

Tally

T6215 **Maintenance Manual**



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This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15, Subpart B of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.



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Preface



About This Manual

This manual presents maintenance, alignment, and troubleshooting procedures for the T6215 printer. Also included are all schematics and diagrams necessary for repair and maintenance. The following chapter and appendix summaries will provide you with a survey of the manual contents.

Chapter 1. Technical Overview

In Chapter 1, you will find detailed descriptions of the technical aspects of your printer. In addition, design and operational specifications are discussed.

Chapter 2. Menu Operations

In Chapter 2, you will find the Menu Operations concerned with troubleshooting and maintaining your printer.

Chapter 3. Faults and Troubleshooting

This chapter contains a listing of the error and fault messages that may appear on the Control Panel Display and various troubleshooting procedures and problem fixes.

Chapter 4. Removing and Replacing Components

This chapter presents instructions for removing and replacing/reinstalling various printer components.

Appendix A. Schematics and Illustrated Parts Breakdowns

In appendix A schematics are given to assist you in troubleshooting problems and locating components that control your printer operations. Also included are exploded views of all printer components along with detailed parts listings.

Appendix B. Downloading Printer Firmware

In this appendix, instructions are given on downloading firmware for your printer.

Conventions



We use the following conventions throughout this manual.

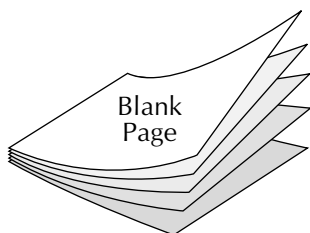
Notes may be considered as supplementary information.



This symbol marks information about actions that may damage the equipment or injure the user.



These statements list special instructions, warnings, or reminders about printer operations.



Chapter 1:

Technical Overview



Technical Overview

The T6215 is a high speed, low cost, line impact dot matrix printer. It's maximum print speed is 1500 lines per minute in uppercase draft text mode. It prints many fonts in a number of languages, and plots raster graphics and images at a wide variety of dot densities. The T6215 comes standard with Serial and Parallel interfaces and supports other interfaces through the use of user-installable PSIO interface cards. OEM add-in cards are supported via an internal IEEE 1284 connector. The T6215 does not accept the T6090/T6180 "Personality Module" cards.

T6215 Electronic Hardware Architecture

The electronic design of the T6215 is implemented in two basic modules: the Engine Control Module and the Hammer Driver Module.

Engine Control Module

The primary components of the Engine Control Module are:

- Main Processor - Motorola Cold Fire® 5307
- Flash Memory - 2 M-bytes
- SDRAM - 2 M-bytes
- EPLD - Altera EPM 7064
- Interface - specific devices
- Control Processor – Intel 87C196KC
- Sensor Inputs
- Motor logic and drive
- EEPROM – 24C64

Control Processor

- 20 MHz clock
- High speed outputs for driving the paper motor and hammer firing
- High speed inputs for synchronizing timing of the shuttle position
- 8 channel 10 bit Analog to Digital Converter for sensor readings (paper out, paper motion, shuttle motion, ribbon motion, platen gap, hammer current, power supply voltage, ambient temperature)
- Serial channel for communication (19.2K bps) with Main CPU
- Port control of Shuttle and Ribbon microcontroller
- Port control of control panel, and hammer loading

Sensor Inputs

- Paper motion – optical
- Paper out – optical
- Platen gap – Hall-effect
- Shuttle motion – optical
- Ambient temperature – thermistor
- Power supply voltage – resistor divider
- Ribbon motion - optical
- Ribbon weld detect - optical

Motor logic and drive

- 8 Hz bridge Motor drive chips (2 for ribbon, 2 for shuttle, 2 for paper, and 2 for ribbon ink pump) – Allegro 3952

EEPROM

The EEPROM stores engine calibration and printer configuration settings.

Serial and Parallel Interfaces

Serial

- MC145407 (5V) chip is used for the RS-232 drivers and receivers
- Both DTR/Busy and XON/XOFF is supported
- Standard secondary RTS on pins 11 and 19. Primary RTS is capable of being jumpered to pin 4

Parallel

- Altera EPM7064 and 74LS374/74LCX244 – supports IEEE-1284 compatibility and nibble modes

Main Processor

Motorola Cold Fire 5307

- 56MHz clock
- 32-bit CPU bus
- Two direct Memory Access (DMA) channels – One for hammer loading, and one for the IEEE-1284 parallel Interface
- Two serial channels – One for the control of CPU communication, and one for the external serial interface
- Internal SDRAM controller

Altera EPM7064

- Logic for IEEE-1284 Parallel interface
- Logic for PSIO Interface

The following table shows host interface configuration options

Table 1–1. Host Interface Configurations

Personality Module	Standard Ser/Par	LANPlex	FourPlex
Host I/Os	IEEE 1284 RS-232-C	IEEE 1284 RS-232-C Ethernet	IEEE 1284 RS-232-C Twinax Coax
Optional Configurations		IPDS	IPDS

Hammer Drive Module

- resident on shuttle/hammer assembly
- hammer drive ASICs
- hammer drive transistors
- cold drive energy damping diodes

Specifications

Serial/Parallel Emulations

Nine emulations are available on the T6215: MT660, Genicom ANSI, HP2564C, Printronix P600, Printronix P6000, IBM Proprinter III XL, Epson FX-100+, DEC LG01, and MTPL.

Font Styles

There are 6 resident type styles available on your printer. They include: Courier, Data Processing, Draft, Gothic, OCR-A, and OCR-B. All font styles and the two output modes (Enhanced and Constant Density Fonts for Draft and DP) are selected through the printer control panel.

Courier and Gothic

These two font styles provide near letter quality (NLQ) printing on your printer. They print at higher dot densities and use denser character matrixes. NLQ type styles provide greater readability for reports and other text output.

Data Processing and Draft

Data Processing and Draft styles appear in two modes: Constant Density (CDF) and Enhanced. Constant Density Fonts print at the same dot density regardless of the CPI. This produces consistent print speed even when changing from one CPI to another.

Enhanced Mode provides higher resolution and a greater range of CPI's than CDF Mode. Because Enhanced Mode uses a variety of dot densities, you should expect a change in print speed of text when switching from one CPI to another.

OCR-A and OCR-B

These font styles print at 10 CPI only. They are used mainly for Optical Character Recognition.

Characters Per Inch

The T6215 offers a variety of CPIs for use in printer output, which are dictated by the font style selected. Each CPI is based on one of twelve character matrixes and twelve dot densities. Each matrix uses a specific number of dot columns for character composition and intercharacter gap. CPIs are grouped in any given type style by the base CPI matrix used for the group. These base CPIs are 10, 12, and 15.

Table 1–2. Type Style, Character Matrix, Dot Density, and CPI Combinations

Print Modes	Type Styles	10 CPI Group	12 CPI Group	15 CPI Group
Constant Density	Draft	Base Matrix: 9 x 8 Dot Density: 60 x 48 CPIs: 5 and 10	Base Matrix: 7 x 8 Dot Density: 60 x 48 CPIs: 6, 6.67, 12, & 13.33	Base Matrix: 5 x 8 Dot Density: 60 x 48 CPIs: 15 & 17.14
	Data Processing	Base Matrix: 9 x 12 Dot Density: 60 x 72 CPIs: 5 & 10	Base Matrix: 7 x 12 Dot Density: 60 x 72 CPIs: 12 & 13.33	Base Matrix: 5 x 12 Dot Density: 60 x 72 CPIs: 15 & 17.14
Enhanced	Draft	Base Matrix: 9 x 8 Dot Density: 60 x 48 CPIs: 5 & 10	Base Matrix: 13 x 8 Dot Density: 80 x 48 CPIs: 6, 6.67, 12, & 13.33	Base Matrix: 9 x 8 Dot Density: 120 x 48 CPIs: 7.5, 8.33, 8.57, 15, 16.67, 17.14, & 20
	Data Processing	Base Matrix: 9 x 12 Dot Density: 60 x 72 CPIs: 5 & 10	Base Matrix: 13 x 12 Dot Density: 80 x 72 CPIs: 6, 6.67, 12, & 13.33	Base Matrix: 9 x 12 Dot Density: 120 x 72 CPIs: 7.5, 8.33, 8.57, 15, 16.67, 17.14, & 20
Near Letter Quality	Gothic	Base Matrix: 17 x 16 Dot Density: 90 x 96 CPIs: 5 & 10	Base Matrix: 13 x 16 Dot Density: 90 x 96 CPIs: 6, 6.67, 12, & 13.33	Base Matrix: 9 x 16 Dot Density: 120 x 96 CPIs: 7.5, 8.33, 8.57, 15, 16.67, 17.14, & 20
	Courier	Base Matrix: 17 x 16 Dot Density: 90 x 96 CPIs: 5 & 10	Base Matrix: 13 x 16 Dot Density: 90 x 96 CPIs: 6, 6.67, 12, & 13.33	Base Matrix: 9 x 16 Dot Density: 120 x 96 CPIs: 7.5, 8.33, 8.57, 15, 16.67, 17.14, & 20
Optical Character Recognition	OCR-A	Base Matrix: 9 x 16 Dot Density: 60 x 96 CPIs: 10		
	OCR-B	Base Matrix: 17 x 24 Dot Density: 90 x 144 CPIs: 10		

Lines Per Inch

Ten lines per inch (LPI) settings are available through the control panel. They include 1.5, 2, 3, 4, 5, 6, 8, 9, 10, and 12 LPI. In some emulations the availability of certain LPI's are restricted.

Dot Densities and Plot Speeds

The T6215 printer supports Horizontal row plots (single and multiple row), Vertical column plots, and specialized Graphic plots.

It supports the following horizontal DPIs: 40, 48, 60, 80, 90, 120, 180, and 240. Scaled densities available on your printer are 50, 72, 75, 96, 100, 144, 150, 160, and 200. All other selections will be approximated by conversion to the next higher density.

Your printer supports the following vertical DPIs: 48, 72, 96, 144, and 288. All other selections are emulated through the use of scaling techniques.

Table 1–3. Plot Data Output Speed

Dot Plot Hor./Vert.	Print Speed Inches Per Min.
60 x 48	187
60 x 72	125
120 x 72	62
240 x 288	7.8

Graphics Benchmarks

Two benchmark tests were used to rate graphics output on the T6215 printer. The first was an AIAG label containing bar codes and block characters inside a box. The second was a POSTNET label with one line of POSTNET bar code and four lines of text.

The AIAG test consisted of a series of labels printed two across repeated vertically with a 0.1 inch vertical space. The test was performed in two variations: Normal AIAG printed with 60 DPI bar codes and Dark AIAG printed with 120 DPI bar codes.

The POSTNET test consisted of rows of labels printed four across with one blank line between each row. In addition, the POSTNET test was run with 4 variations: Draft and Data Processing (DP) type styles for text/bar codes printed at 6 and 8 LPI.

Tests were timed, then results were converted into labels per hour. Code V and PGL had the same results.

Table 1–4. AIAG Label Benchmark Results

60 (Normal)	120 (Dark)
3660 LPH	2460 LPH

Table 1–5. POSTNET Label Benchmark Results

4-Up Draft	60,950 LPH
-------------------	-------------------

Paper Slew Speed

Table 1–6. Slew Speed

Form Weight	Maximum Slew Speed
Light and Medium	36 Inches Per Second
Heavy	20 Inches Per Second

Ribbons

The T6215 is designed to operate optimally with Tally ribbon cartridges. These cartridges are designed for easy access and loading.

Forms/Paper Description

The T61215 is designed to use continuous, sprocket feed type paper, 3.0 to 17.25 inches in width, and 3 to 12 inches in length. One to six part paper may be used with a maximum thickness of .025 inches. (Reference specifications: ISO 2784, DIN 9771, and DIN 6721.)

Acoustics

The noise generated by the T6215 printer is 6.7 Bel (sound power level) and 52 dB(A) (sound pressure level) per ISO 7779:1999E.

Power Supply

The printer requires single phase, 47 to 63 Hz. 90 to 264 VAC input power. The printer's universal power supply automatically adjusts to the correct values. A fuse is provided to interrupt power to the power supply. The following table gives typical current values.

Table 1–7. Power Requirements

External Power Supply		Current/Wattage Requirements @ Nominal Voltage			
AC Volts (RMS)	Frequency (Hz)	Average Operating	Peak Operating	Average Idle (<5 min.)	Average Idle (>5 min.)
110	50	2.00 A/215 W	5.5 A/600W	0.5A/55 W	0.3 A/30 W
110	60	2.00 A/215 W	5.5 A/600 W	0.5 A/55 W	0.3 A/30 W
220	50	1.00 A/215 W	2.8 A/600 W	0.3 A/55 W	0.2 A/30 W

Cooling System

Cooling system malfunctions are detected and a failure will result in shuttle motion, paper motion, and printing functions being inhibited. The malfunction will be reported on the control panel display.

Safety

Personnel hazard areas have restricted access with appropriate warning labels. Catastrophic equipment failures are inhibited with protective functions in major areas of overload potential.

Preventive Maintenance

The T61215 is designed to eliminate the requirement of scheduled maintenance procedures, such as alignment, adjustment, or lubrication. Preventive maintenance is limited to periodic cleaning. Dust and paper fibers should be removed periodically with a soft cloth and brush or a vacuum cleaner. Clean the printer case with a damp cloth and soapy water. **DO NOT** use any abrasive cleaners or solvents, as they will damage the case.

Environment

Operating

Temperature	
Dry Bulb:	50°F to 104°F (10°C to 40°C)
Humidity:	10 to 90% noncondensing with a maximum wet bulb temperature of 82°F (28°C) and a minimum dew point of 36°F (2°C)
Altitude:	To 8,000 ft. (2438 meters)

Nonoperating

Temperature:	
Boxed:	- 40°F to 151°F (-40°C to 66°C)
Unboxed:	14°F to 122°F (-10°C to 50°C)
Humidity:	5 to 95% noncondensing
Altitude:	To 10,000 ft. (3048 meters)
Thermal Shock:	29°F (16°C) per minute
Vibration:	Units meet NSTA (National Safe Transit Association) requirements.

The printer must be allowed to reach room temperature before operating. Three hours out of the shipping container is usually enough time for stabilization. Complies with NSTA Program 1 & 2.

Heat Load Contribution

The average heat load contribution to the environment is approximately 1075 BTUs per hour (315 Watts) with a maximum potential of 3000 BTUs per hour (880 Watts) under continuous full-load printing conditions.

Table 1–8. Heat Load Contribution

Printing Conditions (110 VAC/60 Hz)	Wattage	BTU/Hr
Power On, not printing	55	188
100% Uppercase Rolling ASCII	400	1370
Black Page Plot	600	2050

Physical Configuration

The T6215 printer is only available in the Quietized Cabinet.

Weight

The printer has an actual weight of 185 lbs and a shipping weight of 225 lbs.

Printer Dimensions

Table 1–9. Printer Dimensions

Dimension Parameter	Printer Measurement
Height	40.0"
Height/Lid Open	62.2"
Width	28.8"
Depth	28.3"
Door Opening (paper loading)	22.7"

Industry and Agency Standards

The T6215 is designed to meet the requirements of several industry and Government agency standards.

Electromagnetic Emissions

EMI:	FCC part 15, subpart J, Class A and EN5022 Class B
ESD:	EN 61000-4-2 (REF. Q1012)
RF:	EN 61000-4-3
Power Line:	61000-4-4
Transients:	61000-4-5
RF:	61000-4-6
Energy Star Compliant	

Agency Approvals

United States

The T6215 complies with ANSI UL 1950, C22.2 No. 950-95, and EN 60950:1992 including Amendments 1, 2, 3, and 4 safety requirements.

IEC 60950: 1991 plus Amendment 1, 2, 3, and 4, and National Deviations AT, AU, BE, CA, CH, CZ, DE, DK, ES, FI, FR, GB, GR, HU, IE, IT, JP, KR, NL, NO, SE, SG, SL, US and Group Differences per CB Bulletin 94A1 (Mar 99)

Chapter 2:

Menu Operations



Introduction

The Test menu contains procedures for calibrating sensors, turning motors on and off, changing hammer lead time, running various printer tests, etc. These procedures are located in the Config and Test menus and can be accessed through the Control Panel.

Technical Access Mode

Technical (Tech) Access Mode is provided for the repair technician. It allows you to access tests, calibration, and diagnostic procedures, unavailable in normal menu operations, for use in troubleshooting. Once Tech Access is enabled, these menu items appear on the Control Panel Selections Printout (the Help menu printout).

How To Enter Tech Access Mode

Place the printer Offline. Press Line Feed and Enter simultaneously and hold for 3 seconds. Release the keys when the alarm sounds and "Tech Access On" displays. At this point, the printer defaults to the Powerup configuration.

How to Exit Tech Access Mode

There are two methods for leaving Tech Access Mode.

1. Place the printer Offline. Press Line Feed and Enter simultaneously. Release the keys when the alarm sounds.

OR

2. Cycle power.

Upon leaving Tech Access mode, the printer defaults to the Powerup configuration.

Testing, Troubleshooting and Calibration

The printer is equipped with the following types of Printer Tests, Hex Dumps, and Printer Information Printouts.

Printer Tests

Printer tests appear in both normal menu operations and in Tech Access Mode. These tests consist of the following patterns and types:

- ASCII print patterns
- Plot Mode patterns
- Calibration routines
- Electronic hardware tests

Detailed explanations of the print tests follow in the Test Menu section of this chapter.

Hex Dumps

Use Hex Dumps to check printer functions and data processing operations. They may also be helpful in resolving printer performance. These dumps are located in the Configuration menu, Printer category, under the Dump Mode parameter in normal menu operations. There are three styles of Dump Modes on the printer:

Style 1 Text, spaces, and control codes print out in hexadecimal format.



Make sure that wide paper (136 columns — 13+ inches of printable width) is loaded on the printer before running a Style 1 Hex Dump.

Style 2 Control codes print out in hexadecimal format while text and spaces print out in their original form.

Style 3 Control codes and spaces print in hexadecimal format, while text prints out in its original form.

Printer Information Printouts and Displays

There are fifteen printouts and displays accessible through the printer control panel. The first printout is the Help menu and the rest are Printer Reports (Current Config, All Configs, Configs 1-10, Calibrations, Last Fault, and Version). These reports can be accessed via the Configuration menu, Printer category, under the Report parameter.

Help Menu

The Help menu is a printout that lists selections that are available for each parameter in the multilevel menus on the printer and indicates with an asterisk (*) which ones are currently active.



Before printing out the Help menu, make sure that there is at least 13 inches of printable width on the installed paper.

Printing a HELP Menu In Tech Access Mode

- STEP 1. Place the printer Offline.
- STEP 2. Press the Line Feed and Enter keys simultaneously until the printer alarm sounds, then release them to place the printer in Tech Access Mode.
- STEP 3. Press the Menu/Back Key to enter the multilevel menu system, then scroll (▲ Keys) to the Help menu.
- STEP 4. Press Enter to begin printing the Help menu.

This printout will end when the entire Help menu is printed out.

Report

This parameter has fifteen selections. The selections Current Config, All Configs, Configs 1-10 and Calibrations generate printouts. The second pair of reports (LastFault and Version) are displays. The Report Parameter is located in the Config Menu, under the Printer Category.

Report selections

Configs	Prints a report showing the setups of the configurations.
Calibrations	Prints a report showing the current values of the Paper Out and Paper Motion sensors and the hammer lead time and shuttle amplitude.
Last Fault	The Control Panel Display shows the Last Fault that occurred.
Version	The Control Panel Display shows the version number of the currently installed firmware.

To clear the displays, depress any key on the printer control panel.

Selecting a Printer Report

- Step 1. Take the printer Offline.
- Step 2. Depress the Menu/Back key to enter the multilevel menu system, then scroll (▲ Key) to the Config menu. Press Enter
- Step 3. Scroll (▲ Key) until the Printer Category displays. Press Enter.
- Step 4. Scroll (▲ Key) until the Report Parameter is displayed. Press Enter.
- Step 5. Scroll (▲ Key) to the desired selection.
- Step 6. Press Enter to begin the report printout or display.

TEST Menu

The Test menu contains the parameters for testing printer operation, adjusting print quality, and controlling fault reporting. There are three categories in this menu: Pattern, Diagnostics, and Fault Override.

The table that follows presents the categories, parameters, and parameter selections that will appear in the Test menu while the printer is in Tech Access Mode.

Table 2-1 Test Menu



Use the **▲** Key to scroll to the desired selection.



Use the **ENTER** Key to select a value or option.

	Categories	Parameters	Selections
	Pattern	Print	Upper All Characters 63/69 ECMA Columns
		Print2	Paper Save Thermal Cycle Lower 1 Line All H's All E's All #'s All +'s Parens Rubout Ribbon
		Plot	Grid Cross Gray Black Block
	Fault Override	Paper Motion	OFF ON
		Ribbon Motion	OFF ON
		Paper Out	OFF ON
		Shuttle	OFF ON
		Temp	OFF ON
		Platen	OFF ON

	Categories	Parameters	Selections
		Control	OFF ON
		Link	OFF ON
		Sync	OFF ON
	Diag	Calibrations	Hammer Paper Out Platen Gap Cal
		Meter	Paper Out Paper Motion Ribbon Weld Hammer Bus Temp Sensor Power Platen Keypad
		Motors	Ribbon Shuttle Ribbon Pump Blower
		Shuttle Speed	37-80
		Ribbon Speed	1-250
		Paper Out Thold	0-255
		Energy Star	On Off
		Clear	Calibrations Counts NVRAM
		Shuttle Off	10 Sec 20 Sec 30 Sec 60 Sec
		Shuttle Change	1-30
		Ribbon Ink, Dots/Pump	500-2000
		Serial Dump	Disabled Enabled

Pattern Category

The Pattern Category contains several predefined print patterns used to test basic printer functionality. There are three parameters in this category: **Print**, **Print2**, and **Plot**.

Print

This parameter is also available in normal menu operations. It has five selections:

Print selections

- Upper** Prints a rolling pattern of 63 UPPERCASE ASCII characters.
- All Chrs** Prints all Character Sets available on your printer.
- 63/69** Prints rolling ASCII with spaces.
- ECMA** Prints a pattern designed to produce a specific audible noise pattern specified by European Computer Manufacturers Association used for acoustics testing.
- Columns** This test labels each column in the current print line. The line length used is based on the current margin settings.

To stop any of the above tests, press Enter or Clear.

Print2

This parameter is available in Tech Access only. It has 11 print test selections.

Print2 selections

Except for the **1 Line** test all of the tests below run continuously. They will continue to run until you depress either the **Enter** key or the **Clear** key.

Paper Save This option provides a means of completing long-term testing of the printer without wasting large amounts of paper. It prints a pattern of all uppercase characters that is advanced by one character on each line. Each pass is four lines long. The printer then backs up three lines and prints another four line pass. The printer then continues printing in this fashion until it makes 30 passes. On the 30th pass the printer does not back up.

Thermal Cycle This option prints the **PaperSv** pattern for 15 minutes, stops printing for five minutes, then starts the cycle over. It is used to test the temperature cycling abilities of the printer.

Lower This option prints a rolling pattern of all 95 lowercase ASCII characters.

1 Line This option prints one line only of upper- and lowercase characters.

All H's This option prints lines composed of the uppercase letter H.

All E's	This option prints lines composed of the uppercase letter E.
All #'s	This option prints lines composed of the # symbol.
All +'s	This option prints lines composed of the + sign.
Parens	This option prints lines composed of the left paren followed by a vertical bar followed by the right paren.
Rubout	This option prints lines composed of the currently selected fill character.
Ribbon	This option prints lines composed of rolling ASCII uppercase characters.

Plot

This parameter is available in Tech Access only and it contains selections of plot patterns used to test such things as hammer ball alignment and dot placement. There are five selections for this parameter.

Plot selections

After you have started one of the tests below, it will run continuously until you depress either the **ENTER** Key or the **CLEAR** Key.

Grid	This option prints a grid pattern that can be used to check hammer ball alignment. Proper alignment of the hammer bank components is indicated by clean lines and uniform patterns.
Cross	This option prints a crosshatch pattern of diagonal lines that can be used to check linearity of dot placement. Clean lines and uniform pattern are used to indicate linear shuttle action.
Gray	This option prints a grayscale pattern at 60 x 72 DPI. This test fires all hammers (printing every other dot vertically and horizontally), which should lay down an even gray tone across the page. Any change in the gray tone indicates a variation in the gap between the hammer module and the platen, most commonly indicating either a worn hammer module or a replacement module in need of alignment.
Black	<p>This option prints a solid black page at 60 x 72 DPI matrix. The Black Page Print Mode is the most dense print test that can be run for verifying the proper operation of the printer's power supply. This test places the greatest electrical current load on the power supply as well as increasing the thermal load on the electronics.</p> <p>When performing this test, it is considered normal for the print rate to slow as the current and thermal limits are reached. If the power supply shuts down, rather than simply slowing down, the power supply may need replacement.</p>
Block	This option prints alternating bars at 60 x 72 DPI matrix. Each bar is offset from the previous bar in order to check on dot placement. This pattern is used to test the printer at its maximum sustainable graphics rate without exceeding the boundaries of thermal change or electrical current overload. This test is useful in examining the capabilities of the print mechanism, for checking proper hammer alignment/spacing, and print quality. The output in the printed areas should have uniform

shading. If not, parameters such as individual hammer module heights and alignments should be checked.

Selecting And Running a Print Test

- Step 1. Take the printer Offline and place it in Tech Access Mode.
- Step 2. Access the **Test menu** with the Menu/Back key, then scroll until it displays.
- Step 3. Scroll (▲ Key) until the **Pattern** Category is displayed. Press Enter.
- Step 4. Scroll (▲ Key) until the desired Print Test parameter (**Print**, **Print2**, or **Plot**) is displayed. Press Enter
- Step 5. Scroll (▲ Key) to the desired test pattern.
- Step 6. Press Enter to begin the Print Test.

With the exception of the **1 Line** print test, the print tests are continuous and will continue to print until you depress the Clear key or the Enter key.

Fault Override Category

This category provides you a means of controlling fault reporting from the Engine Manager to the Control Processor. Each of the following parameters has two selections: OFF and ON.

When these parameters are set to OFF, faults are reported as they happen (Fault Override is disabled). When these parameters are set to ON, faults are not reported on the display (Fault Override is Enabled).

Paper Motion

This parameter provides fault override for Paper Motion Faults.

Paper Out

This parameter provides fault override for Paper Out Faults.

Ribbon Motion

This parameter provides fault override for Ribbon Motion Faults.

Shuttle

This parameter provides fault override for Shuttle Fault reporting.

Temp

The Temp Parameter provides fault override for Temperature Threshold fault reporting.

Platen

This parameter provides fault override for the Platen Open Sensor.

Control

This parameter provides fault override for the control processor fault reporting status.

Link

This parameter provides fault override for control processor to main processor communications.

Sync

This parameter provides fault override for the "Lost Sync (28)" error in Twinax Interface Mode. Check printer cable connection.

Diagnostic Category

This category contains parameters for testing various printer components, for setting operational thresholds, and for calibrating certain sensors. You are guided through these diagnostic procedures by instructions on the Control Panel Display. There are 12 diagnostic parameters.

Calibrations

This parameter provides a means to calibrate the hammer timing pulses to obtain the best print quality, and to calibrate the Paper Out sensor. There are three selections for Calibrations: **Hammer**, **Paper Out**, and **Platen Gap Cal**.

After an initial calibration (the standard "hammer" calibration), if print quality is acceptable, no further calibration is needed. The additional procedures need only be performed if certain types of quality defects persist. As with "Hammer" calibration procedure, this option must be invoked separately for single-part and multi-part form platen gap settings.

Selecting And Running a Hammer Calibration Routine

This procedure generates a test pattern consisting of an assortment of characters and character shapes while stepping through a range of lead times during this hammer timing calibration. The lead times are measured in clock cycles and are printed along the left side of the paper (see Figure 2–1). The tests are run at one shuttle frequency and then repeated for other frequencies.

- Step 1. Take the printer Offline and place it in Tech Access Mode.
- Step 2. Access the **Test** menu.
- Step 3. Scroll (▲ Key) until the **Diag** Category is displayed. Press Enter.
- Step 4. Scroll (▲ Key) until the **Calibration** Parameter is displayed. Press Enter.
- Step 5. Scroll (▲ Key) until the **Hammer** selection is displayed.
- Step 6. Depress the **Enter** key to begin the **Hammer Calibration Routine**.
The printer generates coarse test patterns using hammer lead times from several shuttle frequencies.
- Step 7. Examine each line of the printed output for each lead time and select the one that has the best dot placement, then scroll to that setting on the Control Panel and depress the **Enter** key to select it.

After you make the last selection (for 45Hz) the printer prints out the settings for the various lead times and the calibration routine is over.



Repeat the Print calibration routine with "Heavy Forms" turned on and with heavy forms installed on the printer.


```

136  OH TAXI! #+JL)OH TAXI! #+JL)OH TAXI! #+JL)
140  OH TAXI! #+JL)OH TAXI! #+JL)OH TAXI! #+JL)OH TAXI! #+JL)
144  OH TAXI! #+JL)OH TAXI! #+JL)OH TAXI! #+JL)OH TAXI! #+JL)
148  OH TAXI! #+JL)OH TAXI! #+JL)OH TAXI! #+JL)OH TAXI! #+JL)
152  OH TAXI! #+JL)OH TAXI! #+JL)OH TAXI! #+JL)OH TAXI! #+JL)
156  OH TAXI! #+JL)OH TAXI! #+JL)OH TAXI! #+JL)OH TAXI! #+JL)
160  OH TAXI! #+JL)OH TAXI! #+JL)OH TAXI! #+JL)OH TAXI! #+JL)
164  OH TAXI! #+JL)OH TAXI! #+JL)OH TAXI! #+JL)OH TAXI! #+JL)
168  OH TAXI! #+JL)OH TAXI! #+JL)OH TAXI! #+JL)OH TAXI! #+JL)
172  OH TAXI! #+JL)OH TAXI! #+JL)OH TAXI! #+JL)OH TAXI! #+JL)
176  OH TAXI! #+JL)OH TAXI! #+JL)OH TAXI! #+JL)OH TAXI! #+JL)
180  OH TAXI! #+JL)OH TAXI! #+JL)OH TAXI! #+JL)OH TAXI! #+JL)
184  OH TAXI! #+JL)OH TAXI! #+JL)OH TAXI! #+JL)OH TAXI! #+JL)
188  OH TAXI! #+JL)OH TAXI! #+JL)OH TAXI! #+JL)OH TAXI! #+JL)

```

Figure 2–1. Hammer Leadtime Calibration Printout Sample (partial)

Selecting And Running a Platen Gap Calibration Routine

- Step 1. Take the printer offline and place it in Tech Access Mode.
- Step 2. Access the **TEST** Menu.
- Step 3. Scroll (▲ Key) until the **Diag** Category is displayed. Press Enter.
- Step 4. Scroll (▲ Key) until the **Calibrations** Parameter is displayed. Press Enter.
- Step 5. Scroll (▲ Key) until **Platen Gap Cal** is displayed.
- Step 6. Depress the **ENTER** key to begin the first part of the Platen Gap **Calibration routine**.
- Step 7. The message "Set Platen to E and press Enter" displays. Turn the Platen Gap wheel to the letter E and then press Enter.
- Step 8. The message "Set platen to C and press Enter" displays. Turn the Platen Gap wheel to the letter C and press Enter.

Meter

The Meter Parameter provides real-time dynamic measurements of various sensor readings within the printer. They can be used to adjust the sensor for optimum performance or to test sensors to ensure that they are operating properly. These test measurements are displayed directly on the Control Panel Display. There are seven selections for Meter: **Paper Out**, **Paper Motion**, **Ribbon Weld**, **Temp Sensor**, and **Keypad**. **Power** and **Platen** will not be discussed in this manual because they are used on the printer production line only.

Accessing the Meter Measurement Tests:

- Step 1. Take the printer offline and place it in Tech Access Mode.
- Step 2. With the printer display reading **OFFLINE**, depress the **Menu/Back** key and use the **▲/▼** keys to scroll to **Test**
- Step 3. Press Enter and scroll (**▲** Key) to **Diag**.
- Step 4. Press Enter and scroll (**▲** Key) to **Meter**.
- Step 5. Press Enter and scroll (**▲** Key) to one of the following measurement tests at Level 3. Each Meter Test is initiated by pressing the Enter key when the desired selection displays.

Paper Out Sensor

The **Paper Out** Sensor should read less than .2 volts with paper removed and greater than 4 volts with paper installed. No other operator actions are required during this test.

Paper Motion Sensor

The **Paper Motion** Sensor only needs to have a differential of greater than 2 volts between the high and low reading to function properly. No other operator actions are required during this test.

Ribbon Weld

The **Ribbon Weld** Sensor is read by sliding a piece of white paper between the ribbon and the sensor. The readings should be greater than 4 volts uncovered and less than .2 volts covered.

Temp Sensor

The printer has a sensor on the Engine Controller Board for monitoring the air temperature in the area of the engine controller CBA. When **Temp Sensor** is selected, the display shows the temperature in milli-volts.

Keypad

This test verifies that the logic board can receive a signal from each key on the control panel. Once you have entered the Keypad Test, depressing each key should make its label appear on the Control Panel Display (i.e., **Mode**, **View**, **Line Feed**, etc.). Exit the Keypad Test by depressing the **Clear** key three times.

Motors

This parameter provides a means for testing individual motor circuits by turning them on or off. They can be tested at the current selection (Default) or you can select a variety of speeds at which to test them. (See **Shuttle Speed** parameter and **Ribbon Weld** parameter.)

Accessing the Motor Tests:

- Step 1. Take the printer offline and place it in Tech Access Mode.
- Step 2. With the printer display reading **OFFLINE**, depress the **Menu/Back** Key and use the **▲/▼** keys to scroll to **TEST**.
- Step 3. Press Enter and scroll (**▲** Key) to **Diag**.
- Step 4. Press Enter and scroll (**▲** Key) to **Motor**.
- Step 5. Press Enter and scroll (**▲** Key) to either Ribbon or Shuttle. Each Motor Test is initiated by depressing the **Enter** key when the desired selection is displayed.

Motor selections

Ribbon
Shuttle
Ribbon Pump (Remove ribbon before performing this test.)
Blower

CAREFUL!



Remove the ribbon before performing the Ribbon Pump test!

The selected test is initiated by depressing the **ENTER** Key. After the motor reaches its assigned speed the test can be stopped by depressing the **ENTER** Key again. This sequence may be repeated until you are satisfied with the operation of the motor. (The Paper Feed Motor may be tested using the LF (line feed) or FF (form feed) functions.).

Shuttle Speed

This option provides a means to vary the Shuttle Motor speed for a Shuttle Motor Test.

Shuttle Speed selections:

20-99 Hz.

Ribbon Speed

Provides a means to vary the Ribbon Motor speed for a Ribbon Motor Test.

Speed selections:

1-250
Default

Ribbon Threshld

This parameter allows you to set the Ribbon Sensor Threshold value for the Ribbon Motion Sensor.

Threshold selections:

1–255

Paper Out Thold

This parameter allows you to set the Paper Out Threshold value for the Paper Out Sensor. By using this, you can compensate for the reflectivity of different types of paper. Selections are 1–255.

Energy Star

This parameter allows you to control Energy Star Operation. Selections are OFF and ON.

Clear

This parameter provides you with a means of clearing part or all of NVRAM.

Clear selections

Calibrations Clears the calibration data from NVRAM. When CalData is selected you must perform a Hammer Calibration Routine before using the printer.

Counts Clears the count information from NVRAM.

NVRAM Clears ALL NVRAM.

Shuttle Off

This parameter allows you to set the amount of time the shuttle remains at speed after the last printed data. Options are 10 Sec, 20 Sec, 30 Sec, and 60 Sec.

Shuttle Change

The printer checks for incoming data that uses a different shuttle speed. This parameter allows you to determine how much of that data is required before an actual shuttle speed change occurs. Options are 1–30.

Ribbon Ink, Dots per Pump

This parameter allows you to adjust the number of dots printed before the next pump of the ink is added to the ribbon. Options are 500–2000.

Serial Dump

When this parameter is enabled, the data the printer receives from the parallel port of PSIO cards is replicated and sent out from the serial port. This allows you to connect a serial cable from the printer to a computer and capture the data using a serial capture utility.

Control Panel Key Operations For Controlling Fault Reporting

In addition to being able to use the above parameters to set up individual fault overrides, you may also use three different key sequences to set up fault overrides. You may set up all fault overrides, four specific overrides, or just Paper Out Fault override.



To use these, the printer must be in Tech Access Mode.

ALL Fault Reporting

To turn **ALL** fault reporting OFF, place the printer Offline and depress the **FORM FEED** Key and **ENTER** Key simultaneously until the printer alarm sounds. To turn ALL fault reporting back ON, hold down the same two keys when the printer is Offline until the printer alarm sounds.

Four Faults Only

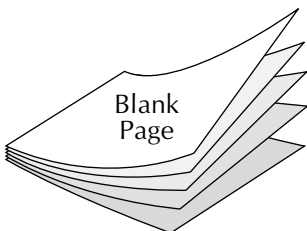
To turn fault reporting OFF for **Paper Motion**, **Paper Out**, **Ribbon Fault**, and **Platen Open** sensors, hold down the **ENTER** Key and **TOF** Key simultaneously until the printer alarm sounds. To toggle them back ON, hold down the same two keys until the printer alarm sounds.

Paper Out Only

To turn OFF fault reporting for the **Paper Out** sensor, depress the **Up Arrow** Key and **ENTER** Key simultaneously until the printer alarm sounds. To turn it back ON, depress the same keys until the printer alarm sounds.



The displays that appear when you are enabling the options above can be somewhat confusing. Just remember, when you turn on fault overrides you are losing fault protection.



Chapter 3:

Faults and Troubleshooting



Introduction

This chapter deals with troubleshooting problems on the T6215 printer. Messages that indicate printer faults and errors are explained and corrective action given. The few paper handling and print quality problems that may occur are also explained. Troubleshooting tables and diagnostic flow charts have been included.

Messages

Messages on the Control Panel Display report both normal operation and fault situations. In **Table 3-1** we present a listing of the Display Messages that need explanation or action on the part of the operator or repair person. Each message listing includes causes and corrective actions where necessary.

Faults

When a fault occurs, it will cause the printer to cease operation and go Offline. The printer alarm will sound, the **FAULT** Indicator will illuminate, and the display will report a fault message.

In some cases it is possible to clear an error message and continue using the printer by depressing the **CLEAR** Key. However, the quality of the print may be questionable and collateral damage to other parts may result. If the fault message returns, perform the required corrective action.

If a nondestructive fault occurs in the middle of printing a document, one line of text may be lost after the error condition is corrected and the printer put back Online.



If the fault is in the control panel or interprocessor link, the fault message may not be displayed, and the beeper and FAULT LED may not operate.

Fault Correction Procedure

- Step 1. First check the fault message on the Control Panel Display and look it up in the Fault Message tables provided later in this chapter.
- Step 2. Perform the required corrective action. Some Fault and Error messages will automatically clear as soon as the problem is corrected (for example, the **Platen Open** message will clear when the Form Thickness lever is lowered to the proper thickness).
- Step 3. If a faulty piece of hardware is found, turn to **Chapter 4: Removal/Replacement Procedures**, for instructions on removal and replacement of faulty parts.
- Step 4. If any other faults appear on the display after you have corrected the original problem, go back to Step 1 and perform required corrective actions for the new problem. Otherwise place the printer back Online and test it during normal print operations.

Fault Override

To allow continued printer operation during serious faults, which usually shut down printer operation, you may use the Fault Override Category in the printer menus system. This allows you to troubleshoot serious faults in order to repair them.

One Fault Override Parameter (Paper Motion) is available in the Standard Multilevel Menu. Once it is enabled it remains enabled until it is disabled through the Control Panel, a printer reset escape sequence is received by the printer, or printer power is cycled.

Eight more are available in the Tech Access Mode, under the **TEST** Menu. They can only be enabled while the printer is in Tech Access Mode. However, they will remain in whichever setting (On or Off) you select when you leave Tech Access Mode.

All of the Fault Override Parameters are explained in **Chapter 2**, under **TEST** Menu.

CAREFUL!



This feature must be used with extreme caution. Any time you disable one of the Fault Sensing Systems on your printer you lose protection from situations that may result in damage to the printer.

Dump Mode

Dump Mode is used to troubleshoot problems that may arise when processing data. You can print out only control codes, control codes and spaces, or control codes, spaces and text in hexadecimal format for use as a debugging tool. The Dump Mode Parameter is explained in **Chapter 2: Menu Operations**.

Table 3–1. Display Messages

MESSAGE	Explanation and Corrective Action	
Bad Packet	<i>Explanation:</i>	This message indicates that a fault has occurred in the communications between the I/O processor and the main processor.
	<i>Corrective Action:</i>	Cycle power and try again. If the problem returns, remove and replace the Engine Controller Board. If the problem returns, download new printer firmware.
Bad TWICO Int.	<i>Explanation:</i>	The Twinax PSIO is damaged or corrupted.
	<i>Corrective Action:</i>	Cycle power and try again. If this does not clear the problem, remove and replace the Twinax PSIO Assembly.
Bad VFU Channel	<i>Explanation:</i>	A VFU channel command has been received from the host requesting an illegal channel.
	<i>Corrective Action:</i>	Correct data from host and retransmit.
Bad VFU Count	<i>Explanation:</i>	An incorrect number of bytes has been detected in a VFU download.
	<i>Corrective Action:</i>	Correct data from host and retransmit.
Buffer Overflow	<i>Explanation:</i>	A buffer overflow has been detected on the currently active host interface. It is most likely caused by a host failure to respond to a busy signal.
	<i>Corrective Action:</i>	<ol style="list-style-type: none"> 1. Ensure correct protocol has been selected. 2. Check wiring of I/O cable between host and printer. (See Appendix C in the Operator Manual for a detailed explanation.) 3. Ensure correct protocol has been selected.
Chnl Not Found	<i>Explanation:</i>	VFU Channel requested by the host computer cannot be found.
	<i>Corrective Action:</i>	Correct data from host and retransmit.
Ctrl Fault (n)	<i>Explanation:</i>	<p>This message indicates that a fault has occurred in the control processor.</p> <p>If n = :</p> <ul style="list-style-type: none"> (4) Control CPU Reset (7) Control CPU RAM Fault (8) Control CPU Checksum Failure
	<i>Corrective Action:</i>	Cycle printer power. If this does not clear the problem, remove and replace the Engine Controller Board.
Ctrl Link Flt	<i>Explanation:</i>	The Control Processor has detected a fault in the Main Processor to Control Processor link.
	<i>Corrective Action:</i>	Cycle power and try again. If it fails again, remove and replace the Engine Controller Board.
Data Overrun	<i>Explanation:</i>	A data overrun has been detected on the currently active host interface. This is most likely caused by an incorrectly configured serial protocol baud rate, data bits, parity or host failure to respond to a busy signal.
	<i>Corrective Action:</i>	Check setting on Serial Protocol baud rate, Data Bits, and Parity parameters through the printer control panel.
Dead CPU	<i>Explanation:</i>	The Main CPU has quit talking to the Control CPU.
	<i>Corrective Action:</i>	Cycle power to the printer. If the error occurs, call Tally.

Table 3–1, Continued

MESSAGE	Explanation and Corrective Action	
Fake Mode	<i>Explanation:</i>	The shuttle motor is disabled, but the printer is “faking” shuttle timing.
	<i>Corrective Action:</i>	Plug in the platen sensor if it is not already. If it’s plugged in already, the platen sensor may be damaged. Replace it.
Fatal Fault n	<i>Explanation:</i>	A fault has been detected in the software.
	<i>Corrective Action:</i>	Cycle power and try again. If this does not clear the problem, remove and replace the Engine Controller Board.
Font Dnld Error	<i>Explanation:</i>	An error has been detected during a font download.
	<i>Corrective Action:</i>	Correct data and retransmit from host.
Graphics Check	<i>Explanation:</i>	Unknown graphics character for Twinax/Coax
	<i>Corrective Action:</i>	Correct data and retransmit from host.
Hammer Time	<i>Explanation:</i>	A fault has been detected in the software.
	<i>Corrective Action:</i>	Depress the Clear key to clear the fault and continue operation
Hammer Voltage	<i>Explanation:</i>	A transistor has been detected out of range.
	<i>Corrective Action:</i>	Check for a malfunctioning blower and if necessary, remove and replace. If the problem persists, remove and replace the Hammer Drive Board.
Heap Overflow	<i>Explanation:</i>	Graphics memory space is full and the printer cannot accept or process data. Printer will reset and data will be lost.
	<i>Corrective Action:</i>	Insert line terminators in data stream so the printer will process the data, then retransmit the data.
I/O Timeout	<i>Explanation:</i>	The NIC ca+rd is recognized, but the NIC doesn’t respond in the given amount of time.
	<i>Corrective Action:</i>	Cycle power. If that does not work, the card jumper might be wrongly set, or there is a bad I/O card.
Link Fault (n)	<i>Explanation:</i>	This message indicates that data flow has been interrupted between the main processor and the control processor. If n = : (0) Maximum Packet Length Exceeded (1) Inter processor Link Transmit Timeout (2) Illegal Packet Length (3) Illegal Packet Type (5) Inter processor Link Receive Timeout (6) Sweep Done Timeout (9) Inter processor Link Receive Overrun (10) Status Request Timeout (11) Temperature Request Timeout
	<i>Corrective Action:</i>	Cycle printer power. If that does not clear the problem, download new printer firmware.
No VFU Loaded	<i>Explanation:</i>	A VFU command was received from the host before a VFU was Downloaded.
	<i>Corrective Action:</i>	Download the required VFU information, then retransmit the data.
NVRAM Fault	<i>Explanation:</i>	The nonvolatile data checksum has failed because the variable values have been altered in a destructive manner.
	<i>Corrective Action:</i>	Depress the CLEAR Key. If the message does not clear, cycle printer power. If the message still does not clear, remove and replace the Engine Controller Board.

Table 3–1, Continued

MESSAGE	Explanation and Corrective Action	
Offline Data In	<i>Explanation:</i>	The printer is in Offline condition and nonprinted data is in the buffer.
	<i>Corrective Action:</i>	There is no corrective action required. Under normal conditions the printer will continue to print when it is placed back Online. If you do not want the buffered data to print, enter the Clear Menu by depressing the CLEAR Key before going back Online and select the Clear Buffers entry to clear the buffered data.
Offline Dump On	<i>Explanation:</i>	The printer is in Offline condition and Dump Mode is enabled.
	<i>Corrective Action:</i>	No corrective action is necessary. Place the printer back Online when you are ready to print. (See the explanation at the beginning of this chapter and in Chapter 2 , under Hex Dumps , for explanations about how the data from the host is printed.)
Online Dump On	<i>Explanation:</i>	The printer is ready to accept and print data from the host through Dump Mode. (See the explanation at the beginning of this chapter and in Chapter 2 , under Hex Dumps , for explanations about how the data from the host is printed.)
	<i>Corrective Action:</i>	No corrective action is required.
Overflow VFU	<i>Explanation:</i>	An excessive number of bytes has been sent by the host in a VFU download.
	<i>Corrective Action:</i>	Correct data and retransmit from host.
Paper Motion Flt	<i>Explanation:</i>	The control processor has detected that the paper has failed to move the required distance after sending a command to the Paper Drive Motor.
	<i>Corrective Action:</i>	Check for paper feed problems. If there are any paper feed problems, correct them, then depress the CLEAR key to clear the fault and continue operation. If this does not clear the problem, check for paper debris blocking the sensor. If problem still exists, check cable connection at the Engine Controller Board. If it fails again, check the sensor's voltage output (in the Meter parameter of the Control Panel). The reading should be approx. +5.0 Volts without paper and $\leq +3.0$ Volts with paper. Ideally the voltage reading should differ at least 2V between paper in and paper out. If the differential is less than 2V, or the voltage does not change or is zero, the Upper Tractor set (Includes Paper Motion Sensor) needs to be replaced. If all the above does not clear the problem, remove and replace the Engine Controller Board.

Table 3–1, Continued

MESSAGE	Explanation and Corrective Action	
Paper Out	<p><i>Explanation:</i> Paper is not being detected in the lower paper path below the print mechanism.</p> <p><i>Corrective Action:</i> If this message is correct, refer to the ENTER Key Section of Chapter 2 of the Operator Manual, then load paper. (See Loading Paper Section of Chapter 1 of the Operator Manual.) If this message is in error, check the sensor connection on the Engine Controller Board and sensor position on its tractor. If the connection is OK and the sensor is properly installed, then recalibrate the Paper Out Sensor. (See TEST Menu in Chapter 2 for the procedure.) If the problem still exists, the Lower Tractor Set (includes Paper Out Sensor) needs to be replaced. If all of the above checks and fixes do not clear the problem, remove and replace the Engine Controller Board.</p>	
Parity Error	<p><i>Explanation:</i> Parity is enabled and a mismatch on Bit 8 has been detected on the currently active host interface.</p> <p><i>Corrective Action:</i> If there is a mismatch between the setting of the printer and the setting of the host, you can change printer parity by referring to the Configuration Menu section of Chapter 3 of the Operator's Manual. If there is no mismatch between the printer and host settings, then the data sent from the host has been corrupted. Retransmit the data from the host. If the condition repeats, set up the printer for Dump Mode (see Configuration Menu Section in Chapter 3 of the Operator's Manual) and retransmit the data again. If you find no errors in the Dump Mode data, remove and replace the Interface Board. If this still does not correct the problem, the likely cause is in the I/O cable or the host.</p>	
Platen Open	<p><i>Explanation:</i> The Form Thickness Lever is set beyond the maximum setting for paper thickness. This message may display when you are loading paper or a Ribbon Cartridge into the printer. This condition disables the printer and the only keys that will function on the control panel are the form movement keys.</p> <p><i>Corrective Action:</i> When you are loading paper or a Ribbon Cartridge, this message will clear when you lower the Form Thickness Lever and close the Platen Gap. If this message appears at any other time or will not clear, run the Platen Calibrate procedure (see Test Menu in chapter 2). Note: This requires initiating Tech Access mode and suppressing all faults (by holding down Enter and FF) to clear the fault, making menu navigation possible.</p>	

Table 3–1, Continued

MESSAGE	Explanation and Corrective Action	
Print Fault	<i>Explanation:</i>	Faulty communication between the main and control processor has occurred causing a dot row to misprint. The printer automatically recovers from this condition.
	<i>Corrective Action:</i>	Under normal circumstances there is no corrective action other than to depress the CLEAR Key to remove the fault message from the display. If this does not clear the problem, remove and replace the Engine Controller Board.
Ribbon Fault	<i>Explanation:</i>	The ribbon is no longer moving. The ribbon has stalled because a ribbon weld broke, ribbon jammed, snagged, or the platen gap is too small. The ribbon shield may not be adjusted correctly, causing ribbon faults.
	<i>Corrective Action:</i>	Depress the CLEAR key, then put the printer back Online. If the fault returns, check the platen gap and ribbon shield. Also check the ribbon by turning the capstan, the ribbon should move freely. If the problem reoccurs, replace the ribbon.
Self Testing	<i>Explanation:</i>	The printer is performing internal diagnostic tests.
	<i>Corrective Action:</i>	If this message does not clear automatically after a few seconds, remove and replace the Engine Controller Board.
Setup Address	<i>Explanation:</i>	The printer address has not been set up or a configuration with address set to UNDEFIN has been loaded.
	<i>Corrective Action:</i>	Set up the printer address using the multilevel menus on the printer. The procedure is located in Chapter 3 of the Operator Manual , under the Configuration Menu .

Table 3–1, Continued

MESSAGE	Explanation and Corrective Action
Shuttle Fault	<p><i>Explanation:</i> If the control processor detects the shuttle operating either above or below the proper frequency, it shuts down the shuttle and attempts to restart it. If the shuttle still operates incorrectly after three consecutive attempts, the Control Processor goes Offline, and the Shuttle Fault message is displayed.</p> <p><i>Corrective Action:</i> Depress the CLEAR Key, then put the printer back Online. Send a print job to the printer or perform a print test. If the error condition returns, cycle printer power, then try to print again.</p> <p>If the fault condition returns after performing the above actions, perform the following checks:</p> <p>Check and verify that the shuttle drive belt is not broken or loose. Replace it if it is.</p> <p>Check sensor position, cable, and Engine Controller Board connection. If the connection and cable are OK and the sensor is properly installed, turn the shuttle drive gears by hand. If they do not turn freely, remove the shuttle mechanism and check it again. If it turns freely while removed, check the Hammer Bank for free side-to-side movement.</p> <p>If the Hammer Bank is binding and does not slide freely, replace the shaft bearing blocks on the Hammer Bank.</p> <p>If the shuttle mechanism still does not turn freely or you find broken or excessively worn gears, replace the Shuttle Drive Mechanism.</p> <p>If they turn freely, the Hammer Bank is not binding, and no excessive wear is present, perform a motor check using the Shuttle Selection under the Motor Parameter in the TEST Menu. If the motor does not function properly, check the drive motor connection on the Engine Controller Board and check the motor cable. Correct any problems you encounter with these items.</p> <p>If the connection and cable are OK, check and ensure that the proper voltage is provided at the motor connector plug on the Engine Controller Board. If the voltage is incorrect, check voltage at the Power Supply. If power supply voltage is OK, replace the Engine Controller Board. If Power Supply voltage is not correct, check the input voltage. If the input voltage is OK, then replace the Power Supply. If the input voltage is not correct, there is a problem with the site power source. Call an electrician.</p>
Skip Ribbon Weld	<p><i>Explanation:</i> This is an advisory message. The message appears when the welded part of the ribbon is moving across the Hammer Bank.</p> <p><i>Corrective Action:</i> None. Wait for the ribbon to finish moving, and the message will disappear.</p>

Table 3–1, Continued

MESSAGE	Explanation and Corrective Action
Thermal Fault	<p><i>Explanation:</i> The ambient temperature has exceeded the limit (Max T).</p> <p><i>Corrective Action:</i> Check to see if the Circuit Cooling and Hammer Bank fans are working. If both fans are working, you have a faulty Engine Controller Board.</p> <p>If only one of the two fans is not working, check power at the Engine Controller Board for the fan that is not operating. If power is OK, remove and replace the fan. If power is not OK remove and replace the Engine Controller Board.</p> <p>If neither fan is working, either the Engine Controller Board or the Power Supply is malfunctioning. Check voltage output of the Power Supply. If it is OK remove and replace the Engine Controller Board. If it is not OK, check the power source voltage. If the power source voltage is OK, remove and replace the Power Supply. If the input voltage is not correct, there is a problem with the site power source. Call an electrician.</p>

Hardware Troubleshooting Guides

Not all printer problems are reported by an error message. Malfunctioning hardware can cause a wide variety of problems without triggering a fault indication. The troubleshooting procedures in this section will help you to repair hardware problems.

The printer does not power up when switched on

There are four things that can cause this problem.

1. A bad connection.
2. A malfunctioning On/Off switch.
3. Incorrect input power.
4. A malfunctioning power supply.

CAREFUL!



Input power voltages can be lethal. Be very careful while performing these procedures.

Troubleshooting Procedure

- Step 1. Check all power connections.

Is the printer plugged in?

Are the connections on the On/Off switch secure?

Are the input power connections on the Power Supply secure?

Are the Power Supply connections to the Engine Controller Board secure?

- Step 2. Check the input power supply voltage. Input power should be 90—130 VAC or 180—264 VAC, single phase, 50 ± 3 — 60 ± 3 Hz. Check input power at the plug-in, on the Power Supply side of the On/Off switch, and on the input side of the Power Supply.

If input power at the plug-in is incorrect, either the printer power cord is defective or the power supply is defective. Check power at the outlet to make sure the power source voltage is correct. If the power source voltage is OK, the problem is in the cord.

If input power at the plug-in is OK, check power from the On/Off switch to the Power Supply. If there is no power at the back of the On/Off switch when it is switched On, the On/Off switch is defective and should be replaced.

If input power is OK on the back of the On/Off switch, check input power on the Power Supply. If there is no input power at the Power Supply, the cabling from the On/Off switch to the Power Supply is defective.

- Step 3. If input power to the printer Power Supply is OK, check output voltage of the Power Supply. Power Supply output voltage should be approximately +48 V DC. If the output voltage is incorrect, remove and replace the Power Supply.

The Printer powers up but the Control Panel does not function.

There are four things that can cause this problem.

1. A bad connection.
2. A bad control panel.
3. A bad Engine Controller Board.
4. Loss of 5 V power supply.



If the yellow Power On Indicator is the only one that does not function, the problem is most likely a malfunctioning Control Panel.

Troubleshooting Procedure

- Step 1. Check the form movement keys to see if they function.

If the form movement keys function properly, the problem is either in the Control Panel or in the Engine Controller Board.

Try another Control Panel first. If that does not correct the problem, then remove and replace the Engine Controller Board.

- Step 2. If the form movement keys do not function properly, check the Control Panel connection to the Engine Controller Board.

If the connection is OK, the problem is in either the Control Panel or in the Engine Controller Board. Try another Control Panel first. If that does not correct the problem, then remove and replace the Engine Controller Board.

The Control Panel Display functions partially, nonsensically, or not at all.

There are three things that can cause this problem.

1. A bad connection.
2. A malfunctioning Control Panel.
3. A malfunctioning Engine Controller Board.

Troubleshooting Procedure

- Step 1. Check the Control Panel connection to the Engine Controller Board.

- Step 2. If the connection is OK, the problem is in either the Control Panel or in the Engine Controller Board.

Try another Control Panel first. If that does not correct the problem, then remove and replace the Engine Controller Board.

There is no printed output but the printer appears to be operating normally.

There are three things that can cause this problem.

1. The platen may be open too far but not far enough to cause a **Platen Open** message.
2. The Ribbon Cartridge may not be functioning properly.
3. Platen alignment may be incorrect.

Troubleshooting Procedure

- Step 1. Check the Platen Gap Lever and make sure it is closed properly.
- Step 2. Make sure the Ribbon Cartridge is functioning (tracking) properly. If the Ribbon Cartridge is not functioning properly, replace it.
- Step 3. If steps 1–2 do not correct the problem, check and adjust the platen alignment guides. The Platen Gap should be approximately .013 " with the Platen Gap Wheel fully closed. (See **Procedure 9** in **Chapter 4**.)

Printed output appears light

There are three things that can cause this problem.

1. The platen may be open too far but not far enough to cause a **Platen Open** message.
2. The Ribbon Cartridge may be worn out.
3. Platen alignment may be incorrect.

Troubleshooting Procedure

- Step 1. Check the Platen Gap Lever and make sure it is closed properly.
- Step 2. If the Ribbon Cartridge is functioning properly, it is probably out of ink. Remove and replace the Ribbon Cartridge.
- Step 3. If steps 1–2 do not correct the problem, check and adjust the platen alignment guides. The Platen Gap should be approximately .013 inches with the Platen Gap Wheel fully closed. (See **Procedure 9** in **Chapter 4**.)

Printed output appears shaky or fuzzy

There are six things that can cause this problem.

1. The platen may be open too far but not far enough to cause a **Platen Open** message.
2. The shuttle mechanism is worn—the shuttle counterweight gears or the bearings are worn.
3. The hammers are not firing properly.
4. Platen alignment may be incorrect.
5. Damaged platen.
6. The Shuttle Sensor is misaligned.

Troubleshooting Procedure

Step 1. Check the Platen Gap Lever and make sure it is closed properly.

Step 2. Check the Shuttle Mechanism for wear in the gears or play in the bearings.

If the Shuttle Mechanism is defective, replace the Shuttle Mechanism, then perform a Hammer Calibration procedure for optimum print quality.

Step 3. Perform a Hammer Calibration procedure. This procedure is explained in **Chapter 2**, in the **TEST** Menu Section, under the **Diagnostic** Category (**PrntCal** Parameter).

If the hammers can not be calibrated, the problem is in the Engine Controller CBA. Replace the Engine Controller CBA following the procedure explained in **Chapter 4**.

Step 4. Check and adjust the platen alignment guides. The Platen Gap should be .012 " – .014" with the Platen Gap Adjustment Wheel fully closed.

Step 5. Check the impact area of the platen and replace the platen if this area is damaged.

Step 6. Make sure the Shuttle Sensor is properly aligned. (See **Procedure 18** in **Chapter 4**.)

Character columns not printing

There are five things that can cause this problem.

1. Broken Hammer.
2. Defective Hammer Coil; either shorted or open.
3. Defective Hammer Bank Cable.
4. Malfunctioning Engine Controller Board.
5. The hammer may be sticking due to contamination, such as paper and ink buildup.

Troubleshooting Procedure

Step 1. Open the cover and paper guide areas.

Step 2. Inspect the Hammer Bank cables for rub spots, cracked insulation, burn spots, etc.

If any physical defects are found in the cables, remove and replace the Cable Assembly and correct the cause of the problem with the cable.

Test the printer to see if the problem is still present. If it isn't, reinstall the cover, etc. and place the printer back in service.

If the problem is still present, proceed to STEP 3.

If no physical defects are found proceed to the next step.

Step 3. Remove the Ribbon Cartridge and Ribbon Platform.

Step 4. Check continuity from the Hammer Bank Cable Connector to the affected coils.

Step 5. Check continuity of the Hammer Coil. Resistance of the coil should be $12\ \Omega$ (Ohms) $\pm .3\ \Omega$ at 70° F. If the coil resistance is outside of this range, remove and replace the Hammer Module.

If the Hammer Coil is defective, check the Hammer Driver on the Engine Controller Board also. Defective Hammer Drivers can cause problems with Hammer Coils. Instructions for checking Hammer Drivers are located at the end of this chapter.

Step 6. Is the hammer broken or defective? If so, remove and replace the Hammer Module.

Step 7. Check between the Hammer Plate and the Hammer Module Return Plate and between the Hammer Head and Hammer Coil for ink and paper buildup. Clean the Hammer Bank by prying out **gently** on the hammer with your finger and running a piece of paper behind the hammer to remove the contamination. For stubborn buildup you may use a little isopropyl alcohol on the paper to loosen the contamination.

Step 8. If there are no physical defects, shorts, or opens, the likely cause of the problem is a malfunctioning Engine Controller Board. Remove and replace the Engine Controller Board.

The Printer is out of paper — No Paper Out fault is reported

There are four things that can cause this problem.

1. Fault override for paper out sensor is on, disabling the paper out sensor.
2. Calibration values have been lost for the paper out sensor.
3. The Paper Out Sensor is bad.
4. Malfunctioning Engine Controller Board.

Step 1. Check to see if the fault override is enabled for Paper Out sensing.

Step 2. If Fault Overrides are not enabled, check the sensor connections and recalibrate the Paper Out sensor. (See **Chapter 2**, under **Diag Category**.)

Step 3. Use the Meters function (explained earlier in the troubleshooting table) to verify operation of the sensor. If the sensor is bad, replace the lower tractor set.

Step 4. If none of the above checks eliminate the problem, the most likely cause is a malfunctioning Engine Controller Board. Remove and replace the Engine Controller Board.



If you have no idea how long the printer has been banging away with no paper installed, check the platen for damage. If necessary, remove and replace the platen and any damaged hammers.

No Paper Motion — No Paper Motion fault is reported

There are three things that can cause this problem

1. Fault override for paper motion sensor is on, disabling the paper motion sensor.
2. Defective Paper Motion Sensor.
3. Malfunctioning Engine Controller Board.

Step 1. Check to see if the fault override is enabled for Paper Motion sensing.

Step 2. Use the PapMot Meter Test to check the sensor. If it does not check correctly, remove and replace the upper tractor set.

Step 3. If none of the above checks eliminate the problem, the most likely cause is a malfunctioning Engine Controller Board. Remove and replace the Engine Controller Board.



If you have no idea how long the printer has been banging away with no paper motion, check the platen for damage. If necessary, remove and replace the platen and any damaged hammers.

Paper Handling Problems

The following table lists the few paper handling problems you may encounter along with corrective actions you may take.

Table 3–2. Paper/Printing Corrective Action

Problem	Cause	Corrective Action
The paper holes are wider than normal after passing through the tractors.	Horizontal paper tension is too tight.	Unlock and readjust the tractors.
Printed characters on heavy weight or multi-part paper are smeared.	The Platen Gap is not set correctly, or there is an incorrect Platen calibration.	Open the Platen Gap Wheel, or calibrate platen.
The printed characters are too light.	The Platen Gap Adjustment Wheel is out of adjustment or the ribbon is worn out, or there is an incorrect platen calibration.	Readjust the Platen Gap Wheel. If this does not correct the problem, replace the ribbon cartridge with a new one, or calibrate platen.
The printed characters are shaky.	The Platen Gap Adjustment Wheel is not set correctly, or there is an incorrect platen calibration	Adjust the Platen Gap Wheel, or calibrate the platen
The printed characters in one line are shorter than normal.	Vertical paper tension is too loose.	Move the Paper Tension Lever until the paper is taut, but not too tight.
The paper holes are elongated after passing through the tractors.	Vertical Paper tension is too tight.	Move the Paper Tension Lever until the paper is taut, but not too tight.
The paper comes out of the tractors or the paper tears at the right or left holes along the edges.	(1) The vertical or horizontal paper tension is incorrect.	To change the vertical tension, raise the Paper Tension Lever to increase tension and lower it to decrease tension. To change the horizontal tension, unlock the upper right and/or lower right tractor and move it left or right to make the necessary adjustment.
	(2) The tractors are too far apart.	Unlock and realign the tractors.
	(3) Upper tractors are not aligned with the lower tractors.	Unlock and realign the tractors so that the lower set is directly under the upper set.
	(4) The Platen Gap Adjustment Wheel is not set correctly, or there is an incorrect platen calibration.	Adjust the Platen Gap Wheel, or calibrate the platen.

Troubleshooting The Hammer Driver Transistors

The Hammer Driver Transistors are located on the Engine Controller Board. When you are having problems like Hammer Coil shorting or Hammers not firing, these components should be checked along with the other components involved in the function.

To check the Hammer Driver for the malfunctioning hammer, use an Ohmmeter on its lowest scale. Test the collector (C) to base (B) by placing the Positive (+) lead on the collector terminal and the Negative (– or Common) lead on the base terminal. If the reading is either a short (0 Ohms) or an open (∞ , infinity), the driver is bad and you should replace the Engine Controller Board. If this check is OK, then test the base (B) to emitter (E) by placing the positive (+) lead on the base terminal and the negative (– or Common) lead on the emitter terminal. If the reading is either a short (0 Ohms) or an open (∞ , infinity), the driver is bad and you should replace the Engine Controller Board. Use the schematics for the Engine Controller Board in the back of this manual to locate the correct driver terminals to check for the hammer(s) you are having trouble with.



The Base of each segment of the driver goes to the LSI Chip, which turns On/Off each segment. The Collector of each driver segment is connected to the corresponding Hammer Coil.

Power On Troubleshooting Sequence

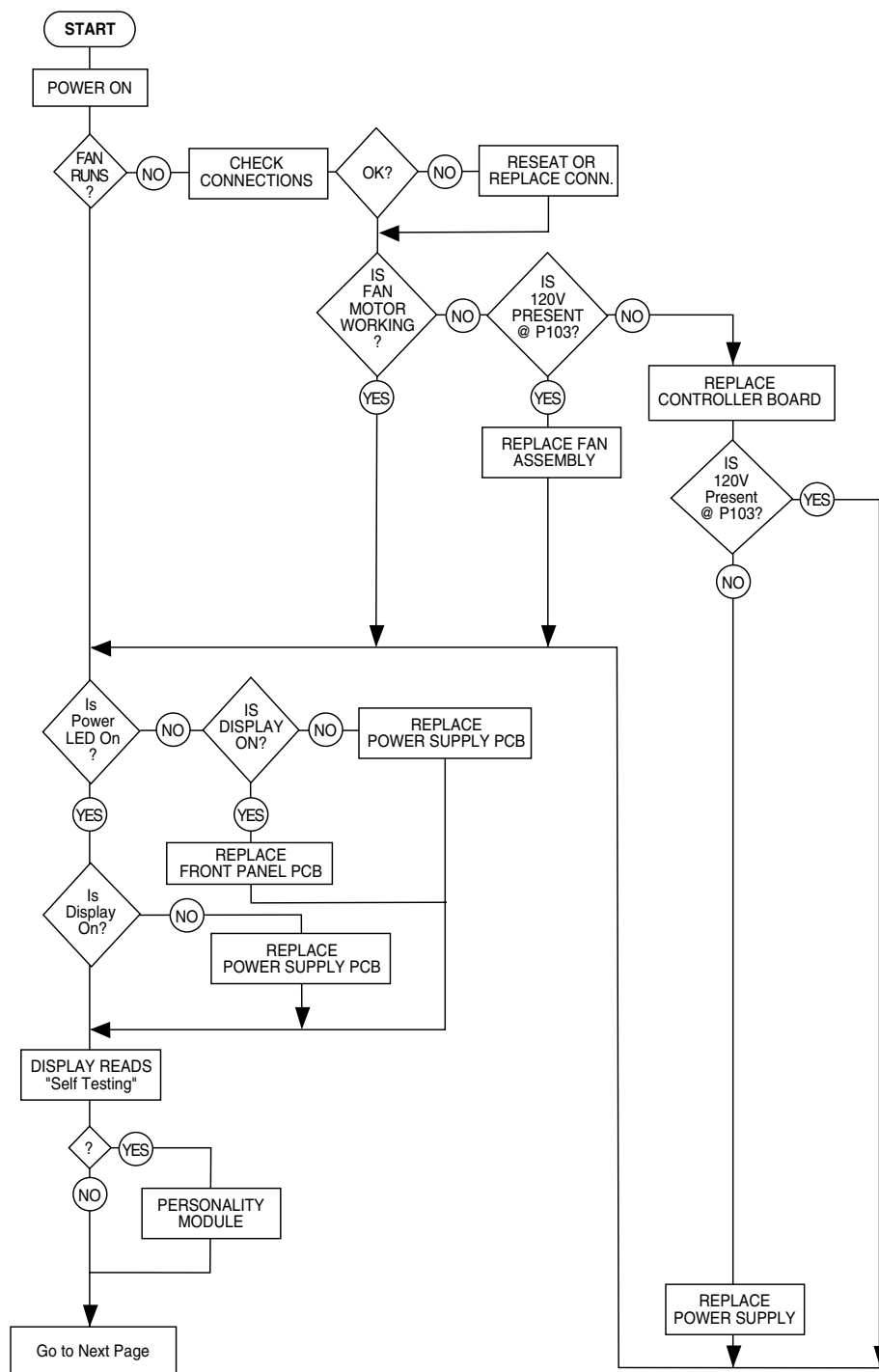


Figure 3-1. Power On Troubleshooting Sequence

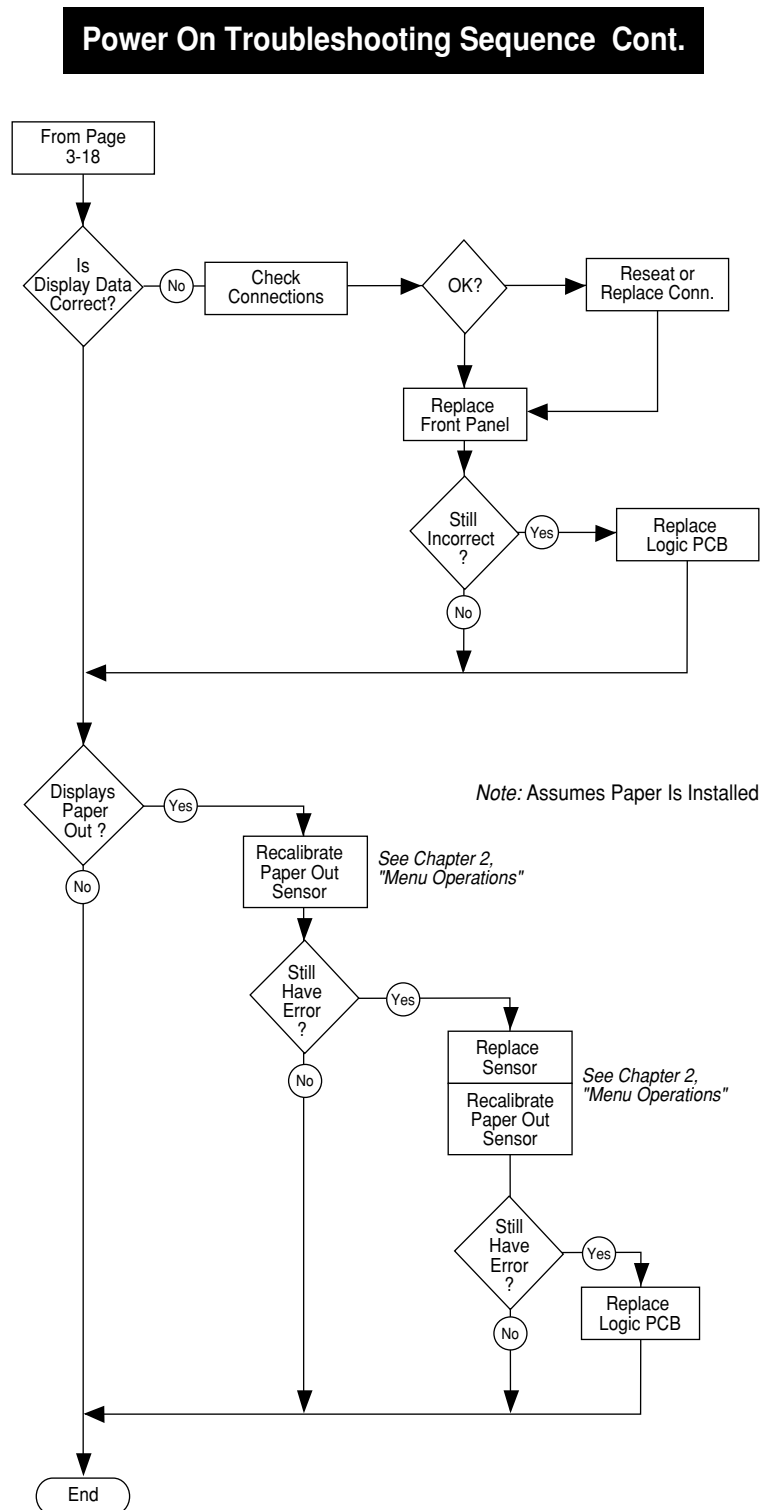


Figure 3-1a. Power On Troubleshooting Sequence, Continued

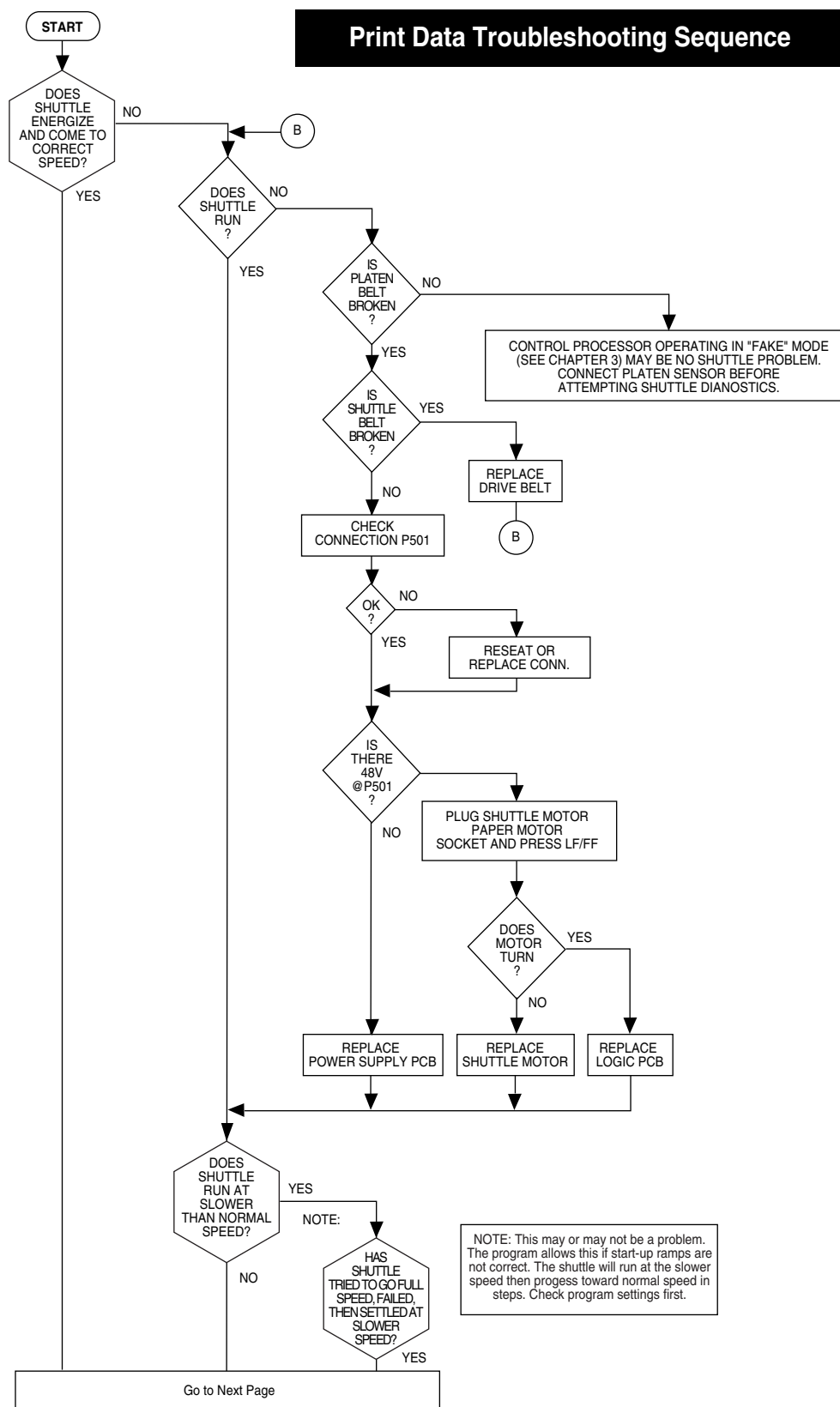


Figure 3–2. Print Data Troubleshooting Sequence

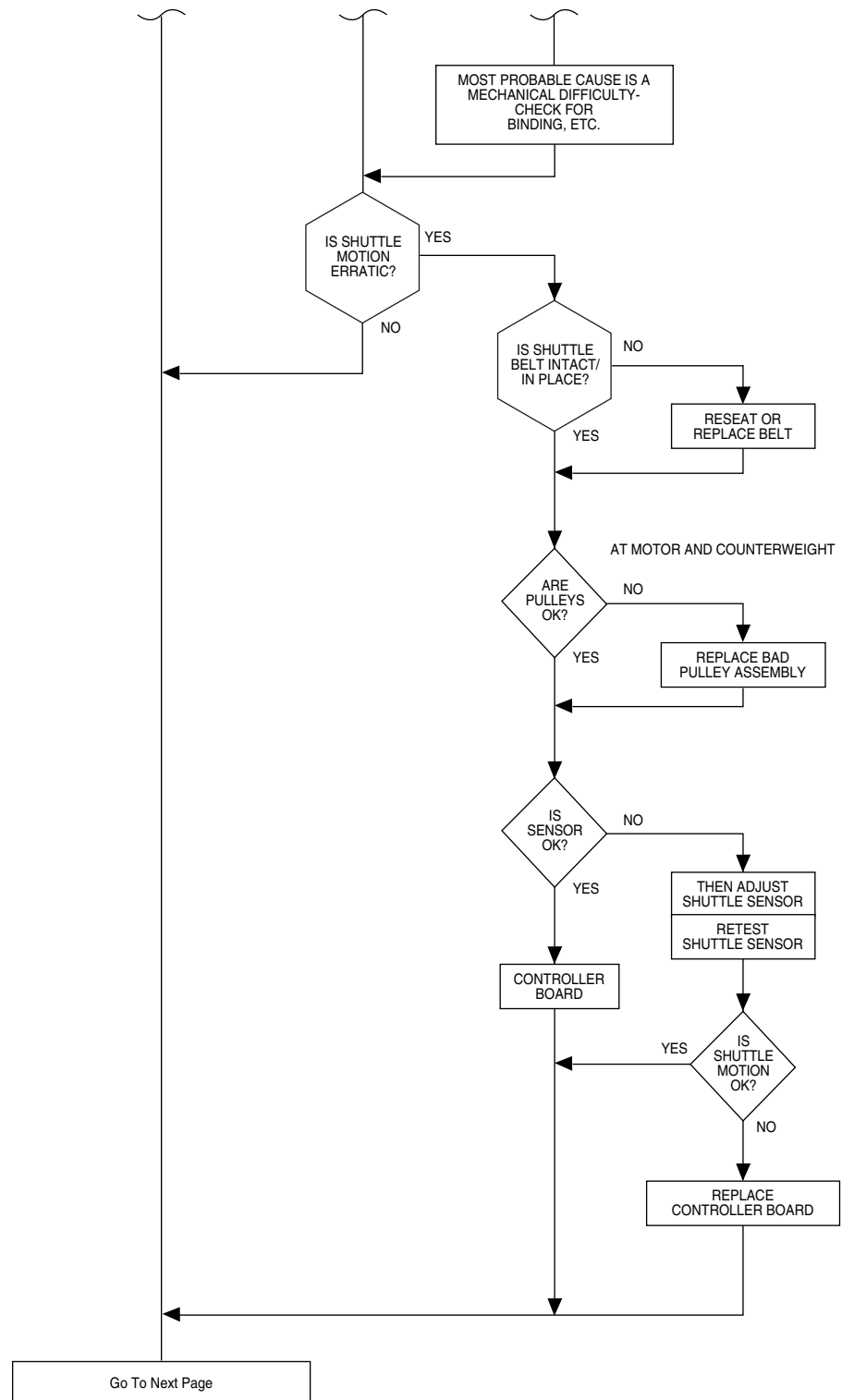


Figure 3–2a. Print Data Troubleshooting Sequence, Continued

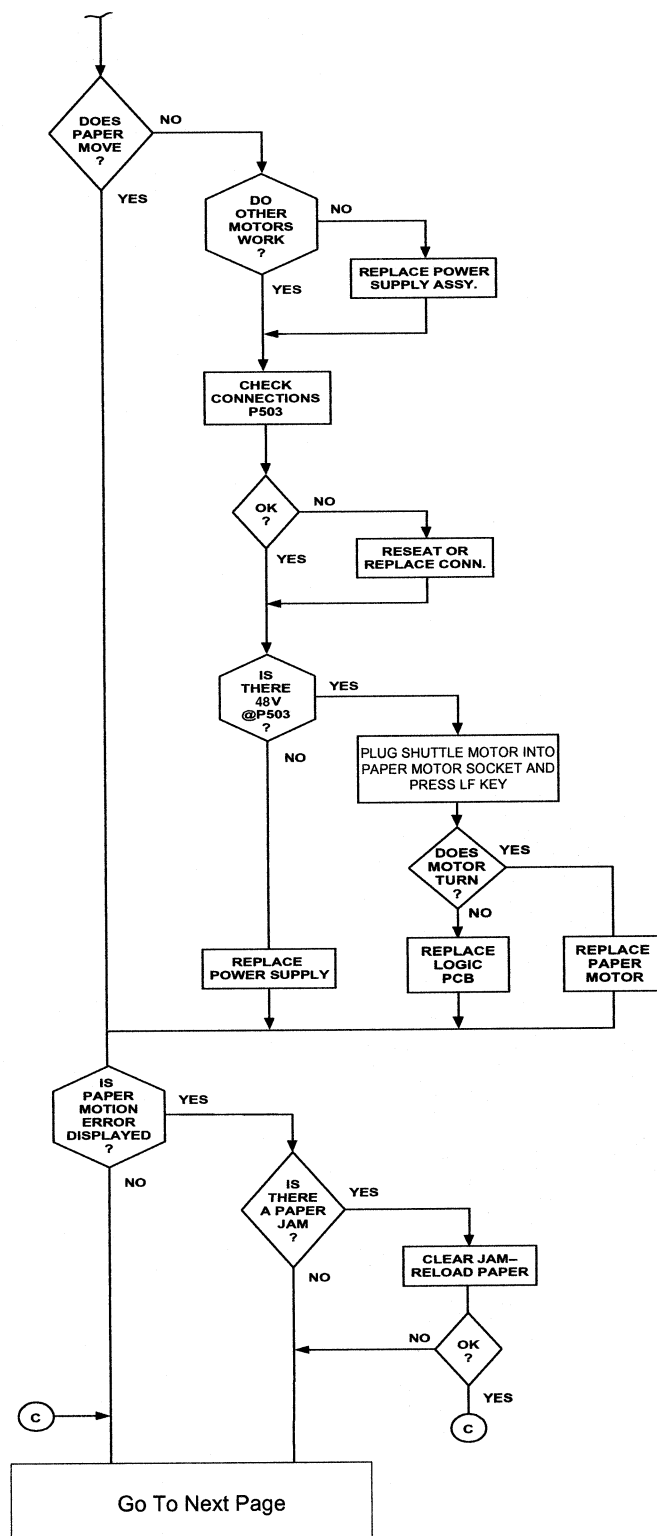


Figure 3-2b. Print Data Troubleshooting Sequence, Continued

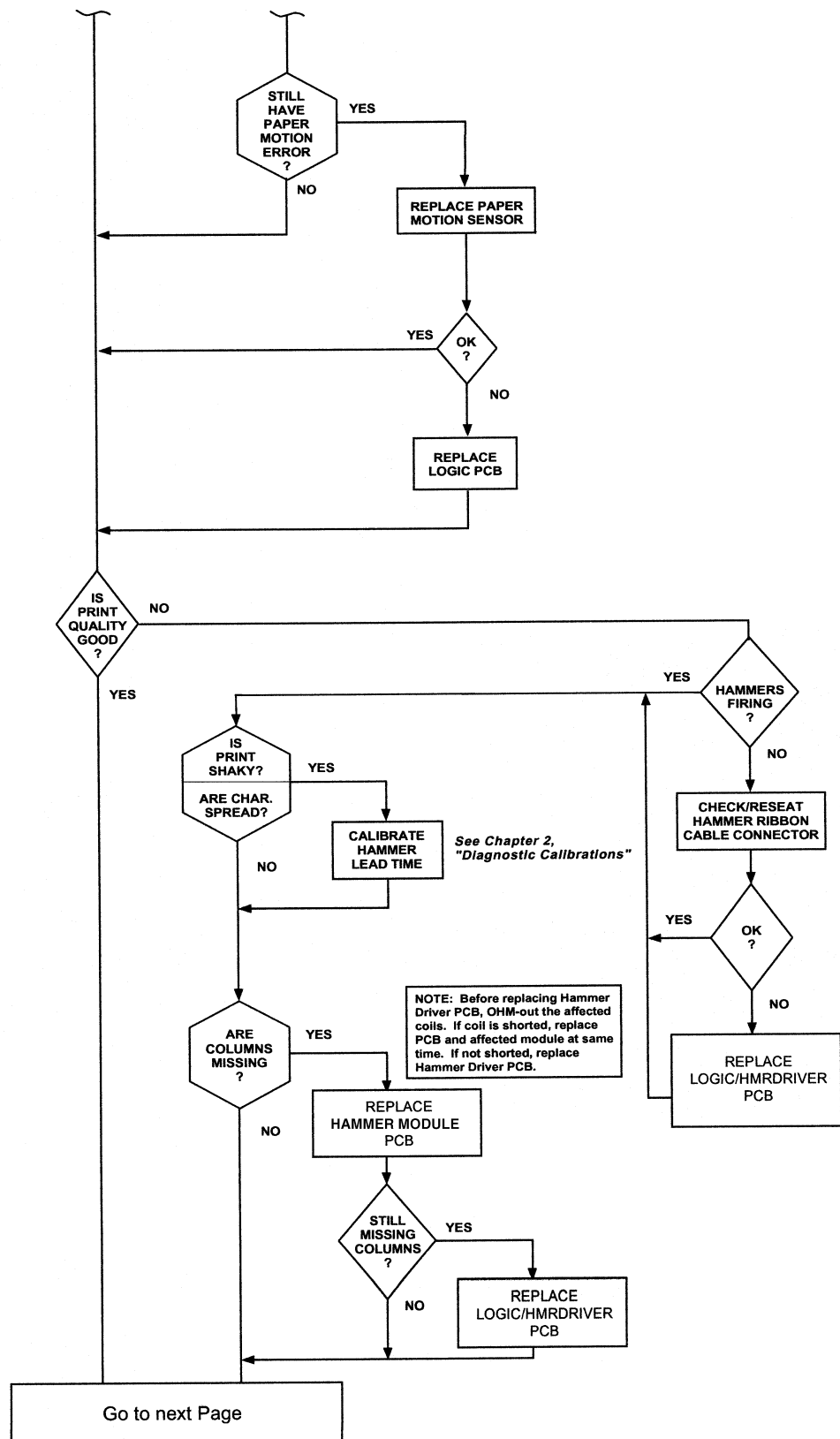


Figure 3-2c. Print Data Troubleshooting Sequence, Continued

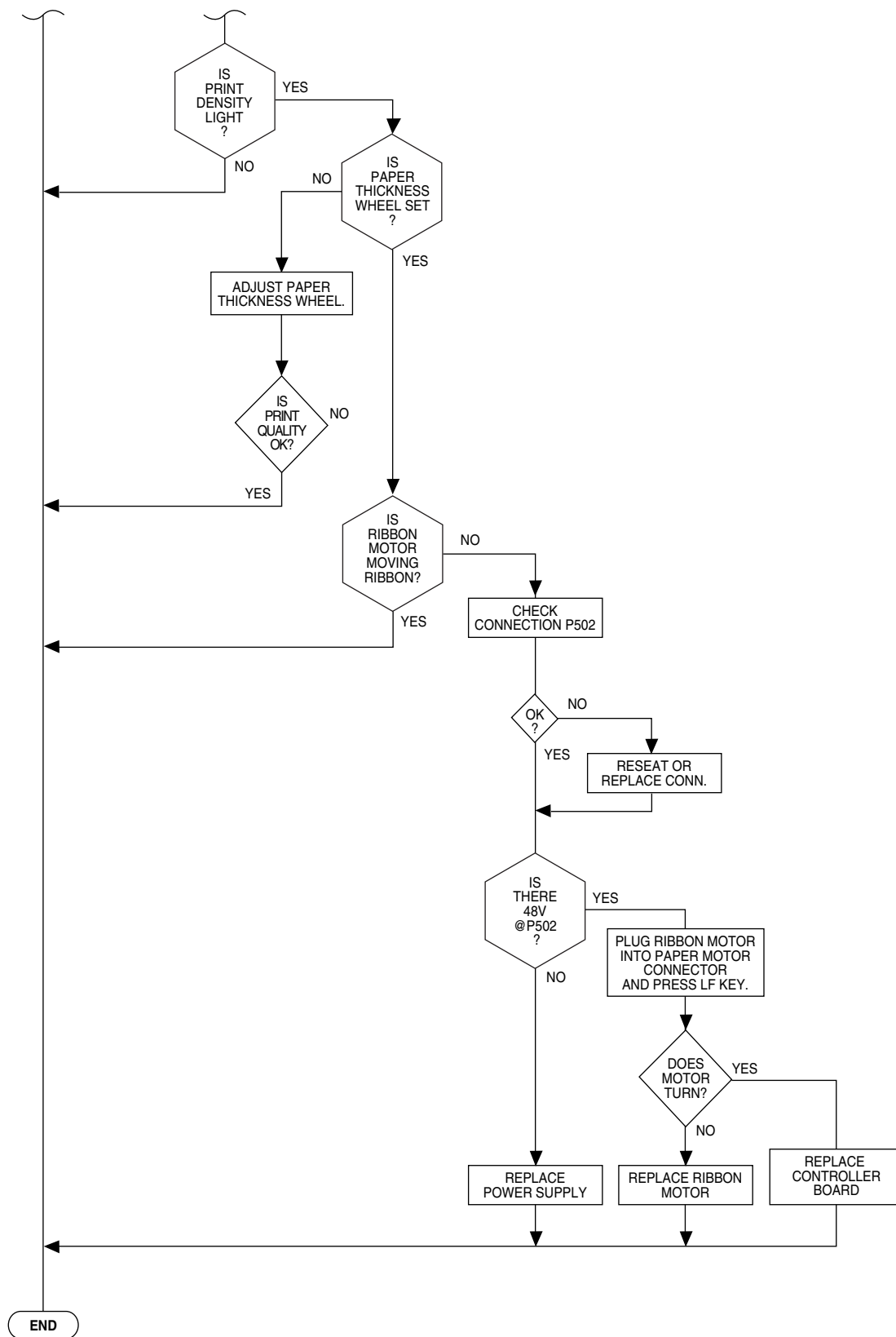


Figure 3-2d. Print Data Troubleshooting Sequence, Continued

Chapter 4:

Removing and Replacing Components



Introduction

This chapter covers removal and reinstallation of selected field replaceable components and assemblies of your printer.

Unplug the printer and remove paper and ribbon for all procedures in this chapter.

Any time you remove a component that is involved in some aspect of the printing process, perform a print test to ensure that print quality has not been affected.

Unless otherwise noted, reinstallation of components is in the reverse order of installation or removal.

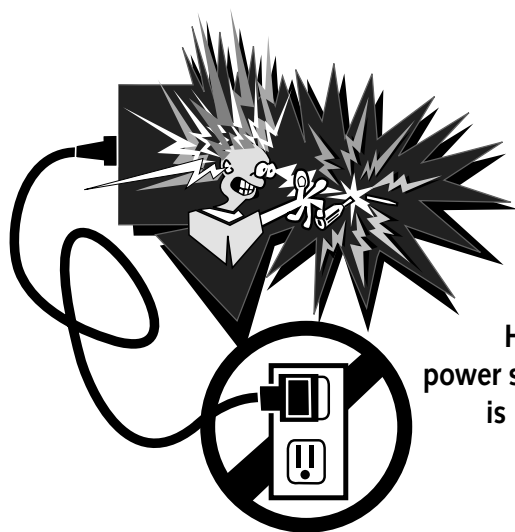
Required Tools

This is a list of tools you will need to perform the procedures in this chapter. The tools are available through the Tally Spares Department (see Appendix A for part numbers).

- Paper belt tension gauge
- T-Handle Allen Driver - 9/64"
- Platen Gap Shim Gauge - 0.011"
- Hammer Module Alignment tool
- Tractor Phasing Gauge
- Nut Driver - 11/32"
- Retaining ring pliers
- Hex Allen key - 3/32"
- Phillips screwdriver 6", #2
- Phillips screwdriver 3", #1
- Needle-nosed pliers
- Flat-head screwdriver
- Torx tool, size 9

Service Procedures

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19.	Control PCA removal	4-37
20.	Power Supply Assembly removal	4-38



WARNING! **HIGH VOLTAGE POTENTIAL**

High levels of AC voltage are present in the power supply. Always ensure that the power cord is unplugged before performing maintenance on the printer.

Procedure 1: Ribbon Platform Removal

- Step 1. Open the top cover of the printer.
- Step 2. Open the Platen Gap lever.
- Step 3. Loosen the screws on the left and right top of the ribbon platform and lift the platform.

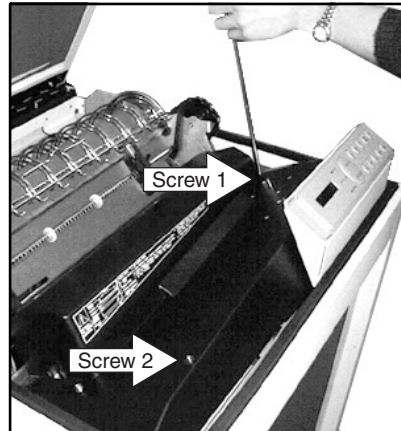


Figure 1. Loosening screws on Ribbon Platform.

- Step 4. Find the Ribbon Drive Motor cable on the underside of the Ribbon Platform and unplug it.



Figure 2. Unplugging Ribbon Drive Motor cable.

Procedure 2: Ribbon Motor Removal



In printers set up to use the 250-million character ribbon, there are two motors in the ribbon platform: one is used as the ribbon drive motor and the other drives the re-inking mechanism.

- Step 1. Remove the Ribbon Platform (see Procedure 1).
- Step 2. There are four screws per motor on the top side of the platform. Remove these screws.

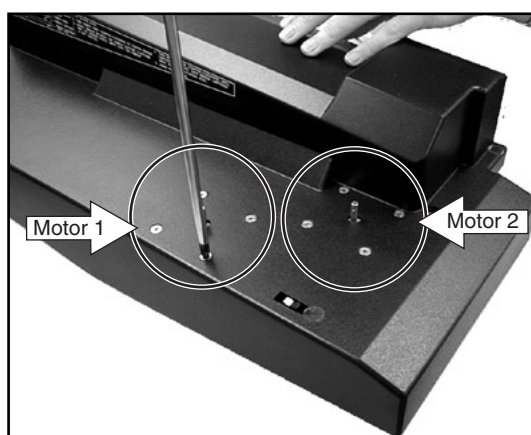


Figure 3. Removing motor screws.

- Step 3. Unplug the orange and white motor cables and remove the motor(s).

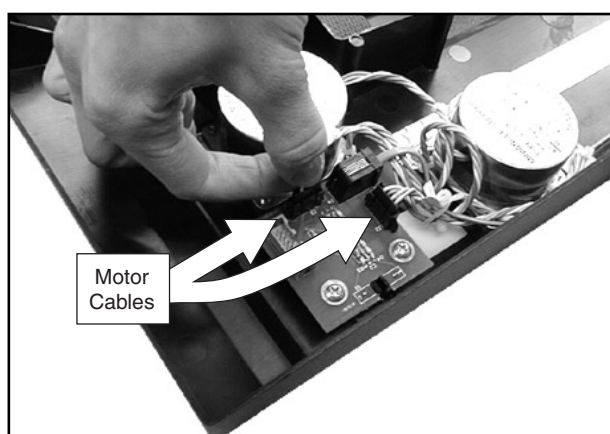


Figure 4. Unplugging Ribbon Motor cables.

Procedure 3: Ribbon Motion Sensor PCA Removal

- Step 1. Remove the Ribbon Platform (see Procedure 1).
- Step 2. Turn the platform over and unplug the orange motor cable(s) and the gray sensor cable.
- Step 3. Remove the two screws that hold the PCA to the platform.

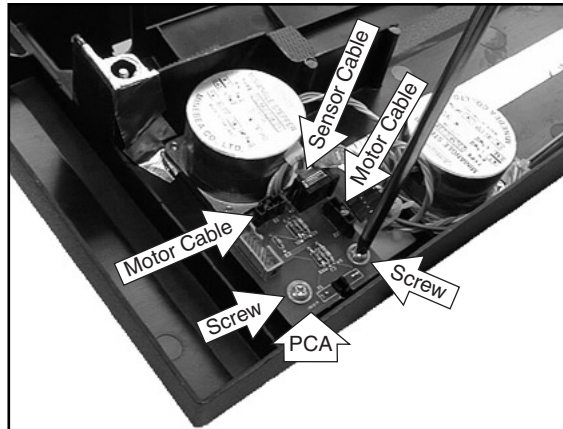


Figure 5. Removing PCA screws.

- Step 4. Remove the PCA.

Procedure 4: Control Panel Removal

Step 1. Remove the Ribbon Platform.

Step 2. Reach underneath the Control Panel assembly and unplug the gray Control Panel cable.

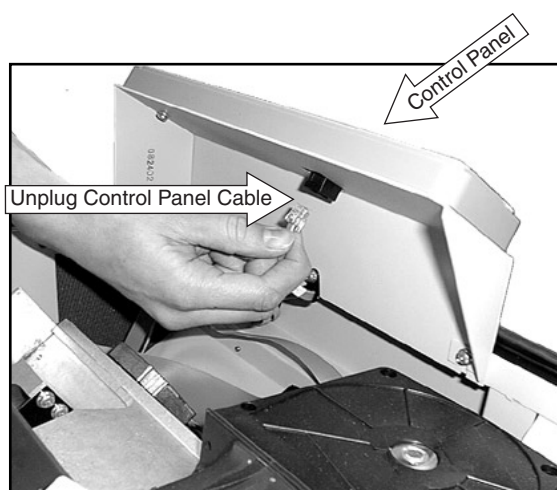


Figure 6. Unplugging Control Panel cable.

Step 3. Loosen the four screws underneath the Control Panel at the bottom edge of the frame.

Step 4. Lift the Control Panel assembly from the printer.

Step 5. Loosen the two screws holding the Control Panel to the metal frame.

Step 6. Lift the Control Panel from the metal frame.



The Control Panel Assembly can be adjusted so that it aligns snugly with the top cover. To do this, loosen the screws and adjust the assembly until it fits properly in the opening of the printer cover. Don't forget to tighten the screws.

Procedure 4a: Control Panel Circuit Board removal

Step 1. Remove all six screws holding the circuit board to the Control Panel.

Step 2. Lift the circuit board from the panel.

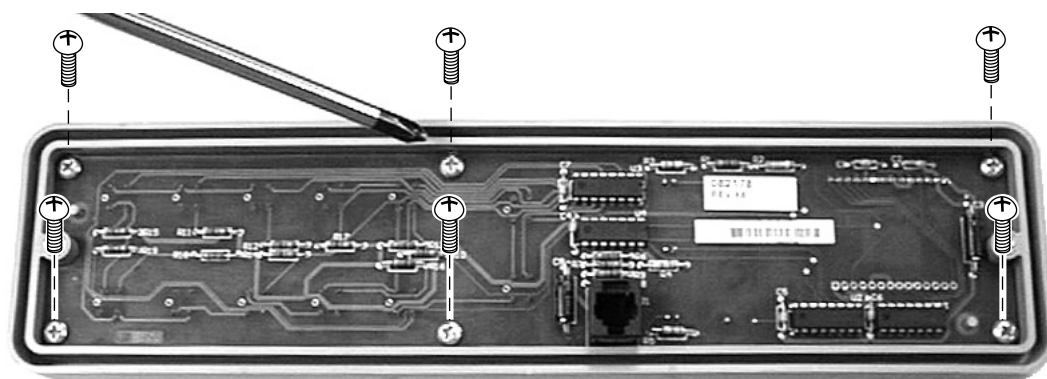


Figure 7. Removing circuit board screws.



To reinstall, seat the keypad, then mount the circuit board. Do not over-tighten the six mounting screws.

Procedure 5: Hammer Bank Removal



The Hammer Driver CBA has components which are static sensitive! Use the appropriate ESD grounding procedures when handling the Hammer Bank Assembly.

- Step 1. Remove the Ribbon Platform (See Procedure 1), and open the Platen Gap lever.
- Step 2. Remove the Control Panel (See Procedure 4).
- Step 3. Remove the two screws holding the plastic cable cage assembly in the top middle of the Hammer Bank. Remove the cage and the white cable lifter.

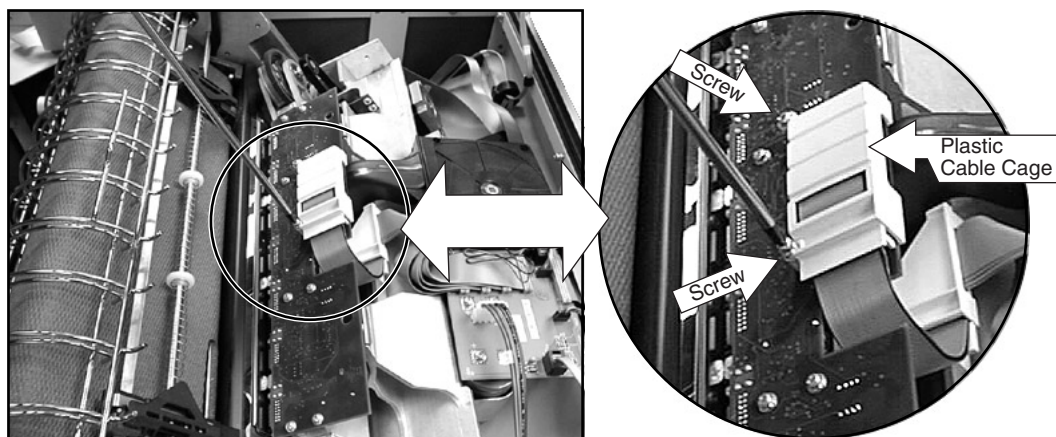


Figure 8. Removing plastic cable cage.

- Step 4. Unplug the now-exposed Hammer Bank ribbon cables.

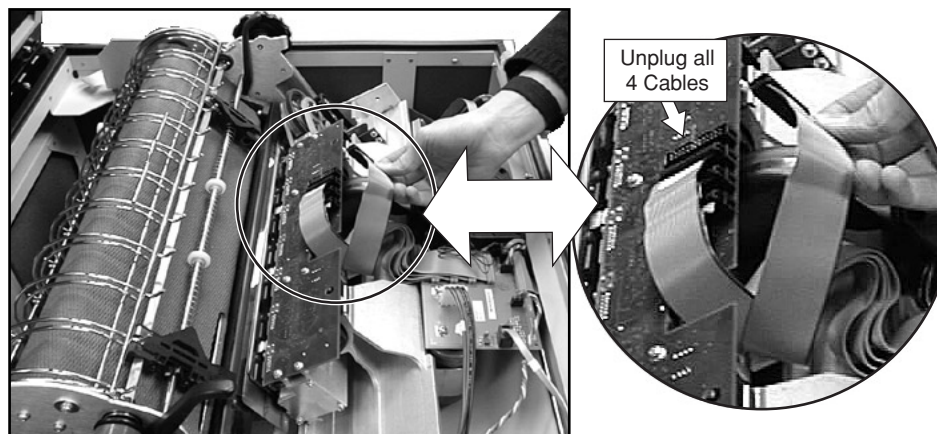


Figure 9. Unplugging Hammer Bank ribbon cables.

Chapter 4: Removing and Replacing Components

- Step 5. Slide the Shuttle Drive Belt from the pulley on the right side of the Hammer Bank.
- Step 6. Remove two screws securing the retainer clips at the front (toward you) of the Hammer Bank. To do this, use the access holes in the Hammer Driver CBA. Lift out the retainer clips.

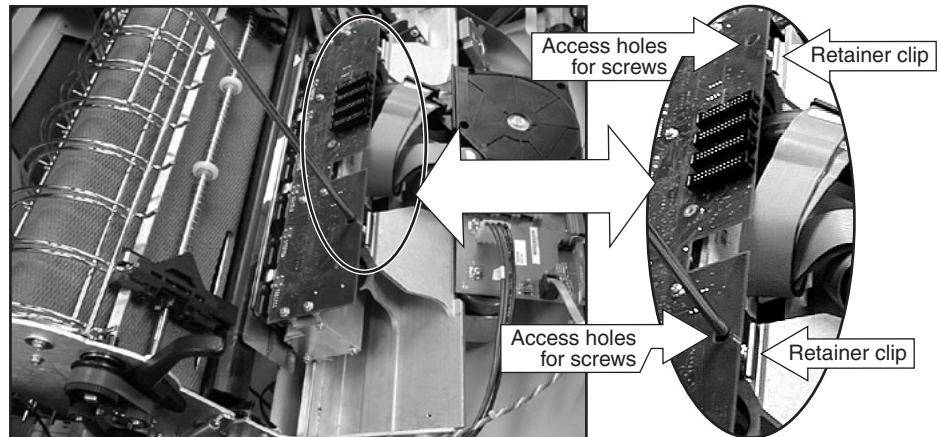


Figure 10. Removing screws on retainer clips.

- Step 7. Remove two KEPS nuts from underneath the Hammer Bank. Both are on your right, and accessible through the front door of the printer. Use an 11/32" nut driver.

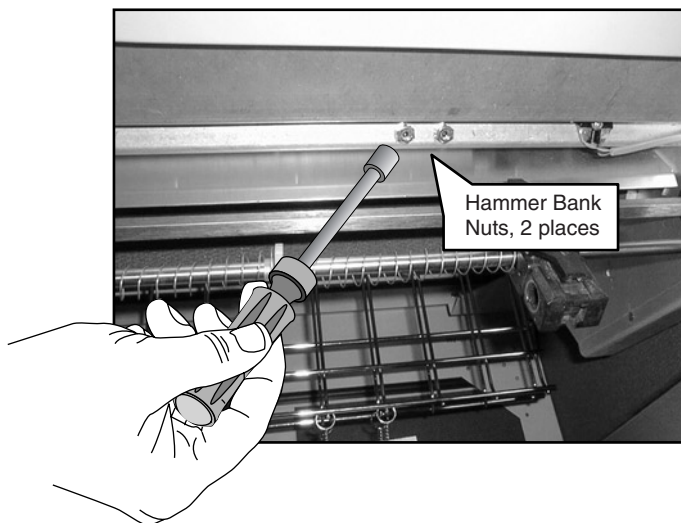


Figure 11. Removing nuts from underneath Hammer Bank (view is from inside front door of printer).

- Step 6. Slide the upper left tractor as far to the left as it will go. Lift the Hammer Bank and shuttle out of the printer, being careful not to damage the ribbon shield.

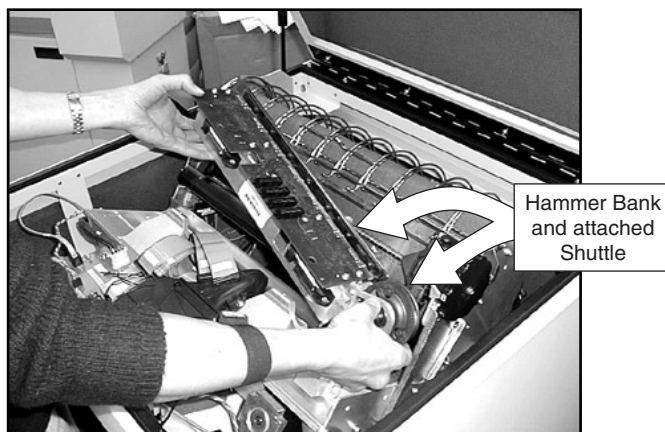


Figure 12. Lifting Hammer Bank from printer.



When reinstalling the Hammer Bank, install and tighten the retainer clips (Step 4), before installing and tightening the KEPS nuts (Step 5).



When reinstalling the Shuttle Drive belt (Step 3), press the belt against the lower shuttle motor pulley with one hand, and "roll" the belt onto the upper shuttle pulley.

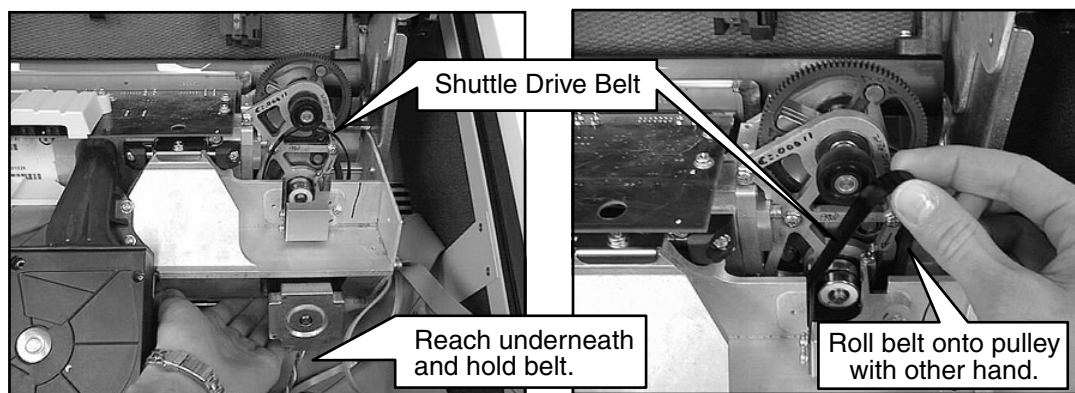


Figure 13. Replacing Shuttle Drive belt.

Procedure 6: Ribbon Shield Removal

Step 1. Remove the Hammer Bank (see Procedure 5).

Step 2. Remove the three screws and lift the Ribbon Shield from the Hammer Bank.

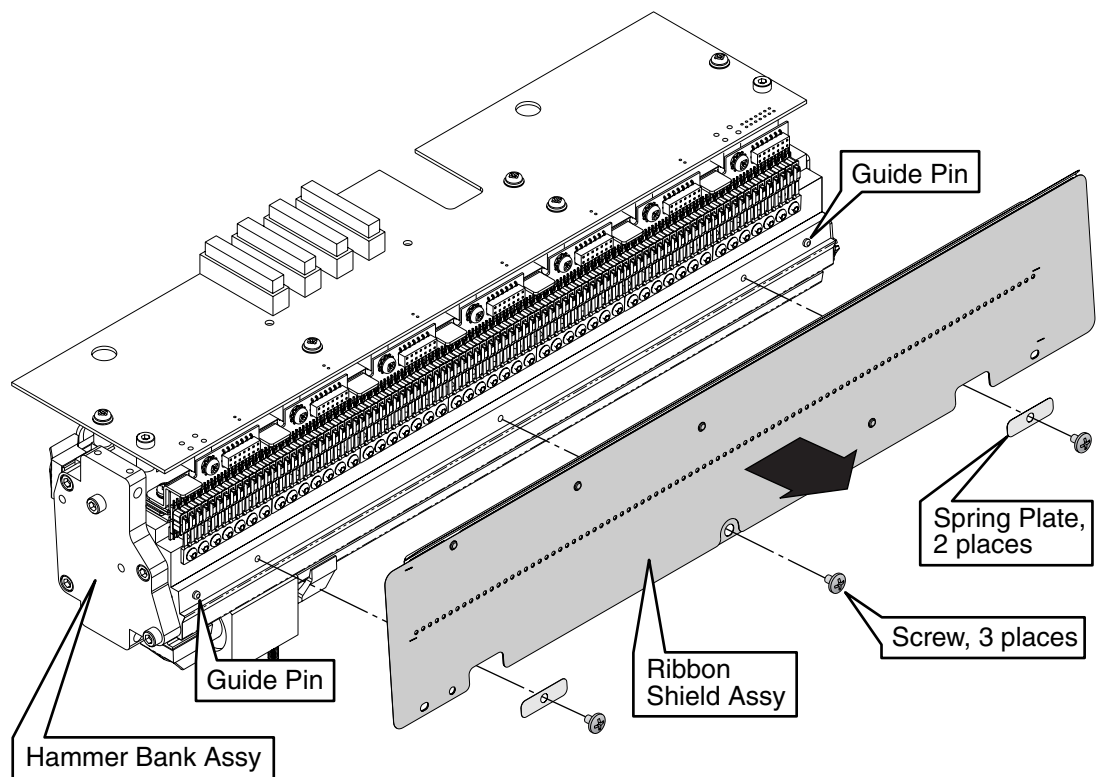


Figure 14. Removing the Ribbon Shield.



When reinstalling the Ribbon Shield, make certain that the shield is seated over the two guide pins before tightening screws.

Procedure 7. 13-pack Hammer Replacement

Step 1. Remove the Hammer Bank assembly from the printer (see Procedure 5).

Step 2. Remove the Ribbon Shield (see Procedure 6).

Step 3. Using your Torx tool, remove the hammer mounting screws.

Step 4. Remove the hammer by sliding it forward until it can be lifted.

Step 5. Measure the defective hammer pack to determine proper replacement size. To do this, insert the old hammer into each of the slots on the Hammer Alignment tool. Use this guide to determine correct replacement part:

If the defective hammer pack does not fit into either slot A or B, use Spares Kit #083686 (High).

If the defective hammer pack fits into slot A, but not B, use Spares Kit #083758 (Medium).

If the defective hammer pack fits into both slots A and B, use Spares Kit #083759.



"Fit" means that the hammer pack easily slides all the way into the slot.

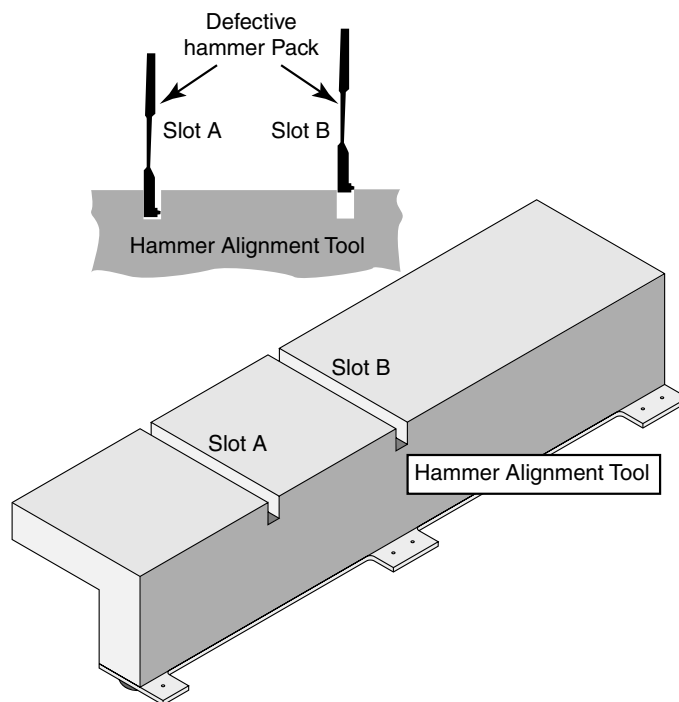


Figure 15. Measuring old hammer for replacement size

Chapter 4: Removing and Replacing Components

- Step 6. Place the new hammer pack in position on the bank and replace screws, but do not tighten.
- Step 7. Use the Hammer Alignment tool to align the impact elements of the new hammer (holes 2 and 3) with the impact elements of the neighboring hammers (holes 1, 4, and 5). Wiggle the tool slightly until it snaps onto the impact elements. See Figure 16.

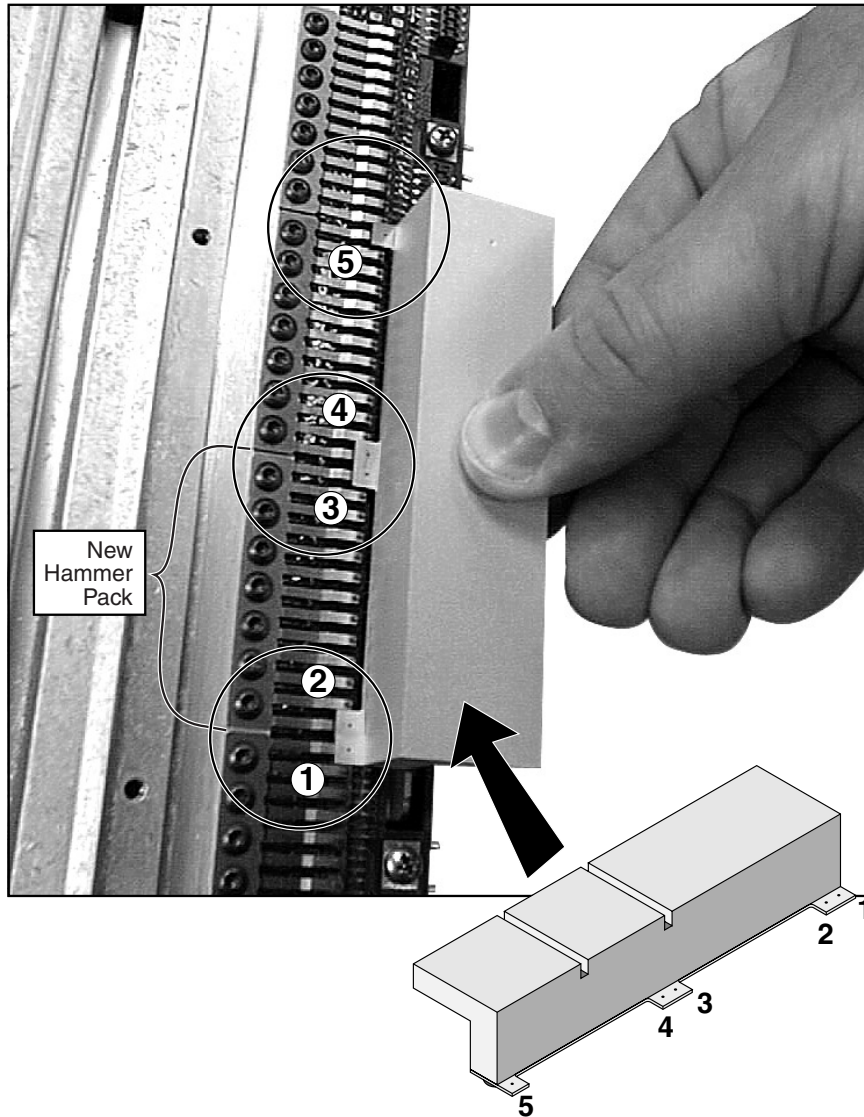


Figure 16. Aligning the new hammer pack.

- Step 8. With the hammer alignment tool holding the hammer in place, tighten the hammer mounting screws.
- Step 9. Replace the Ribbon Shield.
- Step 10. Replace the Hammer Bank.

Procedure 8: Coil Board Replacement

- Step 1. Follow steps 1-4 of the 13-pack Hammer replacement procedure (see Procedure 7).
- Step 2. Remove the coil board mounting screw.
- Step 3. Lift the coil board from the carriage. To do this, you may need to gently pry it with a tool.
- Step 4. Press the replacement coil board onto the carriage. Make sure that each bobbin is fully seated. The coil posts should stick slightly above the tops of the bobbins.
- Step 5. Replace the coil board mounting screw.
- Step 6. Follow steps 6-10 of Procedure 7.

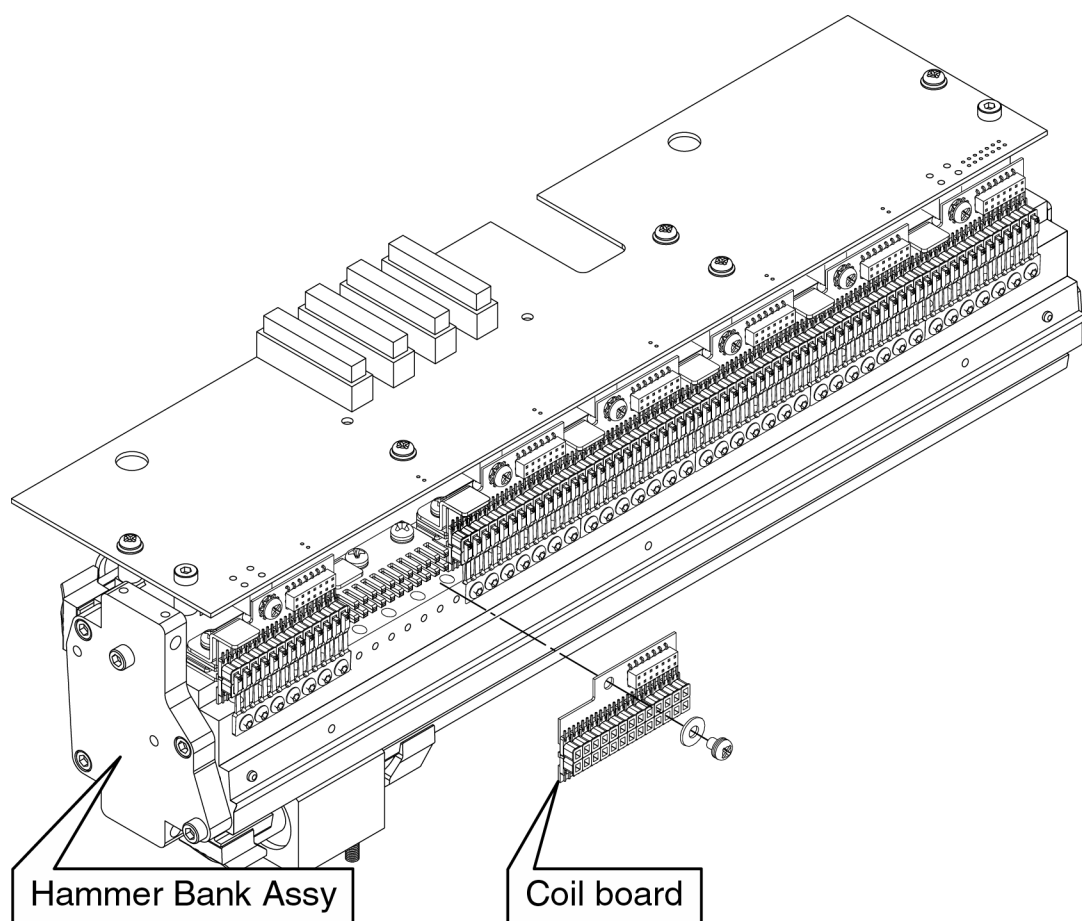


Figure 17. Coil board replacement.

Procedure 9: Shuttle Removal

- Step 1. Remove the Ribbon Platform (see Procedure 1).
- Step 2. Remove the Hammer Bank (see Procedure 5).
- Step 3. Remove the two screws which hold the shuttle frame to the Hammer Bank.

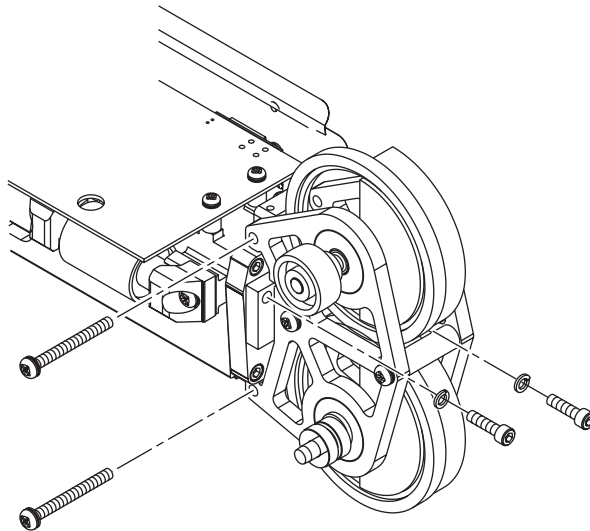


Figure 18. Removing Shuttle screws.

- Step 4. Remove two screws (9/64" Allen) through the center of the shuttle and to the outside edge of the shuttle, then lift the shuttle from the Hammer Bank.

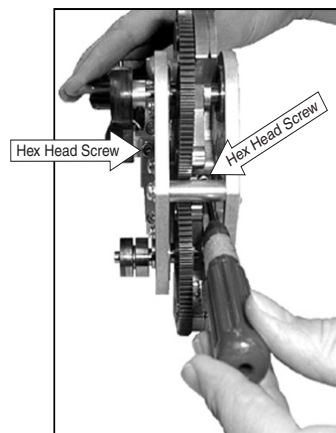


Figure 19. Removing screws from inside shuttle.



When reinstalling the Shuttle to the Hammer Bank, start all four screws until they are snug, but do not tighten. Tighten the two Allen screws first.

Procedure 10: Platen Removal

- Step 1. Remove the Ribbon Platform (see Procedure 1).
- Step 2. Remove the Control Panel assembly (see Procedure 4).
- Step 3. Remove the Hammer Bank (see Procedure 5).
- Step 4. Remove the two screws (#6 Phillips) that attach the circuit board from underneath the left side of the printer. It's located just above the Power Supply Assembly. Let the board dangle by the cables.

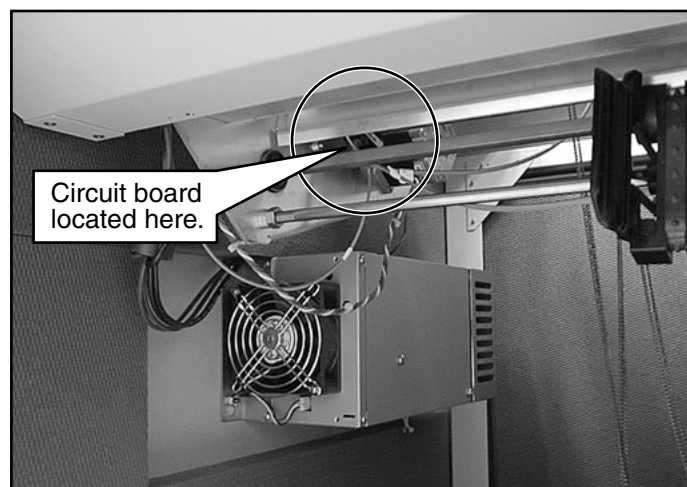


Figure 20. Location of circuit board.

- Step 5. Tilt the Print Mechanism (see Procedure 10).
- Step 6. Remove both the left and the right platen springs by inserting a flat-blade screw driver between two of the spring's coils. Pull the spring forward until it lifts from the mounting pin.

CAREFUL!



Be careful not to send the spring flying!

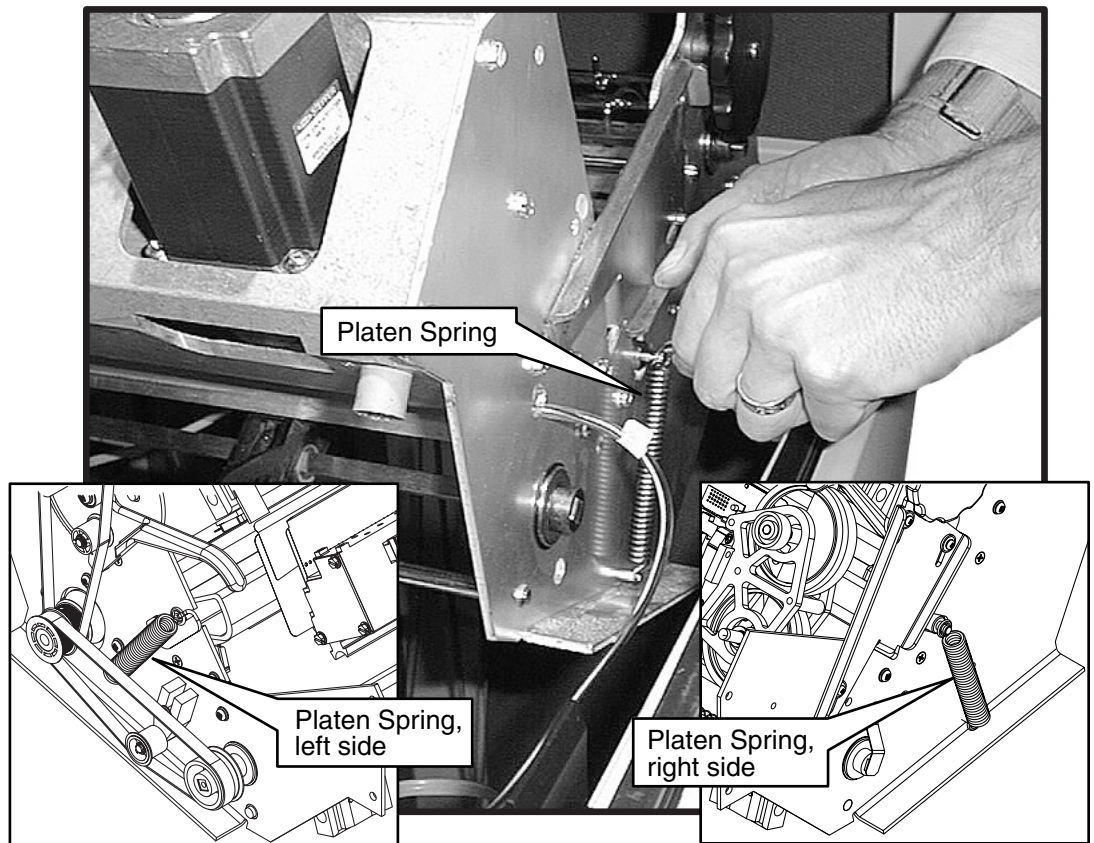


Figure 21. Removing the Platen Springs.

Step 7. Rotate the Platen Gap Adjustment Wheel until it is all the way open (on "H").

Step 8. Remove the three screws that attach the platen stop to the side plate.



There are two washers under each screw. The nylon washer goes next to the platen stop and the curved-spring washer goes next to the screw.

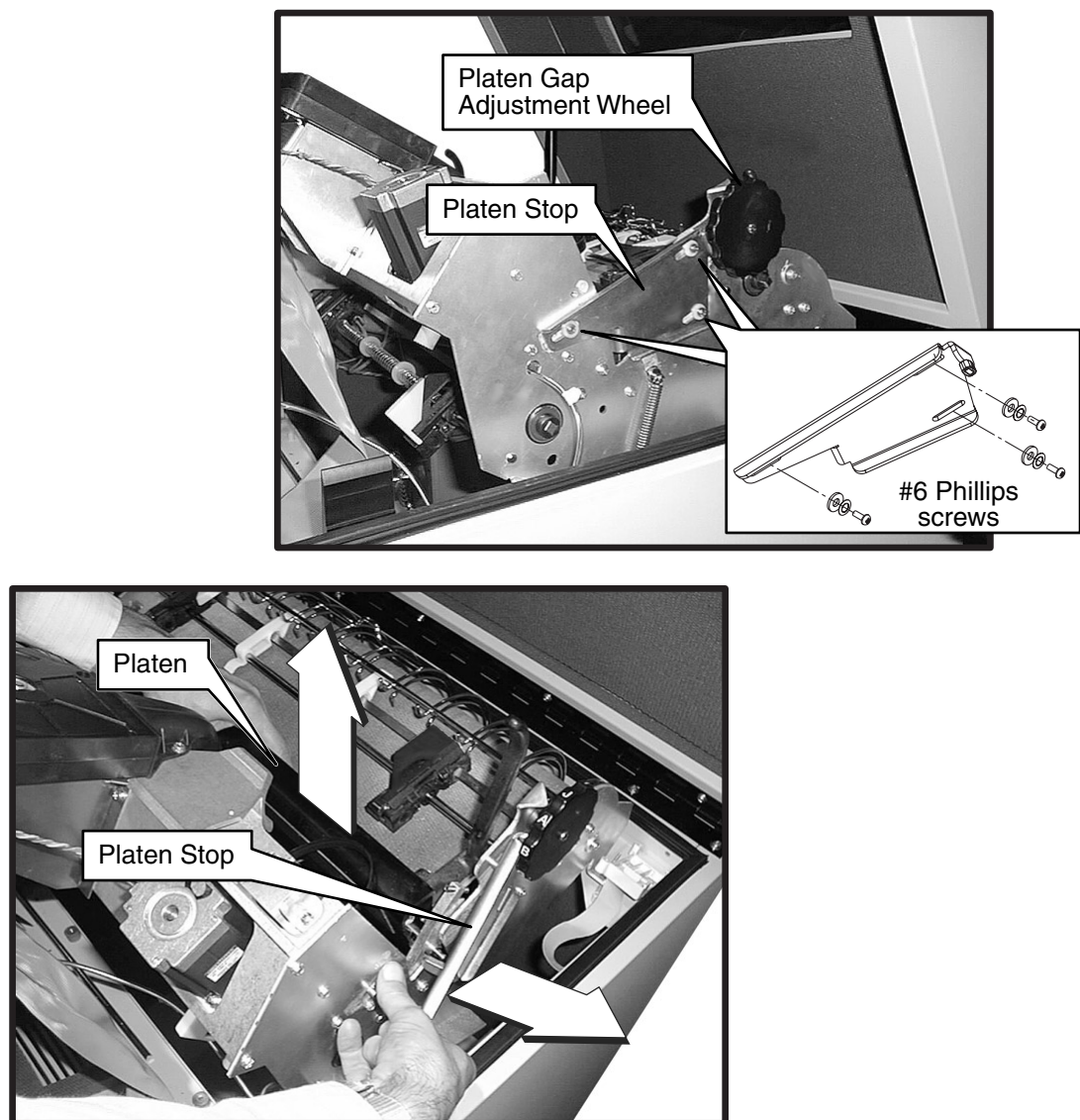


Figure 22. Removing screws from the platen stop.

- Step 9. Pull the platen stop away from the side plate enough for the platen pin to clear it.
- Step 10. Lift the platen toward you, bringing the two platen gap adjust plates and the right side curved-spring washer along with it.
- Step 11. Both the Platen Gap Adjust plates and the right curved-spring washer must be transferred to the new platen. The right Platen Gap Adjust plates and the curved-spring washer can be transferred directly. Do this now.

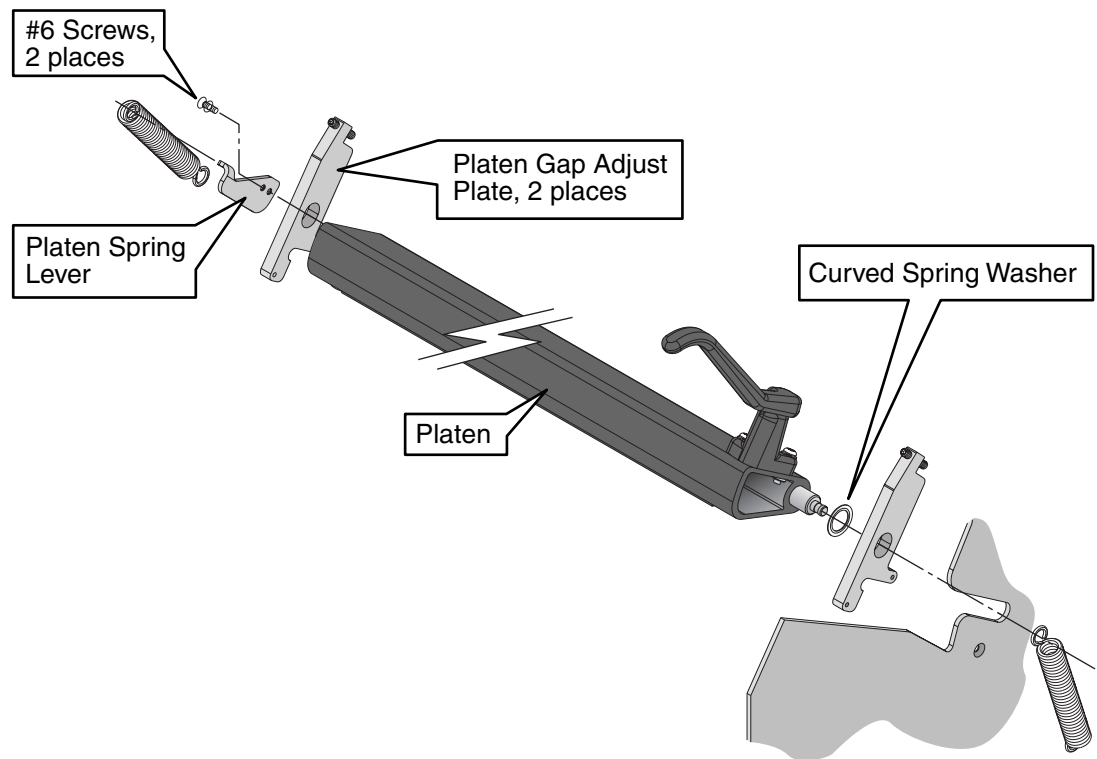


Figure 23. Transferring components from old to new platen.

Step 12. Remove the spring lever from the left side. It is attached with two #6 Phillips screws.

Step 13. Reattach the spring lever to the new platen. Add Lubriplate grease (see Appendix A):

- Between the left Platen Gap Adjustment plate and the platen,
- Between the right curved-spring washer and the right Platen Gap Adjustment plate, and
- Between the curved-spring washer and the platen.

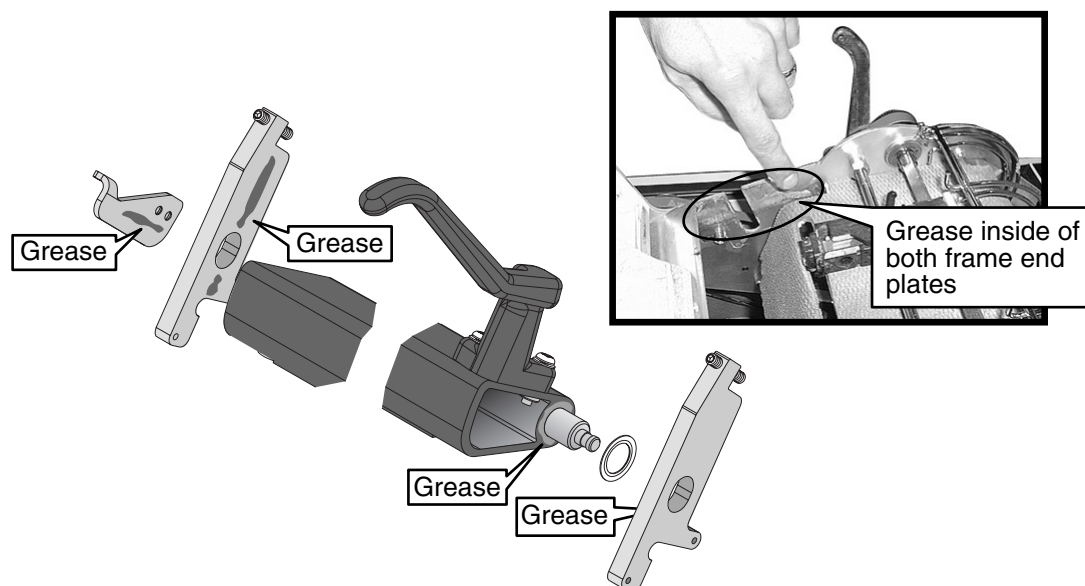


Figure 24. Adding grease.

Step 14. Grease the sideplates of the print mechanism where they will come in contact with the Platen Gap Adjustment plates.

Step 15. Place the new platen into the print mechanism. The platen pins slide into the slots on the sideframes. The Platen Gap Adjustment plates interface with two 5/16" standoffs mounted to the inside of the sideplates.



The hook in the Platen Gap Adjustment plate goes over the lower standoff and the setscrew of the Platen Gap Adjustment plate contacts the upper standoff.



Keep the long axis of the platen perpendicular to the sideplates to prevent wedging of the platen.

Step 16. Move the platen stop back in contact with the sideplate, so that its tab is located under the lower right edge of the platen. Place the washers over the posts in the sideplates and reattach the three screws.

Step 17. Reattach the springs, being careful they do not come loose and snap toward you.

Chapter 4: Removing and Replacing Components

Step 18. Lower the print mechanism into the cabinet (see Procedure 10).

Step 19. Reattach the circuit board to the left Platen Gap Adjustment Plate.

Step 20. Reinstall the Hammer Bank (see Procedure 5).

Step 21. Reset the platen gap (see Procedure 9).

Step 22. Calibrate the Platen Sensor (see Chapter 2).

Procedure 11: Platen Gap Adjustment



You must perform this procedure whenever you have removed and replaced the Hammer Bank and Shuttle.

- Step 1. Remove the Ribbon Platform (see Procedure 1).
- Step 2. Remove paper, if loaded.
- Step 3. Set the Platen Gap Wheel to the green indicator.
- Step 4. Look for the adjustment screws on the right and left sides of the printer (see Figure 25).
- Step 5. Insert the 0.011" shim from your tool kit between the platen and impact elements. The shim should slip behind the ribbon shield and plastic finger guard, and in front of the platen (see Figure 25).
- Step 6. Using the Allen wrench, turn each screw slightly until the shim fits snugly but not too tightly between the platen and impact elements.



The shim should slide up and down with firm pressure, but it should not be so tight that excess force is needed. It should also not be so loose that the shim falls though when it is let go. The platen gap should be equal along the whole platen, so make sure you test the entire length and adjust both the right and left screws accordingly.

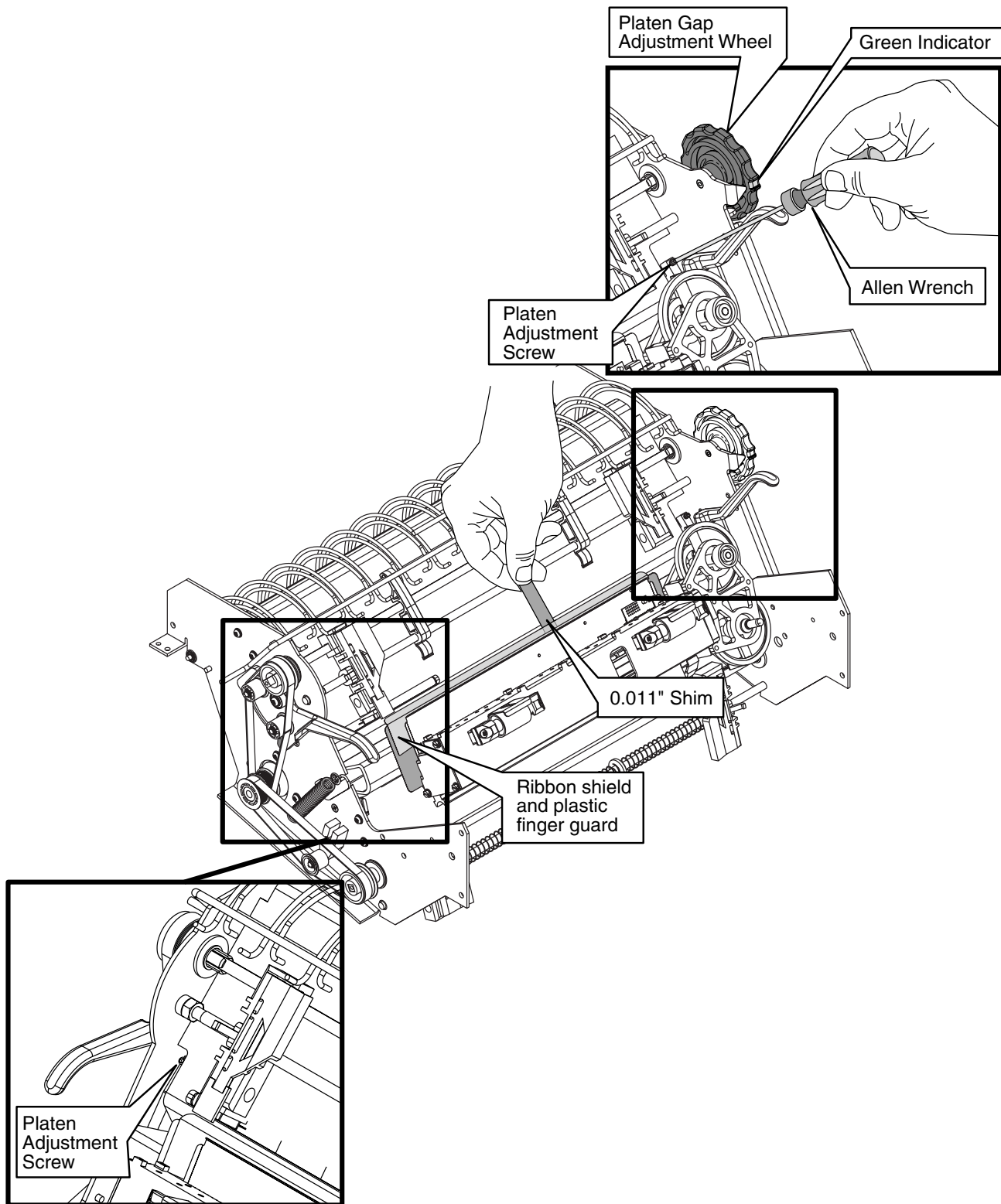


Figure 25. Platen Adjustment screws and use of shim.

Procedure 12: Print Mechanism Access (Tilting)



Access to the Print Mechanism is more easily attained by tilting the Print Mechanism (useful for tractor removal, access to paper drive belts and motor, etc.). Follow these steps to tilt the Print Mechanism.

CAREFUL!



Lock the wheels on the printer cabinet before performing this procedure.

- Step 1: Remove the Ribbon Platform (see Procedure 1).
- Step 2: Remove the Control Panel assembly (see Procedure 4).
- Step 3: Unplug the Power Supply cable (four large red and black wires), and the Hammer Bank cable (large blue cable) from the Power Distribution Board.

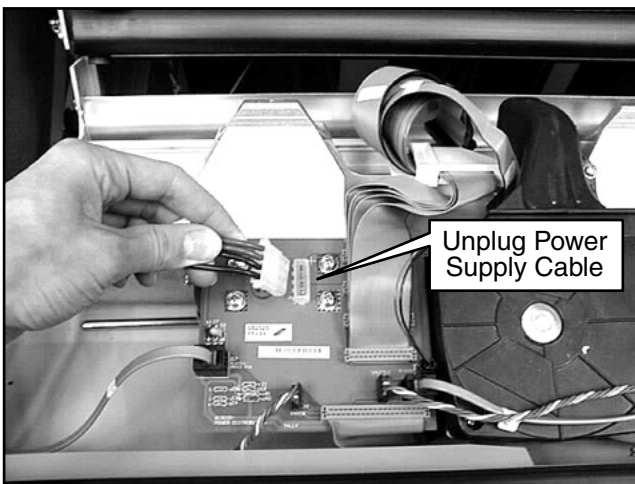


Figure 26. Unplugging the Power Supply cable.

- Step 4. Lift the Print Mechanism. Place the strut in the top and bottom detents, with the shoulder on the strut in the bottom detent.

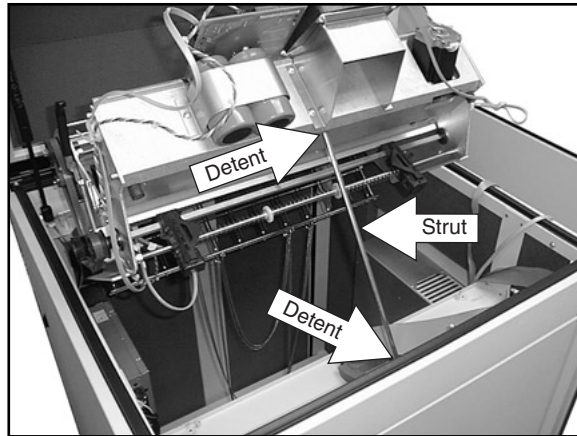


Figure 27. Print Mechanism tilted and held by strut.

Procedure 13: Distribution PCA Removal

- Step 1. Remove the Ribbon Platform (see Procedure 1).
- Step 2. Tilt the Print Mechanism (see Procedure 10).
- Step 3. Disconnect all cables at the Distribution PCA.
- Step 4. Remove the two screws that hold the mounting bracket to the frame and lift the assembly out of the printer.

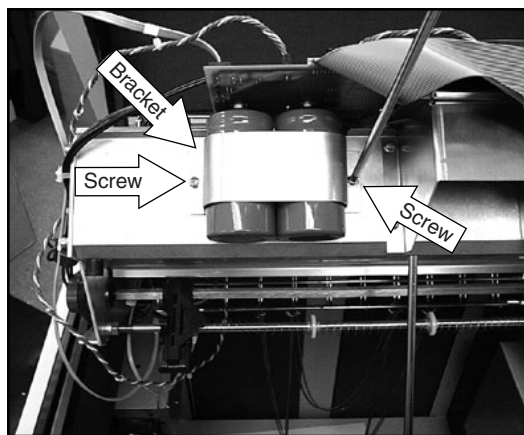


Figure 28. Removing screws on mounting bracket.



If one of the Surge Capacitors is being removed, ensure proper polarity when it is reinstalled.

Procedure 14: Lower Tractor Removal

- Step 1. Remove the Ribbon Platform (see Procedure 1).
- Step 2. Tilt the Print Mechanism (see Procedure 10).
- Step 3. Unplug the Paper Out sensor cable from J1 of the Platen/Paper Sensor PCA. (The Paper Out Sensor is part of the Lower Left Tractor Assembly).

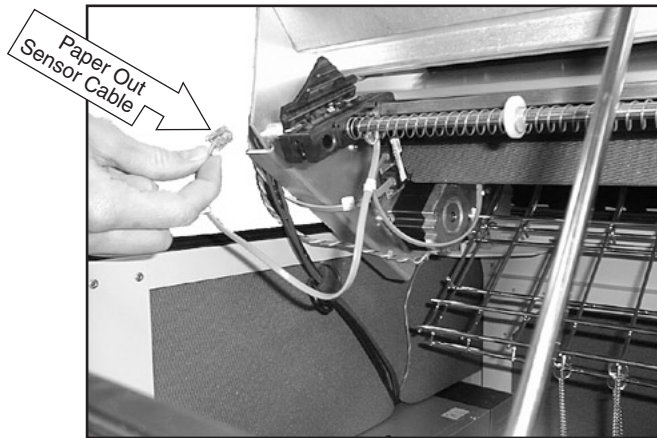


Figure 29. Location of Paper Out sensor cables.

- Step 4. Remove the retaining (snap) rings from both ends of the squared shaft (located inside the frame at each end). Leave the rings sitting loosely on the shaft.

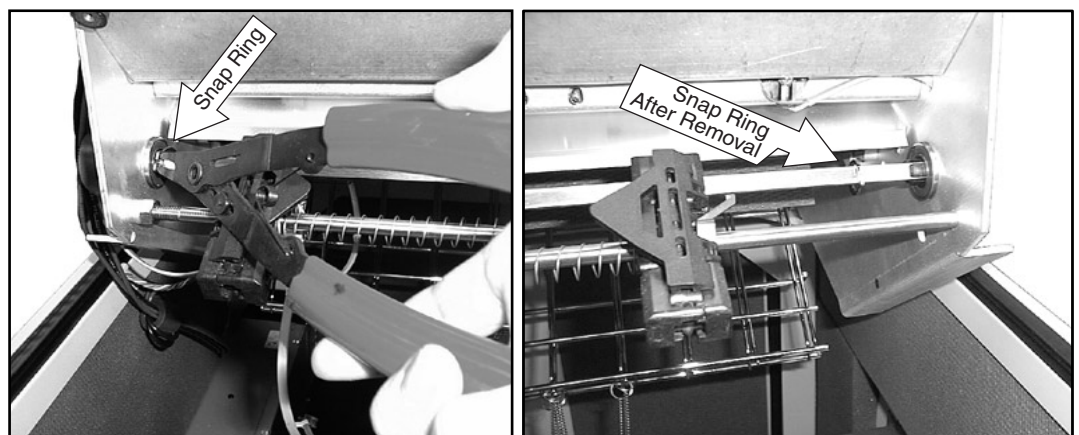


Figure 30. Removing Retaining (Snap) rings.



Do not remove the pulley or drive belt from the shaft. If the pulley and/or the drive belt is removed, you will need to rephase the upper and lower tractor sets. (See Procedure 14).

Step 5. Remove the ground spring from the right side of the square shaft.

Step 6. Slide the square shaft to the right a few inches. When you replace it, make sure it sticks out enough to touch the ground spring.

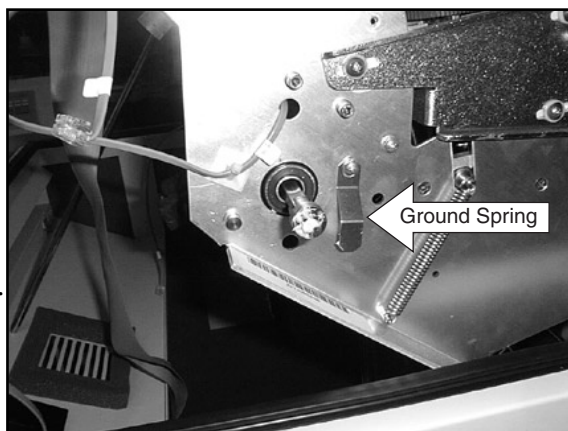


Figure 31. Ground spring.

Step 7. Loosen the nut on the left side of the round shaft using an adjustable wrench or pliers. Unscrew the round shaft and slide it to the right a few inches. Remove the nut from the shaft.

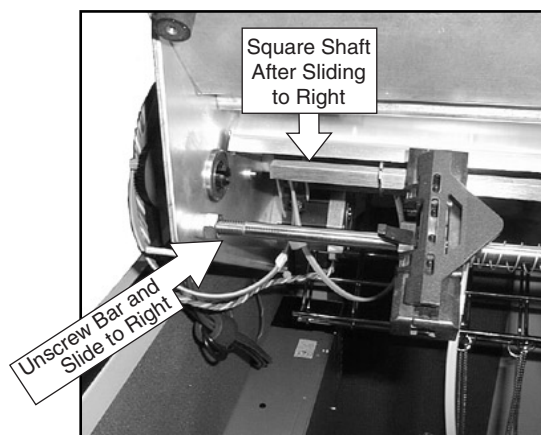


Figure 32. Round and square shafts.

Step 8. You should now have enough space to be able to slide both tractors to the left and off the shafts. Keep track of the position of the springs and washers on the support shaft as you remove them.



Each tractor has a raised bump which corresponds to a corner of the square shaft. Make sure to replace the old or new tractor with the bump corresponding to the same corner.

Procedure 15: Upper Tractor Removal



This is very similar to Procedure 12 on the previous pages.

- Step 1. Open the printer cover and remove the paper. Remove the snap rings from both ends of the square tractor shaft (located inside the frame at each end). Leave the snap rings loosely on the shaft.



Do not remove the pulley or drive belt. If the pulley and/or the drive belt is removed, you will need to rephase the upper and lower tractor sets (see Procedure 14).

- Step 2. Slide the square shaft a few inches to the right through the upper tractor pulley. When you replace the shaft and the ground spring, make sure the shaft touches the spring.
- Step 3. Remove the ground spring on the outside right of the square shaft.
- Step 4. Loosen the nut on the left side of the round shaft using an adjustable wrench or pliers. Unscrew the round shaft and slide it to the right a few inches. Remove the nut from the shaft.
- Step 5. You should now have enough space to be able to slide both tractors to the left and off the shafts. Keep track of the position of the springs and washers on the support shaft as you remove them.



Each tractor has a raised bump which corresponds to a corner of the square shaft. Make sure to replace the old or new tractor with the bump corresponding to the same corner.

Procedure 16: Tractor Phasing/Paper Drive Belt Tension Adjustment



Any time that a tractor paper drive pulley or drive belt is removed or if the paper drive motor is replaced, the paper system must be checked for proper phasing and belt tension.

- Step 1. Remove Ribbon Platform (see Procedure 1).
- Step 2. Tilt the Print Mechanism (see Procedure 10).
- Step 3. Loosen the screw holding the lower idler bracket and slide it away from the belt, then retighten the screw to hold the bracket in place temporarily.

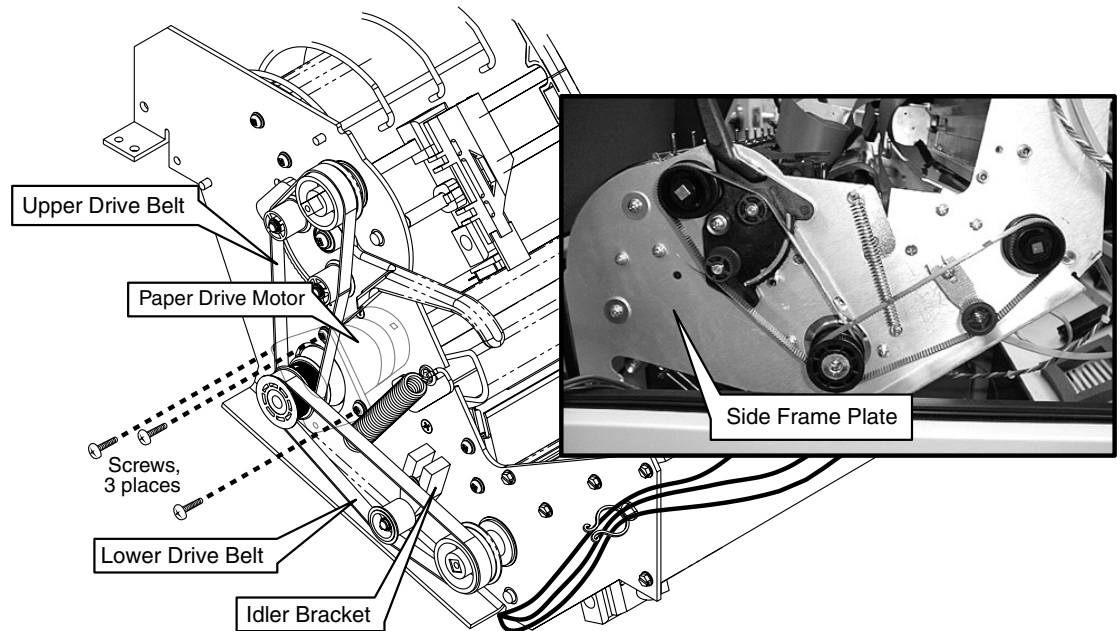


Figure 33. Tractor phasing and paper drive belt.

- Step 4. Loosen the three screws holding the paper drive motor to the side frame plate.
- Step 5. With the lower drive belt installed, slide the motor up as far as possible. Retighten one screw to hold the motor in place.

- Step 6. Place the Paper Tension lever at about the midpoint position, then install the Phasing Gauge onto the upper and lower tractors. (If the Phasing Gauge is not available, a single sheet of computer paper can be used as a temporary tool.)

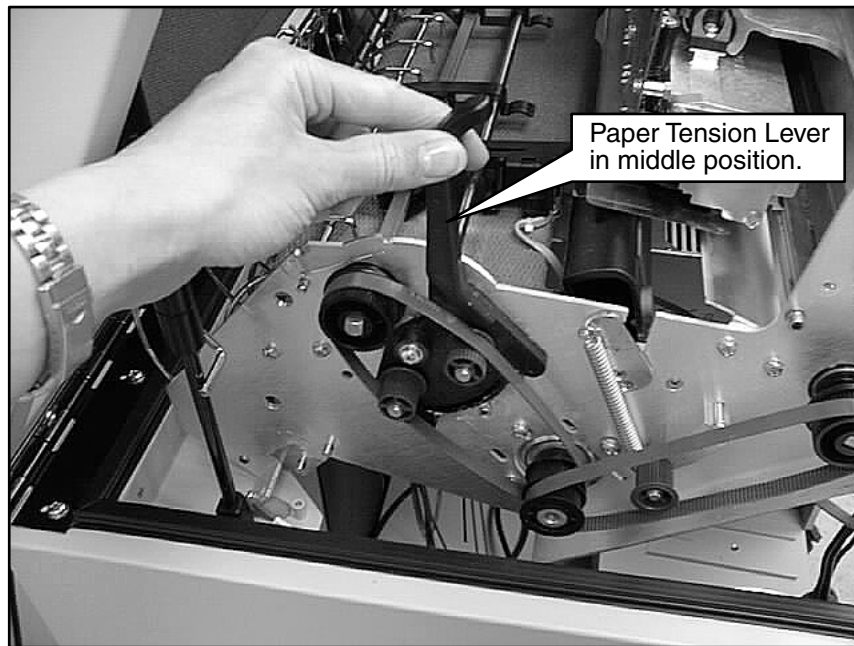


Figure 34. Paper Tension Lever in middle position.

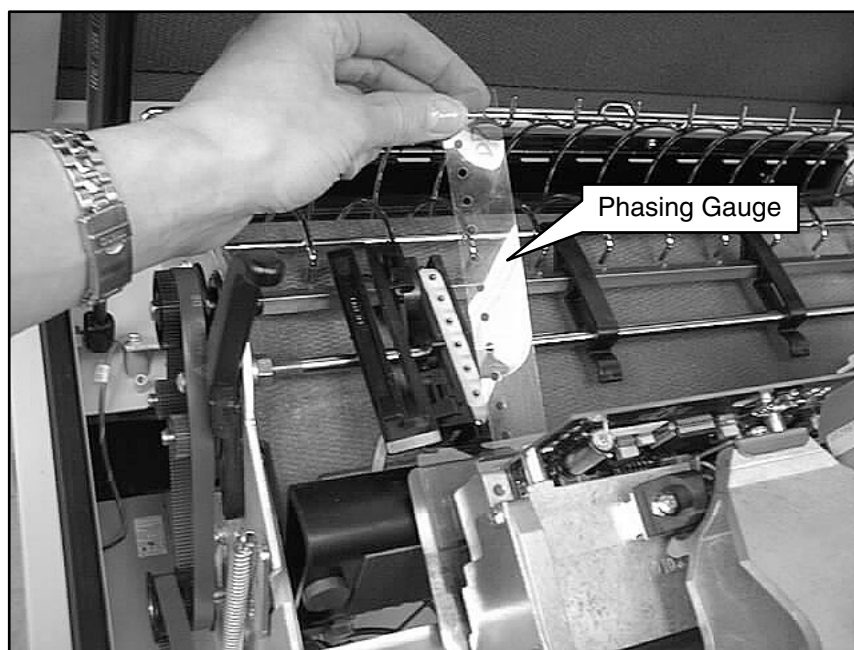


Figure 35. Placing the Phasing Gauge

- Step 7. Gently turn the upper drive shaft pulley (without the belt) manually until the gauge or paper is snug.
- Step 8. Install the upper drive belt, keeping the phasing gauge or paper snug.
- Step 9. Loosen the screw still holding the paper drive motor in place. Adjust the tension on the upper belt by pushing the drive motor down, then tighten the screws.
- Step 10. Check the tension of the belts using the Tension Gauge from the tool kit. First put the Paper Tension Lever in the down position, as shown. Then place the tension gauge on the belt, with the angled end on the paper drive pulley. Adjust the paper drive motor positioning until the spring-loaded pin on the top of the gauge is in the correct position (see Figure 36).

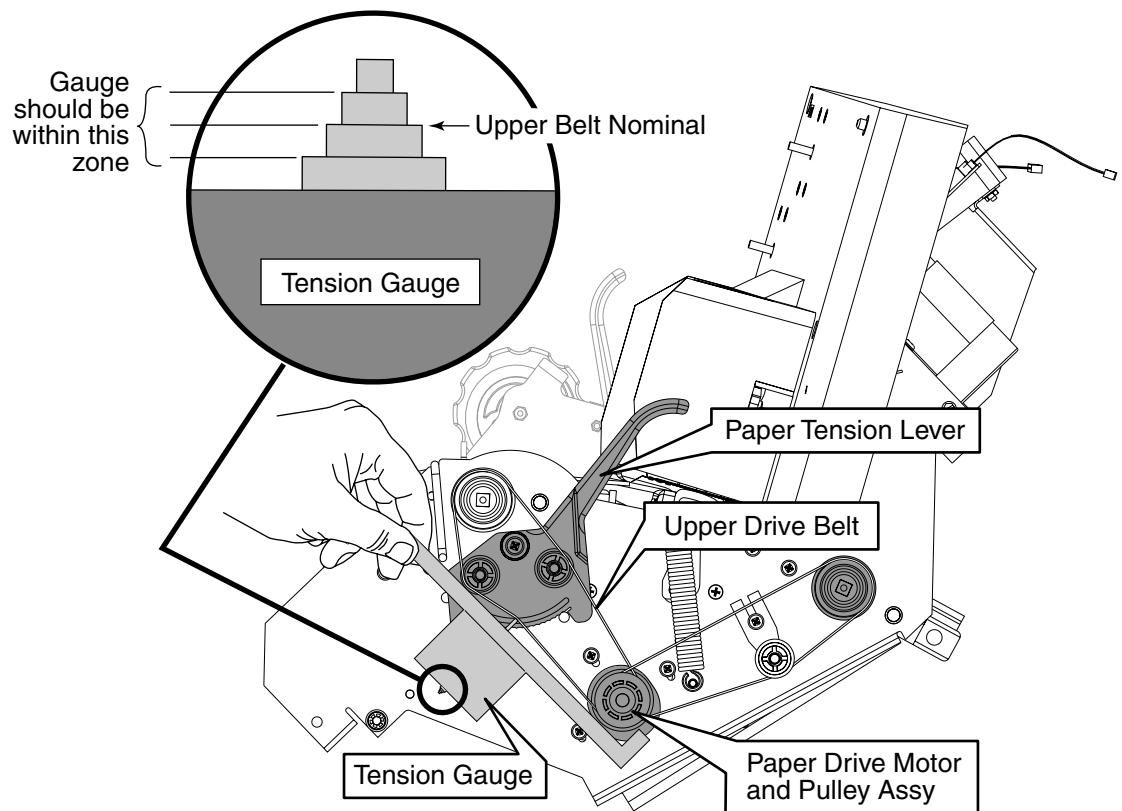


Figure 36. Placing Tension Gauge

Step 11. Loosen the screw securing the Lower Idler Bracket and slide it down to adjust the lower belt tension. Lay the angled end of the belt tension gauge on the paper drive pulley and press it against the belt. Adjust the position of the lower idler bracket until proper tension is achieved (see Figure 37).

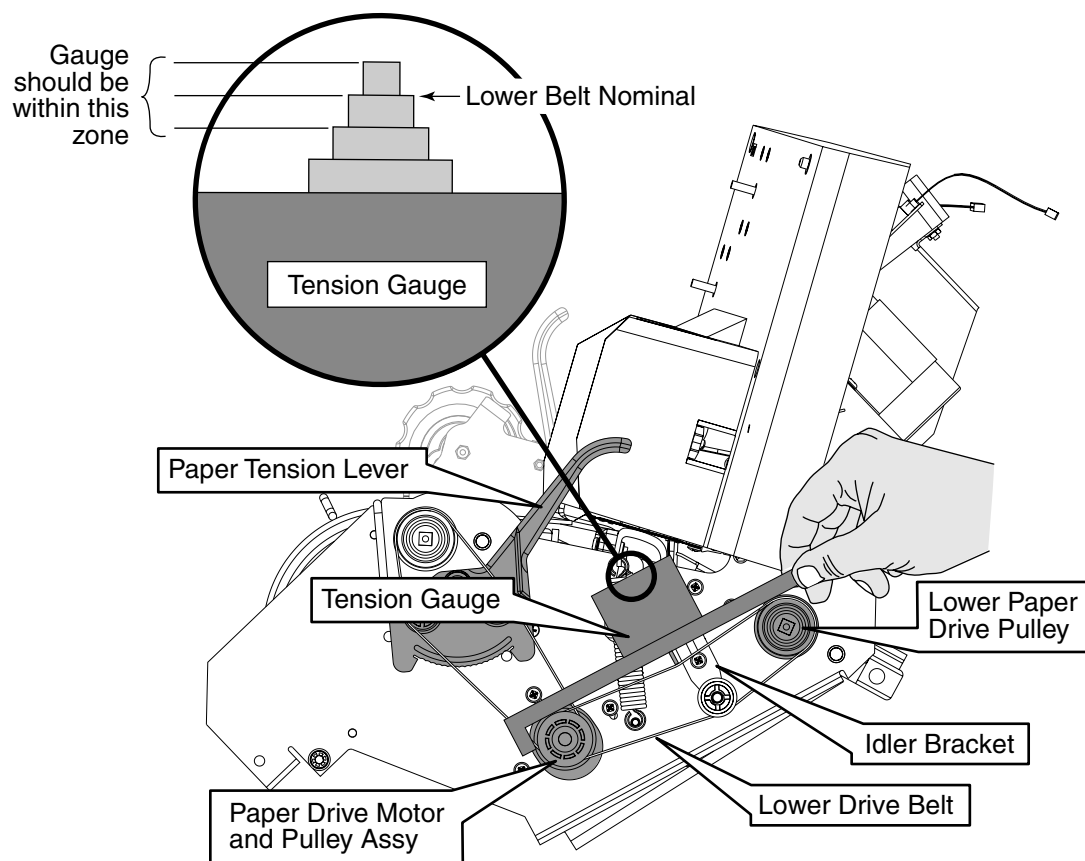


Figure 37. Placing Paper Tension Gauge.

Step 12. Move the Paper Tension Lever up and down to verify that the paper tension ranges from loose to tight.

Procedure 17: Paper Drive Motor Removal

- Step 1. Remove the Ribbon Platform (see Procedure 1).
- Step 2. Tilt the Print Mechanism (see Procedure 10).
- Step 3. Loosen the screw holding the lower idler bracket and slide it away from the belt, then retighten the screw to hold the bracket in place temporarily.
- Step 4. Loosen the three screws holding the paper drive motor to the side frame plate.
- Step 5. Remove the two drive belts from the pulley on the motor. Unplug the motor from the Platen/Paper Sensor CBA.
- Step 6. Remove the three screws holding the motor, then lift the motor out of the frame.
- Step 7. After the motor is reinstalled, leave the mounting screws slightly loose, then perform the Phasing and Belt Tensioning Adjustments (see Procedure 14). Orient the paper motor connector toward the rear of the printer.

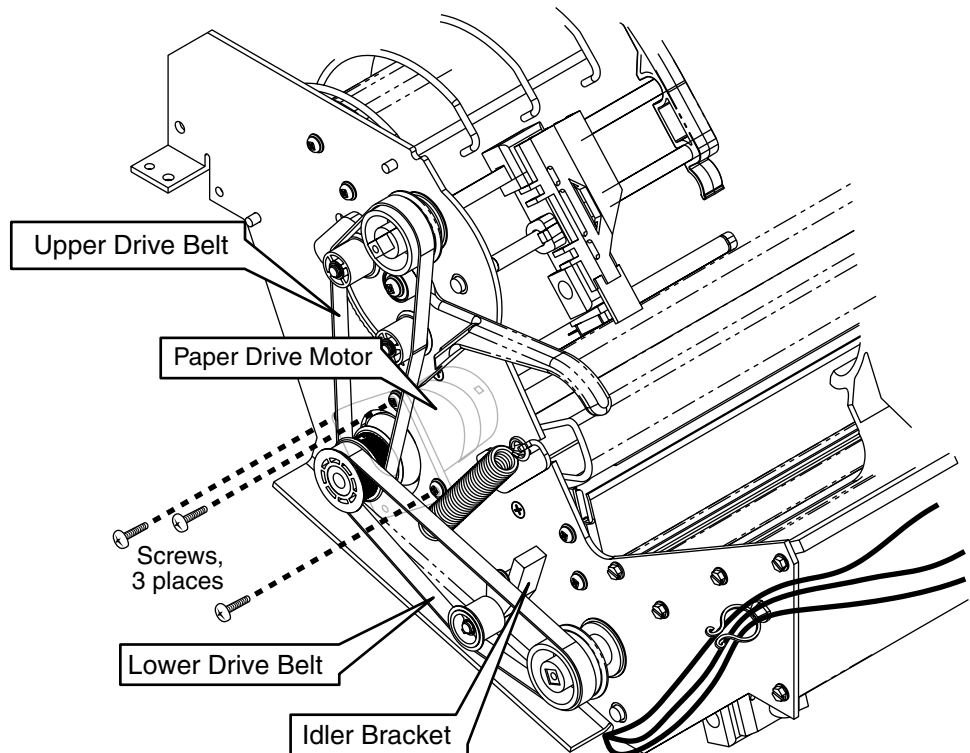


Figure 38. Paper Drive Motor location.

Procedure 18: Shuttle Motor Removal

- Step 1. Remove the Ribbon Platform (see Procedure 1).
- Step 2. Tilt the Print Mechanism (see Procedure 10).
- Step 3. Lift the Shuttle Drive Belt from the upper pulley.
- Step 4. Remove the four screws at the Shuttle Motor.

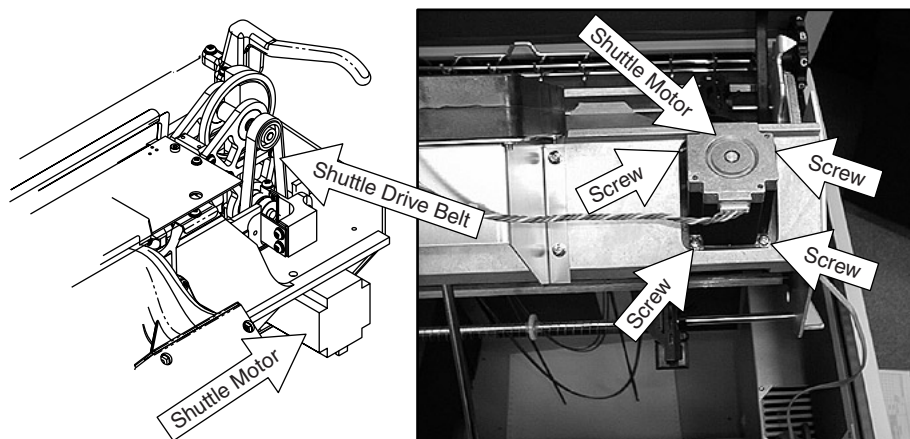


Figure 39. Shuttle Motor



When reinstalling, put the Shuttle Drive belt on the motor pulley as the motor is fitted into the chassis. Press the belt against the lower shuttle motor pulley with one hand, and "roll" the belt onto the upper shuttle pulley with the other (see Procedure 5).

Procedure 19: Control PCA Assembly Removal



The Control PCA assembly has components which are static sensitive! Use the appropriate ESD grounding procedures when handling the Control PCA assembly.

- Step 1. Working through the front door area, loosen the 11/32" nut securing the connector cover and remove the cover.
- Step 2. Unplug all of the connectors at the Control PCA.
- Step 3. Working from the back door of the printer, loosen the two mounting nuts (11/32"), lift the enclosure slightly and lift it off the mounting studs.
- Step 4. To replace the Control PCA, remove the four screws and then lift the PCA out of the enclosure.

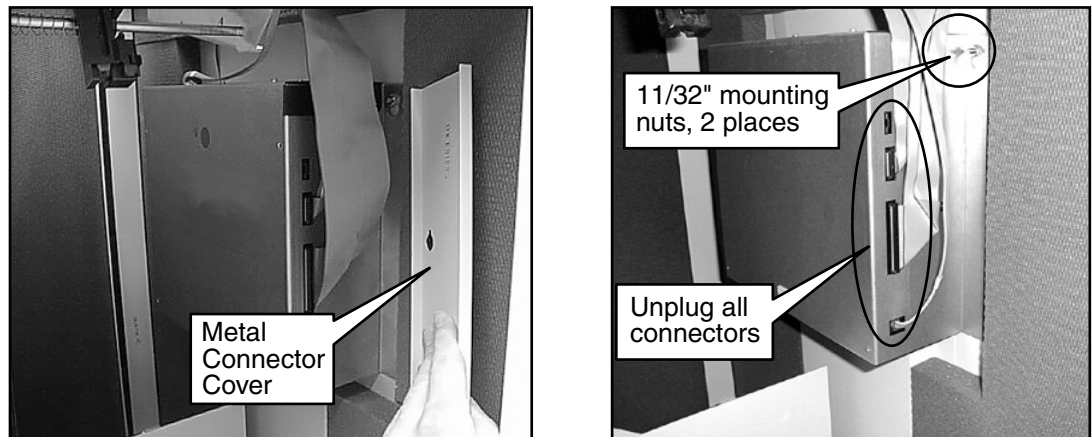


Figure 40. Front of Control PCA assembly after cover has been removed.

Procedure 20: Power Supply Assembly Removal

- Step 1. Remove the Ribbon Platform (see Procedure 1).
- Step 2. Disconnect the DC power cable at the Distribution PCA.
- Step 3. Working through the back door of the printer, loosen the four mounting nuts (11/32"), lift the enclosure slightly and lift it from the mounting studs.
- Step 4. To replace the Power Supply Assembly, remove the mounting screws and lift the assembly out of the enclosure.



The AC Switch is also part of this assembly and may be replaced by squeezing the release tabs, then lifting it clear of the enclosure.

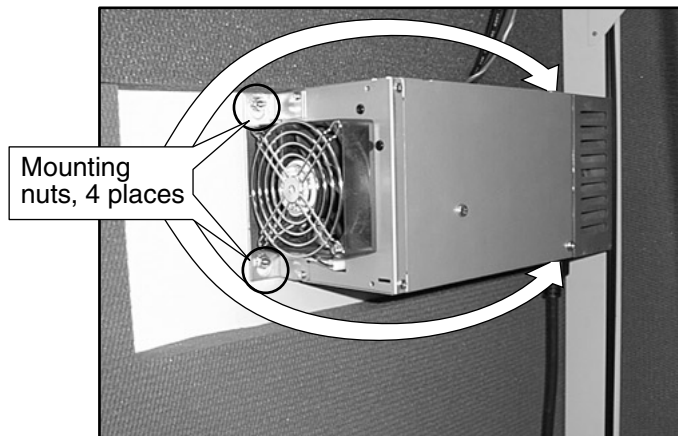


Figure 41. Power Supply Assembly.

Appendix A:

Schematics and Parts lists



T6215 Illustrated Parts Breakdown and Schematics

Recommended Spare Parts

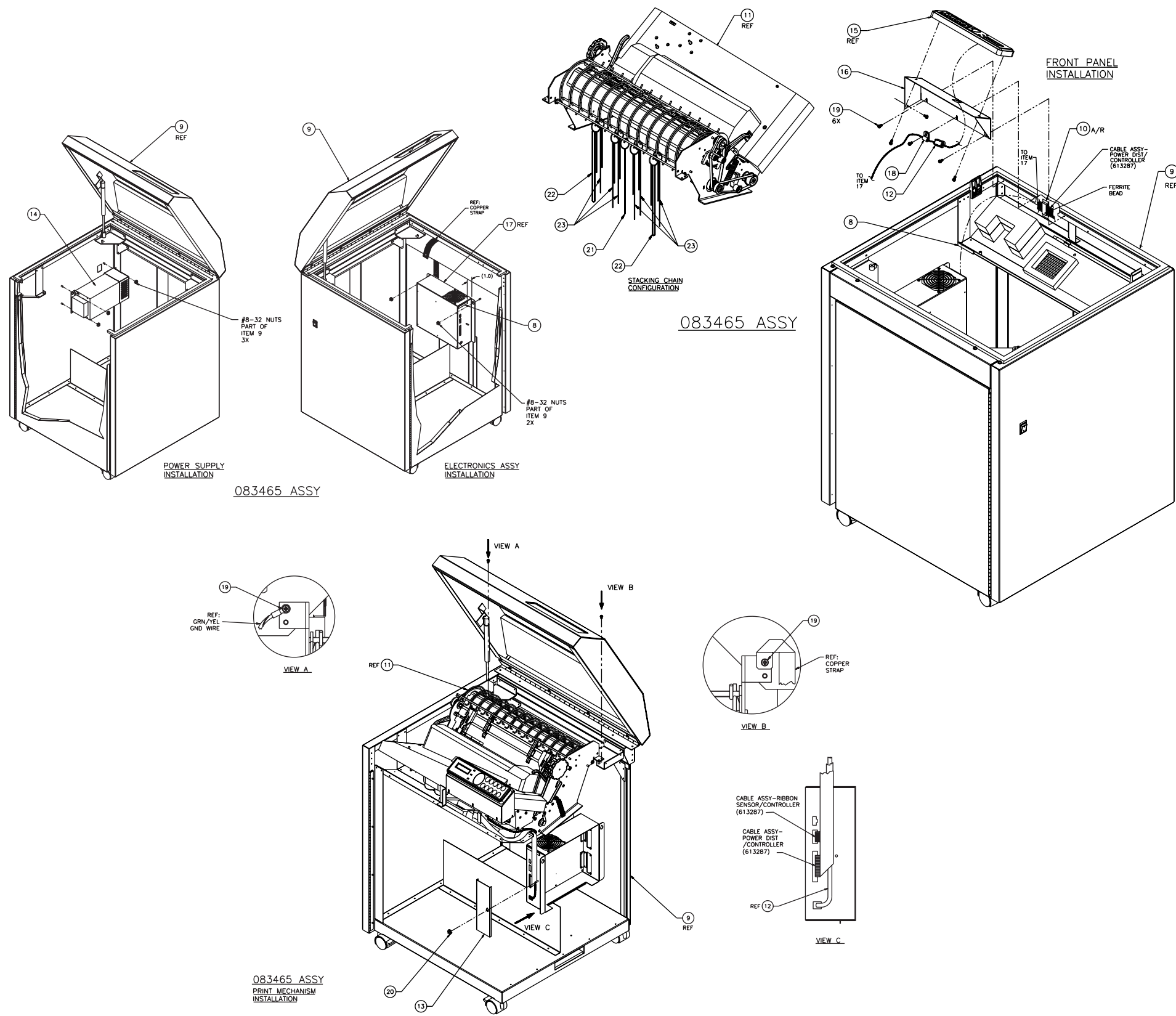
Part Number

Belt, Paper Drive	075127
Belt, Shuttle Drive	732753
Blower Assembly (Electronics Assy)	083145
Blower Assembly (Hammer Bank)	083589
Capacitor, Surge	732752
Control Panel Assembly - Std. English	083488
Control Panel CBA	082766
Controller CBA, Ser/Par/PSIO tstd	083412
Controller - Ser/Par std, tstd	083409
Ground Clip - Tractor Shaft	081470
Hammer 13-pack	082503
Hammer Bank Assembly (w/Bearings - no Ribbon Shield)	083485
Hammer Coil CBA	083557
Hammer Driver CBA	083566
Motor Assembly - Paper Drive	082935
Motor Assembly - Shuttle Drive	082934
Motor - Ribbon Drive	075138
Platen/Paper Sensor CBA	083556
Power Distribution CBA	083558
Power Supply (500W)	732234
Pulley - Paper Drive (on motor)	082857
Pulley - Paper Tractor - Lower	080647
Pulley - Paper Tractor - Upper	080635
Ribbon Sensor CBA	083555
Ribbon Shield Assembly	083491
Shuttle Module Assembly	083486
T6215 Tool Kit	083462
1 Gauge- Tension, Paper Belt	613406-083561
1 Driver- Allen T-Handle, 9/64	400966-28
2 Gauge- Shim, Platen Gap, 0.011	611378-083560
1 Alignment tool- Hammer Module	613407-083562
1 Screw Driver- #8 Torx Plus	400966-732833
Tractor Kit - Lower w/ Sensor	083666
Tractor Kit - Upper w/ Sensor	083667

Manuals

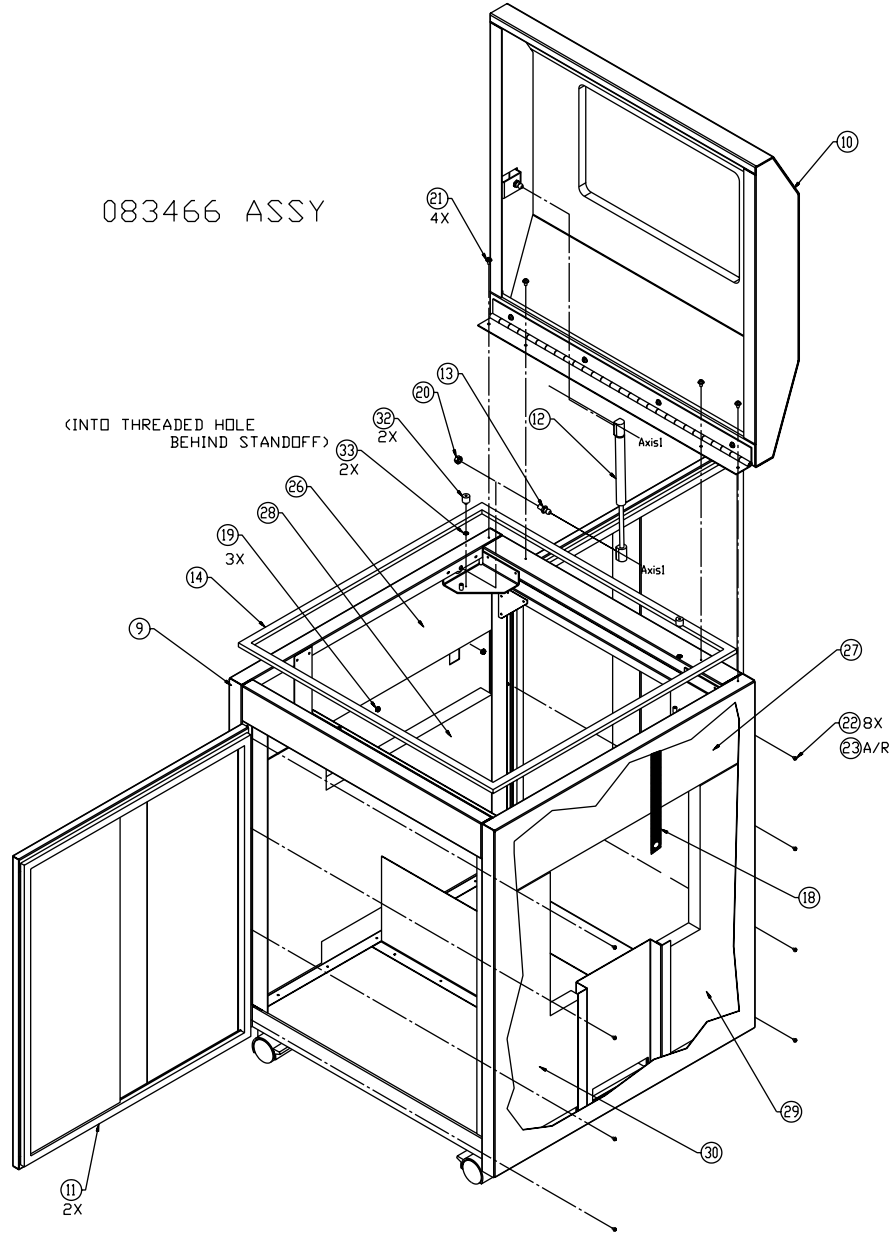
Maintenance Manual	MPL1116
Quick Start Guide w/Operator Manual on CD	MPL1107

Notes:

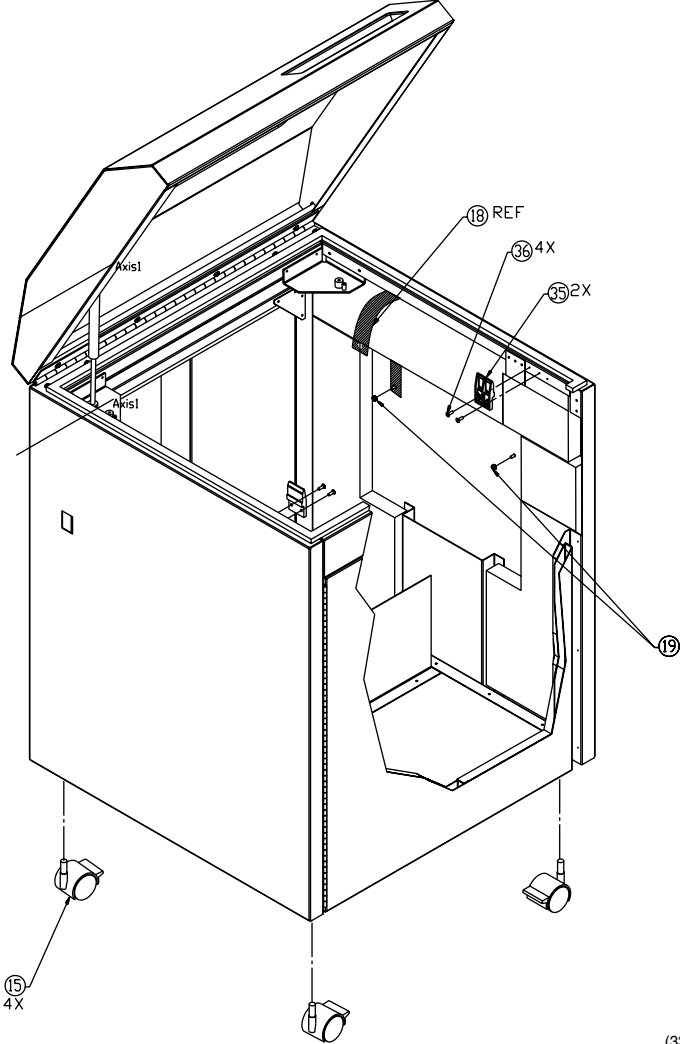
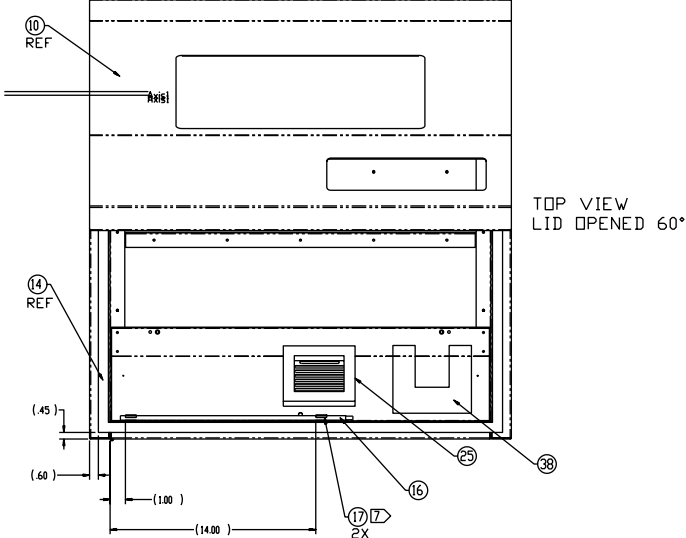


QTY REQUIRED PER ASSY				PART NUMBER	DESCRIPTION	ITEM NO.	
			083465	-	083465	GENERAL ASSY- T6215	1
							2
							3
							4
							5
							6
							7
			2	613411-083569	PAD- CABLE		8
			1	613352-083466	ASSY- PRINTER CABINET		9
			A/R	402986-104	TAPE- FOAM, DOUBLE SIDED 1" WIDE		10
			REF	613335	BASIC PRINTER ASSY		11
			1	611214-083480	CABLE- CONTROL PANEL		12
			1	613367-083163	COVER- CABLE		13
			1	613354-083130	POWER SUPPLY ASSY		14
			REF	613177	CONTROL PANEL ASSY		15
			1	613061-082402	MOUNT- FRONT PANEL		16
			REF	613323	ELECTRONICS ASSY		17
			1	404313-732823	CLAMP- CABLE		18
			8	402524-42	SCREW- #8-32 X 0.37 SEMS		19
			1	400783-730502	NUT- #8-32, KEPS		20
			1	611767-083674	CHAINS- PAPER STACKER		21
			2	611767-083673	CHAINS- PAPER STACKER 27.0"		22
			6	611767-083672	CHAINS- PAPER STACKER 27.0"		23

Cabinet Assembly I

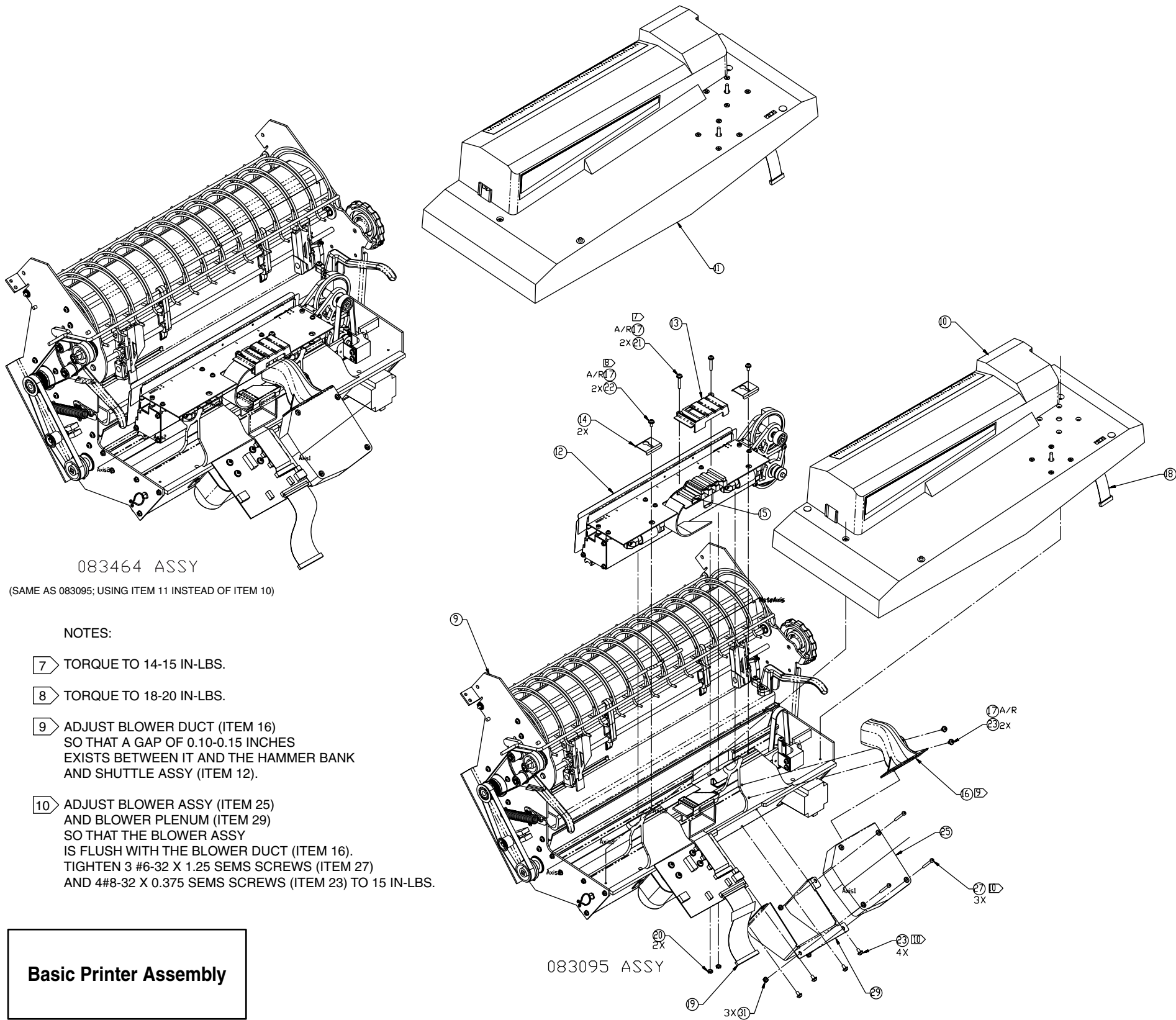


Cabinet Assembly II



(3352D P1&2, PL2&3)

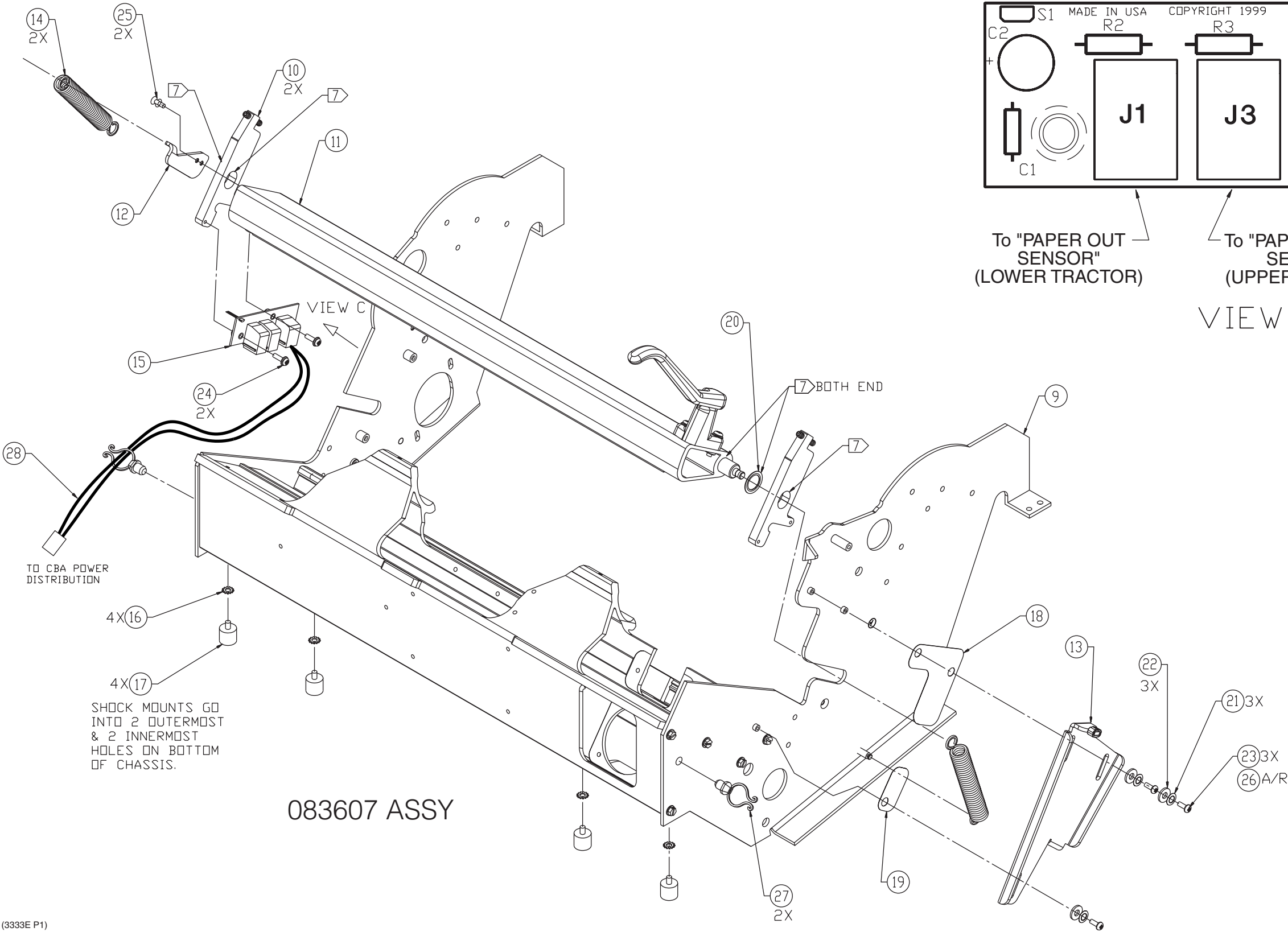
QTY REQUIRED PER ASSY		PART NUMBER	DESCRIPTION	ITEM NO.
	083466			
	-	083466	CABINET ASSY- PRINTER	1
				2
				3
				4
				5
				6
				7
				8
	1	613278-082992	CABINET ASSY	9
	1	613187-082706	COVER ASSY- LID	10
	2	613294-083001	DOOR ASSY	11
	1	403692-732659	GAS SPRING	12
	1	403692-731092	BALL STUD	13
	1	613343-083601	GASKET- MAGNETIC, LID	14
	4	404036-731449	CASTER	15
	1	613373-083378	SHAFT- SUPPORT	16
	2	404307-732796	CLIP- PLASTIC, SELF- ADHESIVE	17
	1	403666-730956	GROUND STRAP- INSULATED, 18" X 1"	18
	5	400783-730502	NUT- #8 KEPS	19
	1	400783-15	NUT- #5/16, KEPS	20
	4	402524-62	SCREW- #10-32 X 0.375, SEMS	21
	8	402524-730381	SCREW- #6-32 X 0.375, SEMS	22
	A/R	400658-730213	ADHESIVE LOCTITE 242	23
				24
	1	613248-082856	SEAL- BLOWER	25
	1	613150-083396	FOAM- ACOUSTIC	26
	1	613150-083397	FOAM- ACOUSTIC	27
	1	613150-083398	FOAM- ACOUSTIC	28
	1	613150-083399	FOAM- ACOUSTIC	29
	1	613150-083400	FOAM- ACOUSTIC	30
				31
	2	403769-09	MOUNT- VIBRATION DAMPING (BLUE)	32
	2	400069-03	WASHER- LOCK, EXTERNAL TOOTH, #8	33
				34
	2	613423-083605	GUIDE- LID	35
	4	402454-732649	SCREW- #8-32 X 0.50 FLAT HEAD, 100° CROSS RECESSED STAINLESS STEEL	36
				37
	2	613150-083670	FOAM- ACOUSTIC	38



Basic Printer Assembly

QTY REQUIRED PER ASSY			PART NUMBER	Basic Printer Assembly DESCRIPTION	ITEM NO.
	083464	083095			
	-		083095	BASIC PRINTER ASSY- W/RIBBON PLATFORM W/RFD & SKOW	1
	-		083464	BASIC PRINTER ASSY- W/RIBBON PLATFORM W/RFD, W/SKOW & RE-INKING DRIVE	2
					3
					4
					5
					6
					7
					8
	1	1	613333-083607	PRINT MECHANISM ASSY	9
		1	613315-083081	PLATFORM ASSY- RIBBON SUPPORT W/O RE-INKING DRIVE	10
	1		613315-083463	PLATFORM ASSY- RIBBON SUPPORT W/RE-INKING DRIVE	11
	1	1	613334-083094	HAMMER BANK & SHUTTLE ASSY	12
	1	1	613232-082784	CAP- FLEX CLAMP, UPPER	13
	2	2	613148-082607	CLIP- BEARING RETAINING	14
	1	1	613233-082785	INSERT- FLEX CLAMP, UPPER	15
	1	1	613337-083543	DUCT- BLOWER	16
	A/R	A/R	400658-730213	ADHESIVE- LOCTITE 242	17
	1	1	613287-083380	CABLE ASSY- RIBBON SENSOR/CONTROLLER	18
	1	1	613287-083671	CABLE ASSY- POWER DISTRIBUTION/CONTROLLER	19
	2	2	400783-25	NUT- #8-32, HEX KEPS	20
	2	2	402524-45	SCREW- #8-32 X 1.00, SEMS	21
	3	3	402524-47	SCREW- #8-32 X 0.312, SEMS	22
	2	2	402524-42	SCREW- #8-32 X 0.375, SEMS	23
					24
	1	1	612726-083506	BLOWER ASSY	25
					26
	3	3	400627-106	SCREW- #6-32 X 1.25, PAN HD, CROSSED RECESSED, S.S.	27
					28
	1	1	613307-083528	PLENUM ASSY- BLOWER	29
					30
	3	3	400783-730382	NUT- #6-32 KEPS	31

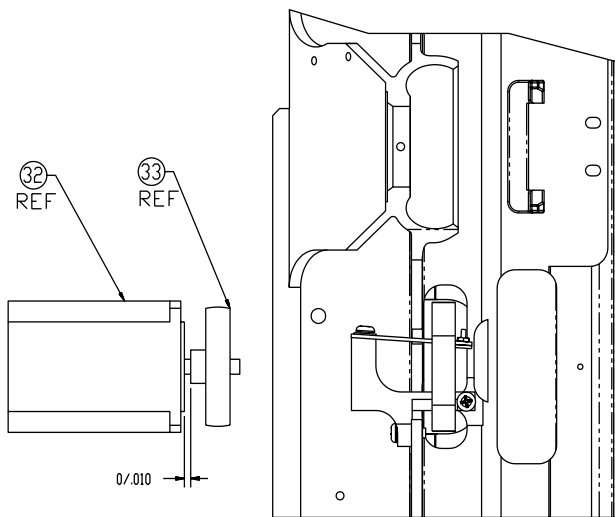
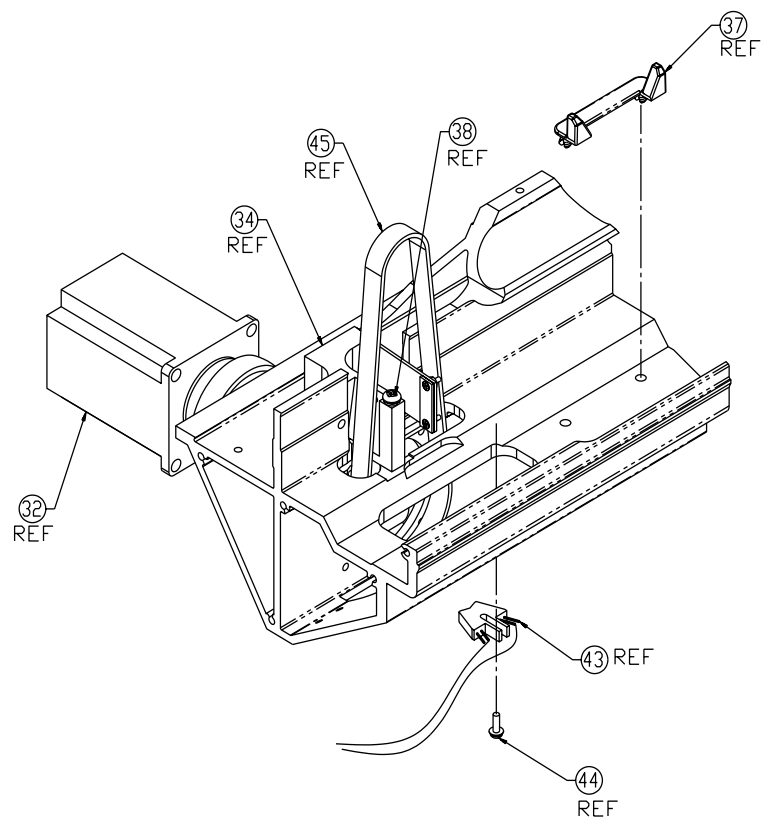
(3335F P1&2 PL2&3)



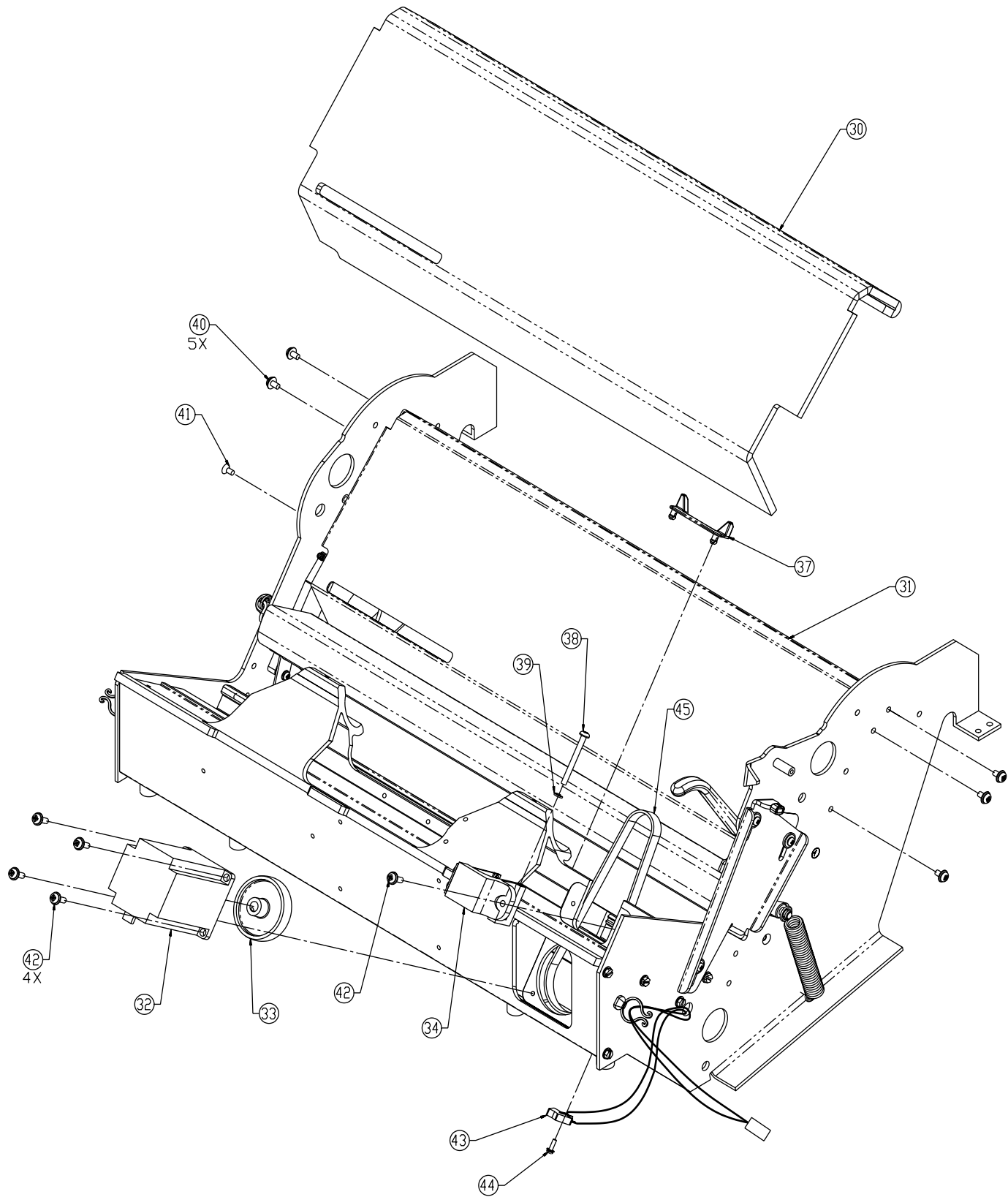
- NOTES:**
- 7 APPLY A LIGHT COAT OF GREASE (ITEM 67) BETWEEN ITEM 54 AND SIDE PLATE, AROUND STANDOFF, OR INDICATED AREA.
 - 8 INSTALL ITEMS 51, 52, AND 61 WITH ZERO CLEARANCE TO ITEM 60, AND LOCK IN PLACE WITH ITEM 74.
 - 9 CLEAR O.D. OF BEARING TO REMOVE OIL PRIOR TO ASSY WITH SPEED BONDER (ITEM 68).
 - 10 END OF SHAFT (ITEM 59) TO BE 0.01 TO 0.05 BELOW FLUSH WITH OUTSIDE SURFACE OF END PLATE.
 - 11 WIPE INSIDE OF BEARING BORE WITH ACTIVATOR (ITEM 69) LESS THAN 1 HOUR PRIOR TO ASSEMBLY.
 - 12 SLIDE ITEM 64 MOTOR DOWNWARD FOR PROPER TENSION IN TOP BELT, THEN SLIDE ITEM 53 IDLER ASSY DOWN AND TIGHTEN FOR PROPER TENSION IN THE LOWER BELT. SET PROPER TRACTOR PHASING WITH ITEM 54 PHASING LEVER IN MID-TRAVEL & PLATEN FULLY CLOSED WHILE USING THE TRACTOR PHASING GAGE.
 - 13 TORQUE TO BE SET AT 18 IN-LBS.
 - 14 POSITION ITEM 58 TO FIRMLY CONTACT ITEM 62, ITEM 58 TO BE NO MORE THAN 0.125 BELOW OUTSIDE END OF ITEM 51 OR ITEM 52.
 - 15 ADJUST SHAFT (ITEM 58) TO BEAR TO SPRING (ITEM 62) WITH 5 LBS ± 2.5 LBS OF LOAD.
 - 16 TORQUE TO BE SET AT 14-15 IN-LBS.
 - 17 TORQUE TO BE SET AT 18-20 IN-LBS.

**Print Mechanism
Assembly I**

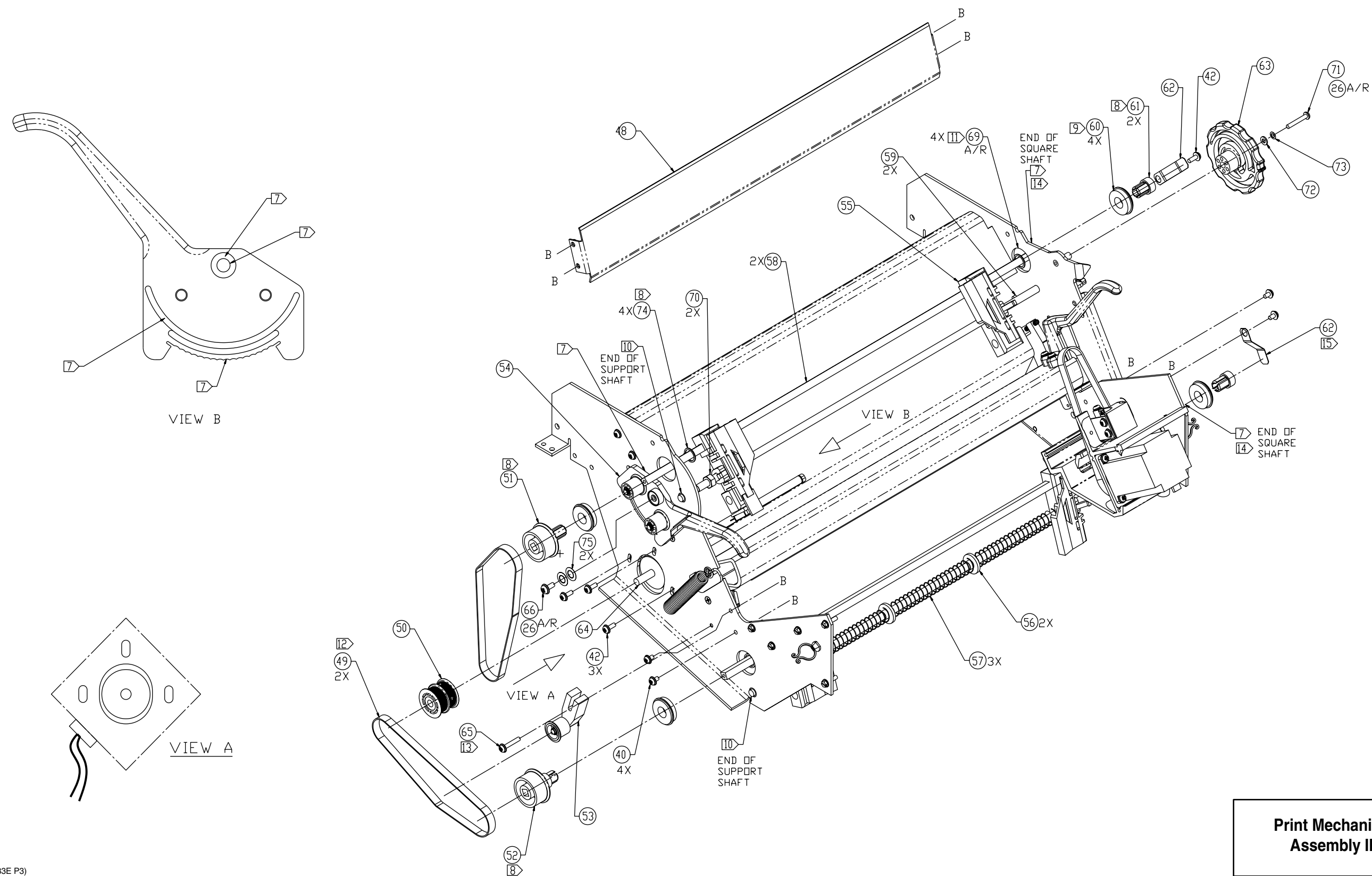
(3333E P1)



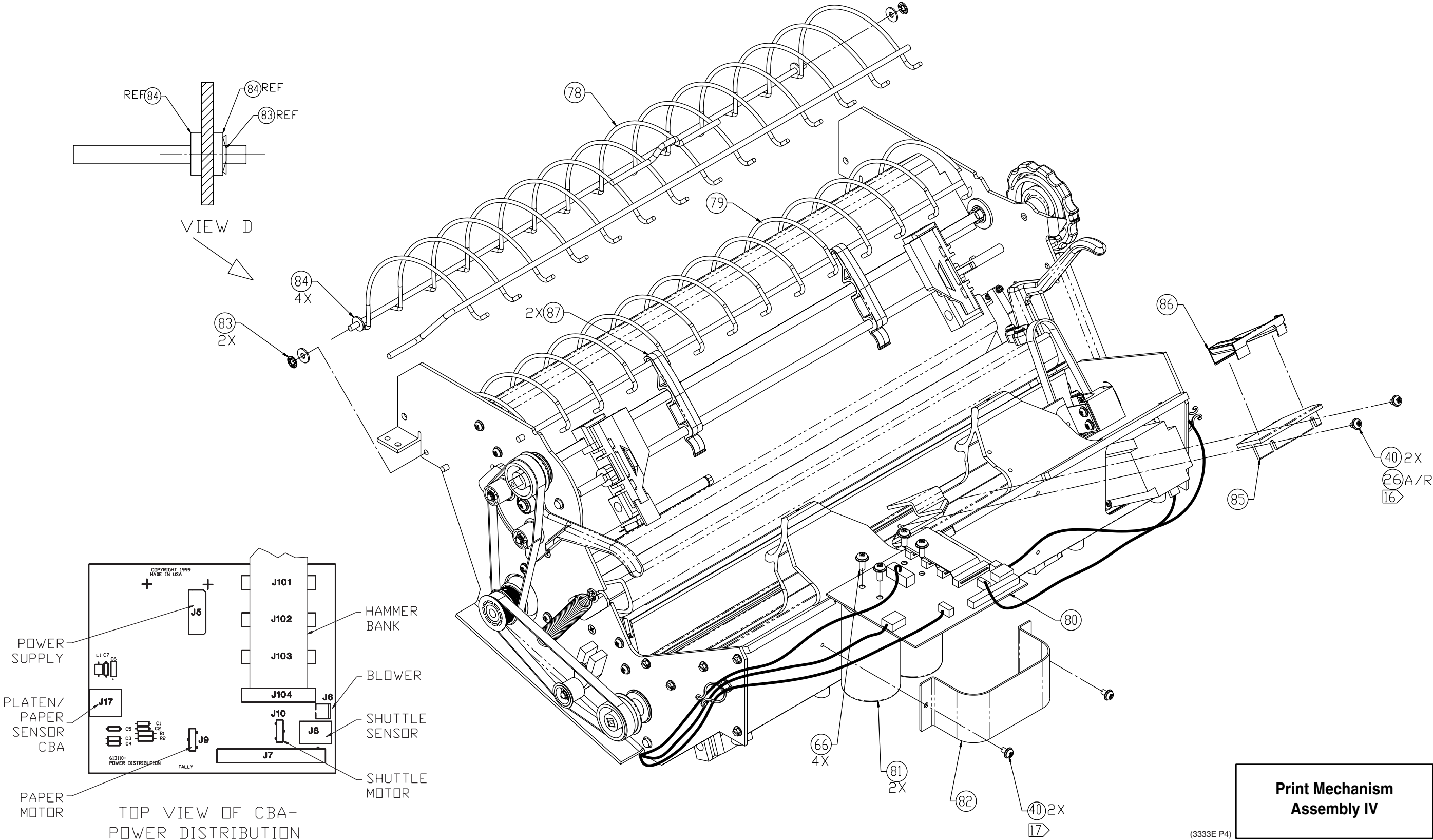
Print Mechanism
Assembly II



(3333E P2)



(3333E P3)

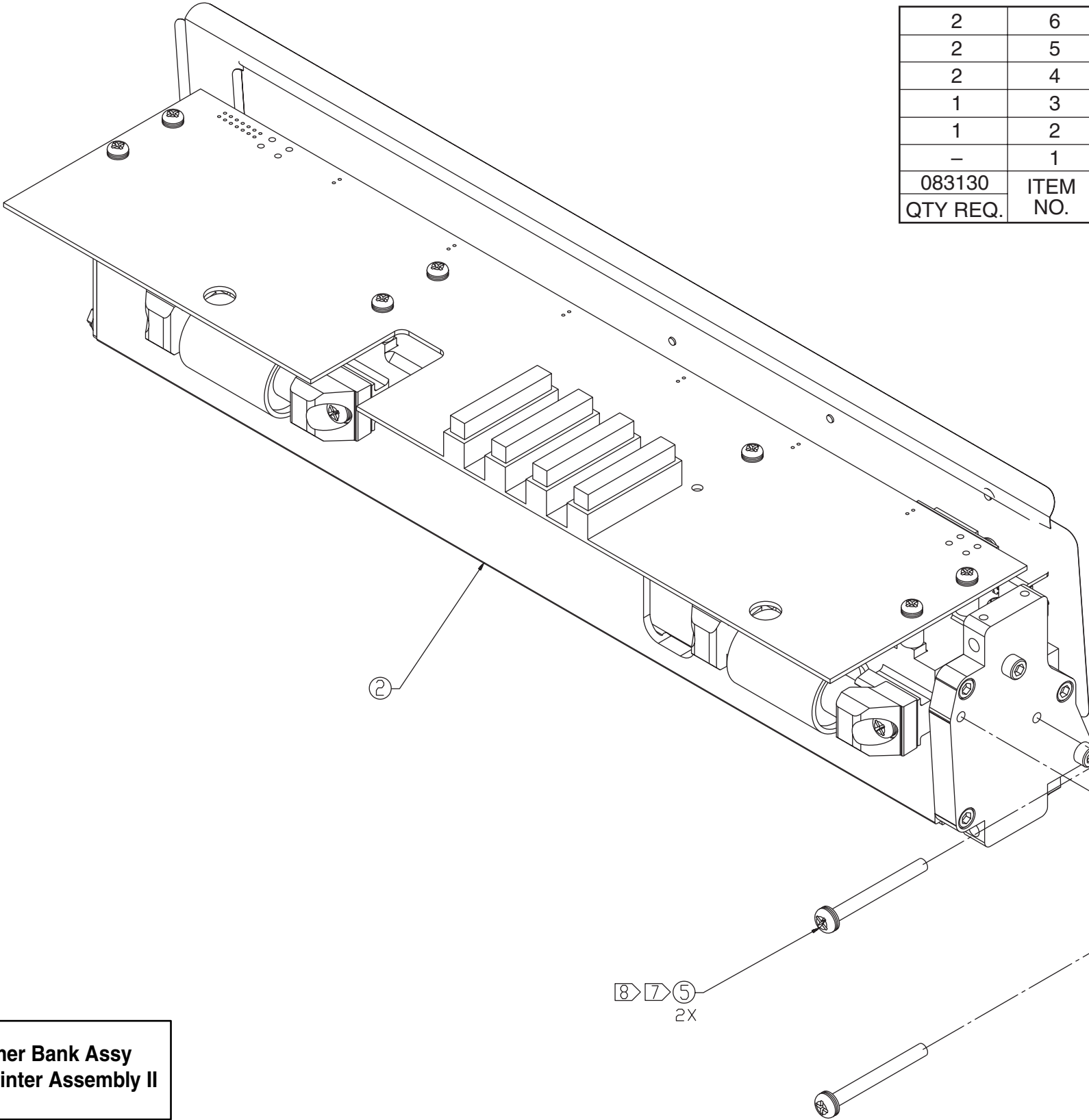


QTY REQUIRED PER ASSY					PART NUMBER	PRINT MECHANISM ASSEMBLY DESCRIPTION	ITEM NO.
				083607			
				-	083607	PRINT MECHANISM ASSY	1
							2
							3
							4
							5
							6
							7
							8
			1		613276-083606	FRAME & END PLATE ASSY	9
			2		613355-083140	PLATE ASSY- PLATEN GAP	10
			1		613251-082857	PLATEN ASSY	11
			1		613136-082592	LEVER- PLATEN SPRING	12
			1		613275-082966	PLATEN STOP & PAWL ASSY	13
			2		404023-732624	SPRING- PLATEN ADJUST	14
			1		613180-082647	CBA- PLATEN/PAPER SENSOR	15
			4		400069-03	WASHER- LOCK, EXTERNAL TOOTH, #8	16
			4		404321-732852	MOUNT- VIBRATION DAMPING	17
			1		613296-083007	SLIDE- BEARING, UPPER	18
			1		613296-083008	SLIDE- BEARING, LOWER	19
			1		400995-732616	WASHER- CURVED SPRING	20
			3		400995-09	WASHER- CURVED SPRING	21
			3		400326-732695	WASHER- NYLON, 0.50 O.D. 0.218 I.D.	22
			3		400627-119	SCREW- #6-32 X 0.375, PAN HEAD	23
			2		402524-23	SCREW- #6-32 X 0.500 SEMS	24
			2		400693-51	SCREW- #10-32 X 0.25 82%%d FLAT HEAD	25
			A/R		400658-730213	ADHESIVE- LOCTITE 242	26
			2		404314-732824	CABLE TIE- BLIND HOLE	27
			1		611214-083481	CABLE ASSY- PLATEN SENSOR	28
							29
			1		612297-083659	FOAM- ACOUSTIC	30
			1		613120-082660	PAPER GUIDE ASSY- UPPER	31
			1		613267-082934	MOTOR ASSY- SHUTTLE	32
			1		613185-082704	PULLEY- FLAT BELT, 2" DIA	33
			1		613213-083599	STABILIZER BLOCK ASSY	34

QTY REQUIRED PER ASSY					PART NUMBER	PRINT MECHANISM ASSEMBLY DESCRIPTION	ITEM NO.
				083607			
							35
							36
			1		613271-082951	CENTERING GUIDE- LOWER LINEAR BEARING	37
			1		404114-732806	SCREW- #8-32 X 1 5/8, PAN HEAD	38
			1		400215-10	WASHER- #8, SPLIT LOCK	39
			13		402524-42	SCREW- #8-32 X 0.375, SEMS	40
			1		400693-732649	SCREW- #8-32 X 0.30, 82% FLAT HEAD	41
			11		402524-43	SCREW- #8-32 X 0.500 SEMS	42
			1		611138-083526	CABLE ASSY- SHUTTLE SENSOR	43
			1		402524-02	SCREW- #4-40 X 0.375, SEMS	44
			1		403736-732753	BELT- SHUTTLE	45
							46
							47
			1		613096-082537	PAPER GUIDE ASSY- LOWER	48
			2		611307-080538	TIMING BELT (202T)	49
			1		613408-083568	PULLEY ASSY- PAPER MOTOR DRIVE(45T)	50
			1		612635-080635	PULLEY- PAPER DRIVE, SHORT	51
			1		612635-080647	PULLEY- PAPER DRIVE, LONG	52
			1		613318-083087	IDLER ASSY- SUPPORT	53
			1		613253-082859	LEVER ASSY- PHASING	54
			1		611507-083133	TRACTOR/SENSOR ASSY- PAPER DRIVE	55
			2		605823-075477	IDLER	56
			6		602631-1	SPRING- PAPER	57
			2		611151-082798	SHAFT- PAPER DRIVE	58
			2		612647-082797	SHAFT- TRACTOR SUPPORT	59
			4		404010-731090	BEARING- 1.125 O.D.	60
			2		611148-075480	BUSHING- SQUARE SHAFT	61
			2		612802-081470	SPRING- GROUNDING, TRACTOR SHAFT	62
			1		613138-083613	KNOB- FORMS ADJUST	63
			1		613267-082935	MOTOR ASSY- PAPER DRIVE	64
			1		402524-45	SCREW- #8-32 X 1.000, SEMS	65
			5		402524-63	SCREW- #10-32 X 0.500, SEMS	66
			A/R		400319-02	GREASE- LUBRIPLATE	67
			A/R		400658-731203	ADHESIVE- LOCTITE 324	68

QTY REQUIRED PER ASSY					PART NUMBER	PRINT MECHANISM ASSEMBLY DESCRIPTION	ITEM NO.
				083607			
			A/R		400658-731239	ACTIVATOR- ADHESIVE	69
			2		400726-06	NUT- #5/16-18 PLAIN HEX	70
			1		400627-221	SCREW- #8-32 X 1.125, PAN HEAD	71
			1		400216-10	WASHER- FLAT, #8	72
			1		400995-06	WASHER- CURVED SPRING	73
			4		400641-18	RING- RETAINING	74
			2		400995-730186	WASHER- CURVED SPRING	75
							76
							77
			1		613167-083477	PAPER GUIDE- UPPER	78
			1		613392-083478	PAPER GUIDE- INNER	79
			1		613110-082526	CBA- POWER DISTRIBUTION	80
			2		404284-732752	CAPACITOR- ALUMINUM ELECTROLYTIC	81
			1		613306-083043	CLAMP- CAPACITOR	82
			2		404319-732845	RETAINING RING- SELF-LOCKING, EXTERNAL	83
			4		400326-732846	WASHER- FLAT, NYLON, #10	84
			1		613230-082782	BRACKET- FLEX CLAMP, LOWER	85
			1		613231-082783	CAP- FLEX CLAMP, LOWER	86
			2		613413-083576	GUIDE- PAPER	87

(3333E PL1-5)



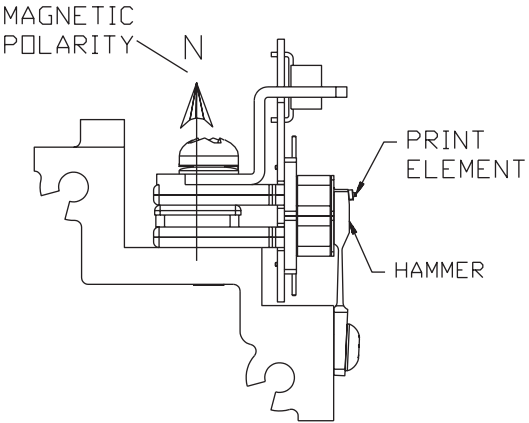
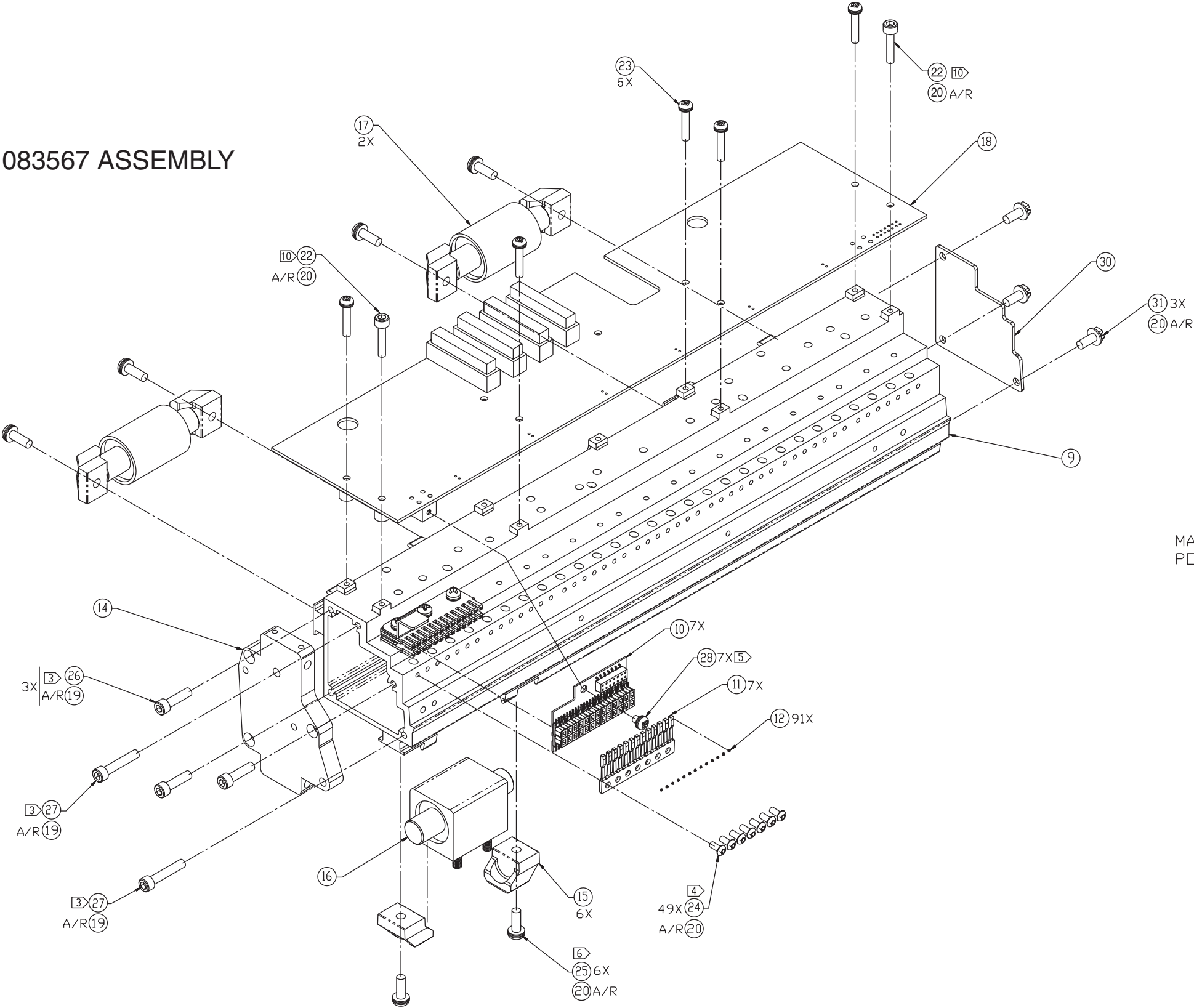
2	6	400215-10	WASHER - #8 SPLIT LOCK
2	5	402524-732692	SCREW - #8-32 X 1.625 SEMS
2	4	400512-249	SCREW - #8-32 X 5/8, SOCKET HEAD
1	3	613286-082982	SHUTTLE ASSY
1	2	613332-083567	HAMMER BANK ASSY
-	1	083094	HAMMER BANK AND SHUTTLE ASSY
083130	ITEM	PART NO.	DESCRIPTION
QTY REQ.	NO.		

NOTES:

- 7 TORQUE 18 IN-LBS
- 8 LIGHTLY SNUG DOWN FASTENERS ITEM 4. INSERT AND TIGHTEN FASTENERS ITEM 7. TIGHTEN FASTENERS ITEM 4.

Hammer Bank Assy
Basic Printer Assembly II

(3334B P1)

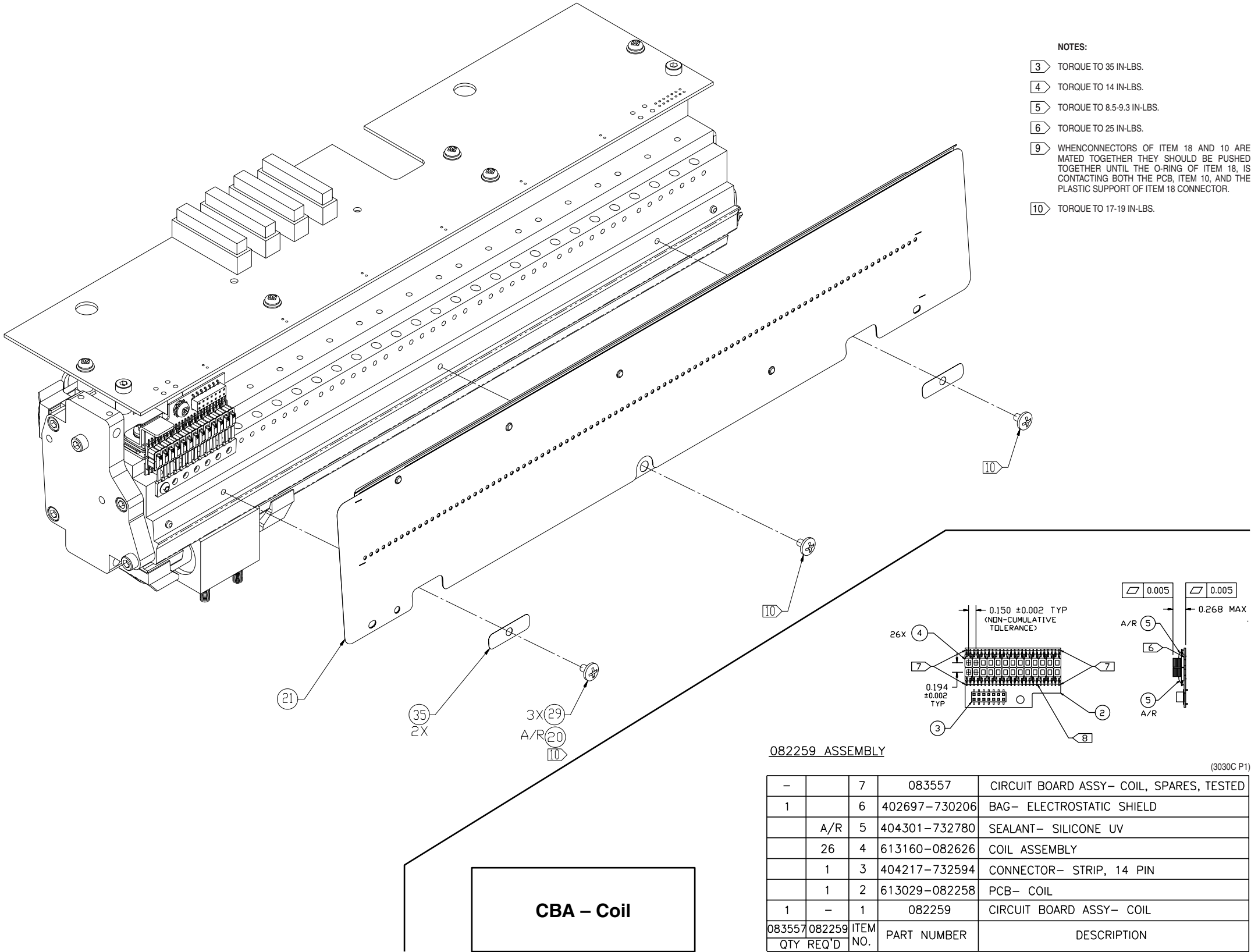


Hammer Bank Assy
Basic Printer Assembly III

(3332D P1)

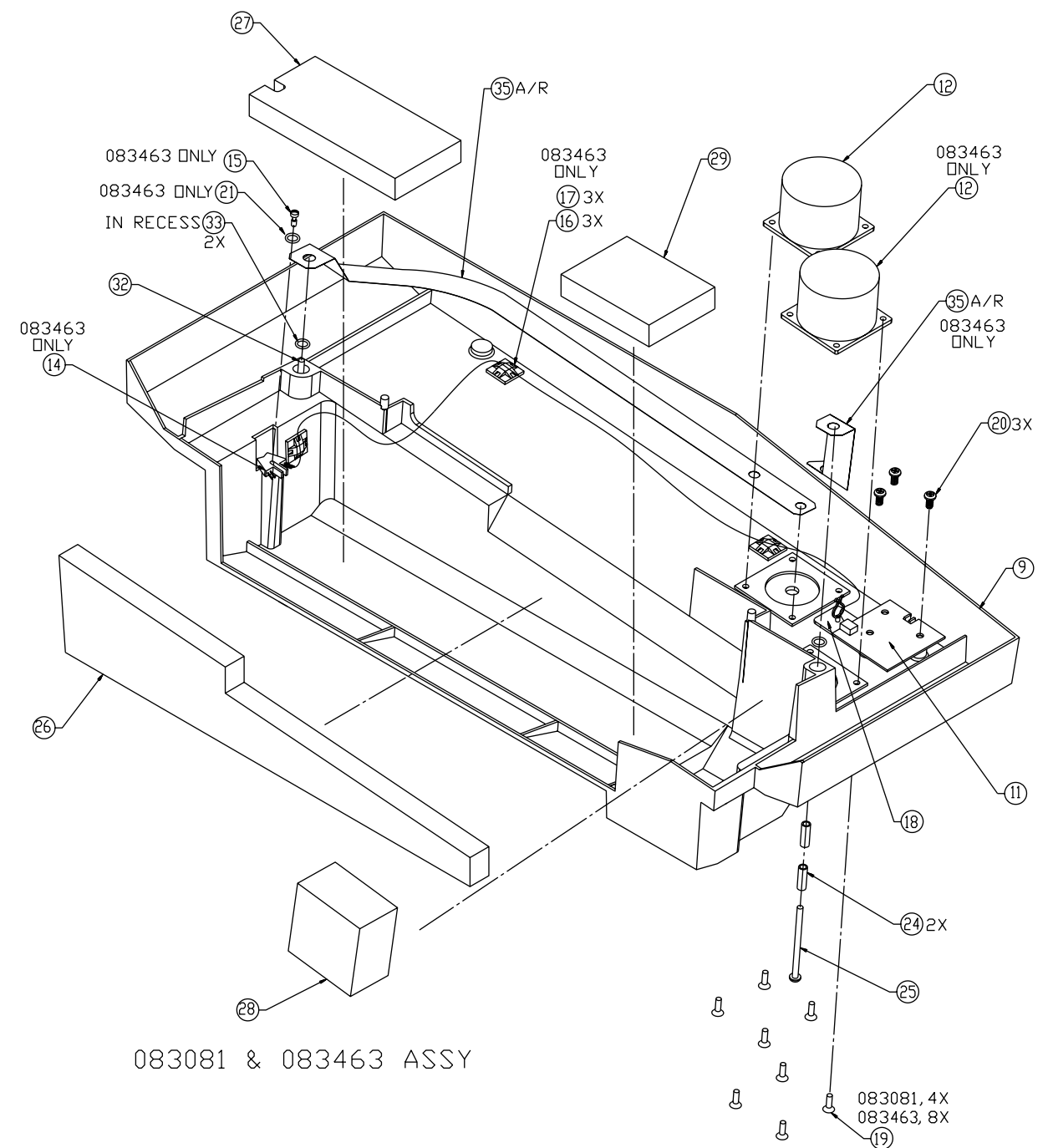
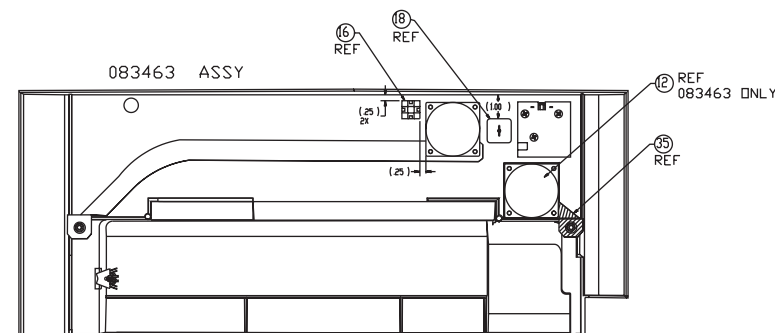
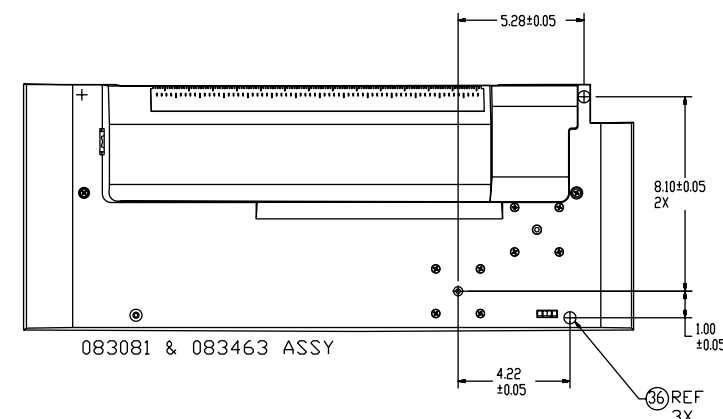
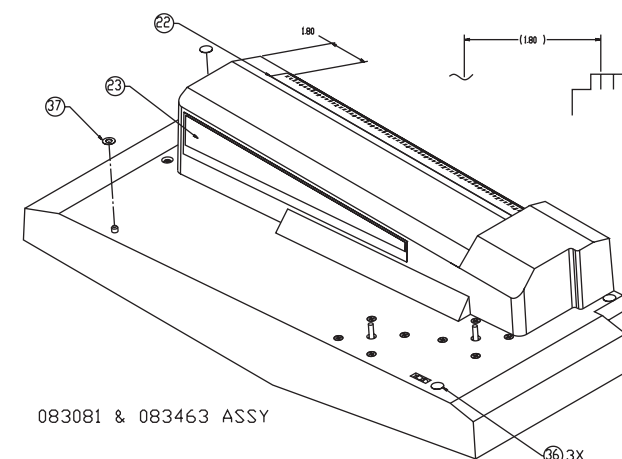
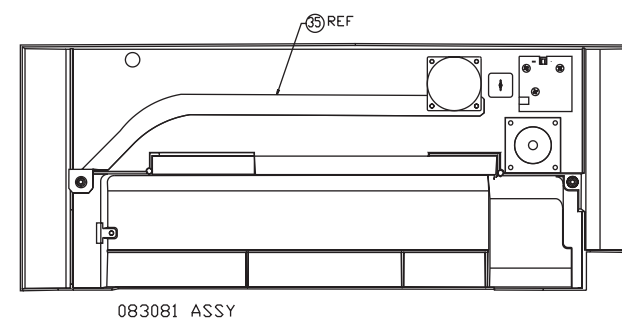
QTY REQ PER ASSY		PART NUMBER	DESCRIPTION	ITEM NO.
	083557			
	-	083567	HAMMER BANK ASSY	1
				2
				3
				4
				5
				6
				7
				8
	1	613314-083074	CARRIAGE- GROUND	9
	7	613030-082259	CBA- COIL	10
	7	613085-082503	HAMMER- 13 PACK	11
	91	612698-080913	PRINT ELEMENT	12
				13
	1	613181-082688	PLATE- SHUTTLE MOUNTING	14
	6	613113-082553	RETAINER- SHAFT	15
	1	613303-083013	BEARING ASSY- LOWER	16
	2	613302-083012	BEARING ASSY- UPPER	17
	1	613040-082261	CBA- HAMMER DRIVER	18
	A/R	400658-730596	ADHESIVE- LOCTITE 262	19
	A/R	400658-730213	ADHESIVE- LOCTITE 242	20
	1	613263-082880	RIBBON SHIELD ASSY	21
	2	400163-732831	SCREW- #6-32 SHOULDER	22
	5	402524-24	SCREW- #6-32 X 0.75 SEMS	23
	49	404303-732788	SCREW- #4-40 X 1/4 TORX PLUS BUTTON HEAD	24
	6	402524-43	SCREW- #8-32 X 0.50 SEMS	25
	3	400512-249	SCREW- #8-32 X 5/8, SOCKET HEAD	26
	2	400512-251	SCREW- #8-32 X 7/8, SOCKET HEAD	27
	7	404260-732701	SCREW- #6-32 X 0.25 W/STAR WASHER	28
	3	404044-732804	SCREW- #6-32 X 0.187 TRUSS HEAD	29
	1	613347-083575	END PLUG- CARRIAGE	30
	3	402077-01	SCREW- #8-32 X 0.375 THREAD FORMING	31
				32
	7	400782-06	WASHER- #6 FLAT, SMALL	33
				34
	2	613436-083642	PLATE- SPRING	35

(3332D P2 PL2&3)



- NOTES:
- 3 TORQUE TO 35 IN-LBS.
 - 4 TORQUE TO 14 IN-LBS.
 - 5 TORQUE TO 8.5-9.3 IN-LBS.
 - 6 TORQUE TO 25 IN-LBS.
 - 9 WHEN CONNECTORS OF ITEM 18 AND 10 ARE MATED TOGETHER THEY SHOULD BE PUSHED TOGETHER UNTIL THE O-RING OF ITEM 18, IS CONTACTING BOTH THE PCB, ITEM 10, AND THE PLASTIC SUPPORT OF ITEM 18 CONNECTOR.
 - 10 TORQUE TO 17-19 IN-LBS.

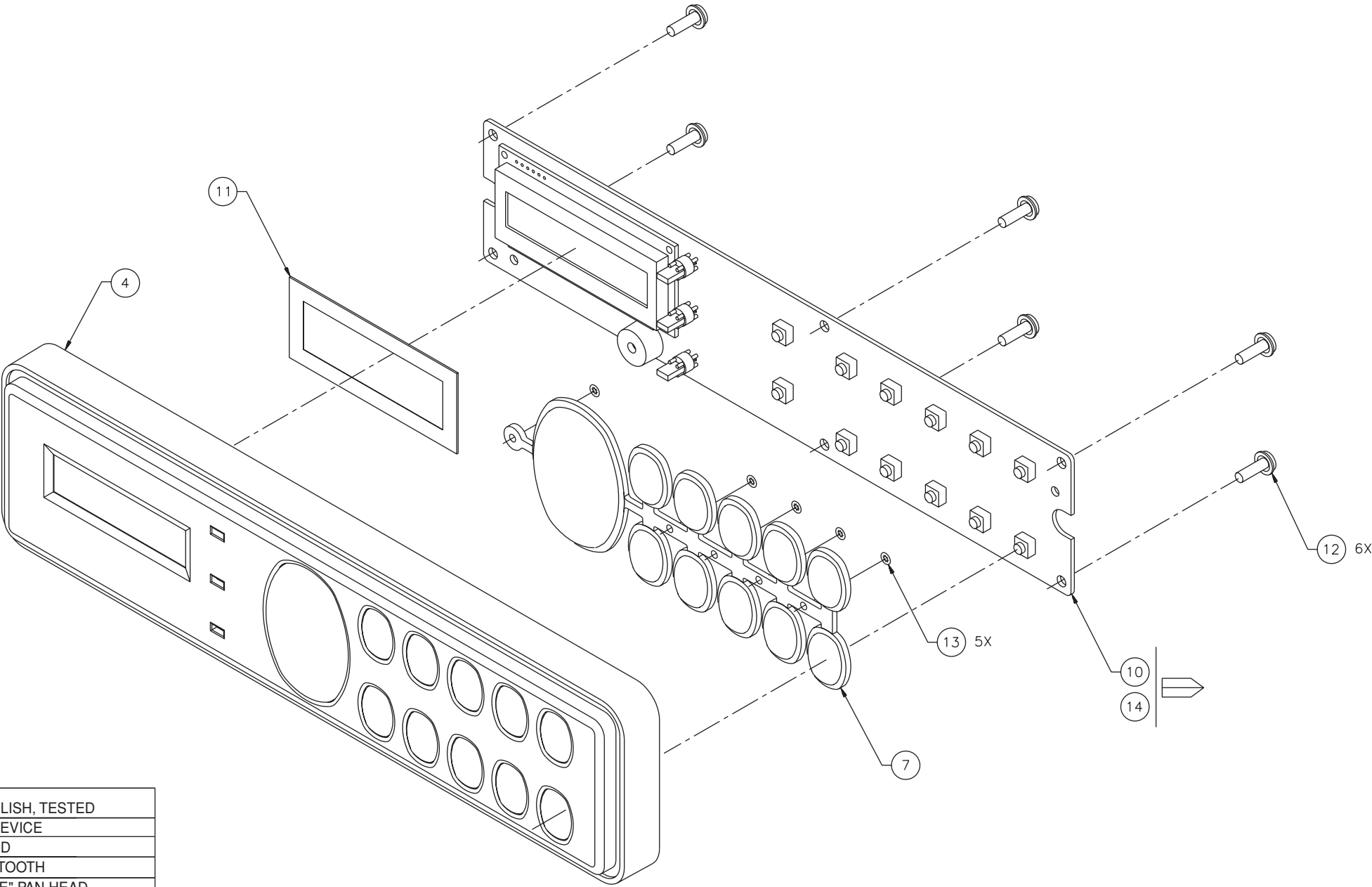
QTY REQ PER ASSY				PART NUMBER	DESCRIPTION	ITEM NO.
		083463	083081			
		-	083081	PLATFORM ASSY- RIBBON SUPPORT W/O RE-INKING DRIVE ASSY	1	
	-		083463	PLATFORM ASSY- RIBBON SUPPORT W/ RE-INKING DRIVE ASSY	2	
					3	
					4	
					5	
					6	
					7	
					8	
	1	1	613277-082969	PLATFORM ASSY- RIBBON	9	
					10	
	1	1	613190-082691	CBA- RIBBON SENSOR	11	
	2	1	611010-075138	MOTOR	12	
					13	
	1		611138-083144	CABLE ASSY- SENSOR	14	
	1		404316-732832	CAPTIVE SCREW- PANEL, #6-32	15	
	3		402953-01	PAD- MTG, CABLE TIE	16	
	3		400341-01	CABLE TIE	17	
	1	1	403637-731038	SUPPORT- CABLE, NYLON, TWIST LOCK	18	
	8	4	400693-70	SCREW- #8-32 X 1/2, 82% FLAT HD PHIL	19	
	3	3	404116-732212	SCREW- #10 X 3/8, HI-LO THREAD FORMING	20	
	1		400216-09	WASHER- #6 FLAT	21	
	1	1	611561-080477	LABEL- HORIZONTAL SCALE (136 COLUMN)	22	
	1		613324-083089	LABEL- RIBBON LOADING	23	
	2	2	401942-732828	SPACER- #8 X 3/4 LG ROUND PLASTIC	24	
	1	1	404114-732829	SCREW- #8-32 X 2.500 PAN HEAD PHILLIPS	25	
	1	1	613150-083401	FOAM- ACOUSTIC	26	
	1	1	613150-083402	FOAM- ACOUSTIC	27	
	1	1	613150-083403	FOAM- ACOUSTIC	28	
	1	1	613150-083404	FOAM- ACOUSTIC	29	
					30	
					31	
	1	1	402524-45	SCREW- #8-32 X 1.00 SEMS	32	
	2	2	400290-07	SEAL- "O" RING	33	
					34	
	A/R	A/R	401706-02	TAPE- FOIL, ALUMINUM, ADHESIVE BACKED	35	
	3	3	613405-083553	FILM TAPE	36	
	1	1	613405-083554	FILM TAPE W/HOLE	37	



Ribbon Support - Platform Assy Basic Printer Assembly III

(3315A P1&2 PL2&3)

082682 & 083488 ASSY

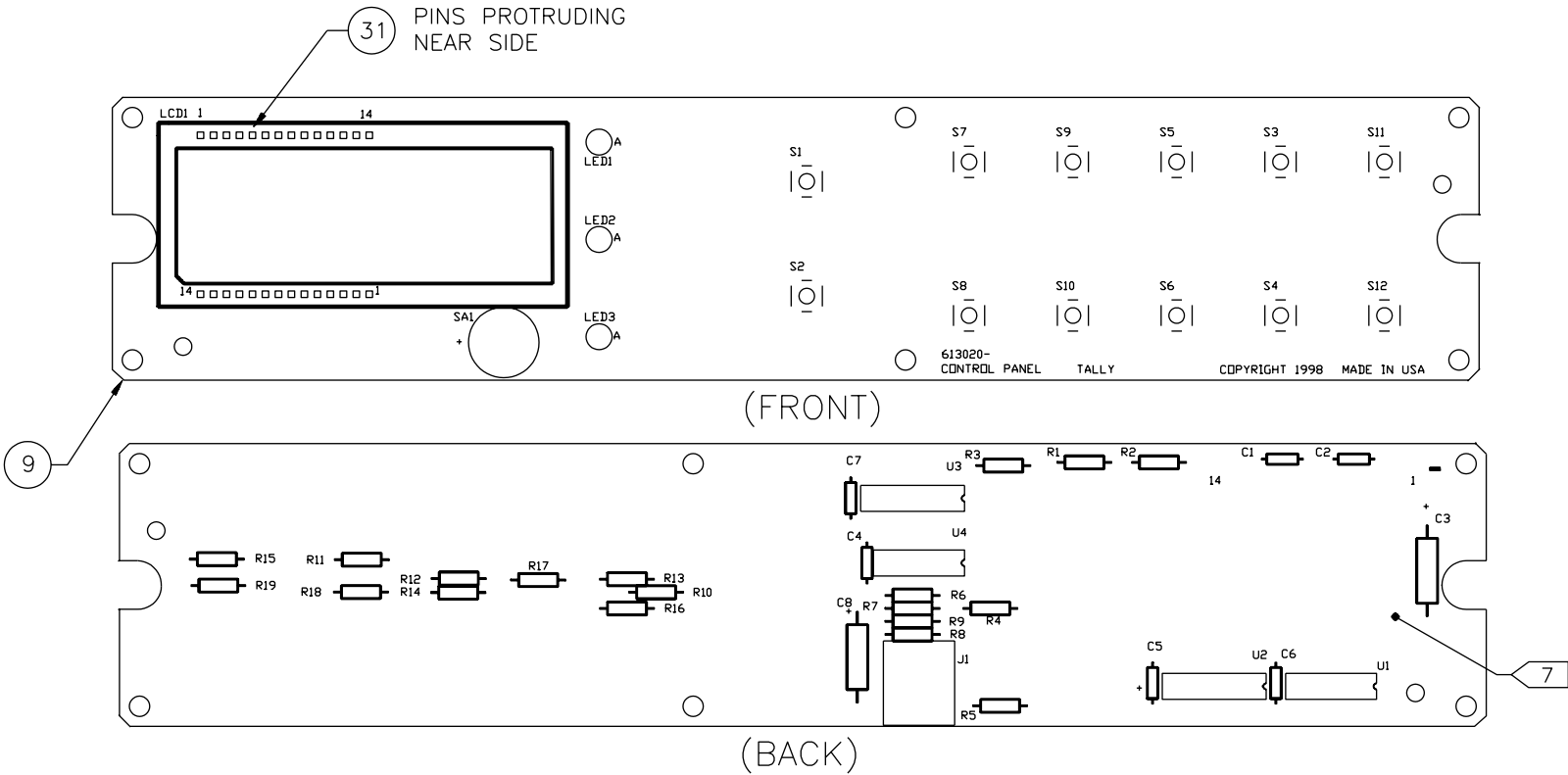


—		16	083488	CONTROL PANEL ASSY— ENGLISH, TESTED
1		15	403077-732805	CONTAINER—ESD SENSITIVE DEVICE
1		14	613020-082766	CBA— CONTROL PANEL, TESTED
5	5	13	404239 - 732637	RETAINER— SHAFT, INTERNAL TOOTH
6	6	12	404240 - 732638	SCREW— #6 - 19 x 3/8 "PLASTITE" PAN HEAD
1	1	11	613164 - 082644	OVERLAY— DISPLAY
	1	10	613020 - 082178	CBA— CONTROL PANEL
		9		
		8		
1	1	7	613191 -082708	BUTTON— CONTROL PANEL
		6		
		5		
1	1	4	613192 - 082711	FRAME- CONTROL PANEL, LABELED, ENGLISH
		3		
		2		
	—	1	082682	CONTROL PANEL ASSY— ENGLISH
083488	082682	ITEM NO.	PART NO.	DESCRIPTION
QTY REQ.				

(3177A P1)

Control Panel Assembly

QTY REQUIRED PER ASSY				PART NUMBER	Control Panel Circuit Board Assembly DESCRIPTION	ITEM NO.
		082766	082178			
		1	-	082178	CIRCUIT BOARD ASSY- CONTROL PANEL	1
		-		082766	CIRCUIT BOARD ASSY- CONTROL PANEL, SPARES	2
						3
						4
						5
						6
						7
						8
		1		613019-082177	PCB- CONTROL PANEL	9
		1		402697-04	BAG- ANTISTATIC, 8 × 10	10
		1		403751-730415	I.C. - 74HC164 SHIFT REGISTER, 8-BIT PARA. OUT	11
		1		403000-730417	I.C. - 74HC174 FLIP-FLOP HEX D W/CLEAR	12
		1		403752-730416	I.C. - 74HC165 SHIFT REGISTER, 8-BIT PARA. LOAD	13
		1		403739-730413	I.C. - 74HC14 INVERTER, SCHMITT-TRIGGER	14
		3		400072-79	RESISTOR- 180 1/4W 5%	15
		4		400073-730105	RESISTOR- 1K 1/4W 5%	16
		1		400073-28	RESISTOR- 13K 1/4W 5%	17
		11		400073-730108	RESISTOR- 10K 1/4W 5%	18
						19
		1		402868-730141	CAPACITOR- 0.01MFD 50V 10%	20
		5		402868-730142	CAPACITOR- 0.1MFD 50V 10%	21
		2		402369-730513	CAPACITOR- 10MFD 25V 20%	22
						23
		1		404250-732655	LCD DISPLAY	24
		1		403753-730429	LED -RED	25
		1		403753-03	LED- YELLOW	26
		1		403753-730428	LED- GREEN	27
		1		404245-732643	BEEPER- PK12N40P	28
		12		404244-732650	SWITCH- TOP-PUSH, SNAP-IN	29
		1		403760-732622	CONNECTOR- MODULAR, 6 PIN	30
		1		402706-730496	CONNECTOR- WAFER, 14 PIN	31
		3		403795-01	SPACER- LED	32



082178 ASSEMBLY

COMPONENT LIST	
REF DES	ITEM NO.
082178	
LCD1	24
LED1	25 32
LED2	26 32
LED3	27 32
SA1	28
S1-S12	29
J1	30

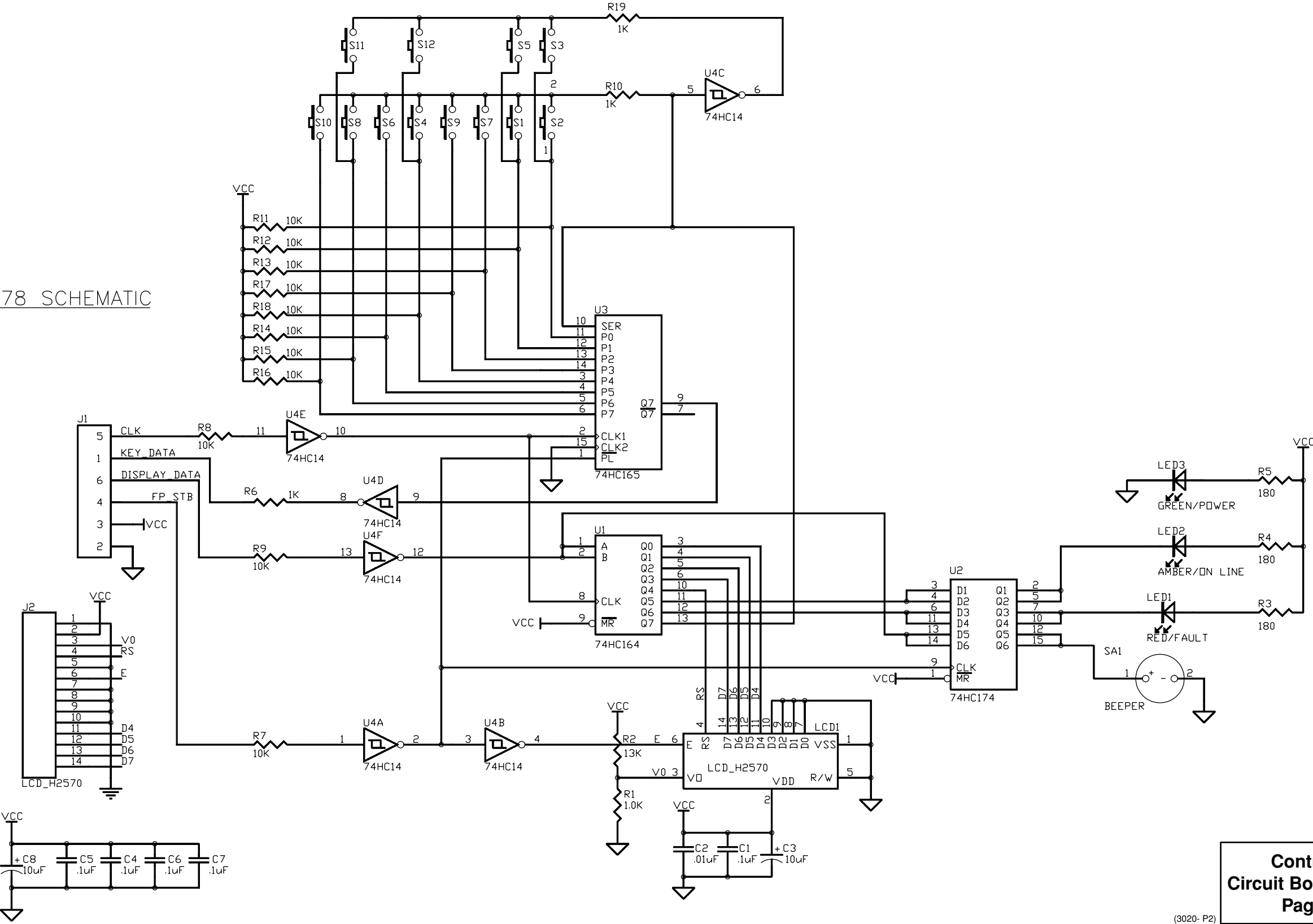
COMPONENT LIST	
REF DES	ITEM NO.
082178	
U1	11
U2	12
U3	13
U4	14
R1 R6 R10 R19	16
R2	17
R3-R5	15
R7-R9 R11-R18	18

COMPONENT LIST	
REF DES	ITEM NO.
082178	
C1 C4-C7	21
C2	20
C3 C8	22
J2	NOT INSTALLED

(3020- P1 PL2&3)

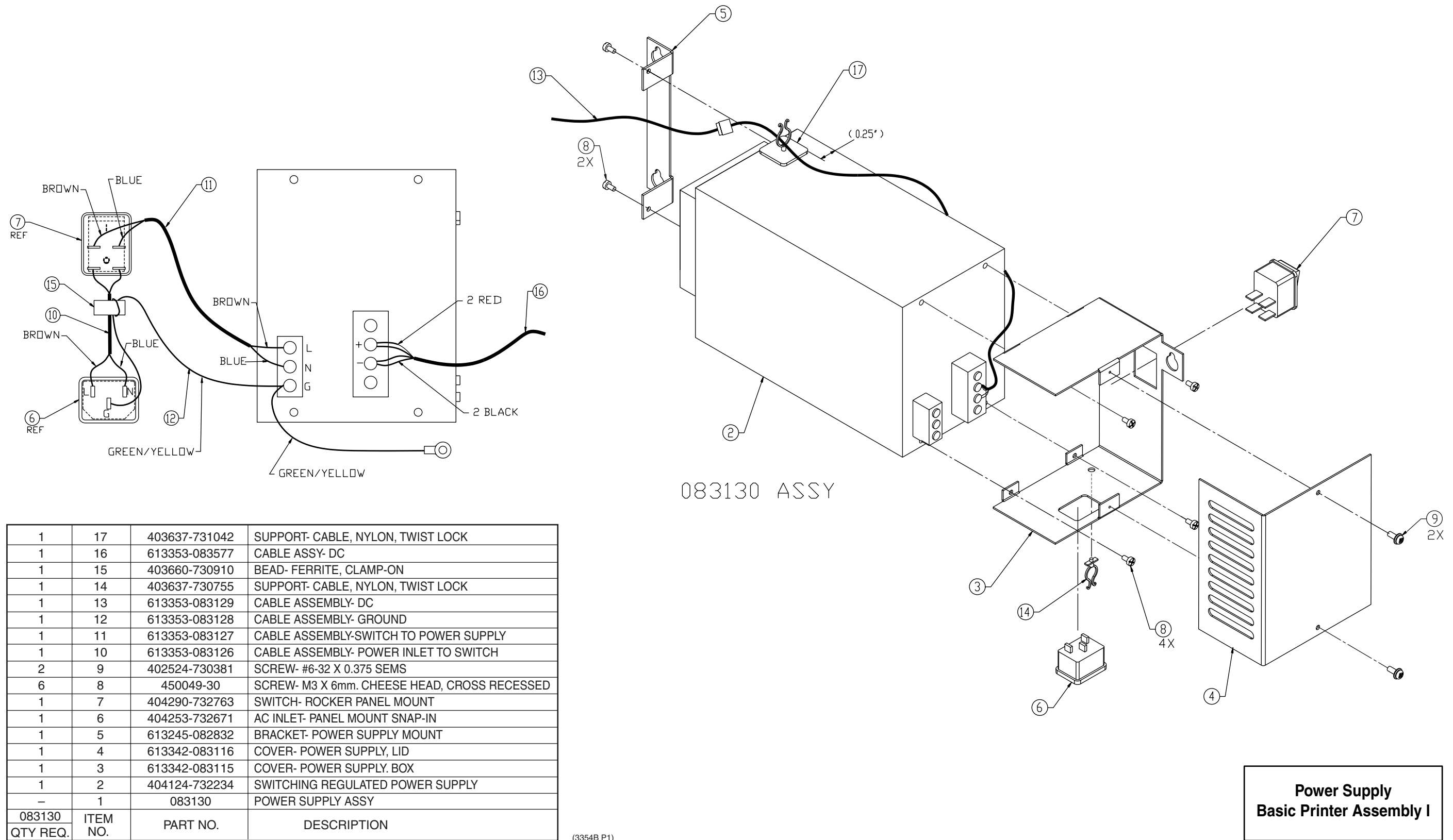
Control Panel
Circuit Board Assembly
Page 1 of 2

082178 SCHEMATIC



Control Panel
Circuit Board Assembly
Page 2 of 2

(3020- P2)

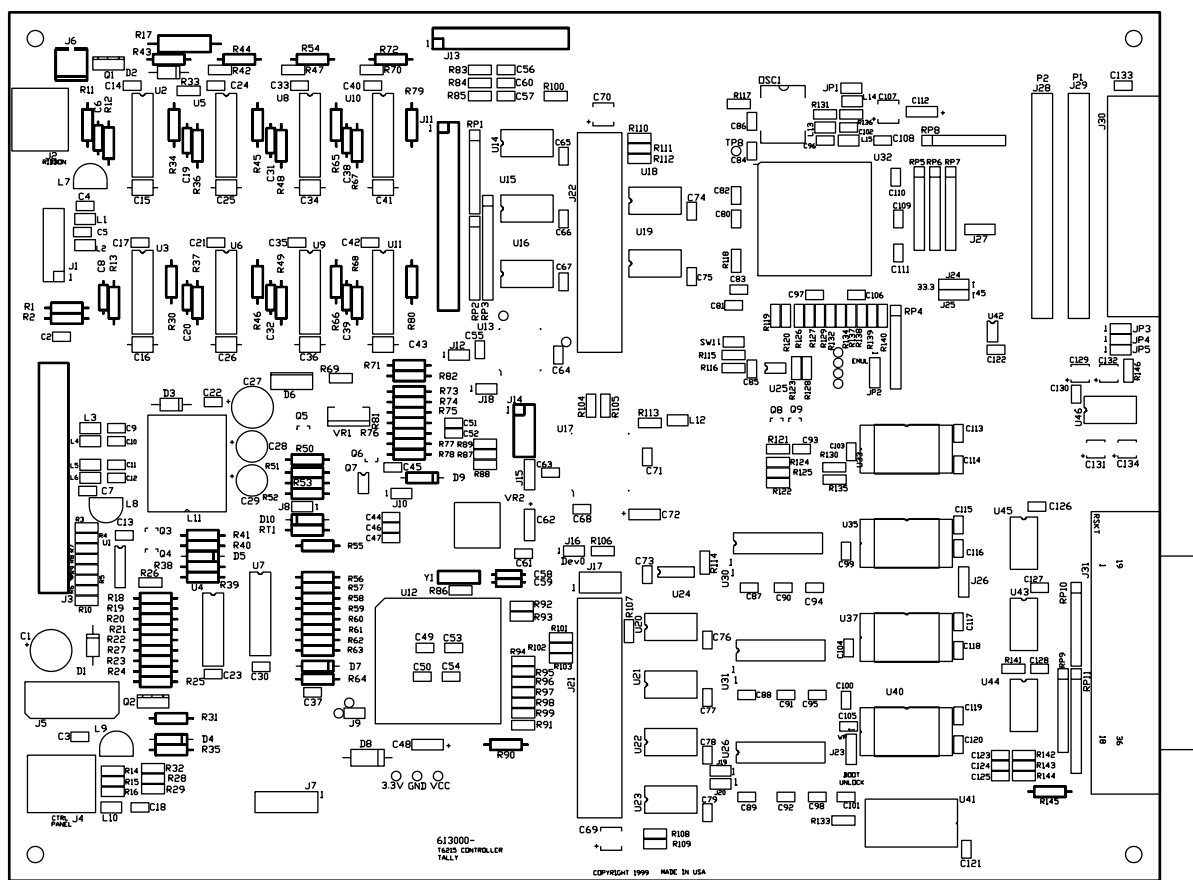


COMPONENT LIST	
REF DES	ITEM NO.
082029 ASSY	
U2 U5 U8 U10	25
U3 U6 U9 U11	25 136
U4	28
U7	29
U12	41 26
D4	50
D1 D2 D3	33
D7 D9	35
D5	36
D6	34
D8	32
D10	37
Y1	40
RP4-RP7	46
RP8	45
RP9 RP10	44
RP11	42
R1 R2 R18-R21 R90	75
R11 R23 R73 R145	63
R12 R36 R41 R48 R67	65
R13 R37	85
R24	78
R27	62
R30 R46 R66 R80	43
R31 R64	81
R34 R45 R65 R79	49
R35	48
R38 R39 R55 R25	74
R40	80
R43 R44 R54 R72	64
R49 R68 R78 R81	73
R50	86
R51 R22	60
R52	66
R53	54
R57 R58	57
R74	76
R75 R77	69
R76 R82	58

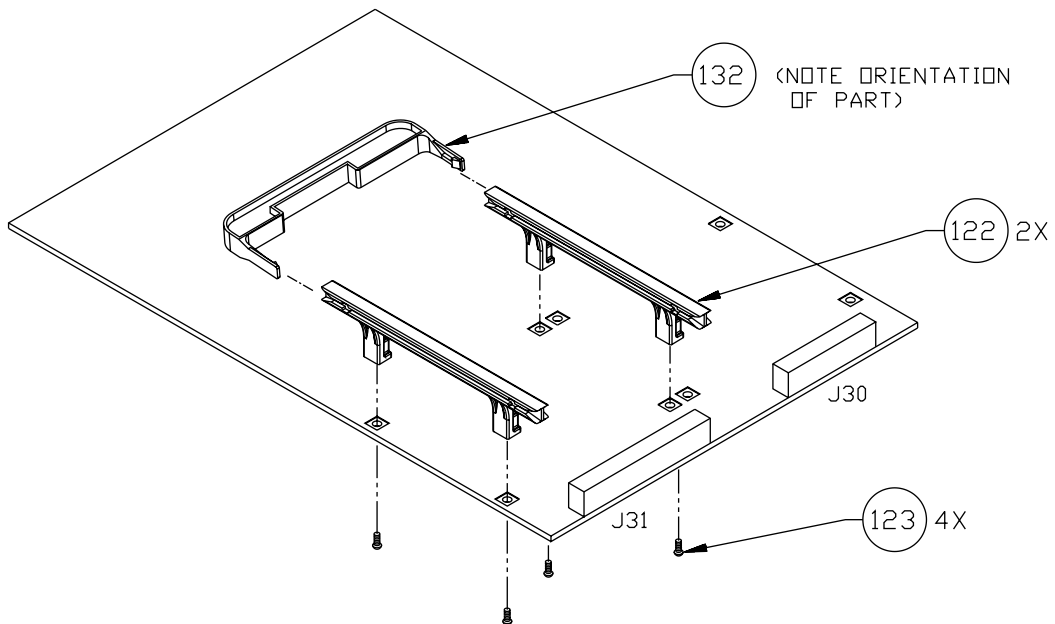
COMPONENT LIST	
REF DES	ITEM NO.
082029 ASSY	
Q1 Q2	87
VRI	91
RT1	97
L7 L8 L9	93
L11	95
C1	115
C6 C8 C19 C20 C31 C32 C38 C39	106
C15 C16 C25 C26 C34 C36 C41 C43	110
C27	112
C28 C29	103
C48	113
C58 C59	101
C62 C72	100
J1	130
J2	124
J3	129
J4	127
J6	125
J14	120
J21	116
J30	121
J31	119

COMPONENT LIST	
U13-U16 U18 U19 U26-U29 U30 U33-U36 U38 U39 U41 U45	NOT INSTALLED
R17 R71 R83-R85 R100 R132 R133 R134 R56 R59 R60-R63	
RP1 RP2 RP3	
C55-C57 C60 C64-C67 C70 C74 C75 C87 C89 C90 C92-C94 C98 C99 C101 C103 C107 C112-C116 C121 C126	
J5 J7 J11 J13 J17 J22 J28 J29	

COMPONENT LIST	
REF DES	ITEM NO.
082052 ASSY	
U1	24
U17	23
U20 U21	13
U22 U23 U44	12
U24	14
U25	17
U31	15
U32	22
U37	19
U40	16
U42	20
U43	18
U46	21
OSC1	39
R3-R10	51
R14-R16 R87-R89 R106 R122	52
R26 R28 R29 R32 R33 R42 R47 R69 R70 R91-R99 R101-R103 R110-R112 R121 R146	71
R86 R104 R105 R107-R109 R113 R114 R118-R120 R123 R126-R129 R131 R136-R141	56
R115 R116 R117	79
R124 R130 R135	55
R125	61
R142-R144	53
C2 C4 C9 C11 C12	107
C3 C5 C7 C10 C13 C14 C17 C21-C24 C30 C33 C35 C37 C40 C42 C44-C46 C51 C52 C61 C63 C68 C71 C73 C76-C79 C81-C86 C96 C104-C106 C109 C110 C117 C119 C122 C127 C128 C130	109
C18 C49 C54 C95 C118 C120	104
C47 C123-C125	105
C50 C53 C80 C97 C102 C108 C111 C133	108
C69	114
C88	111
C91 C100	102
C129 C131 C132 C134	99
Q3 Q4 Q6 Q9	89
Q5 Q8	88
Q7	90
VR2	92
L1-L6 L10 L12-L15	94



082029 ASSEMBLY
(SERIAL/PARALLEL/PSID)



**Controller
Circuit Board Assembly
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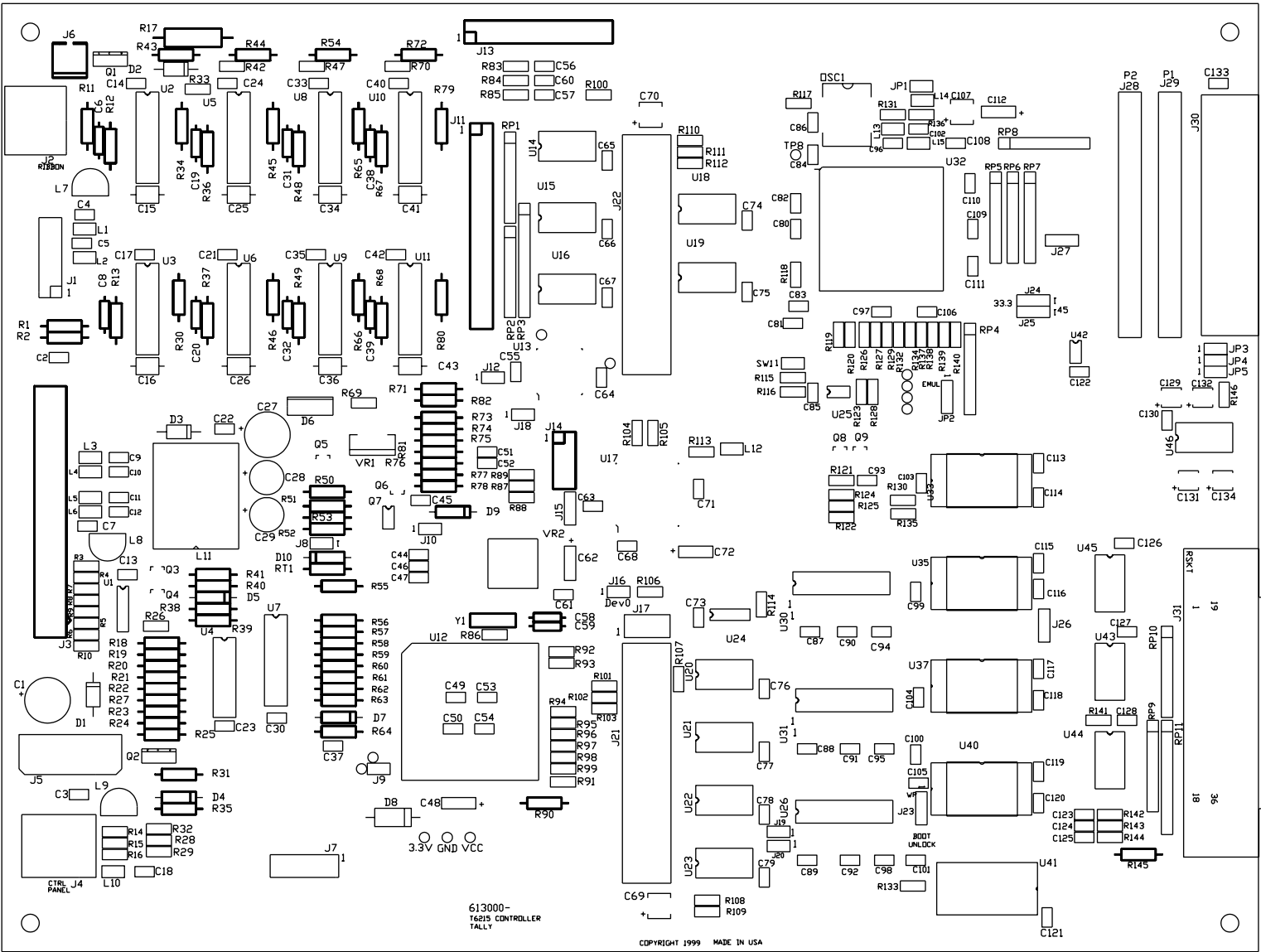
COMPONENT LIST	
REF DES	ITEM NO.
083102 ASSY	
U2 U5 U8 U10	25
U3 U6 U9 U11	25 136
U4	28
U7	29
U12	41 26
D4	50
D1 D2 D3	33
D7 D9	35
D5	36
D6	34
D8	32
D10	37
Y1	40
RP4-RP7	46
RP8	45
RP9 RP10	44
RP11	42
R1 R2 R18-R21 R90	75
R11 R23 R73 R145	63
R12 R36 R41 R48 R67	65
R13 R37	85
R24	77
R27	62
R30 R46 R66 R80	43
R31 R64	81
R34 R45 R65 R79	49
R35	48
R38 R39 R55 R25	74
R40	80
R43 R44 R54 R72	64
R49 R68 R78 R81	73
R50	86
R51 R22	60
R52	66
R53	54
R57 R58	57
R74	76
R75 R77	69
R76 R82	58

(3000D P2)

COMPONENT LIST	
REF DES	ITEM NO.
083102 ASSY	
Q1 Q2	87
VR1	91
RT1	97
L7 L8 L9	93
L11	95
C1	115
C6 C8 C19 C20 C31 C32 C38 C39	106
C15 C16 C25 C26 C34 C36 C41 C43	110
C27	112
C28 C29	103
C48	113
C58 C59	101
C62 C72	100
J1	130
J2	124
J3	129
J4	127
J6	125
J14	120
J30	121
J31	119

COMPONENT LIST	
U13-U16 U18-U23 U26-U30 U33-U36 U38 U39 U41 U45	NOT INSTALLED
R17 R71 R83-R85 R100 R108 R109 R132 R133 R134 R56 R59 R60-R63 RP1 RP2 RP3	
C55-C57 C60 C64-C67 C69 C70 C74-C79 C89 C90 C92-C94 C98 C99 C101 C103 C107 C112-C116 C121 C126	
J5 J7 J11 J13 J17 J21 J22 J28 J29	

COMPONENT LIST	
REF DES	ITEM NO.
083104 ASSY	
U1	24
U17	23
U44	12
U24	14
U25	17
U31	15
U32	22
U37	19
U40	16
U42	20
U43	18
U46	21
QSC1	39
R3-R10	51
R14-R16 R87-R89 R106 R122	52
R26 R28 R29 R32 R33 R42 R47 R69 R70 R91-R99 R101-R103 R110-R112 R121 R146	71
R86 R104 R105 R107 R113 R114 R118-R120 R123 R126-R129 R131 R136-R141	56
R115 R116 R117	79
R124 R130 R135	55
R125	61
R142-R144	53
C2 C4 C9 C11 C12	107
C3 C5 C7 C10 C13 C14 C17 C21-C24 C30 C33 C35 C37 C40 C42 C44-C46 C51 C52 C61 C63 C68 C71 C73 C81-C86 C96 C104-C106 C109 C110 C117 C119 C122 C127 C128 C130	109
C18 C49 C54 C95 C118 C120	104
C47 C123-C125	105
C50 C53 C80 C97 C102 C108 C111 C133	108
C88	111
C91 C100	102
C129 C131 C132 C134	99
Q3 Q4 Q6 Q9	89
Q5 Q8	88
Q7	90
VR2	92
L1-L6 L10 L12-L15	94



083102 ASSEMBLY
(SERIAL/PARALLEL)

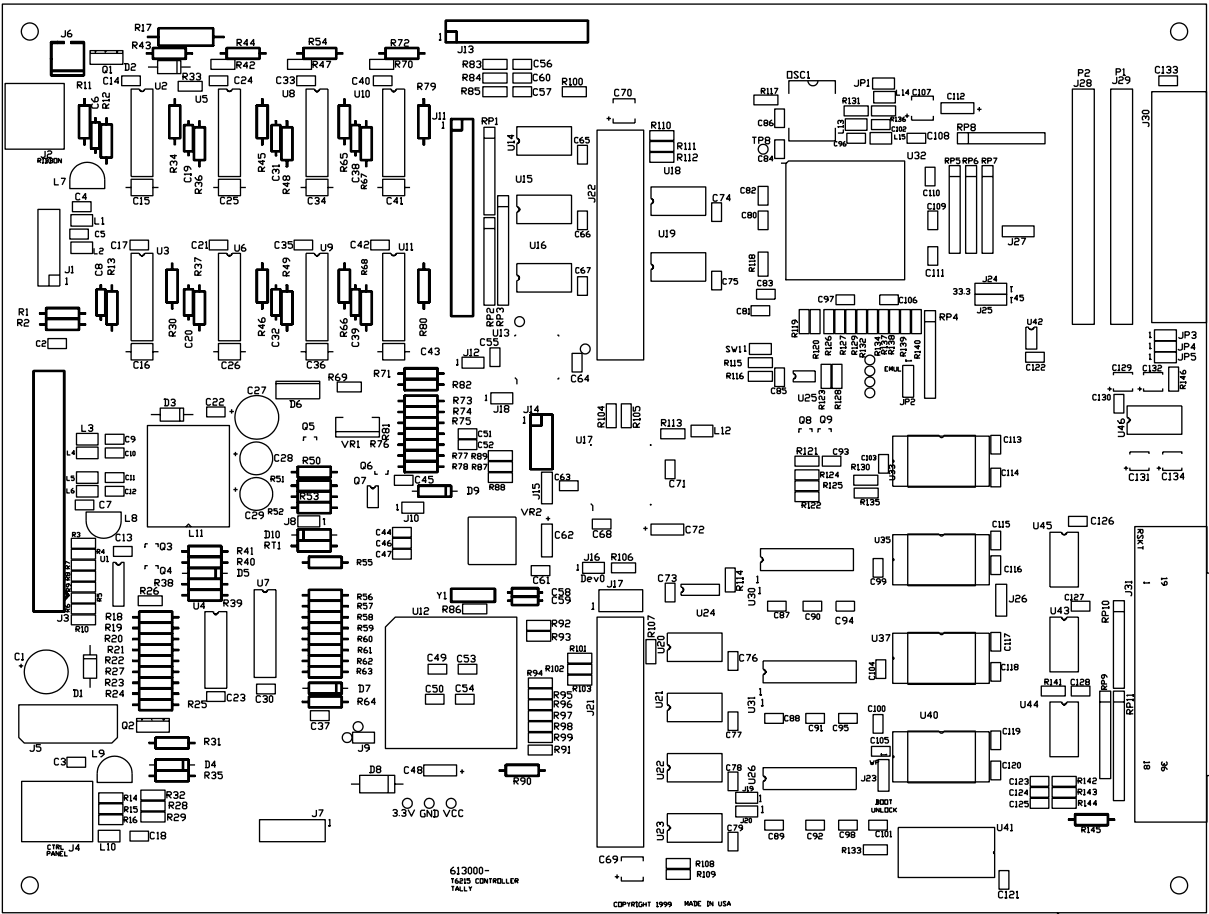
COMPONENT LIST	
REF DES	ITEM NO.
083537 ASSY	
U2 U5 U8 U10	25
U3 U6 U9 U11	25 136
U4	28
U7	29
U12	41 26
D4	50
D1 D2 D3	33
D4 D7 D9	35
D5	36
D6	34
D8	32
D10	37
Y1	40
RP4-RP7	46
RP8	45
RP9 RP10	44
RP11	42
R1 R2 R18-R21 R90	75
R11 R23 R73 R145	63
R12 R36 R41 R48 R67	65
R13 R37 R59 R63	85
R24 R25	78
R27	62
R30 R46 R66 R80	43
R31 R64	81
R34 R45 R65 R79	49
R35	48
R38 R39 R55 R25	74
R40	80
R43 R44 R54 R72	64
R49 R68 R78 R81	73
R50	86
R51 R22	60
R52	66
R53	54
R57 R58	57
R74	76
R75 R77	69
R76 R82	58

(3000D P3)

COMPONENT LIST	
REF DES	ITEM NO.
083537 ASSY	
Q1 Q2	87
VR1	91
RT1	97
L7 L8 L9	93
L11	95
C1	115
C6 C8 C19 C20 C31 C32 C38 C39	106
C15 C16 C25 C26 C34 C36 C41 C43	110
C27	112
C28 C29	103
C48	113
C58 C59	101
C62 C72	100
J1	130
J2	124
J3	129
J4	127
J6	125
J14	120
J21	116
J30	121
J31	119

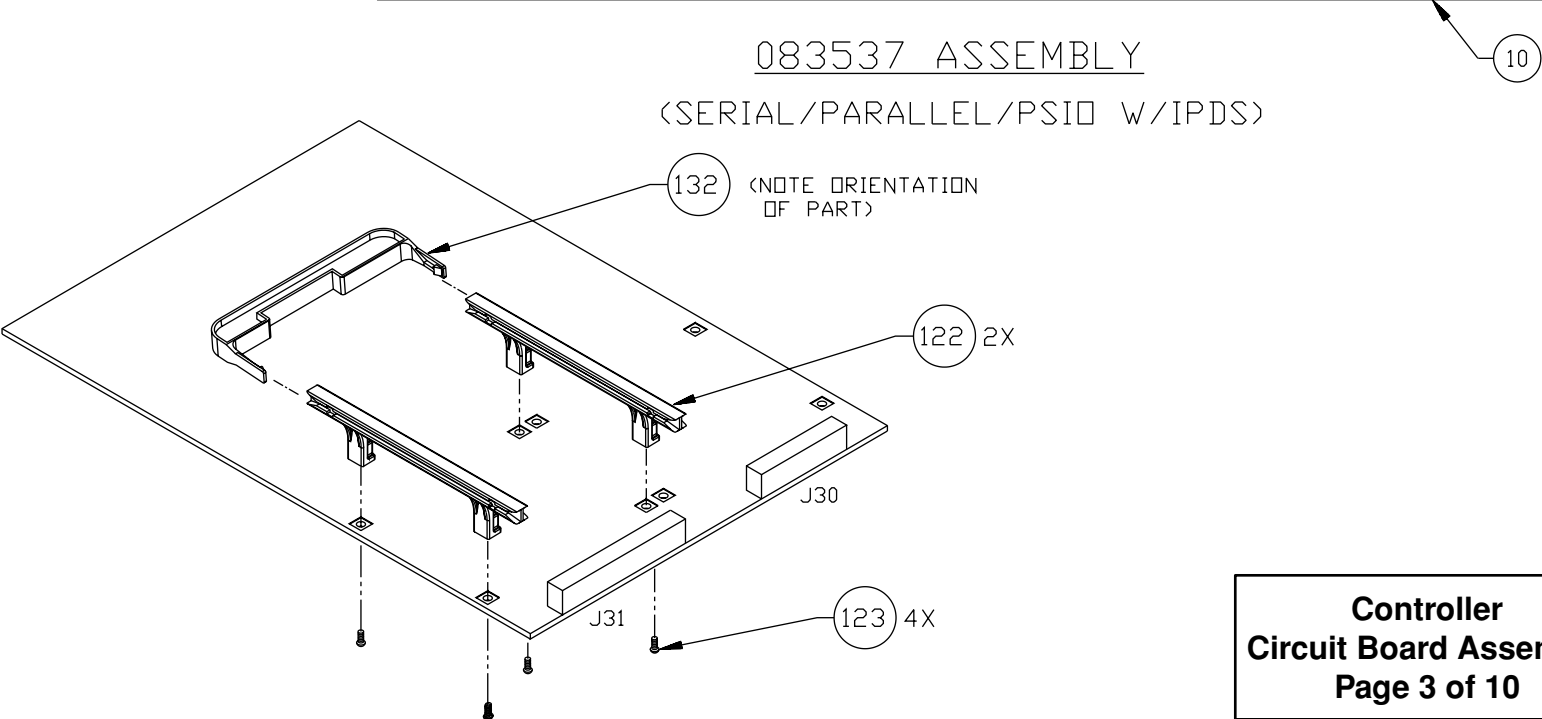
COMPONENT LIST	
U13-U16 U18 U19 U26-U29 U30 U33-U36 U38 U39 U41 U45	NOT INSTALLED
R17 R71 R83-R85 R100 R132 R133 R134 R56 R59 R60-R63	
RP1 RP2 RP3	
C55-C57 C60 C64-C67 C70 C74 C75 C87 C89 C90 C92-C94 C98 C99 C101 C103 C107 C112-C116 C121 C126	
J5 J7 J11 J13 J17 J22 J28 J29	

COMPONENT LIST	
REF DES	ITEM NO.
083539 ASSY	
U1	24
U17	23
U20 U21	13
U22 U23 U44	12
U24	14
U25	17
U31	15
U32	22
U37	31
U40	30
U42	20
U43	18
U46	21
DSC1	39
R3-R10	51
R14-R16 R87-R89 R106 R122	52
R26 R28 R29 R32 R33 R42 R47 R69 R70 R91-R99 R101-R103 R110-R112 R121 R146	71
R86 R104 R105 R107-R109 R113 R114 R118-R120 R123 R126-R129 R131 R136-R141	56
R115 R116 R117	79
R124 R130 R135	55
R125	61
R142-R144	53
C2 C4 C9 C11 C12	107
C3 C5 C7 C10 C13 C14 C17 C21-C24 C30 C33 C35 C37 C40 C42 C44-C46 C51 C52 C61 C63 C68 C71 C73 C76-C79 C81-C86 C96 C104-C106 C109 C110 C117 C119 C122 C127 C128 C130	109
C18 C49 C54 C95 C118 C120	104
C47 C123-C125	105
C50 C53 C80 C97 C102 C108 C111 C133	108
C69	114
C88	111
C91 C100	102
C129 C131 C132 C134	99
Q3 Q4 Q6 Q9	89
Q5 Q8	88
Q7	90
VR2	92
L1-L6 L10 L12-L15	94

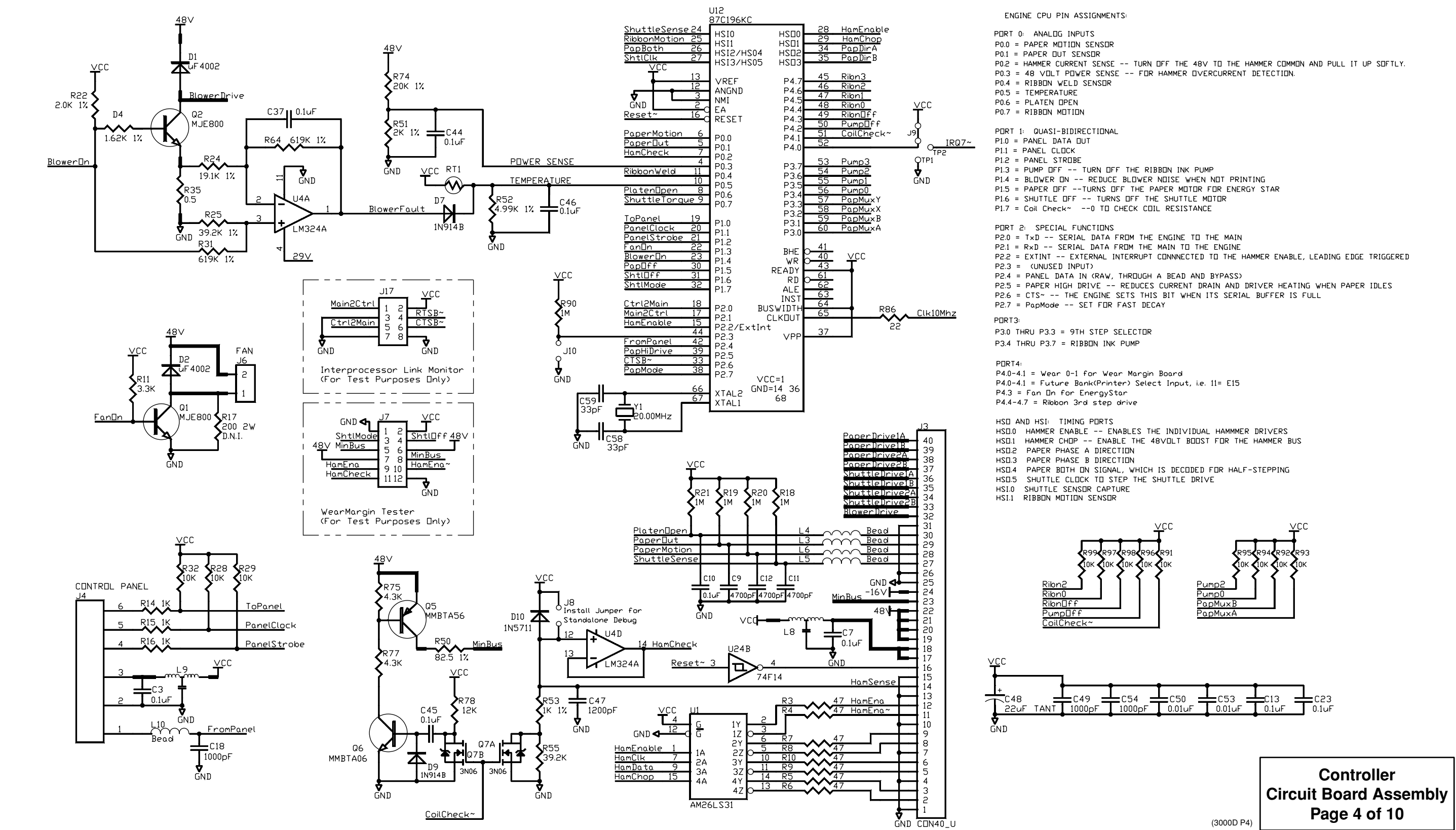


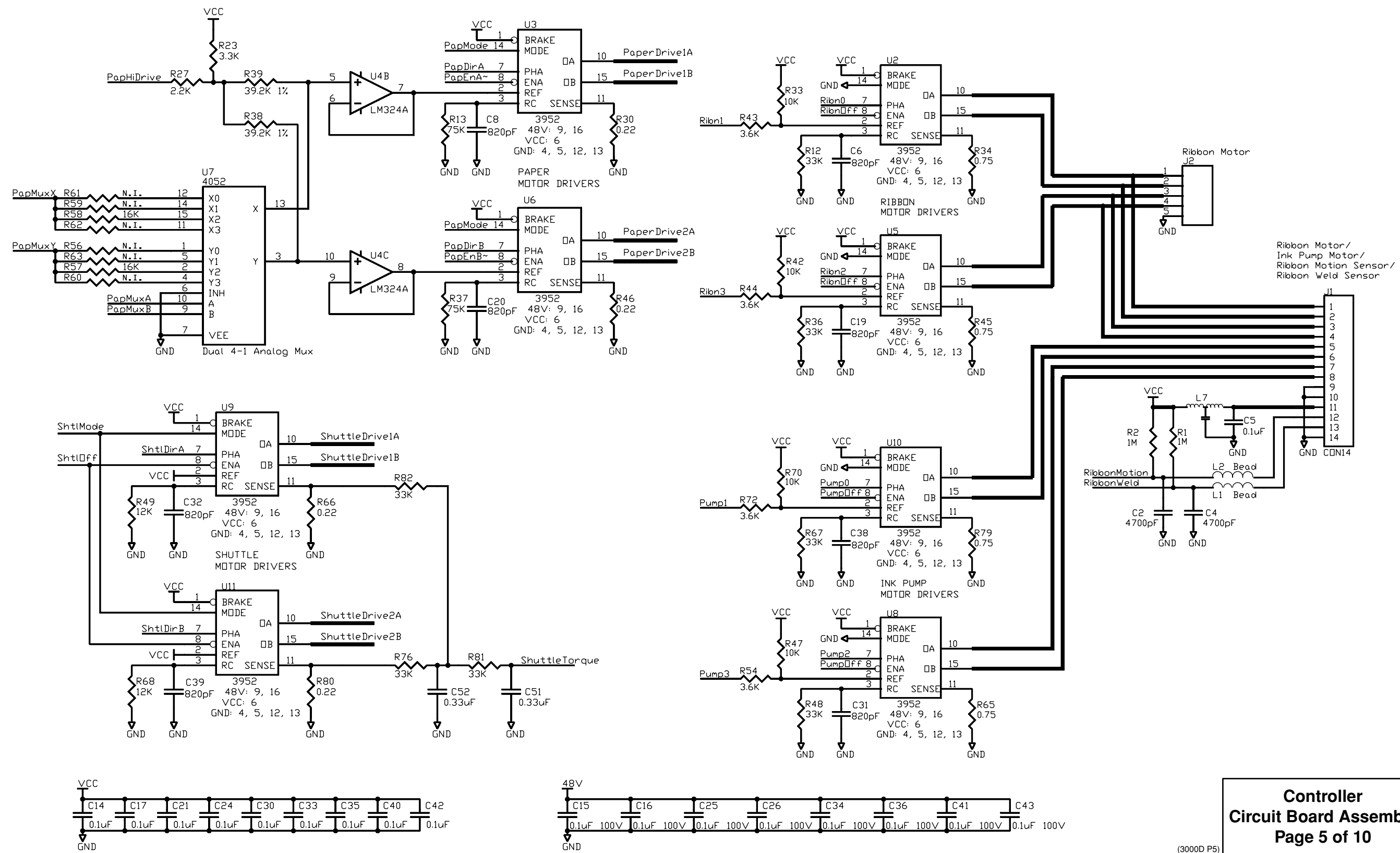
083537 ASSEMBLY

(SERIAL/PARALLEL/PSIO W/IPDS)



Controller
Circuit Board Assembly
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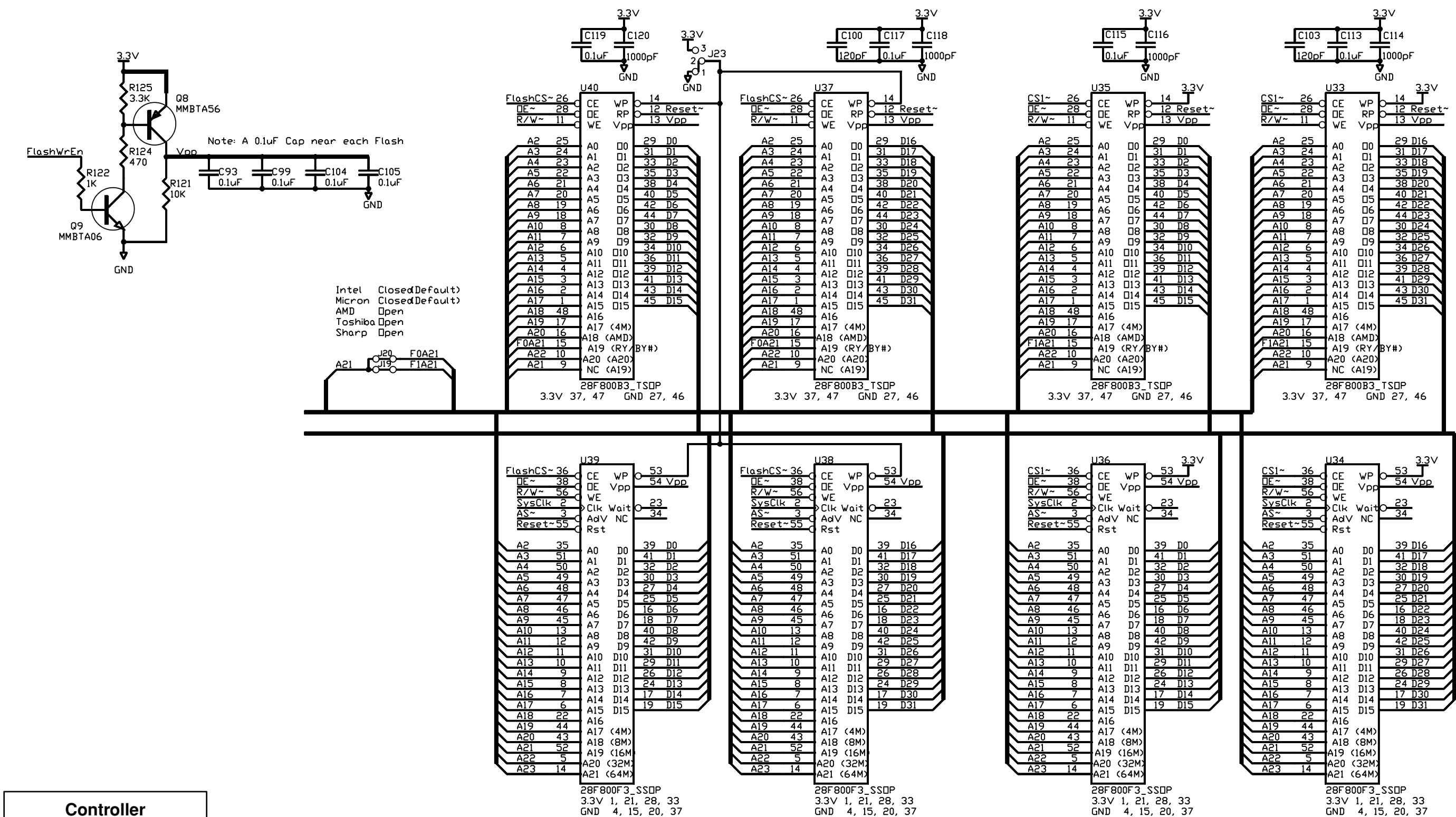




Controller
Circuit Board Assembly
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(3000D P5)



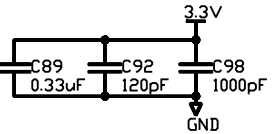
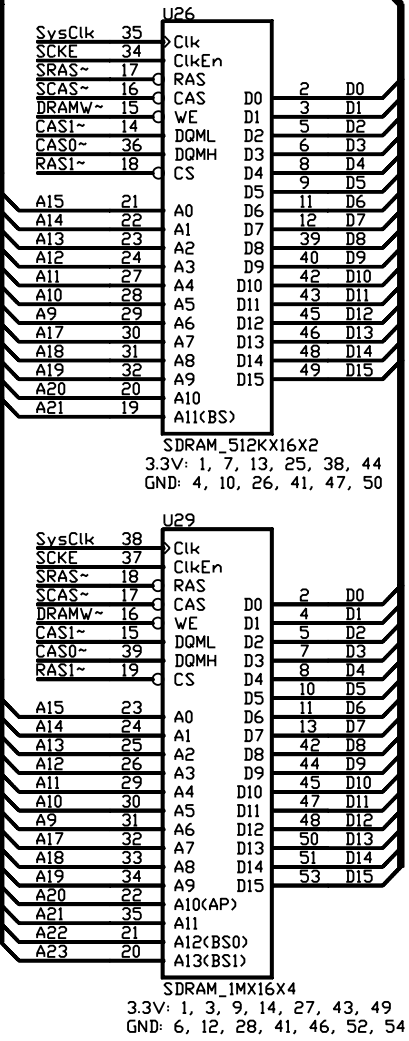
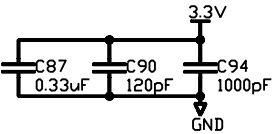
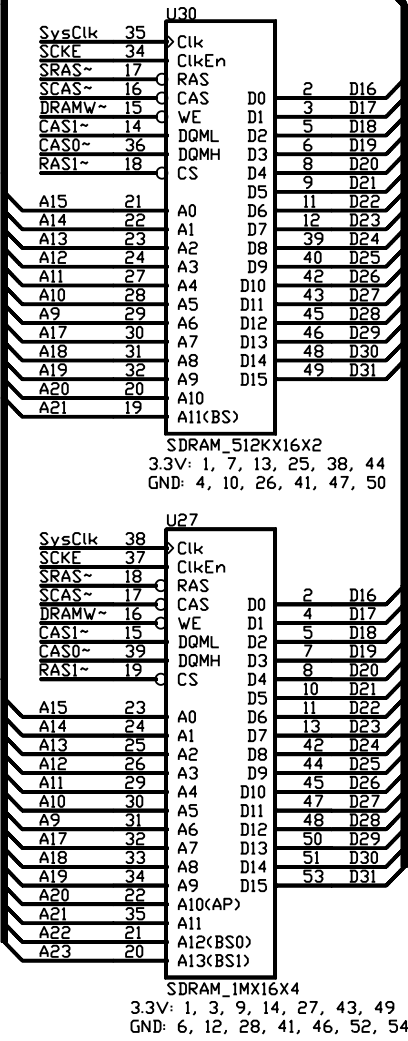
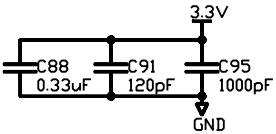
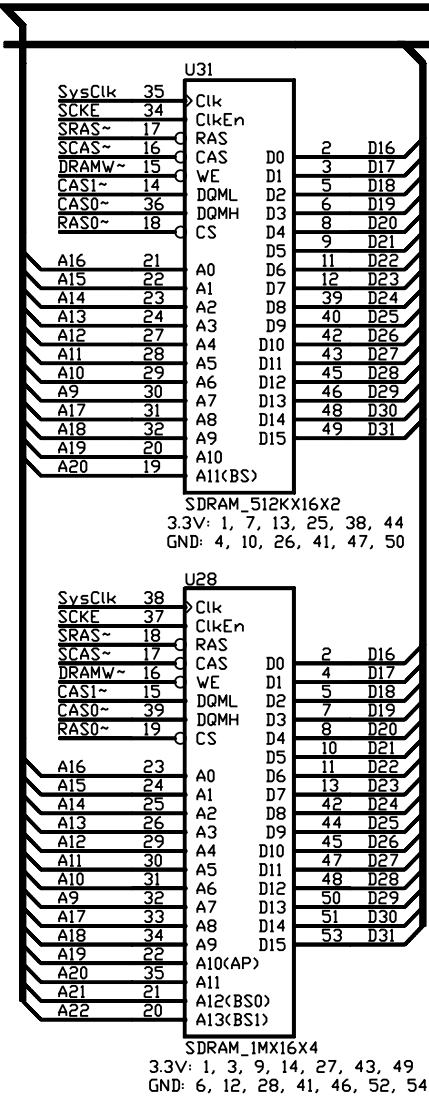


The above B3_TSOP footprint parts are placed on top of the corresponding F3_SSOP footprint parts. Only one type of Flash can be used per CS.

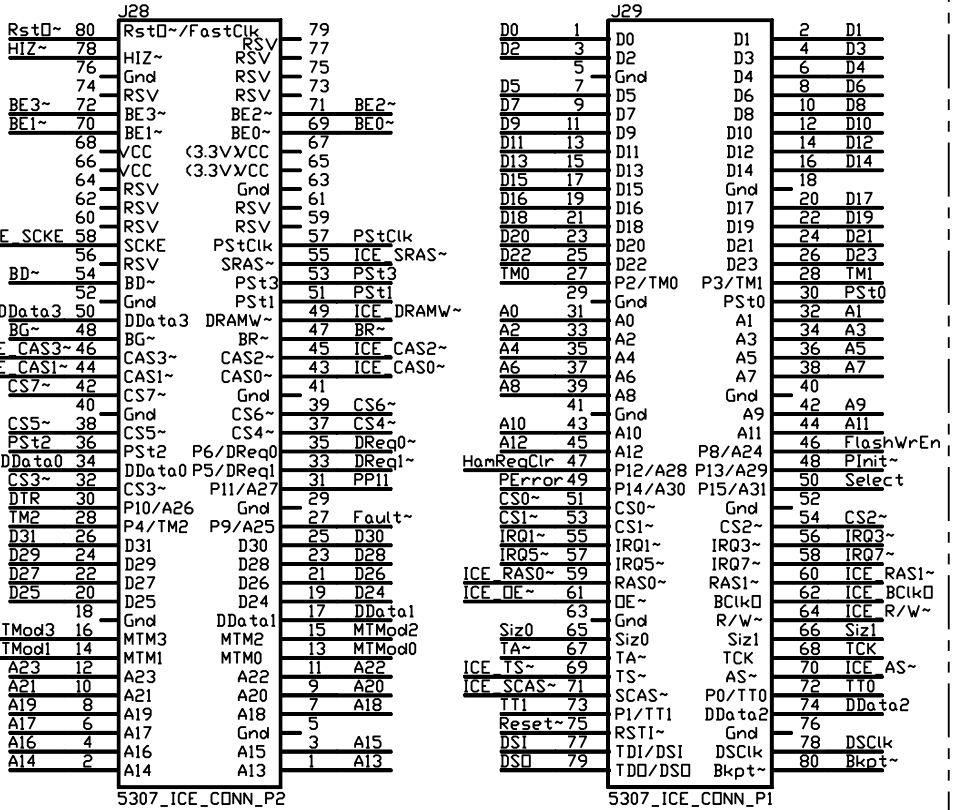
(3000D P7)

BANK 0: 16 Bit SDRAM (2/8 Megabytes)
Note: These two 50 and 54 pin parts are very similar.
Layout one slightly offset and on top of the other.

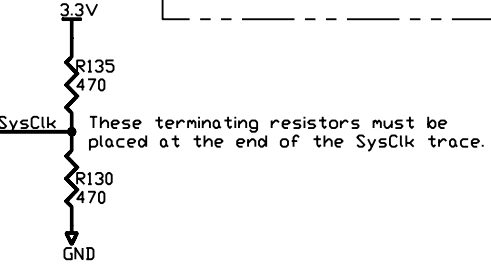
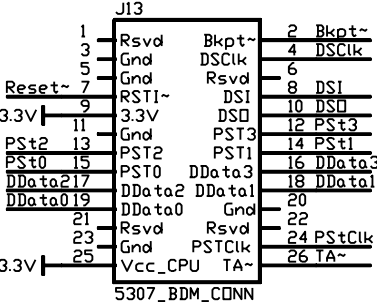
BANK 1: 32 Bit SDRAM (4/16 Megabytes)

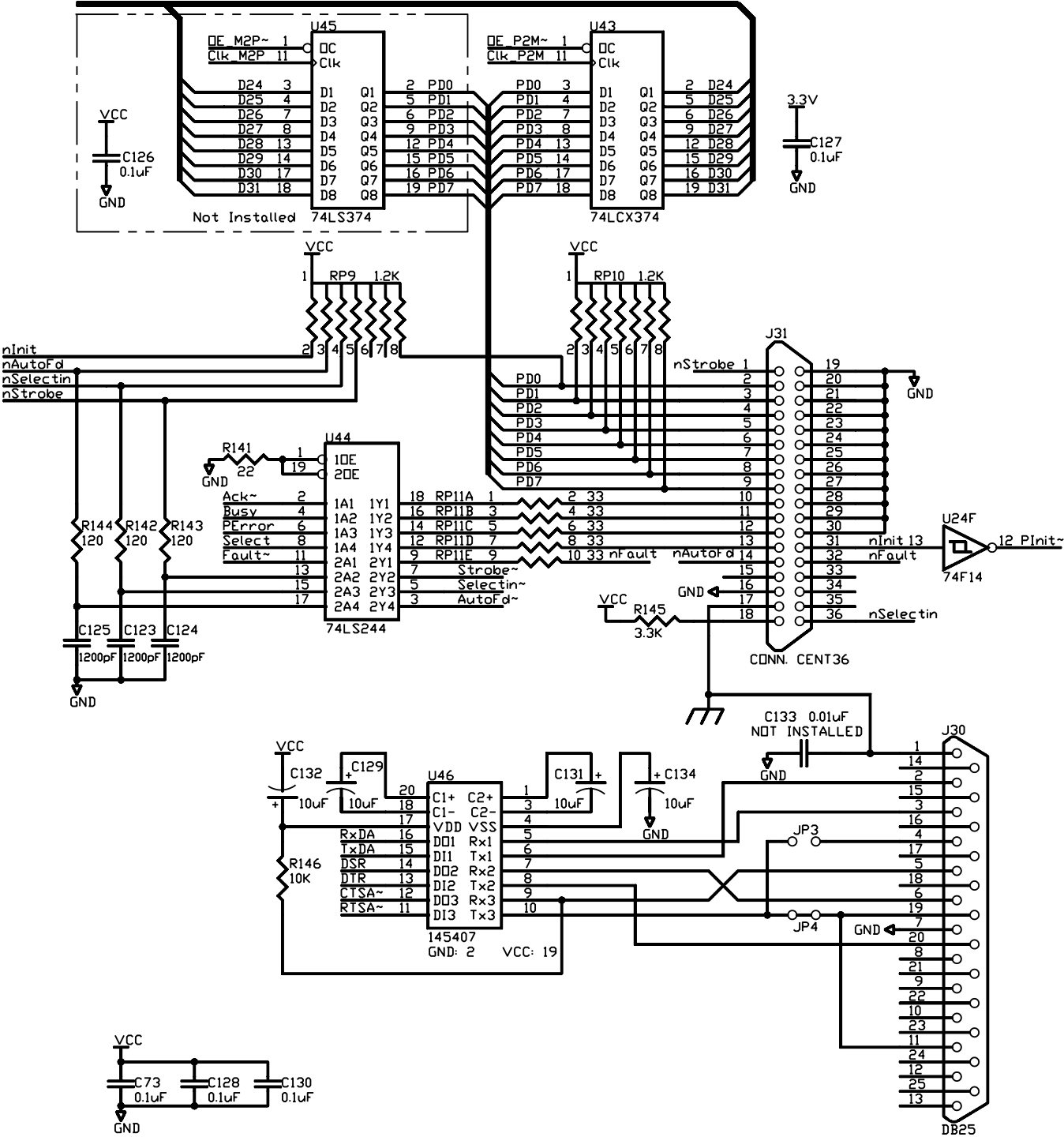
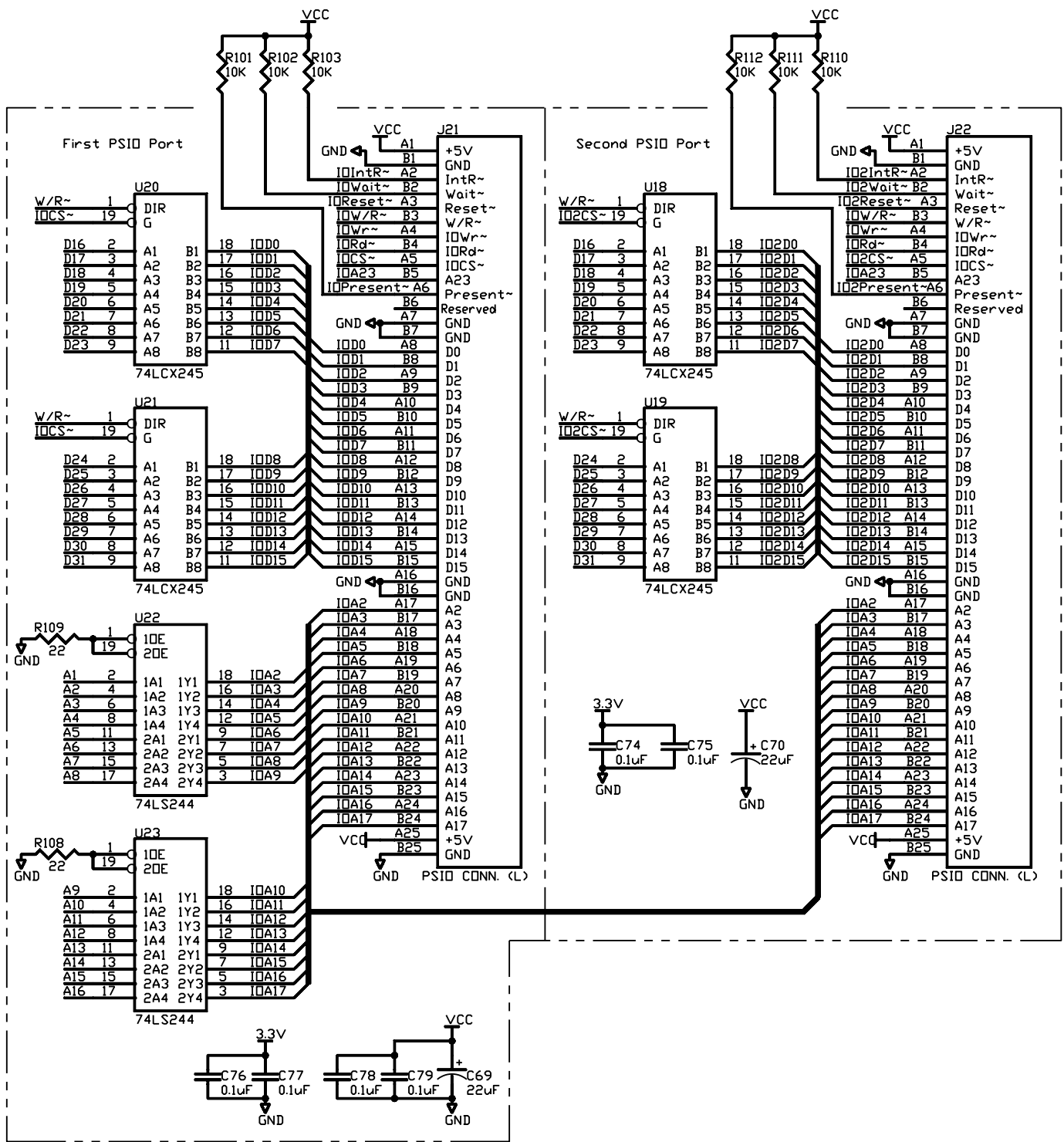


5307 'In Circuit Emulator' Connectors (For Test Purposes Only)
(Remember JP5 needs to be installed for BClkD)



5307 Background Debug Connector
(For Test Purposes Only)





Controller
Circuit Board Assembly
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(3000D P9)



QUANTITY REQUIRED PER ASSEMBLY									PART NUMBER	Controller Circuit Board Assembly	ITEM NO.
083539	083538	083537	083104	083103	083102	082052	082030	082029			
						1	-		082029	CB ASSY- CONTROLLER, T6215 SERIAL/PARALLEL/PSIO	1
							-		082030	CB ASSY- CONTROLLER, T6215, TESTED SERIAL/PARALLEL/PSIO	2
						-		1	082052	CB ASSY- SURFACE MOUNT PARTS SERIAL/PARALLEL/PSIO	3
				1	-				083102	CB ASSY- CONTROLLER, T6215 SERIAL/PARALLEL	4
				-					083103	CB ASSY- CONTROLLER, T6215 TESTED SERIAL/PARALLEL	5
			-	1					083104	CB ASSY- SURFACE MOUNT PARTS SERIAL/PARALLEL	6
	1	-							083537	CB ASSY- CONTROLLER, T6215 SERIAL/PARA/PSIO W/IPDS	7
	-								083538	CB ASSY- CONTROLLER, T6215, TESTED SERIAL/PARA/PSIO W/IPDS	8
	-	1							083539	CB ASSY- SURFACE MOUNT PARTS SERIAL/PARA/PSIO W/IPDS	9
1			1		1				612999-082028	PCB- CONTROLLER, T6215	10
	1			1		1			402697-730208	BAG- ELECTROSTATIC SHIELD	11
3			1		3				401956-732150	I.C. 74LS244	12
2					2				404278-732744	I.C. TRANSCEIVER 74LCX245	13
1			1		1				404006-732151	I.C. 74F14	14
1			1		1				404296-732776	I.C. SDRAM 1Mx16	15
			1		1				700690-083520	PROGRAMMED FLASH- MAIN, LOW, SER/PAR/PSIO	16
1			1		1				404282-732749	I.C. TLC7733	17
1			1		1				404279-732745	I.C. FLIP-FLDP 74LCX374	18
			1		1				700690-083521	PROGRAMMED FLASH- MAIN, HIGH, SER/PAR/PSIO	19
1			1		1				404298-732777	I.C. X24C64 SERIAL EEPROM	20
1			1		1				403977-732620	I.C. 145407	21
1			1		1				404283-732750	I.C. MCF5307	22
1			1		1				404207-732546	I.C. EPM7064STC100	23
1			1		1				404156-732388	I.C. AM26LS31	24
		8			8		8		403699-731071	I.C. 3952	25
		1			1		1		403809-731012	SOCKET- PLCC 68 PIN	26
											27
		1			1			1	402328-732748	I.C. LM324A	28
		1			1			1	404280-732746	I.C. 74HC4052	29
1									700690-083522	PROGRAMMED FLASH - MAIN, IPDS LOW	30
1									700690-083523	PROGRAMMED FLASH - MAIN, IPDS HIGH	31
		1			1			1	404000-731072	DIODE ZENER 1N5908	32
		3			3			3	403880-02	DIODE UF4002	33
		1			1			1	404001-731075	DIODE MUR820	34
		2			2			2	400836-04	DIODE 1N914B	35
		1			1			1	400093-731747	DIODE ZENER 1N5255B 28V	36
		1			1			1	404306-732792	DIODE <SCHOTTKY> 1N5711	37
											38
1			1		1				404297-732772	OSCILLATOR 33.333MHZ	39
		1			1			1	404050-731707	CRYSTAL 20.00MHZ PARA FUND.	40
		1			1			1	700690-083609	I.C.- CONTROLLER PROCESSOR 2.0	41
		1			1			1	403813-731032	RESISTOR SIP10 33	42
		4			4			4	404285-732754	RESISTOR 0.22	43
		2			2			2	401925-731031	RESISTOR SIP8 1.2K	44
		1			1			1	401925-730494	RESISTOR SIP8 10K	45
		4			4			4	401925-05	RESISTOR SIP8 4.7K	46

QUANTITY REQUIRED PER ASSEMBLY									PART NUMBER	Controller Circuit Board Assembly	ITEM NO.
083539	083538	083537	083104	083103	083102	082052	082030	082029			
											47
		1		1		1			400072-732161	RESISTOR .5 1/4W	48
		4		4		4			404285-732755	RESISTOR .75 1/4W	49
		1		1		1			402285-121	RESISTOR 1.62K 1/4W 1%	50
8		8		8					404145-732346	RESISTOR 47 1/8W	51
8		8		8					404144-732266	RESISTOR 1K 1/8W	52
3		3		3					404145-732356	RESISTOR 120 1/8W	53
		1		1		1			402285-101	RESISTOR 1K 1/4W 1%	54
3		3		3					404145-732368	RESISTOR 470 1/8W	55
23		21		23					404145-732340	RESISTOR 22 1/8W	56
		2		2		2			400073-30	RESISTOR 16K 1/4W	57
		2		2		2			400073-34	RESISTOR 24K 1/4W	58
											59
		2		2		2			402285-130	RESISTOR 2.0K 1/4W 1%	60
1		1		1					404144-732277	RESISTOR 3.3K 1/8W	61
		1		1		1			400073-730263	RESISTOR 2.2K 1/4W	62
		4		4		4			400073-730106	RESISTOR 3.3K 1/4W	63
		4		4		4			400073-14	RESISTOR 3.6K 1/4W	64
		5		5		5			400073-37	RESISTOR 33K 1/4W	65
		1		1		1			402285-168	RESISTOR 4.99K 1/4W 1%	66
											67
											68
		2		2		2			400073-16	RESISTOR 4.3K 1/4W	69
											70
26		26		26					404144-732288	RESISTOR 10K 1/8W	71
											72
		4		4		4			400073-27	RESISTOR 12K 1/4W	73
		4		4		4			402285-258	RESISTOR 39.2K 1/4W 1%	74
		7		7		7			400076-730110	RESISTOR 1M 1/4W	75
		1		1		1			402285-230	RESISTOR 20K 1/4W 1%	76
											77
		1		1		1			402285-228	RESISTOR 19.1K 1/4W 1%	78
3		3		3					404144-732280	RESISTOR 4.7K 1/8W	79
		1		1		1			400073-61	RESISTOR 330K 1/4W	80
		2		2		2			402285-377	RESISTOR 619K 1/4W 1%	81
											82
											83
											84
		2		2		2			400073-46	RESISTOR 75K 1/4W	85
		1		1		1			402285-732775	RESISTOR 82.5 1/4W 1%	86
		2		2		2			400951-01	TRANSISTOR MJE800	87
2		2		2					404229-732619	TRANSISTOR MMBTA56	88
4		4		4					404228-732618	TRANSISTOR MMBTA06	89
1		1		1					404256-732688	TRANSISTOR MMDF3N06	90
		1		1		1			404005-731080	REGULATOR VOLTAGE LM2576HVT-5	91
1		1		1					404281-732747	REGULATOR VOLTAGE LT1086CM-3.3	92

QUANTITY REQUIRED PER ASSEMBLY									PART NUMBER	Controller Circuit Board Assembly	ITEM NO.
083539	083538	083537	083104	083103	083102	082052	082030	082029			
		3		3		3			403082-730097	FILTER - EMI SUPPRESSOR	93
11		11		11					404142-732260	FILTER - EMI BEAD	94
		1		1		1			404056-732155	INDUCTOR W/AUXILIARY WINDINGS 150UH	95
											96
		1		1		1			403779-730099	THERMISTOR	97
											98
4		4		4					404143-732262	CAPACITOR 10MFD	99
		2		2		2			401388-730425	CAPACITOR 10MFD TANT	100
		2		2		2			402910-730617	CAPACITOR 33PFD	101
2		2		2					404068-732447	CAPACITOR 120PFD	102
		2		2		2			404008-731084	CAPACITOR 470MFD 16V	103
6		6		6					404069-732458	CAPACITOR 1000PFD	104
4		4		4					404069-732459	CAPACITOR 1200PFD	105
		8		8		8			402868-24	CAPACITOR 820PFD	106
5		5		5					404069-732466	CAPACITOR 4700PFD 50V 10%	107
8		8		8					404069-731545	CAPACITOR .01MFD 50V 10%	108
49		45		49					404069-732481	CAPACITOR .1MFD	109
		8		8		8			402910-149	CAPACITOR .1MFD 100V 10%	110
1		1		1					404069-732535	CAPACITOR .33MFD	111
		1		1		1			402172-730442	CAPACITOR 10MFD 25V ALUM	112
		1		1		1			401388-730120	CAPACITOR 22MFD 25V TANT	113
1					1				404143-732263	CAPACITOR 22MFD	114
		1		1		1			404007-731083	CAPACITOR 100MFD 63V	115
		1				1			404178-732430	CONNECTOR PSIO 50 PIN	116
											117
											118
		1		1		1			403967-732189	CONNECTOR CENT36	119
		1		1		1			402791-732536	CONNECTOR BD PORT 10 PIN	120
		1		1		1			403081-730147	CONNECTOR DB25	121
		2				2			613374-083383	GUIDE- MOLDED, PSIO	122
		4				4			404240-732638	SCREW- #6-19 THREAD FORMING	123
		1		1		1			403726-05	CONNECTOR MOTOR 5 PIN	124
		1		1		1			404092-732164	CONNECTOR FAN 2 PIN	125
											126
		1		1		1			403760-02	CONNECTOR PHONE 6 PIN	127
											128
		1		1		1			402228-732683	CONNECTOR 40 PIN	129
		1		1		1			402228-732681	CONNECTOR 14 PIN	130
											131
		1				1			613396-083507	SUPPORT- PSIO	132
											133
											134
											135
		4		4		4			403883-03	HEATSINK I.C. DIP	136
		A/R		A/R		A/R			404273-732726	ADHESIVE- LOCTITE 383	137
		A/R		A/R		A/R			404273-732727	ACTIVATOR- LOCTITE 7387	138

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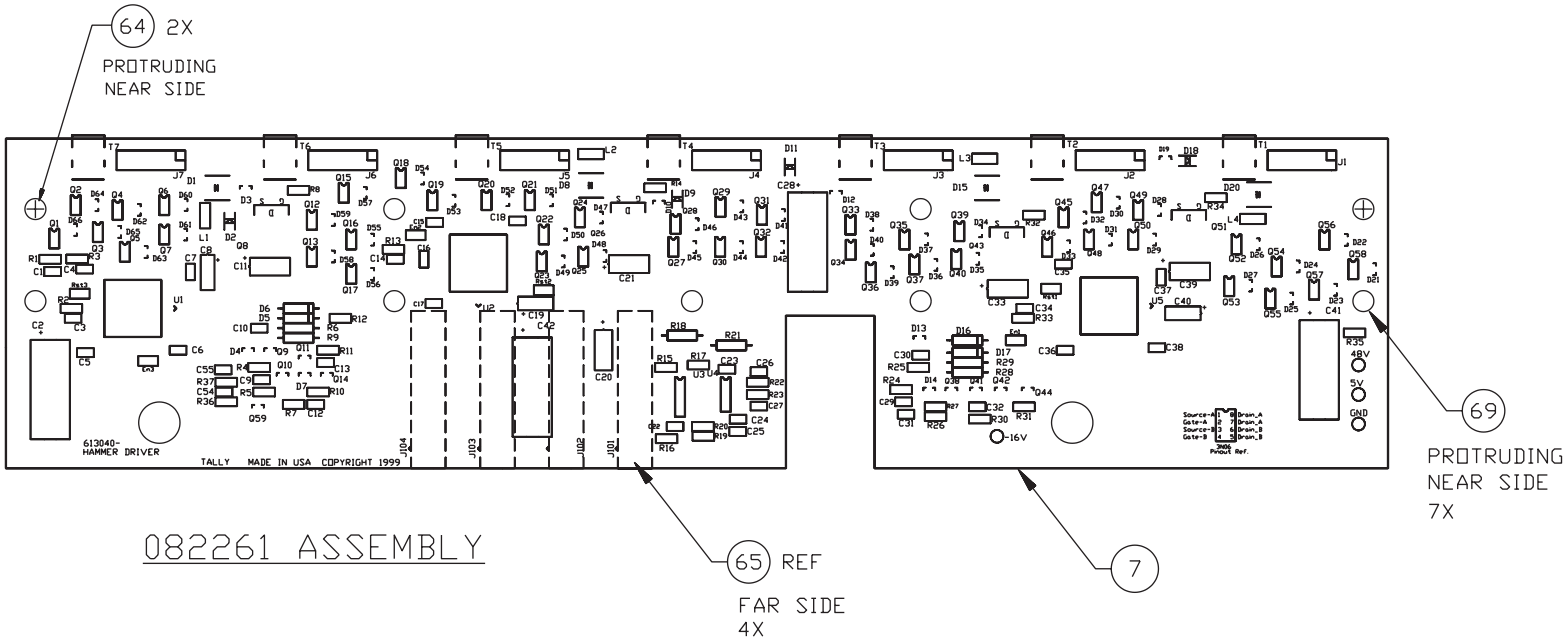
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REF DES	ITEM NO.
082261 ASSEMBLY	
R6 R28	12
R9 R29	28
R18	21
R21	18
C2 C28 C41 C42	35
D5 D6 D16 D17	47
J1 - J7	66
J101 J102 J103 J104 (INSTALLED FAR SIDE)	65
T1 - T7	68

COMPONENT LIST	
REF DES	ITEM NO.
082579 SURFACE MOUNT	
U1 U2 U5	9
U3	10
U4	11
R1	19
R2 R8 R14 R17 R32 R34	13
R3 R33 R35	24
R4 R11 R30 R31	20
R5 R24	17
R7 R26	15
R10 R27	26
R12 R25	25
R13 R15 R16 R19 R20	23
R22 R23	22

COMPONENT LIST	
REF DES	ITEM NO.
C1 C5 C7 C15 C17 C22 C24 C36 C37	30
C4 C6 C10 C13 C16 C18 C30 C32 C35 C38	32
C8 C19 C40	34
C9 C12 C29 C31	31
C11 C21 C33 C39	37
C20	33
C23 C25 C26 C27	40
L1 - L4	63
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D2 D9 D11 D18	51
D3 D4 D7 D10 D12 D13 D14 D19	49
D21 - D66	52

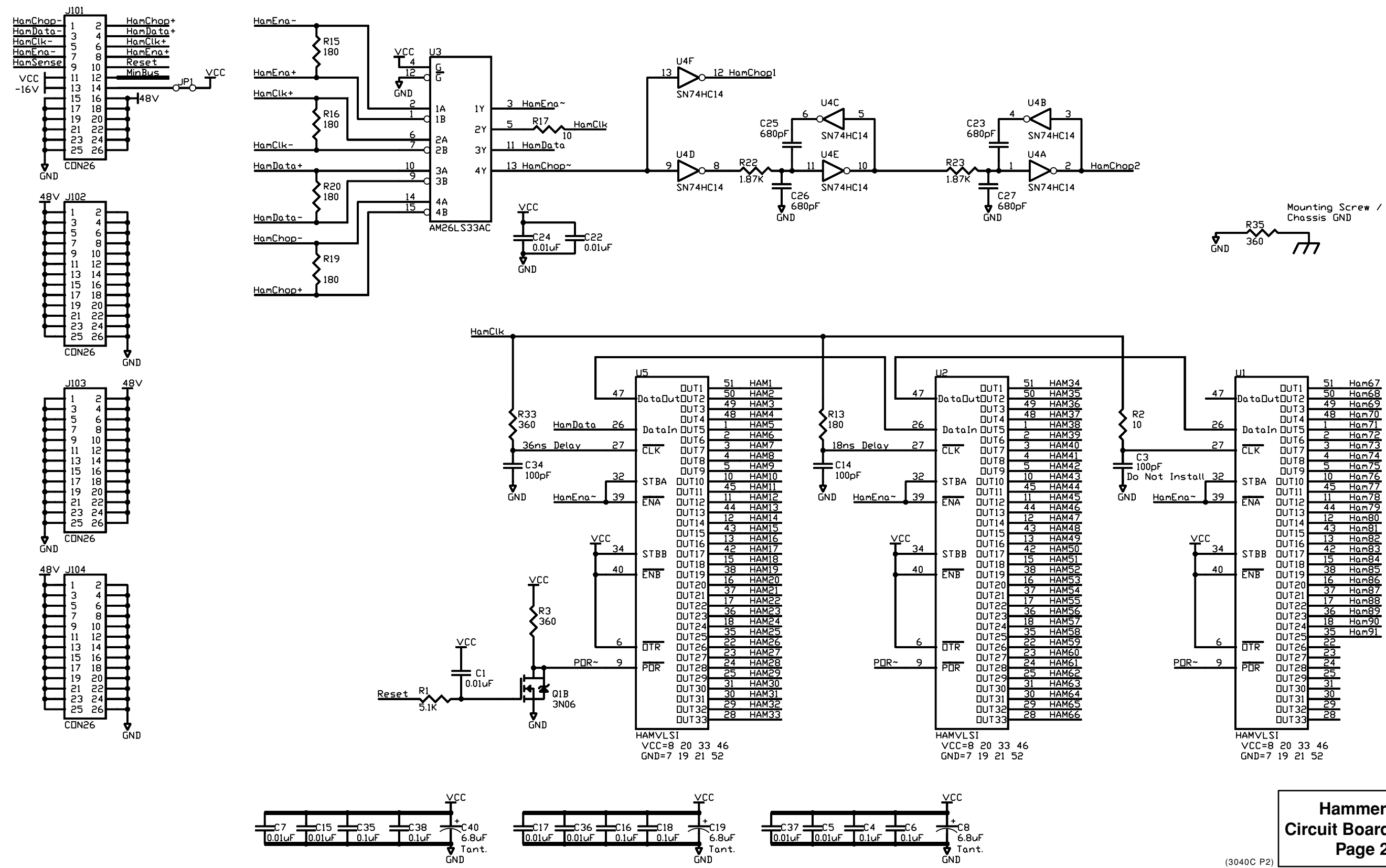
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Q8 Q26 Q43 Q51	60
Q9 Q14 Q38 Q44	59
Q10 Q11 Q41 Q42	58

C3 C14 C34 C54 C55 C95 Q59 R36 R37	NOT INSTALLED
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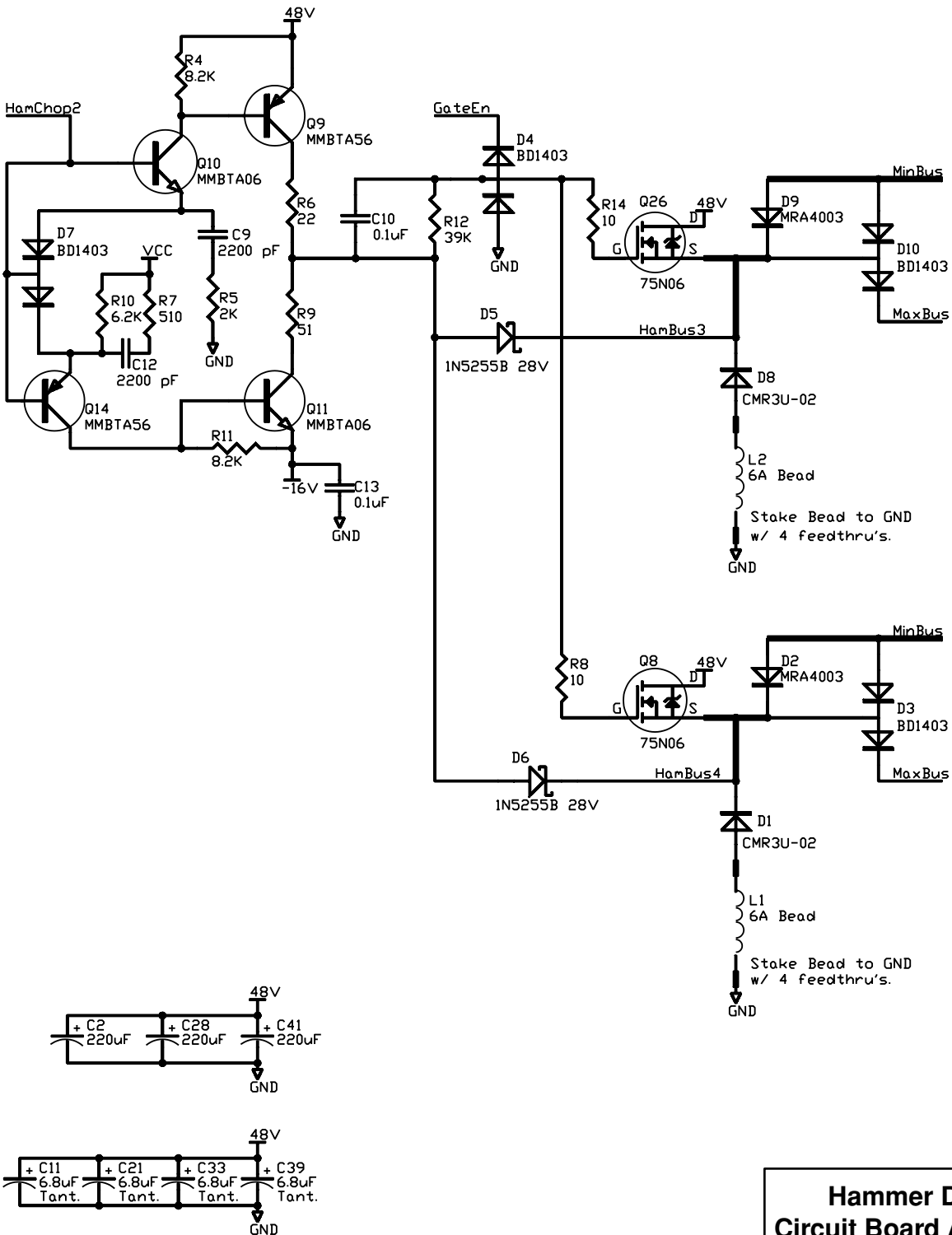
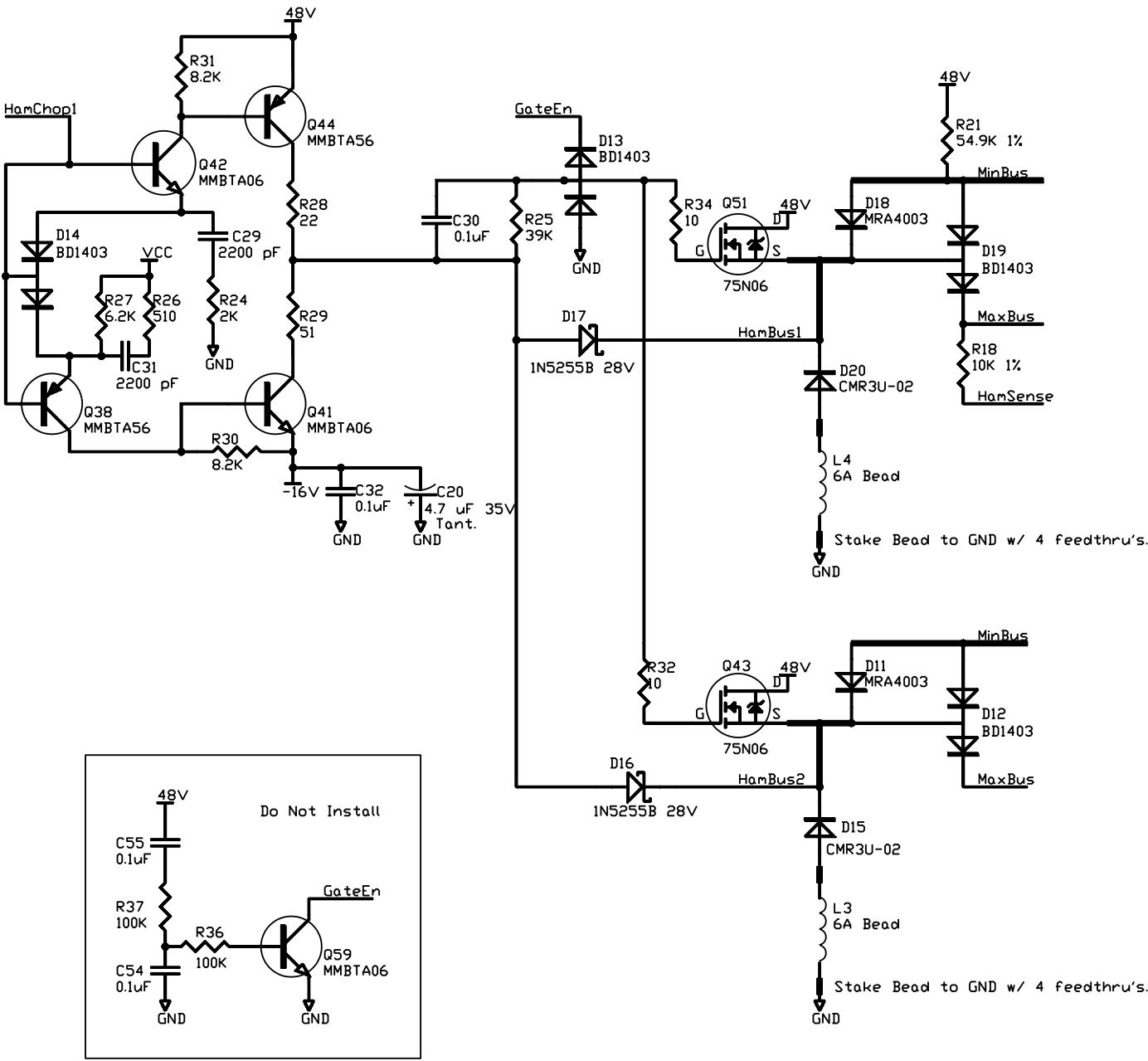
Hammer Driver
Circuit Board Assembly
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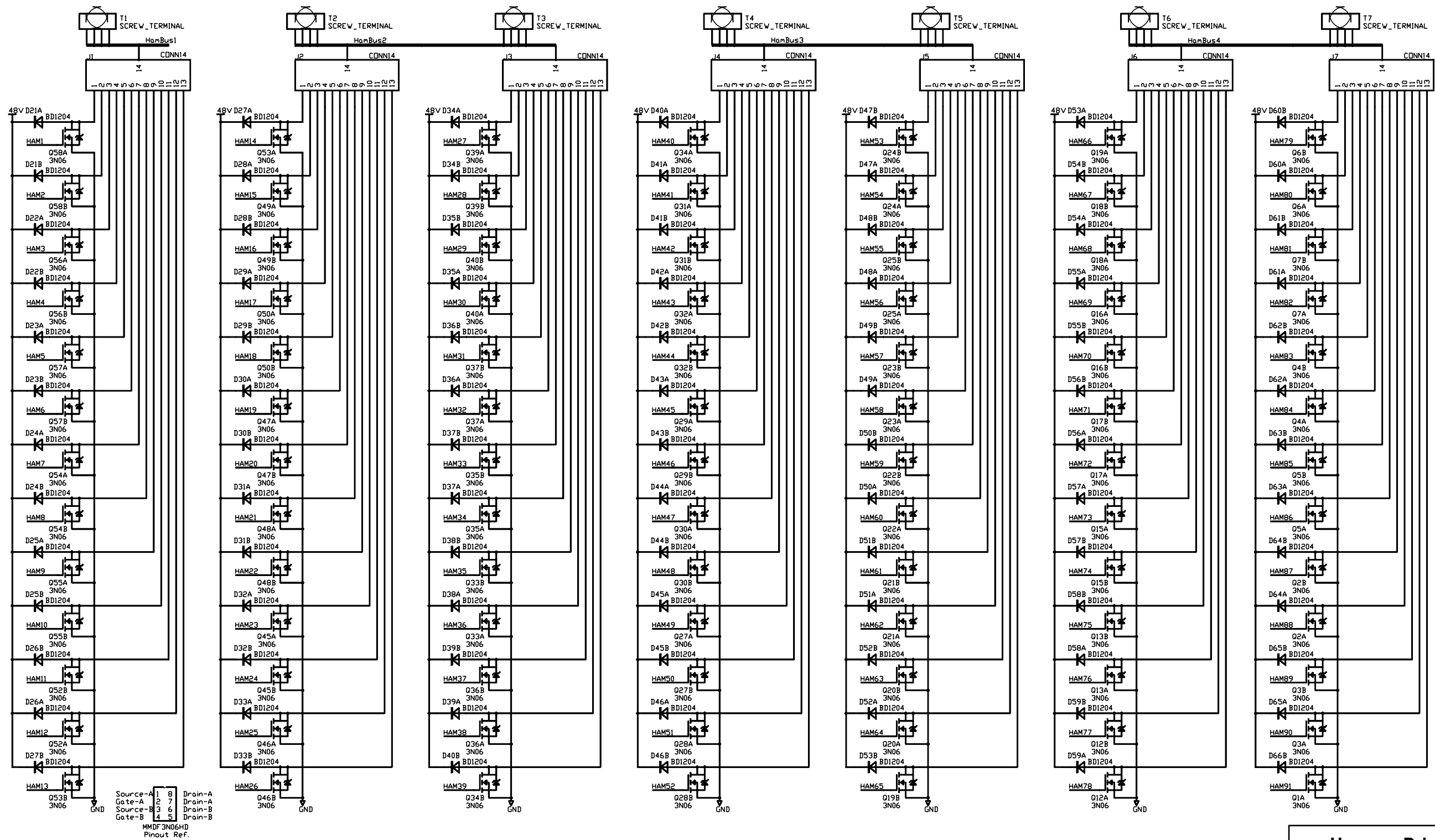
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Circuit Board Assembly
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Hammer Driver
Circuit Board Assembly
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(3040C P3)



Hammer Driver
Circuit Board Assembly
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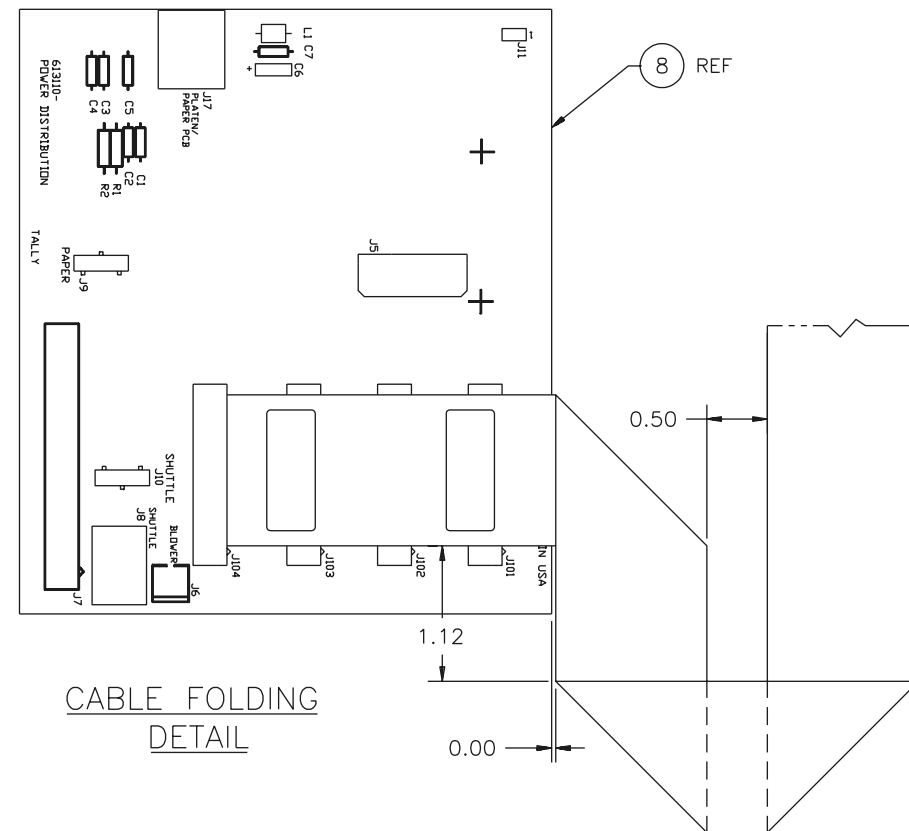
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QTY REQUIRED PER ASSY				PART NUMBER	Hammer Driver Circuit Board Assembly DESCRIPTION	ITEM NO.
	082579	082578	082261			
	1	-		082261	CBA - HAMMER DRIVER	1
	-			082578	CBA - HAMMER DRIVER, TESTED	2
	-		1	082579	CBA - SURFACE MOUNT PARTS	3
						4
						5
						6
1				613039-083608	PCB- HAMMER DRIVER	7
	1			402697-730208	BAG- ELECTROSTATIC SHIELD	8
3				610105-080336	I.C. - HAMVLSI	9
1				404157-732679	I.C. - AM26LS33AC	10
1				403739-732604	I.C. - SN74HC14	11
			2	400072-730259	RESISTOR- 22	12
6				404145-732332	RESISTOR- 10	13
						14
2				404145-732369	RESISTOR- 510	15
						16
2				404144-732273	RESISTOR- 2K	17
			1	402285-272	RESISTOR- 54.9K 1%	18
1				404144-732281	RESISTOR- 5.1K	19
4				404144-732286	RESISTOR- 8.2K	20
			1	402285-201	RESISTOR- 10K 1%	21
2				404172-732674	RESISTOR- 1.87K 1%	22
5				404145-732360	RESISTOR- 180	23

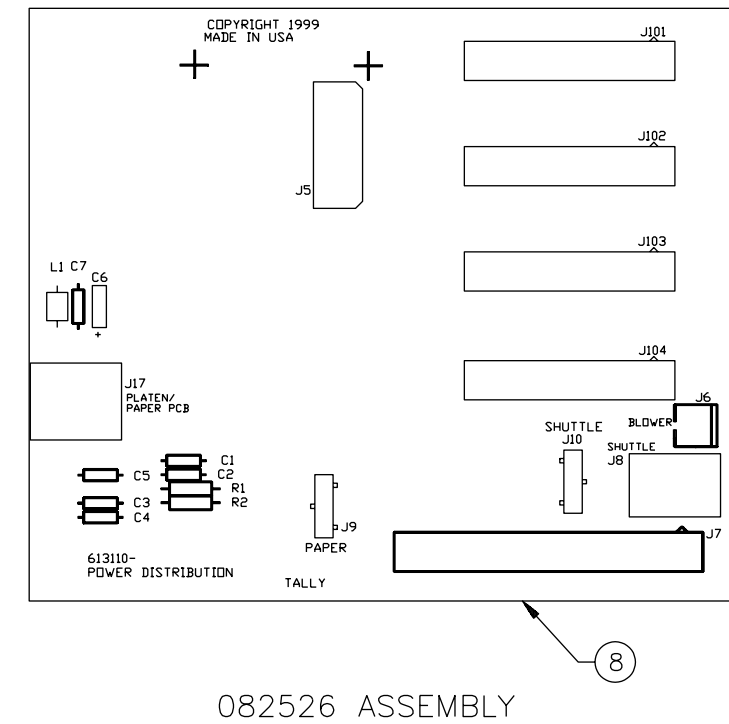
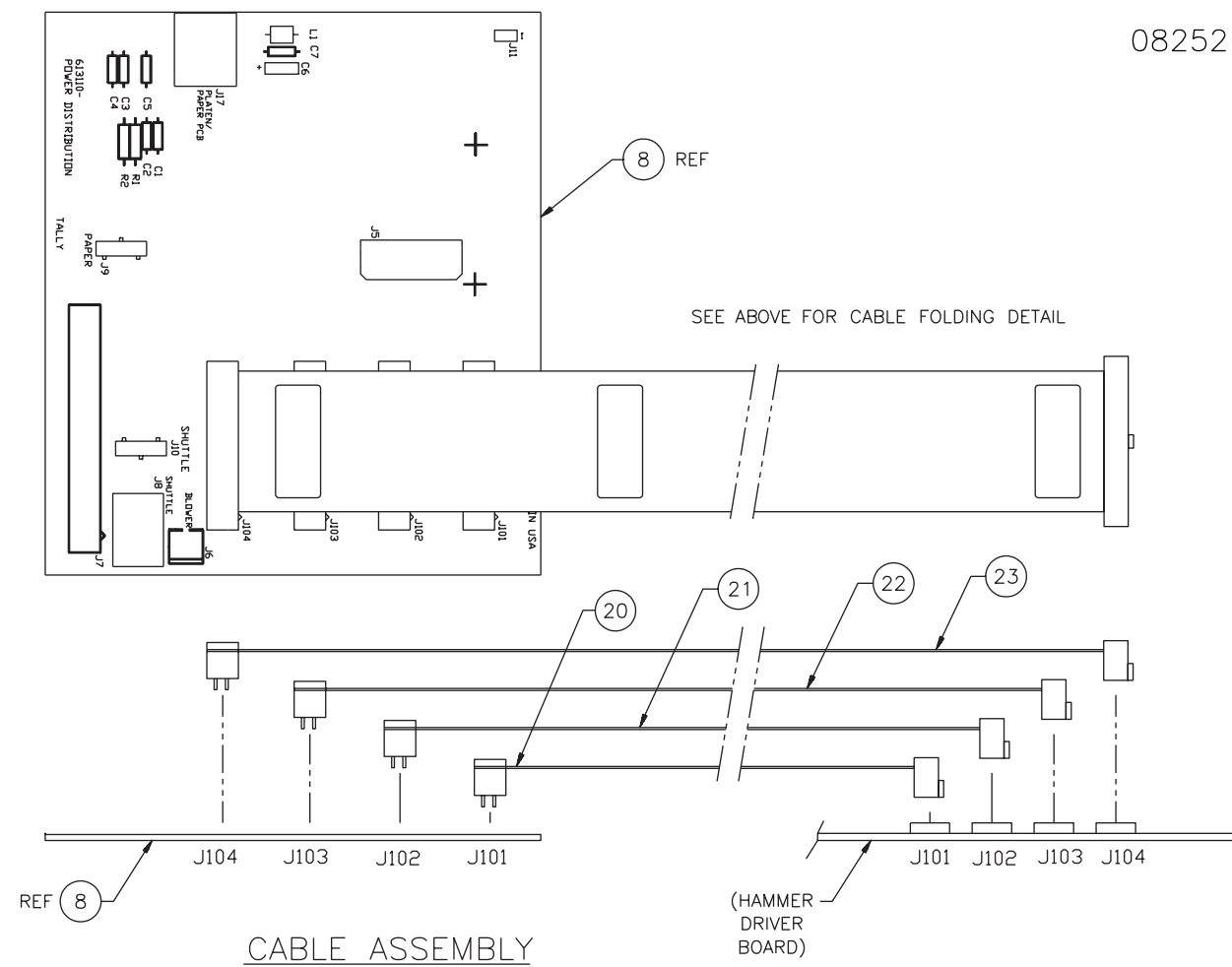
QTY REQUIRED PER ASSY				PART NUMBER	Hammer Driver Circuit Board Assembly DESCRIPTION	ITEM NO.
	082579	082578	082261			
	3			404145-732366	RESISTOR- 360	24
	2			404144-732410	RESISTOR- 39K	25
	2			404144-732283	RESISTOR- 6.2K	26
						27
			2	400072-730102	RESISTOR- 51 1/4W 5%	28
						29
	9			404069-731545	CAPACITOR .01UF	30
	4			404069-732462	CAPACITOR 2200PF	31
	10			404069-732481	CAPACITOR .1UF	32
	1			404173-732677	CAPACITOR 4.7UF 35V TANT	33
	3			404173-732424	CAPACITOR 6.8UF 16V TANT	34
			4	400900-732691	CAPACITOR 220 63V ALUM	35
						36
	4			404277-732740	CAPACITOR 6.8UF 50V TANT	37
						38
						39
	4			404069-732456	CAPACITOR 680PF	40
						41
						42
						43
			A/R	404309-732803	ADHESIVE- HOT MELT, 3M 3779	44
						45
						46

(3040C PL2&3)

QTY REQUIRED PER ASSY				PART NUMBER	Hammer Driver Circuit Board Assembly DESCRIPTION	ITEM NO.
(3040C PL4)	082579	082578	082261			
			4	400093-731747	DIODE 1N5255B 28V	47
						48
	8			404257-732696	DIODE BD1403	49
	4			404255-732687	DIODE CMR3U-02	50
	4			404254-732685	DIODE MRA4003	51
	46			404318-732843	DIODE BD1204	52
						53
						54
						55
						56
	46			404256-732688	TRANSISTOR MMDF3N06	57
	4			404228-732618	TRANSISTOR MMBTA06 LT1	58
	4			404229-732619	TRANSISTOR MMBTA56 LT1	59
	4			404258-732690	TRANSISTOR MTB75N06	60
						61
						62
	4			404142-732583	FILTER - EMI BLM41P600SPT	63
			2	613401-083530	INSERT- STANDOFF, THRU HOLE	64
			4	402242-732669	CONNECTOR 26 PIN	65
			7	404224-732673	CONNECTOR 14 PIN	66
			7	404310-732815	"O" RING	67
			7	404223-732595	TERMINAL- SCREW, PC MOUNT	68
			7	403625-732644	INSERT- THRU HOLE STANDOFF 3/8 LONG	69



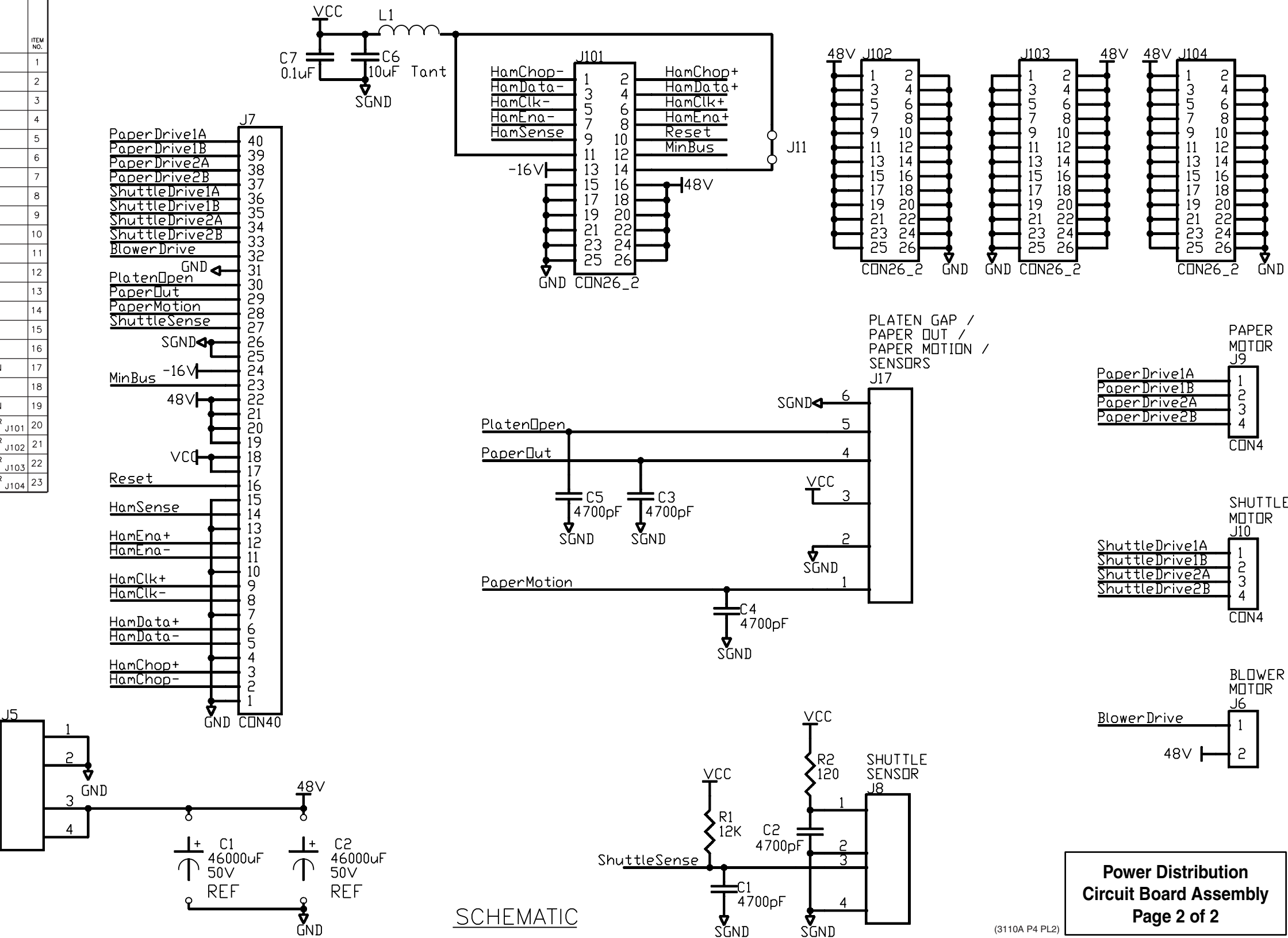
COMPONENT LIST						
REF DES					ITEM NO.	
R1					11	
R2					10	
C1	C2	C3	C4	C5	12	
C6					6	
C7					7	
J101					20	
J102					21	
J103					22	
J104					23	
J5					14	
J6					15	
J7					16	
J8					19	
J9 J10					18	
J17					17	
L1					5	

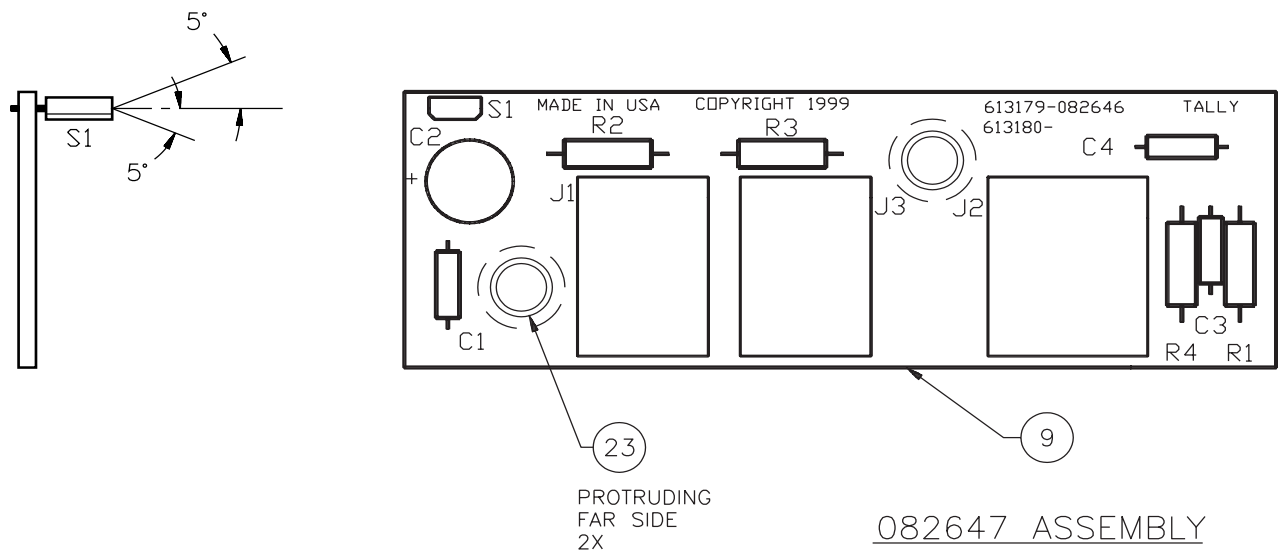


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**Power Distribution
Circuit Board Assembly
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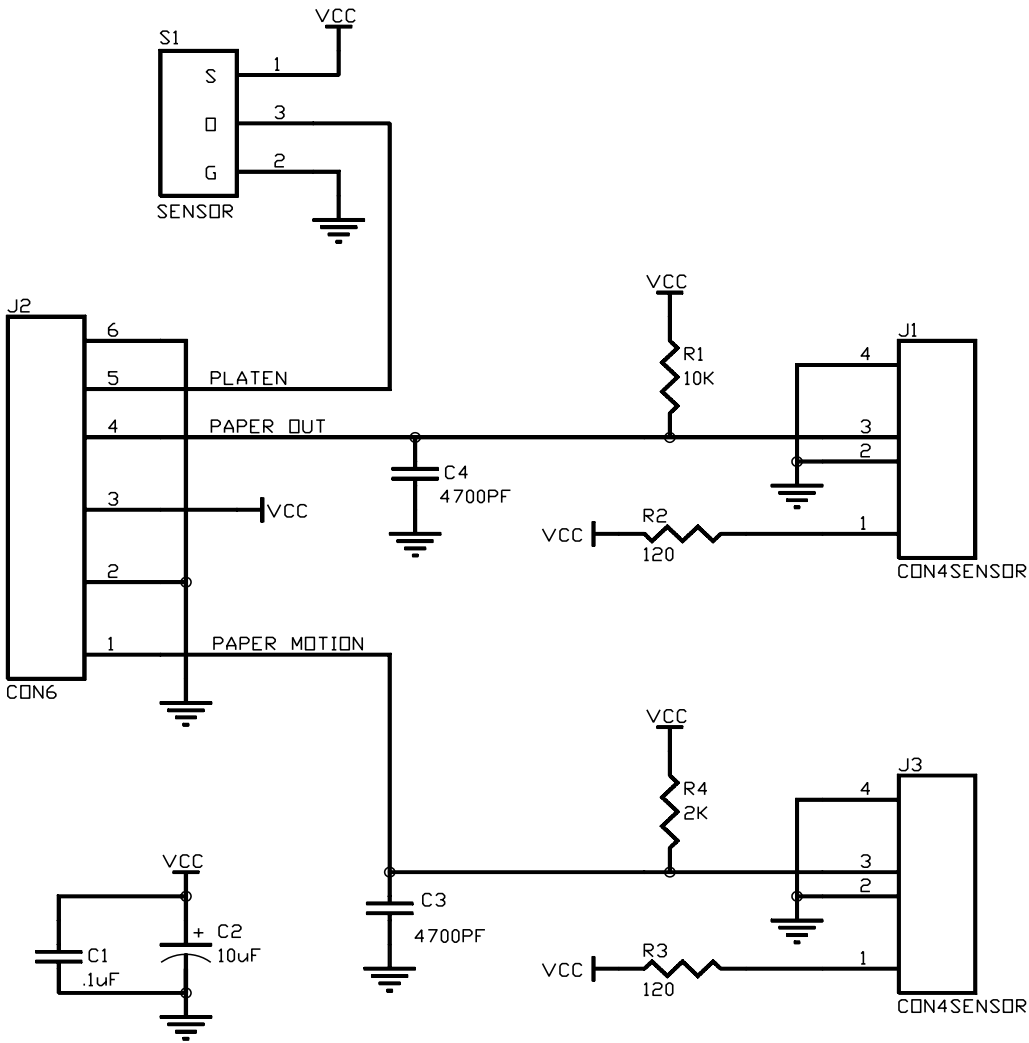
QTY REQUIRED PER ASSY		PART NUMBER	DESCRIPTION	ITEM NO.
083556	082647			
1	-	082526	CBA - POWER DISTRIBUTION	1
-	-	083558	CBA - POWER DISTRIBUTION SPARES, "TESTED"	2
				3
				4
				5
				6
				7
				8
				9
				10
				11
				12
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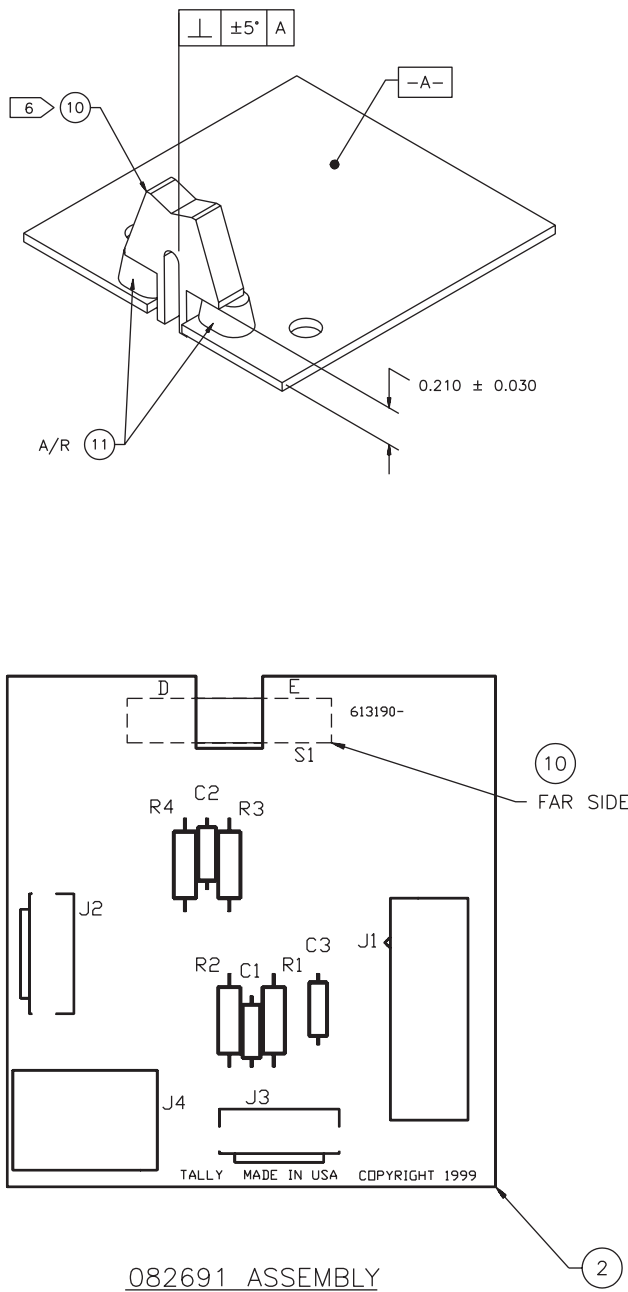


QTY REQUIRED PER ASSY					PART NUMBER	DESCRIPTION	ITEM NO.
			083556	082647			
			1	-	082647	CIRCUIT BOARD ASSY- PLATEN/PAPER SENSORS	1
			-		083556	CIRCUIT BOARD ASSY- PLATEN/PAPER SENSORS, SPARES, TESTED	2
							3
							4
							5
							6
							7
							8
			1		613179-082646	PCB- PLATEN/PAPER SENSORS	9
			1		402697-730206	BAG- ELECTROSTATIC SHIELD	10
							11
			2		400072-75	RESISTOR- 120	12
			1		400073-730677	RESISTOR- 2K	13
			1		400073-730108	RESISTOR- 10K	14
							15
			2		402910-133	CAPACITOR- 4700PFD	16
			1		402868-730142	CAPACITOR- .1MFD	17
			1		402172-52	CAPACITOR- 4.7MFD	18
			1		404315-732826	SENSOR	19
							20
			2		403760-01	CONNECTOR- 4 COND. SENSOR	21
			1		403760-02	CONNECTOR- 6 COND.	22
			2		403625-732220	INSERT- 1/4 LG THRU HOLE STANDOFF	23

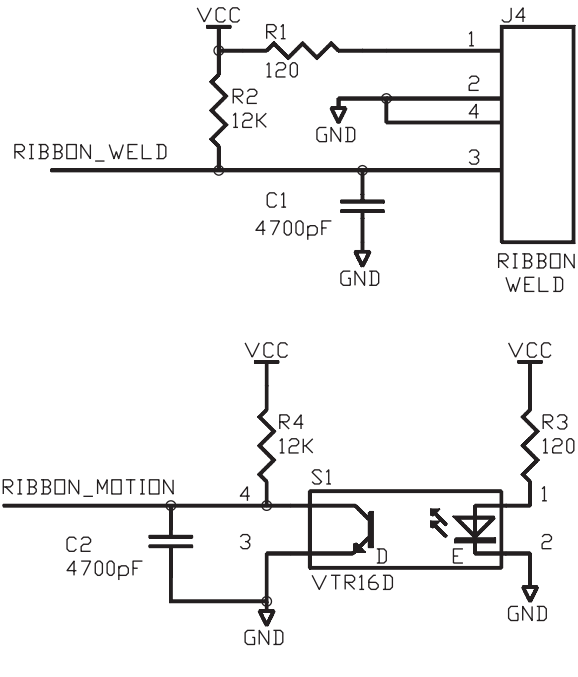
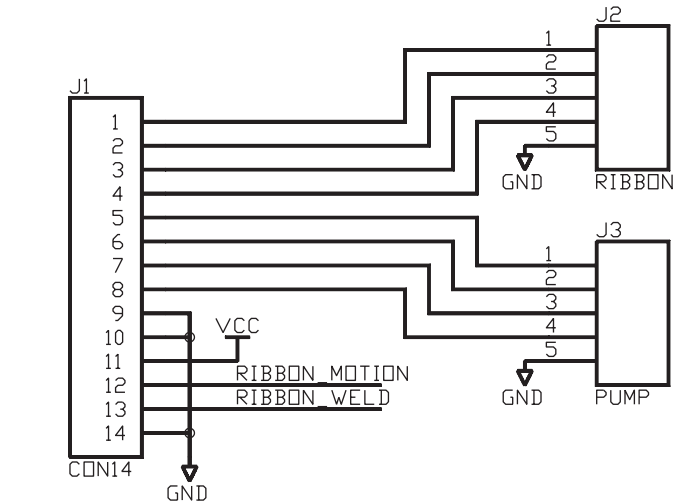
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R2	R3	12
R4		13
C1		17
C2		18
C3	C4	16
S1		19
J1	J3	21
J2		22



Platen/Paper Sensor
Circuit Board Assembly



Ribbon Sensor
Circuit Board Assembly



COMPONENT LIST		
REF	DES	ITEM NO.
R1 R3		3
R2 R4		4
C1 C2		5
C3		6
J1		7
J2 J3		8
J4		9
S1		10

1		402697-730206	BAG- ELECTROSTATIC SHIELD	13
-		083555	CIRCUIT BOARD ASSY- RIBBON SENSOR, SPARES, TESTED	12
	A/R	404309-732803	ADHESIVE- HOT MELT, 3M 3779	11
	1	402877-01	SENSOR	10
	1	403760-01	CONNECTOR- 4 PIN	9
	2	404092-731731	CONNECTOR- MOTOR	8
	1	402242-732571	CONNECTOR- 14 PIN	7
	1	402868-730142	CAPACITOR- .1MFD	6
	2	402910-133	CAPACITOR- 4700PFD	5
	2	400073-27	RESISTOR- 12K	4
	2	400072-75	RESISTOR- 120	3
	1	613189-082690	PCB- RIBBON SENSOR	2
1	-	082691	CIRCUIT BOARD ASSY- RIBBON SENSOR	1
083555	082691	PART NUMBER	DESCRIPTION	ITEM NO.
QTY	REQ'D			

(3190B P1&2)

Appendix B:

Downloading Firmware



Firmware Update Procedure

The following instructions explain how to download updated printer firmware.

- Step 1. Power up the printer normally and print out a Configuration Report. This will give you a hard copy of the printer setup. You will need this to restore any parameters that you have set in the printer. Power the printer down.
- Step 2. Connect the printer to your computer using the parallel interface.
- Step 3. Power up the printer while holding down the following three keys on the control panel: **FF**, the up arrow, and **Config**. Hold them down until the following message scrolls on the control panel display: "Tally Flash Loader." The display then stops scrolling and says: "Flash Dnld Ready."
- Step 4. Change the directory to the floppy drive. From the DOS Command Prompt enter:

<filename> -P

This will cause the compressed file to expand directly to the PRN device.

The time required to update the firmware depends upon the speed of the computer you are using. Typically the times will vary from 3–10 minutes.

- Step 5. After the download is complete, check the hard copy of the configuration and set up the appropriate parameters.



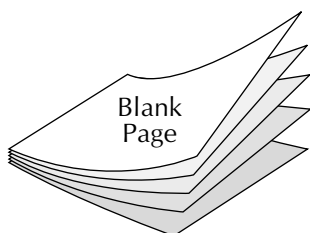
The firmware download is now complete.

You may or may not get an NVRAM fault at the end of the download. If you do, it does not indicate a problem with the printer. Simply depress the CLEAR Key on the printer control panel and the message will clear.

Before using the printer again, you should do the following calibrations:

- Print
- Paper Motion Sensor
- Paper Out
- Platen

These calibration procedures are explained in Chapter 2.



Supplements



Supplements



Please file here any supplements you receive.

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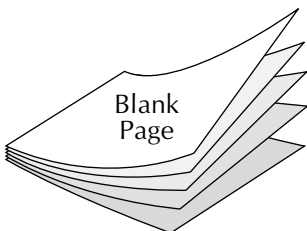
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