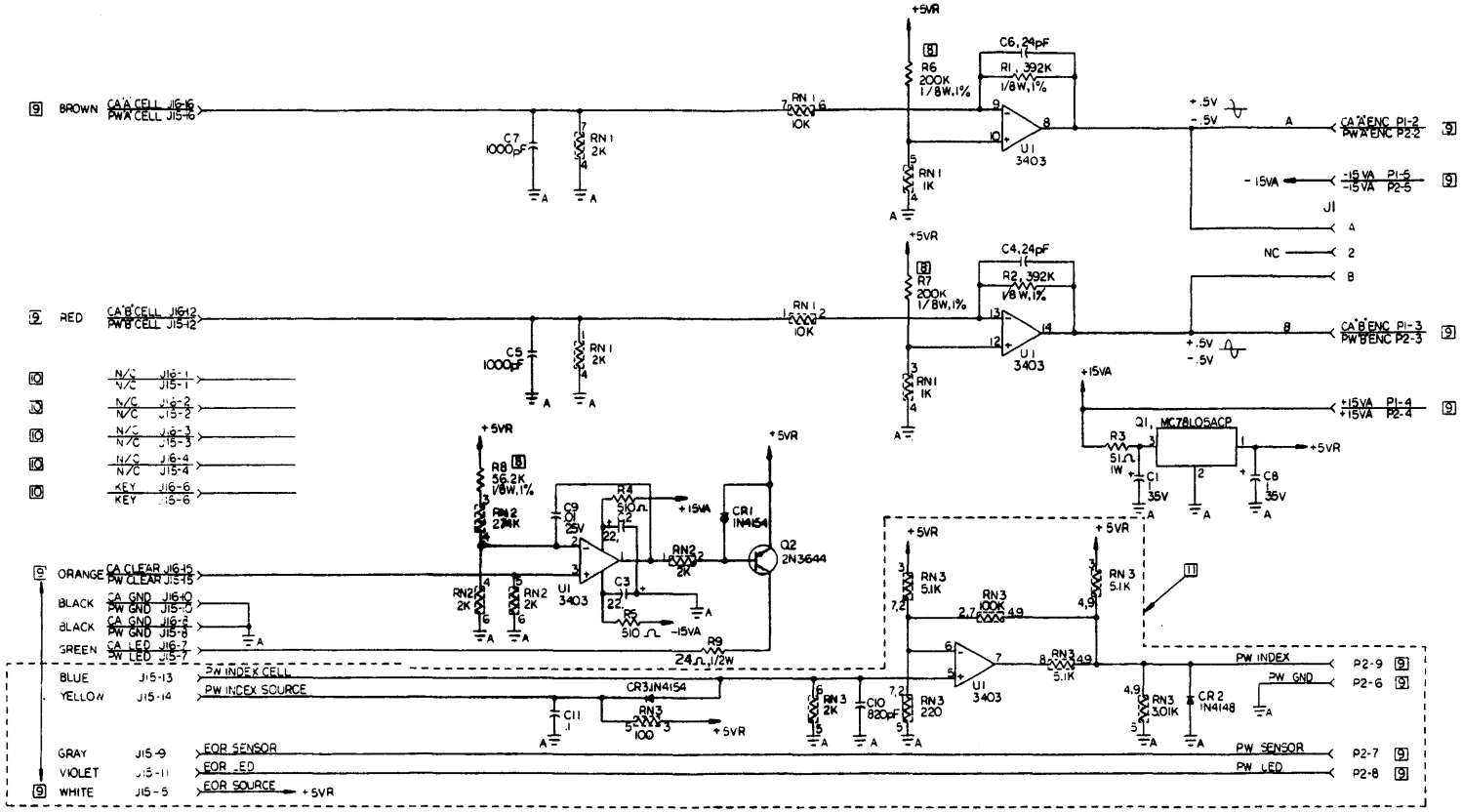
NOTES CON'T SHEET 4 SCHEMATIC

		G HSING	9-2-92
A	367316		

Qume

PWB ENCODER ASSY.

SIZE D | DWG NO. 90796-XX



NOTES: UNLESS OTHERWISE SPECIFIED

[8] RESISTOR VALUE TO BE SELECTED AT TEST

[9] P1 AND J16 REFER TO -01 FOR CA
P2 AND J15 REFER TO -02 FOR PW

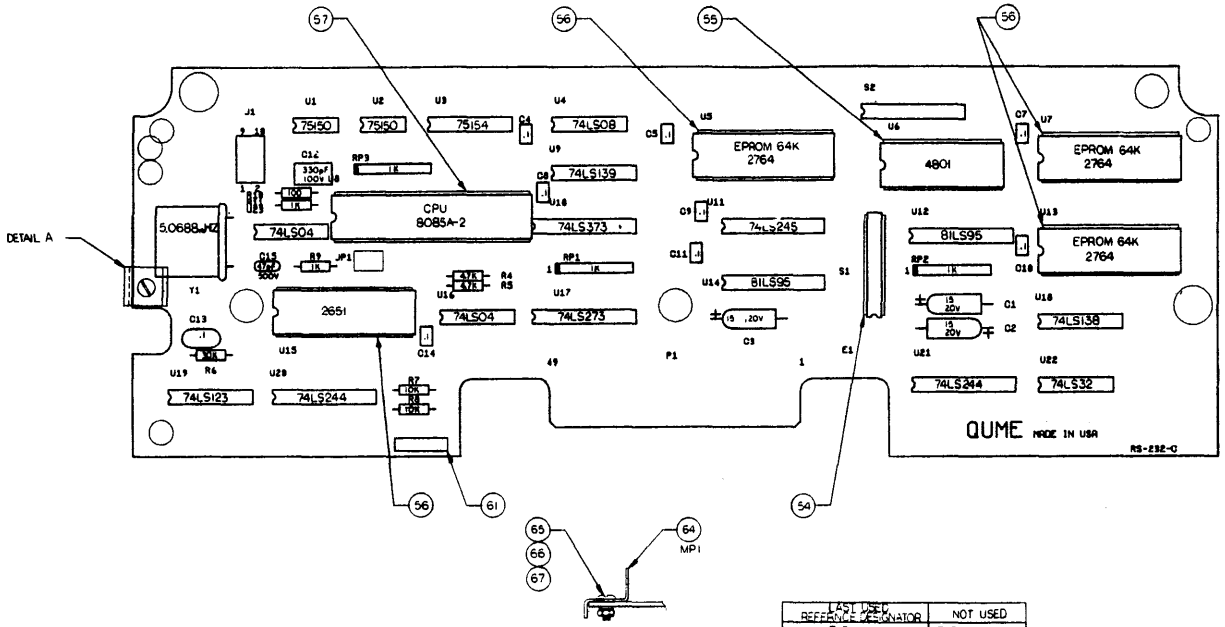
[10] FOR FUTURE USE.

[11] CIRCUIT INSIDE OF DASH LINE IS NOT USED FOR -01

ALTERNATE PART TABLE

REF. DES.	ALTERNATE
U1	96001-14
C4, C6	93418-01

G HSING	9-2-82	Qume
	9-16-82	PWB ENCODER
	9/16/82	SCHEMATIC
3673		NONE
		D1 90796-XX

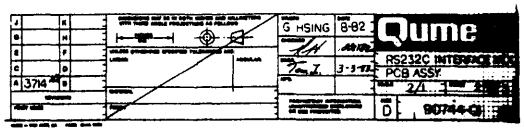


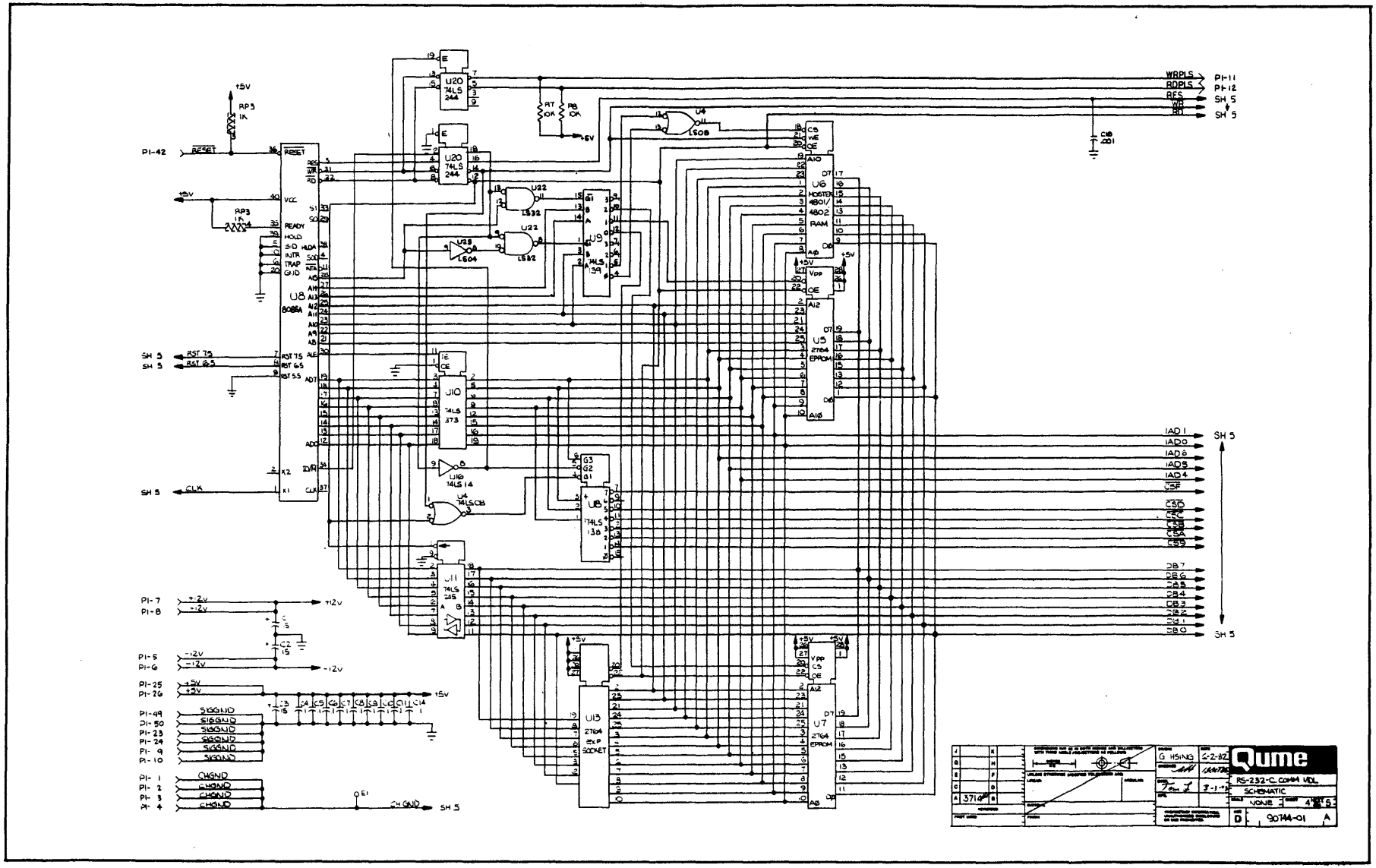
DETAIL A
SCALE:NONE

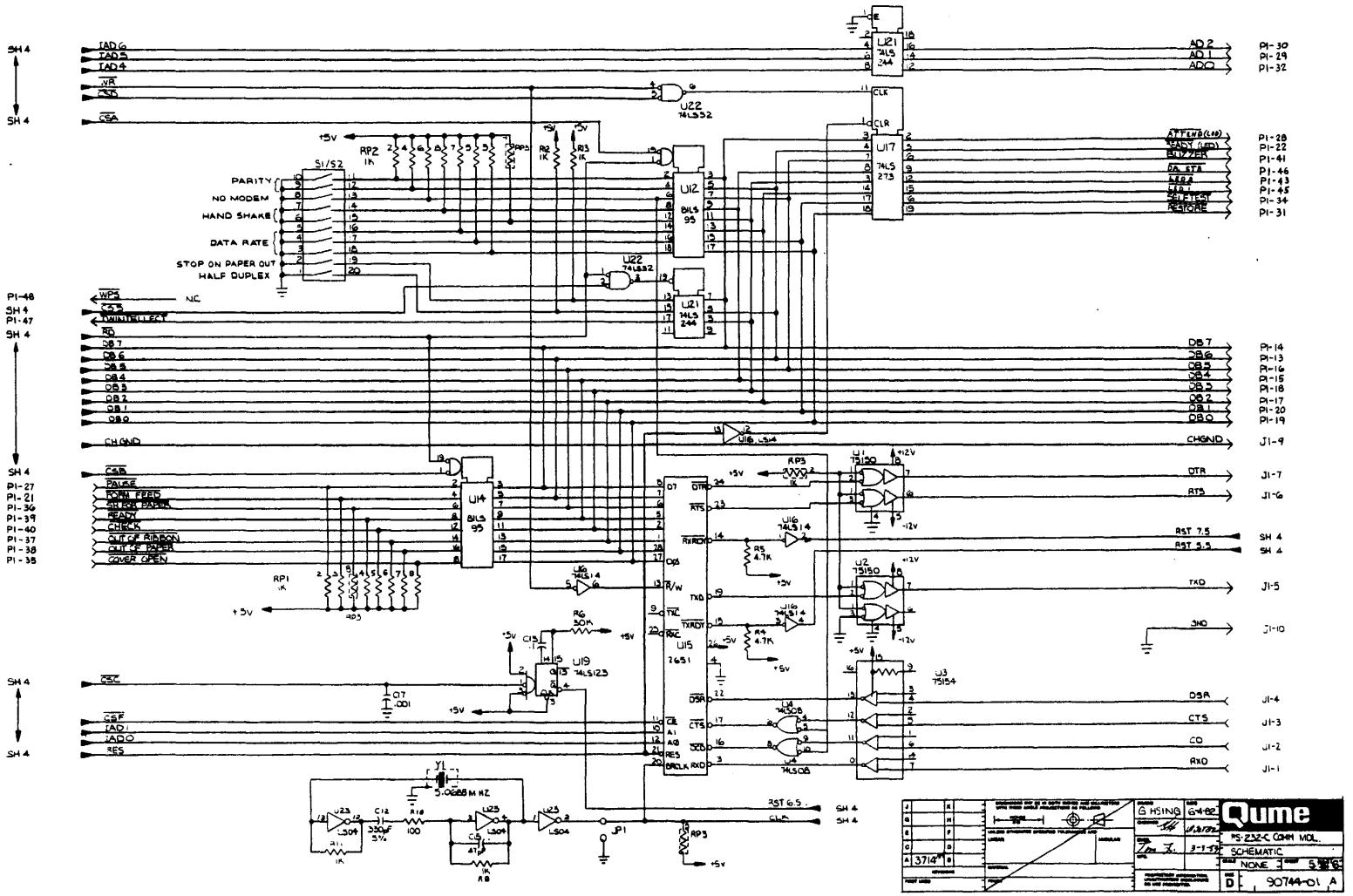
NOTES: UNLESS OTHERWISE SPECIFIED.

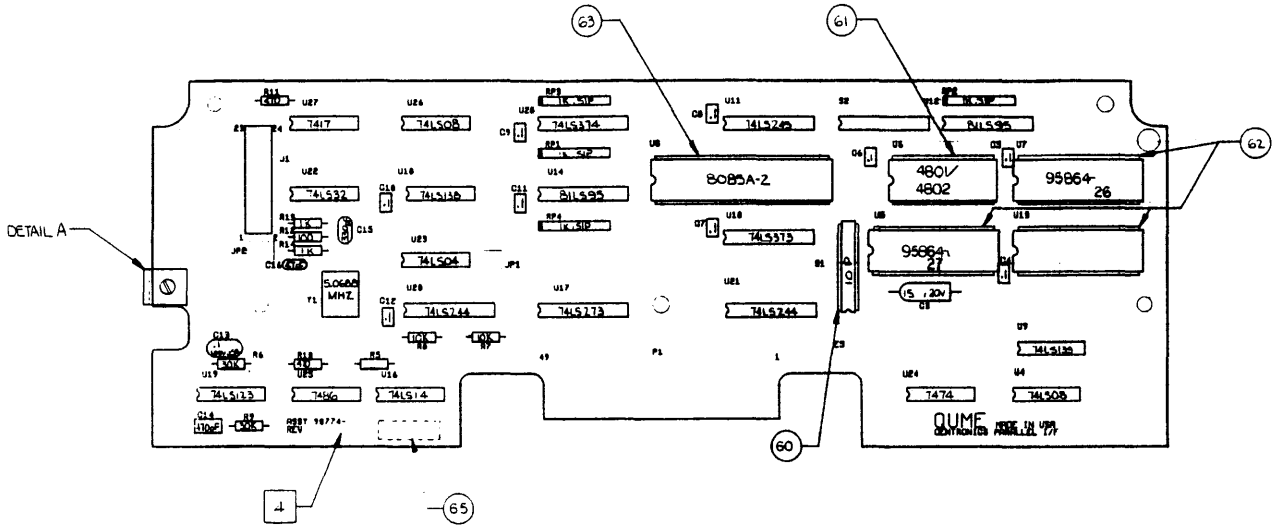
1. ALL RESISTANCE VALUES ARE IN OHMS, 1/4 W, 5%.
2. ALL CAPACITANCE VALUES ARE IN MICOFARADS.
3. STAMP APPROPRIATE DASH NO. WITH NONCONDUCTIVE INK APPROXIMATELY WHERE SHOWN.
4. SCHEMATIC REV A IS VALID TO ASSY REV A

LAST USED REFERANCE DESIGNATOR	NOT USED
R13	R1,R2,R3
C17	C6
Y2	
RP3	
S2	S2
J1	
Y1	
E1	E1
JP1	JP1
MP1	



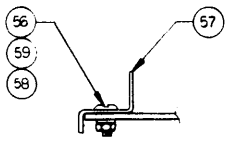

RS-232-C COMM VDL
SCHEMATIC
90744-01
A
Qume


SH 4
IAD6
IAD5
IAD4
WR
RST
CSA
+5V
RP2
1K
SI/S2
PARITY
NO MODEM
HAND SHAKE
DATA RATE
STOP ON PAPER OUT
HALF DUPLEX
U22
74LS32
U12
8ILS 95
U21
74LS 244
U17
74LS 273
AD2
AD1
AD0
P1-30
P1-29
P1-32
ATTENB(LED)
BUSY (RED)
BUZZER
P1-28
P1-22
P1-41
P1-46
P1-43
P1-45
P1-34
P1-31
P1-48
WPS
NC
SH 4
P1-47
TWINTELLECT
RD
DB7
DB6
DB5
DB4
DB3
DB2
DB1
DB0
P1-14
P1-13
P1-16
P1-15
P1-18
P1-17
P1-20
P1-19
CHGND
J1-9
CSB
PAUSE
FORM FEED
SWITCH PAPER
READY
CHECK
OUT OF RIBBON
OUT OF PAPER
COVER OPEN
P1-27
P1-21
P1-39
P1-40
P1-37
P1-38
P1-35
U14
RP1
1K
RP5
U16
74LS14
U15
2651
RP3
1K
U1
75150
U2
75150
U3
75154
U16
74LS08
U4
74LS08
R5
4.7K
R4
4.7K
R6
50K
C13
U19
74LS123
C7
.001
DTR
RTS
RST 7.5
RST 5.5
TXD
SNO
DSR
CTS
CD
RXD
J1-7
J1-6
SH 4
SH 4
J1-5
J1-10
J1-4
J1-3
J1-2
J1-1
GSC
GSF
IAD1
IAD0
RES
Y1
5.0688 M HZ
U23
U24
U25
LS04
C12
330pF
5%
R18
100
C15
47pF
R11
1K
R8
1K
RST 6.5
CLK
JP1
RP3
G HSING
6-4-82
3-1-83
3714
Qume
RS-232-C COMM MDL.
SCHEMATIC
NONE
SIZE
D
90744-01 A



NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL RESISTANCE VALUES ARE IN OHMS, 1/4W, 5%
2. ALL CAPACITANCE VALUES ARE IN MICROFARADS
3. ALL 1% RESISTORS ARE 1/8W
4. STUFF APPROPRIATE DASH NO. WITH NONCONDUCTIVE INK APPROX STATELY WHERE SHOWN

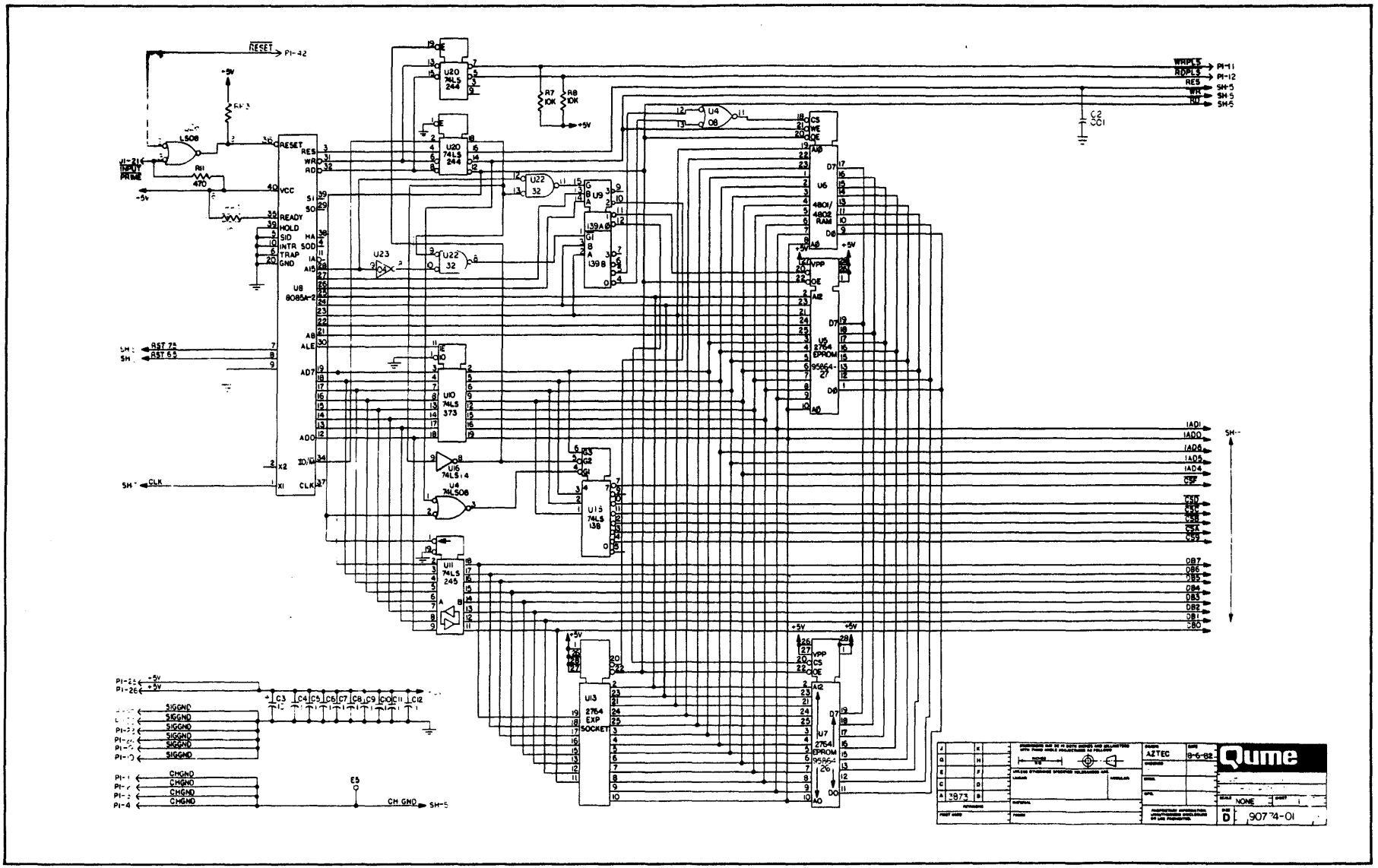


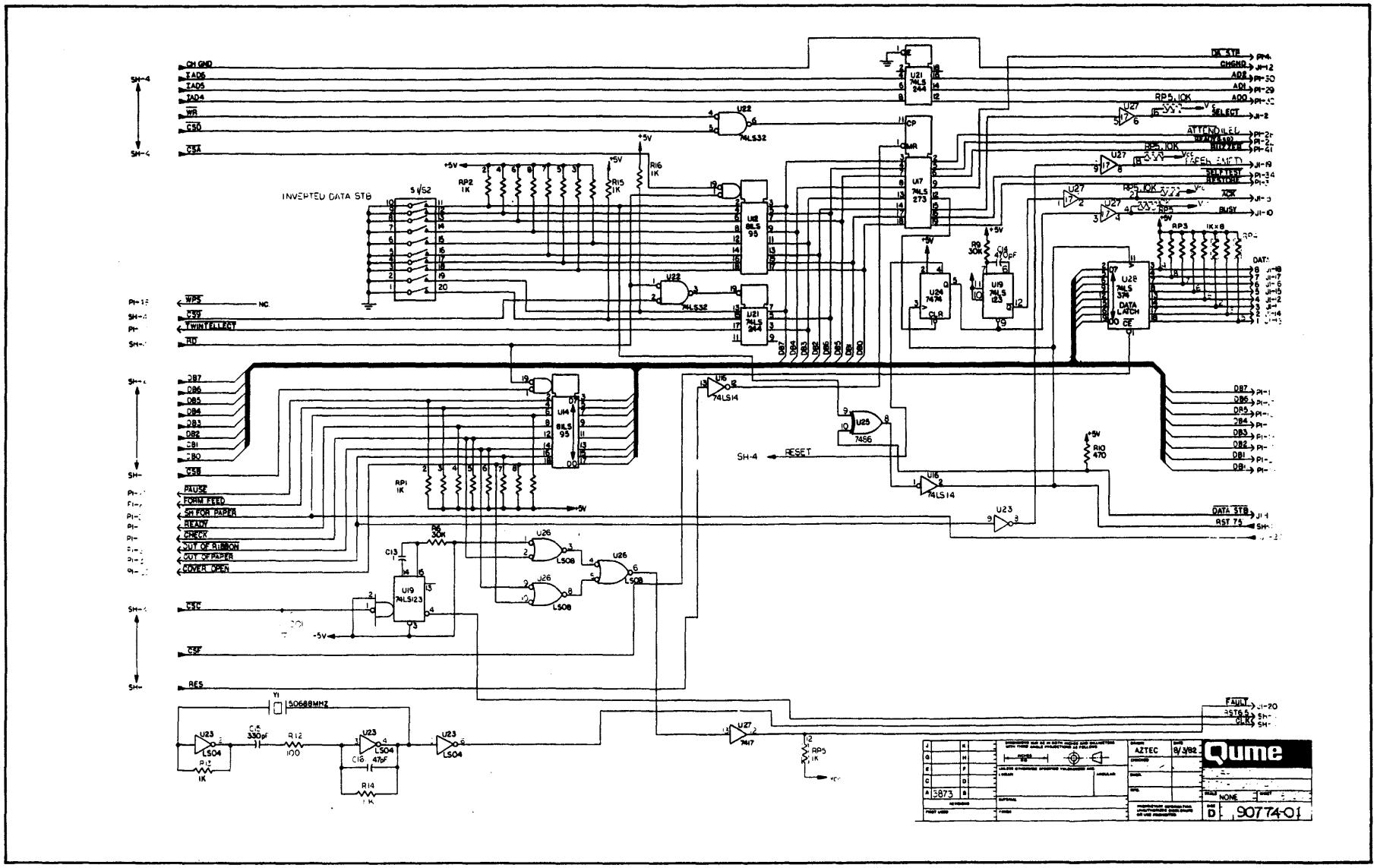
DETAIL A
SCALE: NONE

LAST USED REF DESIGNATORS	NOT USED
R16	R1, R2, R3, R4, R5
C16	
RP5	
U28	U1, U2, U3
S2	S2
Y1	
J1	

DRAWN	G HSING
DATE	7-30-82
CHECKED	
ENG.	
MFG.	
QUALITY	
MATERIAL	
FINISH	
NEXT ASSY	3873
SIZE	D
DWG NO.	90774-01 A
SCALE	1/2 : 1
SHEET	2 OF 3

Qume
PCB-CENTRONIC INTFC
MDL - ASSY


RESET
U8
8085A-2
U20
74LS
244
U10
74LS
373
U11
74LS
245
U13
2764
EXP
SOCKET
U5
2764
EPROM
U7
2764
EPROM
U6
4801/
4802
RAM
U9
139A
139B
U4
74LS08
U16
74LS14
U15
74LS
138
U22
32
U23
R7
10K
R8
10K
R11
470
C2
.001
AZTEC
9-6-82
Qume
NONE
D
90774-01


INVERTED DATA STB
RESET
AZTEC
Qume
NONE
90774-01

INDEX

INDEX, Con't

INDEX, Con't

INDEX, Con't