HP QuietJet Series Printer Service Manual

HEWLETT PACKARD

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Printing History

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Service Manual Symbols

There are three flags used throughout this manual that must be followed to ensure your safety and safety of the product. Text relating to the flag is directly to the right of the symbol. Be sure to pay special attention to the following symbols:

Warning 

The warning symbol will be used where potential danger to an individual may occur.

Caution 

The caution symbol will be used where potential danger to equipment may occur.

Note 

The note symbol will be used where attention to special instructions appear.

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1 Product Information

Introduction

This service manual contains maintenance and repair information for HP 2227A and HP 2228A QuietJet Series printers. The HP QuietJet Series consists of:

- **HP 2227A.** Wide paper width capability with RS-232C & parallel Centronics interfaces.
- **HP 2227B.** Wide paper width capability with an HP-IB (IEEE 488 (1978)) interface.
- **HP 2228A.** Standard paper width capability with RS-232C & parallel Centronics interfaces.

HP 2227B maintenance and repair information is found in the HP 2227B QuietJet Series Service Manual Supplement. Operation and programming information is contained in the HP QuietJet Series Owner's Manual, P/N 02227-90019.

Product Description

The HP QuietJet series are dot matrix thermal ink-jet printers capable of operating with a variety of personal computers. A disposable print cartridge with draft, near letter quality (NLQ), and compressed print selectable from the keypad provides convenient operation. QuietJet Series printers communicate using HP Printer Command Language Level I+ (HP PCL I) or select IBM/Epson control sequences. The QuietJet Plus (QuietJet printer capable of handling wide paper) can handle Z-fold paper up to 15 inches wide.

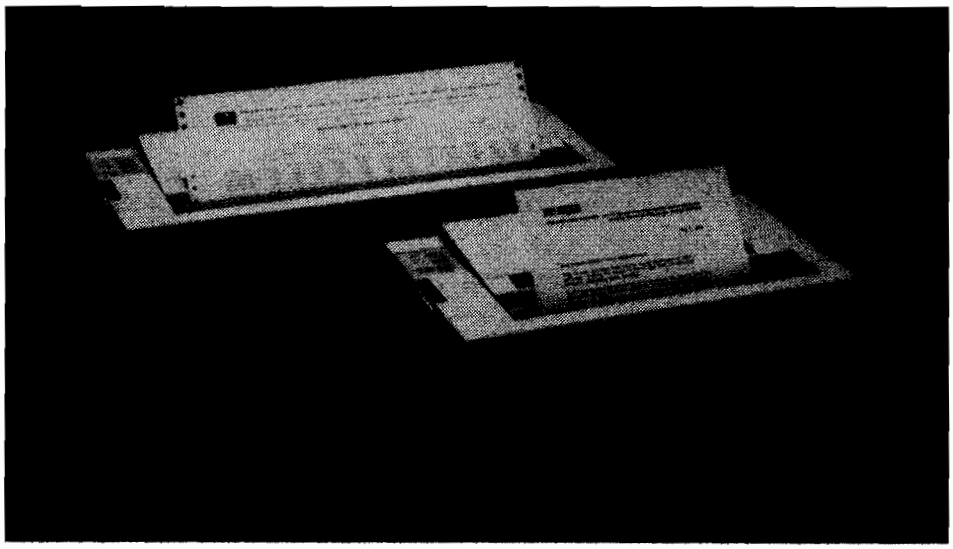

Figure 1-1. The HP QuietJet Series Printers

HP QuietJet Series printers use an external power module (called Power Module 1) to transform the country's power to 20 VAC. Different power modules are available for different country's power and wall receptacle requirements. Therefore, HP QuietJet printers are identical worldwide but the appropriate power module depends upon the country the printer is used.

Manual Overview

The HP QuietJet Service Manual consists of the following information:

Chapter 1: General Information. Identifies HP QuietJet Series printers. This chapter lists accessories, capabilities, recommended tools, and a section explaining printer operator controls.

Chapter 2: Site Planning and Requirements. Defines site operating requirements by listing physical, electrical, and environmental specifications. Product certifications are also listed.

Chapter 3: Installation and Configuration. Information for installing, configuring, and verifying proper printer operation. This chapter explains how to install optional memory.

Chapter 4: Preventive Maintenance. Contains information on print cartridge maintenance, visual inspection, and cleaning.

Chapter 5: Functional Description. Provides a brief component description of the HP QuietJet printer including analog, digital, and I/O circuitry.

Chapter 6: Removal and Replacement. Contains procedures to remove and replace HP QuietJet Series parts and assemblies.

Chapter 7: Adjustments. There are no field service adjustments on the HP QuietJet printers.

Chapter 8: Troubleshooting. This chapter covers printer self tests and other troubleshooting information.

Chapter 9: Replaceable Parts. Contains latest overall, mechanism, and PCA parts lists. Exploded drawings are included to help locate and identify parts and assemblies.

Chapter 10: Reference. A collection of information to support the HP QuietJet Series Service Manual.

Chapter 11: Product History. Contains product history to adapt preceding HP QuietJet printer information to this version service manual.

Chapter 12: Diagrams. Contains drawings and diagrams helpful in understanding the product's operation and troubleshooting.

Accessories

Table 1-1. HP QuietJet Series Printer Accessories

PART NUMBER	PART/ACCESSORY DESCRIPTION
	Ink-Jet Print Cartridges
92261A	Black
51605R	Red
51605B	Blue
51605G	Green
	Ink-Jet Paper (finished sizes)
51630A	Z-fold, 500 sheets 8 1/2" x 11"
92261N	Z-fold, 2500 sheets 8 1/2" x 11"
51630J	Cut sheet, 500 sheets 8 1/2" x 11"
51630B	Z-fold, 500 sheets 14 7/8 x 11"
51630D	Z-fold, 2500 sheets 14 7/8 x 11"
92261U	QuietJet Printer Stand
92261T	QuietJet Plus Printer Stand
1818-3183	8K RAM for Downloadable Fonts
	Power Modules
9100-4503	U.S.
9100-4505	Europe
9100-4507	Japan
9100-4509	U.K.
9100-4519	China
9100-4522	Australia
9100-4524	Switzerland
9100-4526	South Africa
9100-4528	Denmark

Table 1-1. HP QuietJet Series Printer Accessories (Cont.)

PART NUMBER	PART/ACCESSORY DESCRIPTION
35177M	Jetstart Software Program
	I/O Cables
	HP 239X Terminals
13242D	Parallel (or HP 40242D)
13242G	Serial (or HP 40242G)
13242G	HP Touchscreen Serial
92221P	HP Portable & Portable Plus
	HP Vectra
24542D	Using 24540A Parallel Inter. Card
24542G	Using Port 1 on 24541A Inter. Card
24542G	Using 24540A Serial/Par. Interface
13242G	Using Port 2 on 24541A Inter. Card
	IBM PC Family & Compatibles
13242H	Using IBM Async. Comm. Adaptor
24542D	Parallel Interface Printer Cable
24542G	Using IBM AT & Serial/Parallel Adaptor
	Apple
590-0042*	Apple II* & IIe Parallel Interface Cable
17355M	Apple II, II+, or IIe & Super-Serial Card
92219N	Apple IIc (or Apple P/N 590-0191-A)
92219M	Apple Macintosh
	Manuals
02227-90019	HP QuietJet Series Owner's Manual
02227-90031	HP QuietJet Series Service Manual
02227-90037	HP-IB Version QuietJet Series Service Manual Supplement

Product Specifications

Note

Physical, electrical, and environmental specifications can be found in Chapter 2, Site Planning and Requirements.

Product Capabilities

Printing	Bidirectional and logic seeking
Print Speed (characters/second)	160 cps (draft @ 10 cpi) 192 cps (draft @ 12 cpi) 40 cps (NLQ @ 10 cpi) 48 cps (NLQ @ 12 cpi)
Carriage Slew Speed (inches/second)	16 ips (draft) 12.5 ips (NLQ or enhanced)
Linefeed Speed	95 msec/linefeed
Form Feed Speed	5.3 sec/11"
Paper Slew Speed	2.08 ips (inches/second)
Line Spacing (lines/inch)	6 lpi 8 lpi
Normal Pitch (dip switch selectable)	10 cpi 12 cpi
Print Pitch (characters/inch)	5 cpi (expanded when normal pitch = 10 cpi) 6 (expanded when normal pitch = 12 cpi) 10 10.7 (expanded-compressed) 12 cpi 21.3 cpi (compressed)
Print Modes	Draft Near Letter Quality (NLQ) Bold Underline Superscript Subscript

Print Resolution (horizontal dots/inch x vertical dots/inch)	192 dpi x 96 dpi (draft) 192 dpi x 192 dpi (NLQ)
Graphics Dot Resolution (horizontal dots/inch x vertical dots/inch)	96 dpi x 96 dpi 192 dpi x 96 dpi 192 dpi x 192 dpi
Dot Size	.015" (.381mm) diameter on HP inkjet paper
Character Cell	19 x 12 (draft @ 10 cpi) 19 x 24 (NLQ @ 10 cpi) 16 x 12 (draft @ 12 cpi) 16 x 24 (NLQ @ 12 cpi)
QuietJet Line Length (characters/line)	40 cpl @ 5 cpi 48 cpl @ 6 cpi 80 cpl @ 10 cpi 85 cpl @ 10.7 cpi 96 cpl @ 12 cpi 170 cpl @ 21.3 cpi
QuietJet Plus Line Length (characters/line)	66 cpl @ 5 cpi 79 cpl @ 6 cpi 132 cpl @ 10 cpi 140 cpl @ 10.7 cpi 158 cpl @ 12 cpi 281 cpl @ 21.3 cpi
Paper Width QuietJet QuietJet Plus	 5 to 9.75" (127 to 248mm) 5 to 15" (127 to 380mm)
Paper Type (HP ink jet paper required)	Cut Sheet Z-fold
Page Length (dip switch selectable)	11" (279mm) 12" (305mm) (1/8" to 42.5" using escape sequences)
Last Form Tear-off (Window to top of next print line)	< 1" (25.4mm)
Typical Printer Usage	10 pages/day
Print Cartridge Life	500 pages @ 1000 characters per page

Programming Command Set	HP PCL Level I+ Select IBM/Epson control sequences
Selectable Character Sets	Roman8 USASCII Swedish IBM PC (US version) French German UK Spanish Norwegian Italian

Interface

Type	RS 232-C Eight-bit parallel (Centronics)
RS 232-C Handshake (dip switch selectable)	DTR XON/XOFF
RS 232-C Baud Rates (dip switch selectable)	1200 2400 9600 19200
Word Length (dip switch selectable)	7 8
Parity (dip switch selectable)	Odd Even One none/zero
Buffer Size	
Raw Buffer	255 bytes
Formatted Buffer	1400 bytes

Getting Acquainted

This section identifies key HP QuietJet Printer parts. These parts are referred to throughout this manual.

HP QuietJet Part Identification

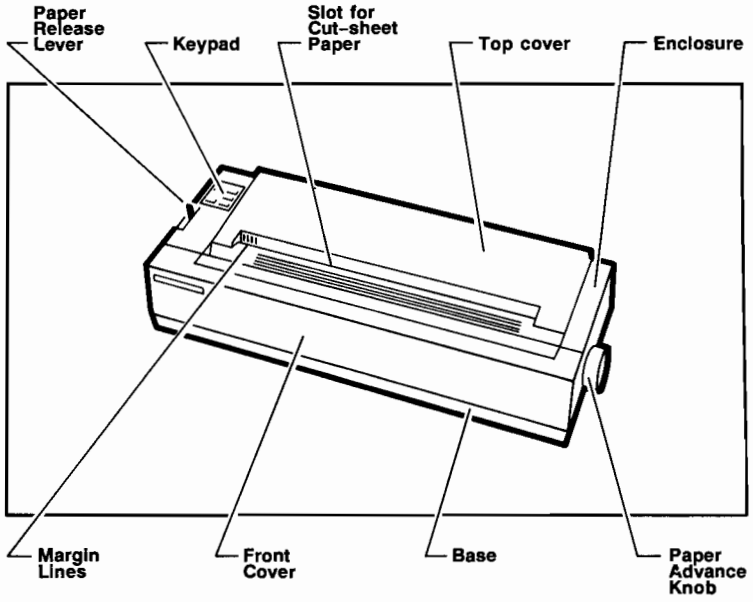

Figure 1-2. HP QuietJet Front View

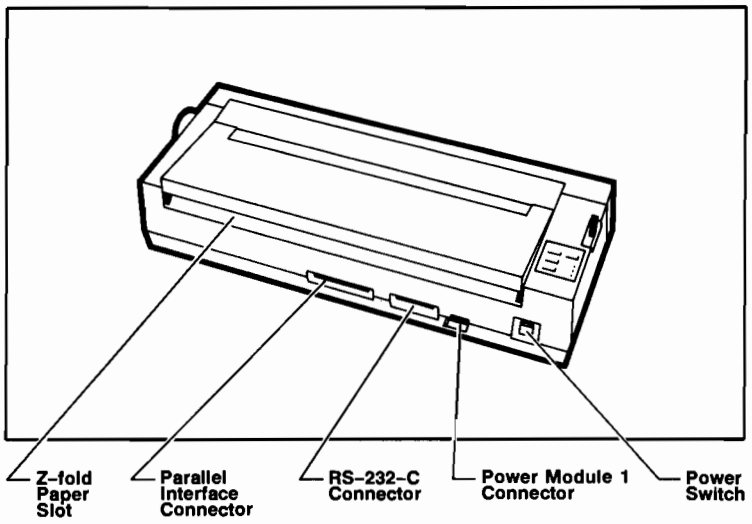

Figure 1-3. HP QuietJet Rear View

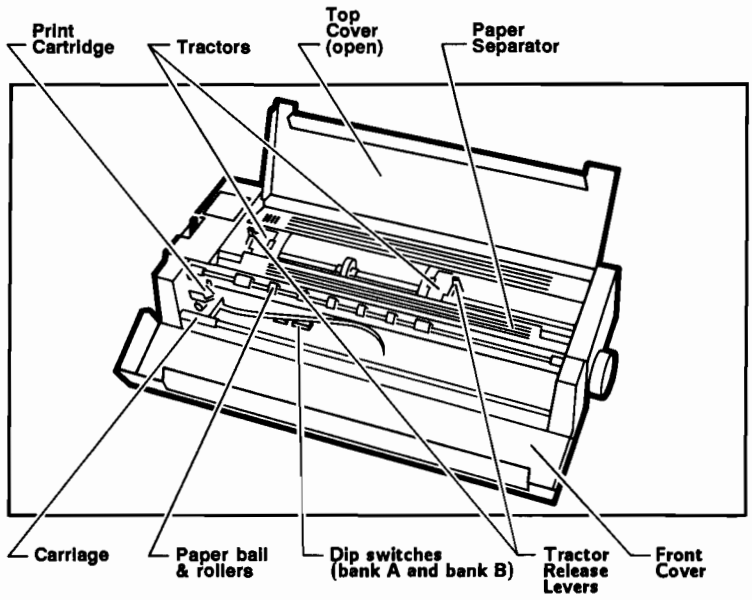

Figure 1-4. HP QuietJet Internal View

Keypad Lights and Keys

This section explains the functions of the HP QuietJet keypad lights and keys. For more explanation, see the HP QuietJet Owner's Manual, P/N 02227-90012.

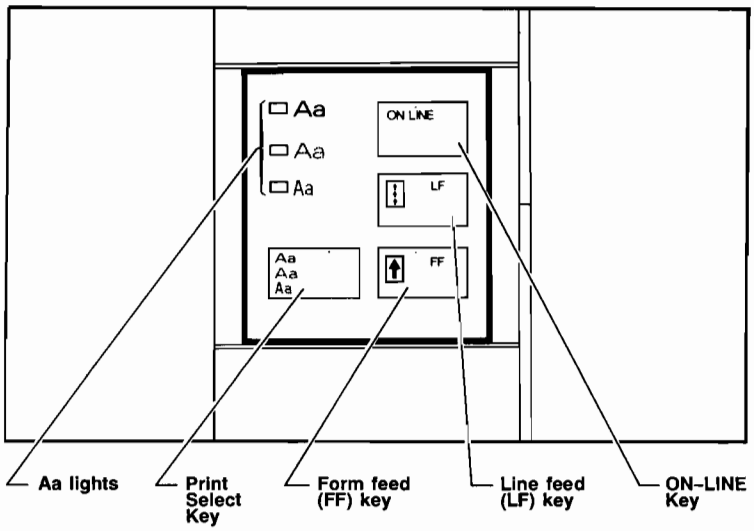

Figure 1-5. HP QuietJet Keypad

Aa Lights

The HP QuietJet Printer has three keypad LEDs labeled "Aa" to indicate one of the following four conditions:

- Selected print mode when the printer is on-line (single LED on)
- Off-line (slow sequential flashing)
- Operating error condition (rapid sequential flashing)
- Self test failure (single LED flashing)

There is no power light on the keypad but one of the three keypad lights will be on or flashing to indicate a power-on condition. The Aa lights are updated whenever the print mode changes.

When the printer is on-line, the LED lit indicates the selected print pitch (top LED for near letter quality, middle LED for draft mode, lower LED for compressed print). All selected print pitches 15 cpi and higher are indicated with the compressed print LED only.

An off-line condition is indicated by a slow sequential flashing of the Aa lights. The printer will complete the present line of print prior to going off-line. Press the ON-LINE key to return the printer to the print pitch selected prior to the off-line condition.

A rapid sequential flashing of the Aa lights indicates an operating error condition:

1. Out-of-paper
2. Carriage position lost

If an out-of-paper condition is detected, the printer goes off-line and the Aa Lights will begin a rapid sequential flashing. Once paper is installed, the Aa lights will display the off-line condition by a slow sequential flashing. Pressing the ON-LINE key will reset the top-of-form (TOF) position then return to the selected print pitch prior to the paper-out condition. Top-of-form is set only when the ON-LINE key is pressed after an out-of-paper condition or at power-on.

For more information on operating and self test errors, see Chapter 8, Troubleshooting.

ON-LINE Key

The ON-LINE key, sensed all the time (except during home seeking), toggles the printer between an on-line and off-line condition. The printer will finish executing the present line of print before going off-line. An off- line condition is indicated by a slow sequential flashing of the keypad Aa lights. One Aa light on steady indicates an on-line condition and the selected print mode of near letter quality, draft, or compressed.

Pressing the ON-LINE key after the printer detected an out-of-paper condition and paper is reinstalled sets the top-of-form position.

Line Feed (LF) Key

The line feed key, sensed between lines of print and when the printer is idle, advances the paper one line and pauses. If the key remains pressed after the pause period, it automatically repeats paper advancement until the key is released.

Pressing the line feed key, turning the printer on, th n releasing the line feed key initializes the printer self test.

Form Feed (FF) Key

The form feed key, sensed between lines of print and when the printer is idle, advances paper to the next top-of-form position provided dip switch A4 is set for the correct page length (11 or 12 inches).

Print Mode Select Key

Pressing the print mode select key selects draft, NLQ, or compressed print. Keypad Aa lights indicate the selected print mode. The print mode key is sensed between lines of print and when the printer is idle. The printer powers up in the draft mode. Pressing the print mode select key cycles the print mode in the following order:

1. Normal pitch (10 or 12 cpi depending on the setting of switch A2) in draft mode.
2. Normal pitch (switch A2 dependent) in near letter quality mode
3. Compressed print in draft mode

Note NLQ is not available in compressed print. Print mode software commands override operator keypad selections.

Test Equipment and Tools

The following tools and equipment are recommended for proper HP QuietJet Printer maintenace and repair:

Posi-drive screwdriver (PZ1)
DVM, HP 3435A or equivalent
Oscilloscope, HP 1741A or equivalent
Logic probe, HP 545A or equivalent
Fuse module, P/N 02227-60003
Long nose pliers
Diagonal cutters
Paper clip

Supported Equipment

The HP QuietJet Printer programming command sets of HP PCL Level 1 and select IBM/Epson control sequences provide user compatibility with a wide variety of hardware and software applications. Many software packages require a printer driver selected from a printer driver list. This allows the software package to utilize the printer's capabilities. If **QuietJet** is not on the list, pick one of the following (listed in order of preference):

- HP ThinkJet (HP 2225A)
- HP 82906A
- HP 2932A
- HP 82905B
- IBM Graphics Printer
- IBM ProPrinter
- Epson MX-80 or MX-100
- Epson FX-80 or FX-100

If one of the above HP printers is specified, select the HP PCL command set by setting switch A5 down. If you choose an IBM printer, Epson printer, or HP ThinkJet printer with the software package requesting alternate mode, choose the select IBM/Epson control sequences by setting switch A5 up. See Figure 1-4 or Figure 3-1 for switch A5 location.

Note

The select IBM/Epson control sequences is a subset of the printer industry command set and may not recognize all commands sent by the host.

Support Strategy

The HP QuietJet Printer can be repaired to the component or assembly level by technically trained service personnel. The logic PCA (printed circuit assembly) can be ordered and replaced as an assembly. A surface mounted device (SMD) custom IC on the PCA cannot be replaced to the component level. The QuietJet print head voltage (VHD) cannot be adjusted by field service and the PCA must be replaced if VHD is out of tolerance.

For identifying or ordering parts/assemblies, see Chapter 9, Replaceable Parts. Information on the internal self tests and troubleshooting can be found in Chapter 8, Troubleshooting.

2 Site Planning and Requirements

Introduction

This chapter contains important information, defining:

- Physical Specifications
- Electrical Specifications
- Environmental Specifications
- Product Certifications

This information will help to determine if the desired operating location satisfactorily meets HP QuietJet Printer requirements.

Physical Specifications

QuietJet

Dimensions	395mm W x 118mm H x 214mm D (15.5" W x 4.65" H x 8.43" D)
Weight	< 4.3kg (9.46 lbs)

QuietJet Plus

Dimensions	527mm W x 121mm H x 221mm D (20.75" W x 4.76" H x 8.7" D)
Weight	< 4.3kg (9.46 lbs)

Electrical Specifications

Power Capabilities (supplied by Power Module 1 adapters)

Input Specifications

100, 120, 220, or 240VAC (+/- 10%)

47.5 to 66Hz

Output from Power Module 1 (open circuit specifications)

20VAC +/- 14% (sec1 to sec2 with centertap)

40VA

Power Consumption

18 watts (printing)

10 watts (idle)

Environmental Specifications

Temperature

Operating

10 to 40 deg C

Operating Survival

10 to 55 deg C

Non-operating

-20 to 60 deg C

Relative Humidity

Operating

10 to 90% RH @ 40 deg C

Non-operating

90% RH @ 60 deg C

Altitude

Operating

0 to 4600 meters

Non Operating

0 to 15300 meters

Electro-Static Discharge (ESD)

<15kV

No catastrophic failure

Probe Specifications

300 pF & 100 Ohms

Accoustic Measurement Per ISO DP7779

Sound Power-LwA

5.85 Bels

Sound Pressure-LpA

48.5 dBA @ 1 meter

BTU Output

61.5 BTU/hr

Product Certifications

The HP QuietJet Printer complies with the following product certification requirements:

- **SAFETY**
  - UL 478
  - CSA 22.2-154 M/1983
  - IEC 380
  - IEC 435
  - VDE 0806
  - Spain 1251/85
- **EMI**
  - FCC Class B
  - VDE Level B

Warning 

Print cartridge ink contains 50% Diethylene Glycol. Harmful if swallowed. Keep out of reach of children.

Electro-Static Discharge (ESD)

<15kV

No catastrophic failure

Probe Specifications

300 pF & 100 Ohms

Accoustic Measurement Per ISO DP7779

Sound Power-LwA

5.85 Bels

Sound Pressure-LpA

48.5 dBA @ 1 meter

BTU Output

61.5 BTU/hr

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- **SAFETY**
  - UL 478
  - CSA 22.2-154 M/1983
  - IEC 380
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  - VDE 0806
  - NEMKO
  - FEI
  - Spain 1251/85
- **EMI**
  - FCC Class B
  - VDE Level B

Warning 

Print cartridge ink contains 50% Diethylene Glycol. Harmful if swallowed. Keep out of reach of children.

3 Installation and Configuration

Introduction

This chapter contains the following information for installing and configuring the HP QuietJet Printer:

- Setting Up the HP QuietJet
  - Items Included
  - Setup Instructions
- Installing Optional Memory (RAM & Character ROMs)
- HP QuietJet Switches
- Cabling and Configuration

See Figure 1-2, 1-3, and 1-4 in Chapter 1 for part identification. More detailed setup and configuration information can be found in the HP QuietJet Printer Owner's Manual, P/N 02227-90012.

Setting up the HP QuietJet

Items Included

HP QuietJet Printers are shipped with the following items:

- Power Module 1
- 50 sheets of z-fold ink jet paper
- Print Cartridge
- Owner's manual

See Table 1-1, HP QuietJet Accessories, for item part numbers.

Setup Instructions

To setup the HP QuietJet:

1. **Connect Power Module 1:**

   A. Set the power switch to the OFF position.

   B. Attach Power Module 1 to the printer's backpanel power connector. The shape of the power module connector and tabs around the printer's backpanel power connector reduces the possibility of attaching Power Module 1 incorrectly.

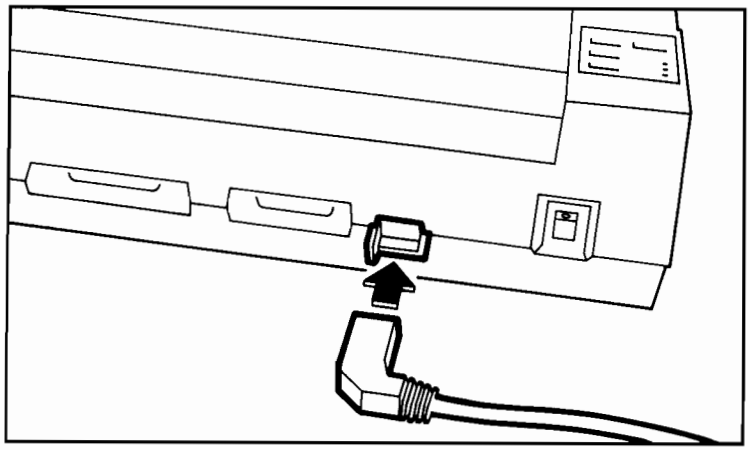


Figure 3-1. Connecting Power Module 1

   C. Plug the other end of Power Module 1 into the wall receptacle.

2A. **To load z-fold feed paper:**

   A. Disengage the paper release lever (lever forward).

   B. Open the front cover.

   C. Open the paper bail by pulling it away from the platen.

   D. Swing the top cover open.

E. Unlock both tractors (tractor release levers back) and open the tractor feed gates.

F. Slide the paper below the open top cover to the tractors.

G. Attach the paper to the tractors and close the tractor feed gates.

H. Horizontally position the paper by sliding the tractors to the right or left. With the paper taut, lock the tractors in position (tractor release levers forward).

I. Turn the paper advance knob until paper is visible in front of the platen and above the paper bail.

J. Close the paper bail, top cover, and front cover.

K. Turn the paper advance knob to position the top edge of paper at the tear window.

2B. To install cut sheet paper:

A. Remove any z-fold paper from the printer and close the top cover.

B. Engage the paper release lever (lever toward back).

C. Open the front cover. Open the paper bail by pulling it away from the platen.

D. Place the paper through the top cover cut sheet paper slot, allowing the paper to contact the platen.

E. Turn the paper advance knob knob until paper is visible in front of the platen and above the paper bail.

F. Close the paper bail and front cover. The paper can be repositioned by disengaging the paper release lever (lever forward), sliding the paper to the desired location, and engaging the paper release lever (lever back).

G. Turn the paper advance knob to position the top edge of paper at the tear window.

3. **Install the print cartridge:**

   A. Open the front cover.

   B. Open the print cartridge container.

   C. Lower the carriage latch.

   D. Prime the print cartridge. See Chapter 4 on "Print Cartridge Maintenance" for priming and cleaning instructions.

   E. Place the print cartridge in the carriage.

   F. Raise the carriage latch, ensuring that it is in a fully locked position.

   G. Close the front cover.

4. **Run the self-test:**

   A. Press and hold the line feed key while turning the power switch on.

   B. Release the line feed key.

The draft LED will turn on and the printer will print one page of characters (depending on the character set selected). For more self-test information, see Chapter 8, Troubleshooting.

Installing Optional Memory

The HP QuietJet Printer can have additional RAM installed for downloadable character sets or additional buffer space. Additional 16K or 32K ROMs can be installed on the PCA to provide optional character sets or a demonstration ROM called "Demo ROM". **This optional RAM and ROM is not operator installable. Optional memory must be installed by authorized HP service personnel only.** An 8K RAM part number for downloadable character sets can be found in Table 1-1, HP QuietJet Printer Accessories. For more optional memory information and specifications, see Chapter 5 section labeled "Memory".

To install RAM or ROM in the HP QuietJet Printer:

1. Turn the printer off **and disconnect Power Module 1 from the printer.**

2. Remove the printer enclosure and PCA (See Removal 6.A and 6.B in chapter 6).

3. Remove the shield from the PCA.

4. Install optional ROM in IC location U5 or U4 (U10 or U9 on REV B or REV D PCAs), as shown in Figure 3-2. Install optional RAM in IC location U5 or U4 (U10 or U9 on REV B or REV D PCAs), as shown in Figure 3-3. Remember, 8K RAM cannot be installed in location U4 (U9 on REV B or REV D PCAs) unless an 8K RAM is installed in U5 (U10 on REV B or REV D PCAs).

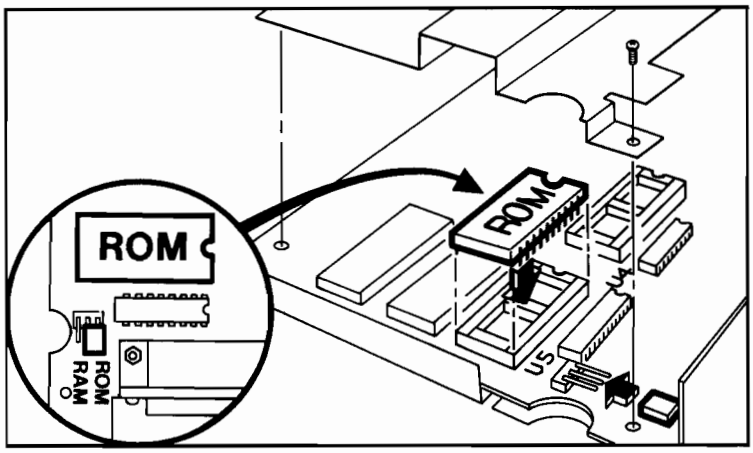


Figure 3-2. Installing Optional ROM

Caution 

Note the IC orientation and be extremely careful not to bend legs under the chip when pressing the RAM or ROM into an IC socket.

5. Connect jumper J7 (J5 on REV B or REV D PCAs) pins labelled "ROM" if a 16K ROM, 32K ROM, or Demo ROM is installed in IC location U5 (see Figure 3-2). Connect jumper pins labelled "RAM" if 8K RAM is installed in U5 (see Figure 3-3).

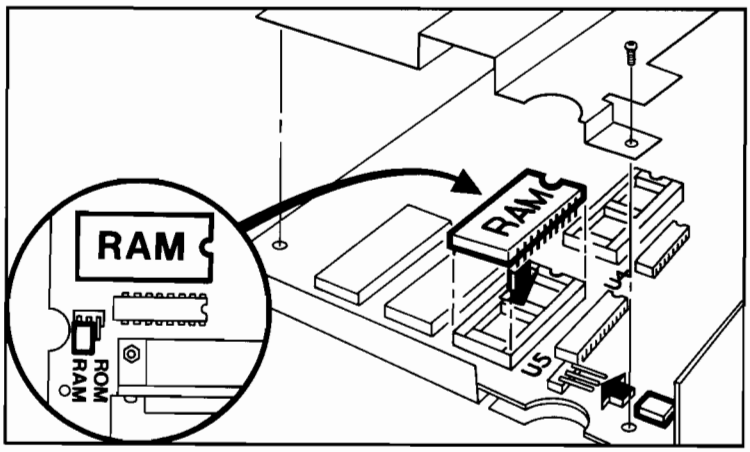


Figure 3-3. Installing Optional RAM

6. Attach the shield to the PCA.

7. Install the PCA in the printer and attach the enclosure to the printer.

Verifying Optional Memory

The printing self test verifies optional memory by printing the amount of usable RAM and/or functional ROM fonts installed. The base printer has 2K of RAM. Two additional 8K RAMs may be installed, totaling 18K of RAM. If the first of these 8K RAM fails (U5 except REV B or REV D PCAs), the printer is unable to use either 8K RAM and the self test will print 2K of RAM available. If the second 8K RAM fails (U4 except REV B or REV D PCAs), the printer is able to use the first 8K RAM (U5) and the self test will print 10K of RAM.

To invoke the printing self test, turn the printer off, press the LF key on the keypad, turn the printer on, then release the LF key. An alternate method is sending an Esc z to the printer (HP mode only).

HP QuietJet Switches

This section explains the HP QuietJet dip switch functions. These dip switches, located below the platen, are accessible with the front cover open (see Figure 1-4). DIP switch settings are updated while the printer is idle. Tables 3-1, 3-2, 3-3, and 3-4 define the HP QuietJet Printer switch settings.

Note

Switch settings for specific host devices are shown later in this chapter under "Cabling & Configuration".

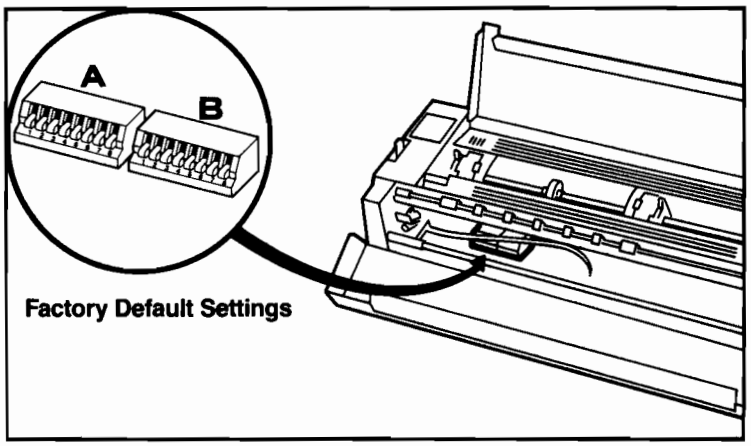


Figure 3-4. DIP Switch Identification

The left dip switch bank "A" and right dip switch bank "B" are numbered 1- 8, from left to right respectively. Therefore, a dip switch is identified by the letter A or B (indicating the dip switch bank) followed by a number (indicating the switch on the bank). For example, the second dip switch from the left on the left bank is A2.

Table 3-1. DIP Switch Definitions

DIP SWITCH NUMBER	SWITCH FUNCTION	SWITCH POSITION DOWN	UP
A1	Carriage Return Definition	CR=CR only	CR=CR and LF
A2	Normal (Default) Pitch	10 cpi	12 cpi
A3	Perforation Skip	Disabled	Enabled
A4	Page Length	11"	12"
A5	Programming Command Set	HP PCL Level I	Epson
A6 A7 A8 B1	Character Set Selection	See Table 3-2	
B2	RS 232-C Handshake	XON/XOFF	DTR
B3 B4	RS 232-C Parity	See Table 3-3	
B5 B6	RS 232-C Baud Rate	See Table 3-4	
B7	Out-of-Paper Detection	Enabled	Disabled
B8	Width Detection/Print Region	13.2"	8"

Note

In the select IBM/Epson control sequence mode, line feeds are executed as a line feed plus carriage return and wrap around mode is enabled. In HP PCL mode, line feeds do not imply a carriage return and wrap around mode is disabled.

Table 3-2. Character Set Selection

Character Set	A6	A7	A8	B1
Roman8	down	down	down	down
ANSI ASCII	up	down	down	down
Swedish	down	up	down	down
IBM8 (US version)	up	up	down	down
French	down	down	up	down
German	up	down	up	down
United Kingdom	down	up	up	down
Spanish	up	up	up	down
IBM8 (Den./Norway)	up	up	down	up
Norwegian	down	down	up	up
Italian	up	up	up	up

Table 3-3. RS 232-C Parity Selection

B3	B4	Parity	Word Length
down	down	None	8 bits
down	down	Zero	7 bits
down	up	Odd	7 bits
up	down	Even	7 bits
up	up	One	7 bits

Table 3-4. RS 232-C Baud Rate Selection

B5	B6	Baud Rate
down	down	9600
down	up	19.2K
up	down	2400
up	up	1200

Cabling and Configuration

The interface cable, connecting the HP QuietJet to your computer, is dependent on the computer. The cable is not supplied with the printer. It must be purchased separately. **To comply with FCC regulations in the USA and minimize radio frequency interference, use only shielded interface cables.**

Note

The HP QuietJet Printer has a Centronics-Parallel and RS 232-C interface. If your computer has both parallel and RS 232-C ports available, we recommend that you use the parallel port to connect the printer. Many software packages assume your printer is on the parallel port.

Note

Do not attempt to transmit data from the host devices to both printer ports simultaneously. Plugging cables into both interface connectors simultaneously will not damage the printer but using both ports at the same time may result in erratic performance and increased radio frequency interference.

HP Vectra PC

Parallel Interface

Connect interface cable HP 24542D when using the HP 24540A Parallel Interface Card. From the DOS prompt (A> or C>) enter the following commands to avoid possible timeouts:

```
MODE LPT1:,,P
```

Serial Interface

Connect interface cable HP 24542G if using the HP 24540A Serial/Parallel Dual Interface Card or port 1 on the HP 24541A Dual Serial Interface Card. Connect interface cable HP 13242G if using port 2 on the HP 24541A Dual Serial Interface Card.

From the DOS prompt (A> or C>) enter the following commands:

1. **MODE COM1:96,N,8,1,P** then press the **Enter** key.

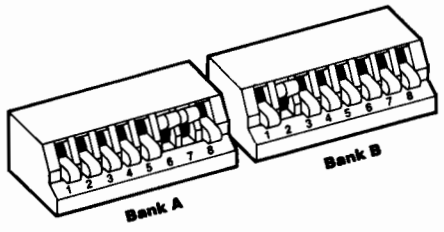
   - This command sets the serial communications at 9600 baud, no parity, 8 data bits, and 1 stop bit.

2. **MODE LPT1:=COM1:** then press the **Enter** key.

   - This command directs the primary communication to the first serial port.

Refer to your DOS manual for more information on the MODE command. If your printer is connected to the second serial port, change COM1 to COM2 in the two previous DOS commands.

Set the HP QuietJet Printer dip switches as follows:



To Verify

To verify that your printer is connected properly, type something on your screen and copy it to your printer by doing the following:

1. Make sure the printer and PC are ON.

2. Make sure that a DOS disk is in drive A, or on the hard disk. If you are using the serial interface, make sure the above MODE commands have been executed.

3. Hold down the **Shift** key and press the **PrtSc** key.

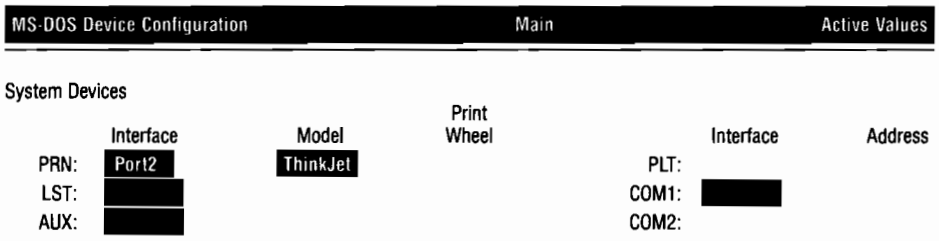
All text on the screen will print.

HP Touchscreen or HP 150

Connect interface cable HP 13242G between port 2 on the HP Touchscreen computer and the QuietJet Printer RS-232-C connector. From P.A.M.:

1. Select **DEVICE CONFIG** then **Start Applic.** The menu below will appear.

2. Ensure that the values displayed relect those given in the fields below.



Only the fields associated with the operation of QuietJet have values displayed in them. Refer to your PC's manual for information on changing the values in the fields.

3. Once the changes, if any, have been made, save the information by pressing the **Save Config** key (f4). After saving the changes press **Exit Config** (f8) to return to P.A.M.

Next, from P.A.M.

1. Press the **Terminal** key (f6), then the **User System** key followed by the **device control** (f1) and "to" **devices** (f2) keys.

2. Ensure that an asterisk (*) appears in the **Serial Device** (f2) field. Do this by pressing the function key corresponding to the field.

3. Press the **User System** key again, then press **config keys** (f8) and **port2 config** (f4).

4. The following menu will be displayed. Press the **system default** key (f4) then the **DEFAULT VALUES** key (f4).

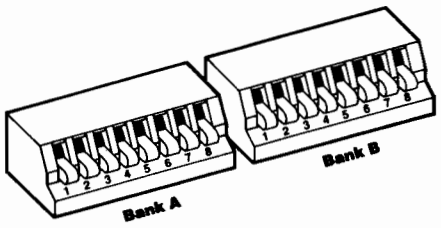
Ensure that the values displayed on your screen reflect those shown in the menu fields below. Only those fields that are associated with the operation of your printer are given; all other fields have been left blank. Refer to your PC's owner's manual for information on changing the values in the fields. Remember to save the values once the changes have been made by pressing the **SAVE CONFIG** key (f1). Return to P.A.M. by holding down the **Shift** key and pressing the **Stop** key.

Terminal Config. Screen

FULL DUPLEX HARDWIRED Port 2

BaudRate	9600	Parity	None	DataBits	8			Clock	INT
Asterisk	Off			Stop Bits	1	EnqAck	No		
TR(CD)	Hi	Check Parity	No	SR(CH)	Lo				
RecvPace	None			SRRXmit	No	RR(CF)Recv	No		
XmitPace	Xon/Xoff			SRRInvert	No	CS(CB)Xmit	No	DM(CC)Xmit	No

To ensure that your Touchscreen PC is using these new settings, hold down the **CTRL** and **Shift** keys while pressing the **Reset/Break** key. This will reset your PC. Set the HP QuietJet Printer dip switches as follows:



To Verify

From P.A.M.

1. Select **MSDOS COMMANDS**, then press **Start Applic.**
2. Once the **A>** system prompt appears, type **dir>prn**, then press the **Return** key. This will cause the directory of the disc in drive A to print.
3. Type **Exit**, then press the **Return** key. This will return you to P.A.M.

HP Portable

Connect Cable HP 92221P between your HP Portable and the HP QuietJet Printer.

From the P.A.M., press the **Datacom Config** key and ensure that the following fields in the Datacom Configuration menu reflect the values given below. Press **Exit Config** after the changes have been made.

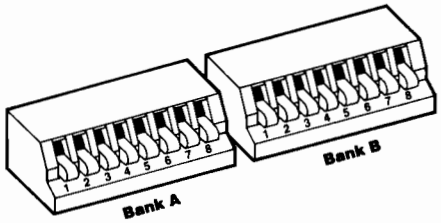
Serial port: RS-232
Serial Baud rate: 9600
Serial word length: 8
Serial stop bits: 1
Serial parity: None
Serial XON/XOFF pacing: On
Serial CTS line: Ignore
Serial DSR line: Ignore
Serial DCD line: Ignore

System Set Up

From P.A.M., press the **System Config** key and ensure that the following fields in the System Configuration Menu reflect the values given below. Press **Exit Config** after the changes have been made.

Printer: HP Graphics/Alpha
Printer Interface: Serial
Print Pitch: No config
Print line spacing: No config
Printer skip perf: No config

Set the HP QuietJet Printer dip switches as follows:



To Verify

From P.A.M.:

1. Select **DOS Commands** using the **TAB** key, then press **Start Applic** (f1) key.

2. Once the **A>** system prompt appears, type **dir>prn**, then press **Return**. This will cause the directory of the internal disc A to print.

3. Type **exit**, then press the **Return** key to return to the P.A.M. screen.

HP Portable Plus

Connect cable HP 92221P between the HP QuietJet Printer and the Portable Plus Computer.

Datacom Set Up

From the P.A.M., press the **Datacom Config** key and ensure that the following fields in the Datacom Configuration Menu reflect the values shown below. Press **Exit Config** after the changes have been made.

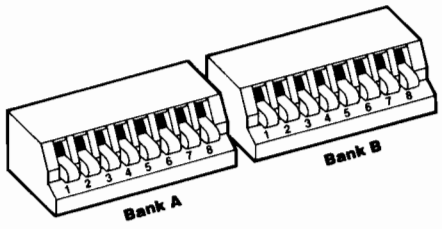
Transmission rate (BPS): 9600
Word Length (bits): 8
Stop bits: 1
Parity: None
XON/XOFF Pacing: ON
CTS line: Ignore
DSR line: Ignore
DCD line: Ignore

System Set Up

From P.A.M., press the **System Config** key and make sure that the following fields in the System Configuration Menu reflect the values shown below. Press **Exit Config** after the changes have been made.

Printer Interface: Serial
Printer Mode: Alpha and HP Graphics
Print Pitch: No Configuration
Print line spacing: No Configuration
Print skip perf: No Configuration

Set the HP QuietJet Printer dip switches as follows:



To Verify

From P.A.M.:

1. Select **DOS Commands, then press Start Applic** (f1) key.
2. Once the **A>** system prompt appears, type **dir>prn**, then press **Return.** this will cause the directory of the internal disc A to print.
3. Type **exit**, then press the **Return** key to return to the P.A.M. screen.

HP 2392 & 2394 Terminals

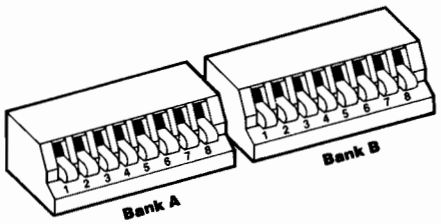
Connect interface cable HP 13242G or 40242G if you are using the terminal's serial interface. Connect interface cable HP 13242D or 40242D if you are using the terminal's parallel interface.

To configure the terminal's port to work with your HP QuietJet Series Printer, press the **User System** key. Next, press the **config keys** (f8) and the **ext dev config** key (f4). The External Device Configuration Menu will be displayed. Ensure that the display of settings reflect those shown below. the same settings can be used for both serial and parallel interfaces. Be sure to exit this display by pressing **Save Config** (f1).

EXTERNAL DEVICE CONFIGURATION

BaudRate	9600	Parity/DataBits	None/8	PrinterNulls	000
PrinterType	ROMAN8	SRRXmit	NO		
XmitPace	Xon/Xoff	SRRInvert	NO	CS(CB)Xmit	NO

Set the HP QuietJet Printer dip switches as follows:



To Verify

To verify that your printer is connected properly, type something on the screen and copy it ot your printer by doing the following:

1. Press the **User System** key.
2. Press the **modes** key.
3. Press **REMOTE MODE** key (f4) until the asterisk (*) disappears from the REMOTE MODE label on the screen. This selects Local Mode.
4. Press **AUTO LF** (f8) until the asterisk (*) disappears from the AUTO LF label on the screen. This deselects automatic line feeding.
5. Type **This is a Test!** and press the **Return** key.
6. Hold down the **Shift** key and press the **Print Enter** key. **This is a test!** will print.
7. Press **REMOTE MODE** (f4) until the asterisk (*) appears in the REMOTE MODE label, then press the **User System** key to return the terminal to normal operation.

HP 2393 & 2397 Terminals

Connect interface cable **HP 13242G** or **40242G** if you are using the terminal's serial interface. Connect interface cable **HP 13242D** or **40242D** if you are using the terminal's parallel interface.

To configure your terminal to work with your **HP QuietJet Printer**, press the **System** key twice. Next, press the key labeled **config keys**, then the **ext dev config** key. When you press the **ext dev config** key, one of the following menus will be displayed: If your terminal has a serial interface connector, the External Serial Device configuration Menu will be displayed; if your terminal has a parallel interface connector, the External Parallel Device Configuration menu will be displayed. Ensure that the values displayed reflect those shown below for your terminal's interface. When the changes have been made, save the new configuration by pressing the **SAVE CONFIG** key.

EXTERNAL SERIAL DEVICE CONFIGURATION

BaudRate	9600	Parity/DataBits	None/8			PrinterNulls	0
XmitPace	Xon/Xoff	SRRXmit	No	CS(CB)Xmit	No	DM(CC)Xmit	No
		SRRInvert	No	Protocol	HP		

GRAPHICS PRINTOUT

Contents	B&W	Invert B&W	Yes	Image Size	X1	Layout	Vert

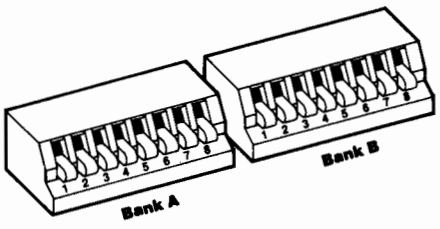
EXTERNAL PARALLEL DEVICE CONFIGURATION Port 2

				Protocol	HP		

GRAPHICS PRINTOUT

Contents	B&W	Invert B&W	Yes	Image Size	X1	Layout	Vert

Set the **HP QuietJet** dip switches as follows:



To Verify

To verify that your printer is connected properly, type something on the screen and copy it to your QuietJet Printer by doing the following:

1. Press the **User System** key.
2. Press the **modes** key (f4).
3. Press the **REMOTE MODE** key (f4) until the asterisk (*) disappears from the REMOTE MODE label on the screen.
4. Press **AUTO LF** (f8) until the asterisk (*) disappears from the AUTO LF label on the screen. This deselects automatic line feeding.
5. Type **This is a Test!** and press the **Return** key.
6. Hold down the **Shift** key and press the **Print Enter** key. **This is a Test!** will print out on your QuietJet Printer.
7. Press **REMOTE MODE** (f4) until the asterisk (*) appears in the REMOTE MODE label. Press the **User System** key to return the terminal to normal operation.

IBM PC Family & Compatibles

Follow the instruction below for the type of interface you will be using with your HP QuietJet Series Printer.

Parallel Interface

Connect interface cable HP 24542D when using the parallel interface. From the DOS prompt enter the following command to eliminate possible timeouts:

```
MODE LPT1:,,P
```

Serial Interface

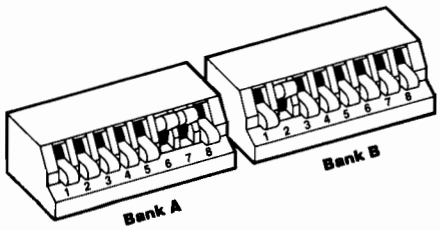
Connect interface cable HP 13242H or HP 17255D when using the IBM Asynchronous Communications Adaptor. Connect interface cable HP 24542G when using the Serial/Parallel Dual Interface Card on the PC AT.

From the DOS prompt (A> or C>) enter the following commands:

1. **MODE COM1:96,N,8,1,P** then press the **ENTER** key.
   - This command sets the serial communications to 9600 baud, no parity, 8 data bits, and 1 stop bit.
2. **MODE LPT1:=COM1:** then press the **ENTER** key.
   - This command directs the primary printer communication to the first serial port.

Refer to your DOS manual for more information on the MODE command. If your printer is connected to the second serial port, change COM1 to COM2 in the two DOS commands above.

Set the HP QuietJet Printer dip switches as follows:



To Verify

To verify that your printer is connected properly, type something on your screen and copy it to your printer by doing the following:

1. Make sure that the printer and PC are ON.
2. If you are using the serial interface, make sure that the previous MODE commands have been executed.
3. Hold down the **SHIFT** key and press the **PrtSc** key.

All text on the screen will be printed.

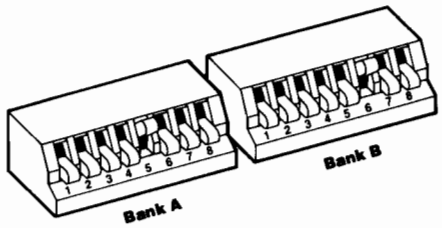
Apple Macintosh (JetStart)

You can run your HP QuietJet Printer from the Macintosh personal computer with the help of Jetstart, SoftStyle's software package that modifies the standard Macintosh printer driver to correctly drive QuietJet.

Your Jetstart manual contains easy-to-follow instructions on using Jetstart to modify your application disks. Simply open Jetstart, select the appropriate printer setup, and insert the application disk you want to alter.

The HP QuietJet Printer uses the standard Imagewriter cable or HP 92219M.

Set the HP QuietJet Printer dip switches as follows:



Refer to the chapter "More on Using Jetstart" in the Jetstart manual for futher information on the recommended switch settings

To Verify

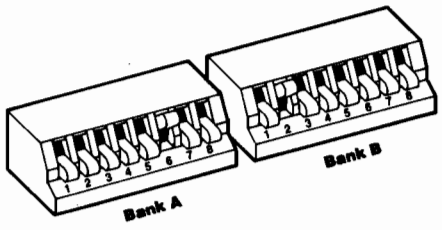
To verify the configuration, insert an application disk that has been modified by Jetstart. For example, insert MacWrite, begin the application and type something on the screen. The entire screen can be copied to the printer by doing a print screen. For information on printing the entire screen, refer to "Test the Printer" in the "How to Begin" chapter of your Jetstart manual.

Jetstart is available from your nearest HP dealer, HP Computer supplies Operation, or a SoftStyle dealer.

Apple IIc

Connect the HP QuietJet Printer to the Apple IIc using the HP 92219N Serial Printer Cable or Apple Serial Printer Interface Cable (Apple Part Number 590-0191-A).

Set the HP QuietJet Printer dip switches as follows:



To Verify

The following BASIC program will verify proper connection between computer and printer. This program will run properly only if DOS is loaded. Type:

```
10 REM CONNECTION VERIFICATION
20 PRINT CHR$ (4);"PR#1"
30 FOR I=0 to 10
40 FOR J=33+I TO 111+I
50 PRINT CHR$ (J);
60 NEXT J
70 PRINT
80 NEXT I
90 PRINT
100 PRINT CHR$ (4);"PR#0"
110 END
```

Type **RUN** and press **RETURN**. The following will print:

```
]RUN
!"#$%&()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]_abcdefghijklmno
"#$%&()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]_abcdefghijklmnop
#$%&()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]_abcdefghijklmnopq
$%&()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]_abcdefghijklmnopqr
%&()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]_abcdefghijklmnopqrs
&()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]_abcdefghijklmnopqrst
()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]_abcdefghijklmnopqrstu
)*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]_abcdefghijklmnopqrstuv
*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]_abcdefghijklmnopqrstuvw
+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]_abcdefghijklmnopqrstuvwx
```

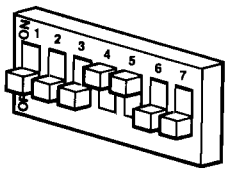
Apple IIe

Follow the instructions below for the type of interface you will be using with your HP QuietJet Series Printer.

Parallel Interface

Connect Apple parallel printer interface cable (Apple Part Number 590-0042) or equivalent between the Apple computer and the HP QuietJet printer.

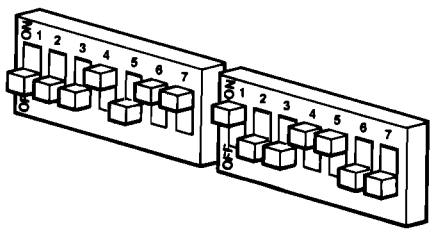
Set the configuration switches on the Parallel Interface Card according to the illustration below, and install the board into slot 1 as instructed in chapter 1 of the Parallel Interface Card Installation and Operating Manual.



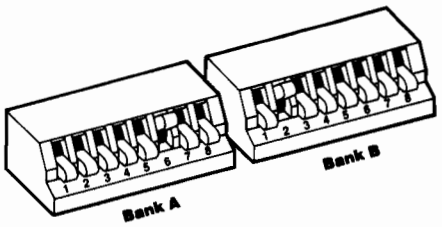
Serial Interface

Connect interface cable HP 17355M (or Apple cable Part Number 590-0037) between the Apple computer and the HP QuietJet Printer.

Set the configuration switches on the Super Serial Card to match the following illustration and install the card in slot 1 as instructed in the Super Serial Card Installation and Operating Manual.



Set the HP QuietJet Printer dip switches as follows:



To Verify

The following BASIC program will verify proper connection between computer and printer. this program will run properly only if DOS is loaded.

```
10 REM CONNECTION VERIFICATION
20 PRINT CHR$ (4);"PR#1"
30 FOR I=0 to 10
40 FOR J=33+I TO 111+I
50 PRINT CHR$ (J);
60 NEXT J
70 PRINT
80 NEXT I
90 PRINT
100 PRINT CHR$ (4);"PPO"
110 END
```

Type **RUN** and press **RETURN**. The following pattern will print.

```
]RUN
!"#$%&()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]_abcdefghijklmno
"#$%&()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]_abcdefghijklmnop
#$%&()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]_abcdefghijklmnopq
$%&()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]_abcdefghijklmnopqr
%&()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]_abcdefghijklmnopqrs
&()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]_abcdefghijklmnopqrst
()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]_abcdefghijklmnopqrstu
)*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]_abcdefghijklmnopqrstuv
*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]_abcdefghijklmnopqrstuvw
+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]_abcdefghijklmnopqrstuvwx
```

4 Preventive Maintenance

Introduction

This chapter contains information to aid in maintaining the HP QuietJet Printer. Information is arranged in the following order:

- Maintenance Philosophy
- Print Cartridge Maintenance
- Visual Checks
- Cleaning

Maintenance Philosophy

The HP QuietJet does not require periodic maintenance. However, it is a good practice to visually check and clean the printer routinely, as explained in this chapter.

The print cartridge should be primed and wiped prior to installation. If a printout is missing a row or rows of dots, replace or clean the print cartridge as explained in the section labeled "Print Cartridge Maintenance".

Print Cartridge Maintenance

Maintaining the HP QuietJet disposable print cartridge is easy and convenient. If dots are missing on a printout, remove the print cartridge from the printer. Likely, one of five print cartridge problems occurred:

1. Carriage latch not closed tightly to push the print cartridge against the carriage contacts.
2. The print cartridge requires priming.
3. The print cartridge ran out (or is running out) of ink.
4. Dust is clogging the print cartridge orifice plate (chrome square area).
5. Dirty contacts on the print cartridge or printer's carriage.

Warning 

Ink contains 50% Diethylene Glycol. Harmful if swallowed. Keep out of reach of children.

If the bladder looks similar to Figure 4-1, the print cartridge is out of ink and needs replacement. For the replacement print cartridge number, see Table 1-1 on HP QuietJet Accessories or the Hewlett-Packard Computer Users Catalog.

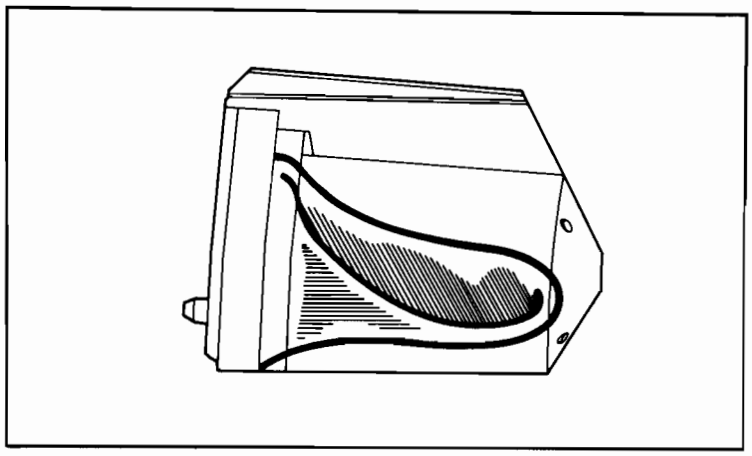


Figure 4-1. Print Cartridge Out-of-Ink Condition

If the print cartridge contains ink and the printout is missing a single dot row, wipe the print cartridge orifice plate with a clean dry tissue to remove any dust clogging the nozzle.

If the printout eventually loses more than one row of dots and the cartridge is not out of ink, the cartridge probably needs priming. Prime and clean the print cartridge as follows:

1. Hold the print cartridge in your hand with the flat surface up.
2. Form a paper clip as shown in Figure 4-2.
3. Insert the modified paper clip in the center hole and press upward until a puddle of ink covers the square chrome orifice plate.

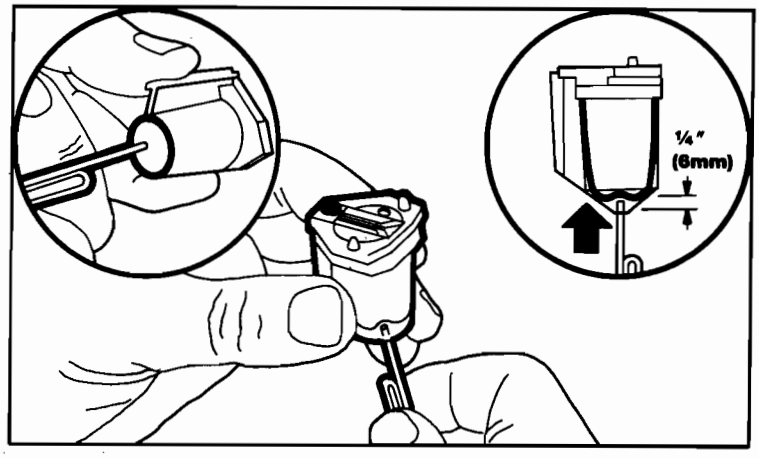


Figure 4-2. Priming the Print Cartridge

4. Wipe the print cartridge flat surface with a clean tissue.

5. Wipe the two columns of contacts on the print cartridge with a clean soft tissue. Clean the carriage contact points with a swab. See Figure 4-3.

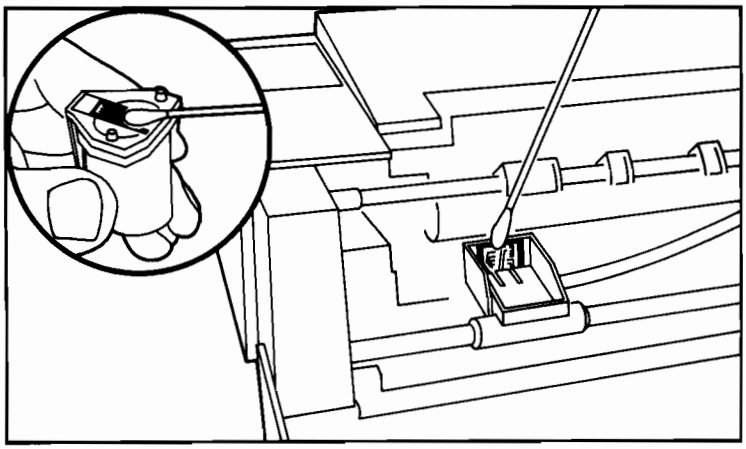


Figure 4-3. Cleaning the Print Cartridge Contact Points

6. Install the print cartridge and verify proper printing operation.

Another possible cause for single or multiple dots missing during printing is the print head voltage (VHD) from the logic PCA. If the print cartridge is replaced but the same dot row is missing, VHD may be damaging the print cartridges. See "Print Head Voltage" in Chapter 8 for instructions on checking VHD..

Cleaning

Appearance

The printer's interior and exterior should be examined for smudges, dust, etc. Clean the exterior with a soft cloth moistened with mild detergent and water. Examine the interior areas with the front cover open. Accumulations of paper or lint should be carefully removed by brushing the loose material onto a cloth, or by using a vacuum cleaner.

The carriage rail can be cleaned with a dry clean cloth. **Do not lubricate the carriage rail.** The oil would mix with the paper lint, forming a paste, hindering and slowing the printer's carriage movement.

Platen

Remove ink from the platen by wiping the platen with platen cleaner, HP P/N 92193T. Turn the paper advance knob to clean the entire platen surface.

Tear Window

Ink or paper dust on the tear window can be removed with a clean soft cloth or tissue. **Do not use any solvent.**

5 Functional Description

Introduction

This chapter contains information to understand the general operation of the HP QuietJet Printer. Open the foldout block diagrams in Chapter 12 to aid in the HP QuietJet functional description.

HP QuietJet Overview

The HP QuietJet has two buffers:

- Raw Data Buffer
- Formatted Buffer

Data is received from the parallel (Centronics) or RS 232-C interface and is initially stored in the raw data buffer. Both interfaces are always enabled. The data is formatted (which is dependent on the selected print mode of draft, compressed, or NLQ) and stored in the formatted buffer, ready for printing. The formatted buffer is much larger than the raw data buffer. Pressing the print mode key causes raw buffer data to be formatted to the new print mode but data in the formatted buffer is not affected.

The printer does not actually begin printing until it has a full line of text or graphics to print. A full line of text is considered to exist once the printer receives any one of the following:

- Back Space
- Carriage Return
- Line Feed
- Form Feed
- Esc = (half line feed command)
- A printing character whose right edge would lie to the right of the right margin.
- Esc E (reset command)
- Esc z (self test command)
- Page length, text length, line spacing, or perforation skip command
- Vertical motion commands
- Download font descriptor or character data
- Esc *b#w/W (raster graphics data transfer)
- Insuffient memory to buffer any more data
- Change to the character placement (superscript or subscript)

A full line of graphics is considered to exist once the printer receives any one of the following:

- Data for the 12th consecutive row of single density raster graphics
- Data for the 24th consecutive row of quad density raster graphics
- Any of the following after one or more rows of raster graphics data:
  - A row or raster graphics data that would exceed the available memory.
  - Line feed preceded by character other than a carriage return.
  - Form feed
  - Any printing character.
- Esc = (half line feed)
- Esc E (reset)
- Esc z (printing self test)
- Page length, text length, line spacing, or perforation skip command
- Vertical motion commands
- Download font descriptor or character data
- Esc *rb/B (raster graphics complete)

Block Level Operation

The HP QuietJet Printer can be divided into the following blocks:

- Power Module 1
- Analog Circuitry
- CPU
- Custom CMOS IC
- Memory
- Keypad and DIP Switches
- Print Cartridge and Stepper Motor Drive Circuitry
- Sensors
- Parallel (Centronics) Interface
- RS 232-C Serial Interface
- Mechanism

Power Module 1

The HP QuietJet Printer uses a power module to transform the input voltage (100, 120, 220, or 240VAC) to 20VAC (sec1 to sec2). These modules consists of a transformer, thermal cutout on the primary winding, and two 4A **non-replaceable fuses** on the secondary winding. A centertap on the secondary winding creates two 10VAC outputs (sec1 to CTAP and sec2 to CTAP). All power module components are sealed in a plastic housing on the power cord and are not replaceable by component.

Analog Circuitry

The HP QuietJet Printer analog circuitry consists of a rectifier, reset, motor supply, voltage reference, Vcc, +12V regulator, -12V surge pump, print head drive, and motor select circuitry.

Rectifier Circuitry

Output from Power Module 1 is rectified to a DC level called Vraw. Vraw is nominally 13 volts but the printer will operate with Vraw from 8.75 to 16 volts DC.

Power-on & I/O Reset Circuitry

The power-on & I/O reset circuitry holds the printer from operating until supplies settle during power-on or resets the printer when a host device sends an INIT command on the parallel (Centronics) interface.

Motor Supply Circuitry

The motor supply circuitry provides a logic selectable two-level voltage to run the carriage and paper motors. It also provides voltages and signals for the -12V surge pump, +12V regulator, and print head drive circuitry.

The appropriate voltage level is selected by Vsel from the HP custom IC. When Vsel is in a high impedance state, the motor supply output (VM) is 22.7 to 25.1 volts. When Vsel is pulled to a low state, VM is 25.8 to 28.3 volts. Fuse F1 on the PCA provides circuit protection and disables the +12V, -12V and print head drive supplies.

Regulators

The analog circuitry contains a regulator for the +5V, +12V, and voltage reference (Vref). The voltage reference regulator is not field replaceable because the IC must meet an increased part specification. Therefore, if the voltage reference regulator is faulty, replacement of the PCA is required.

-12V Surge Pump

The -12V supply for RS-232-C communication is created by a parasitic charge pump operating from the switching node in the motor supply circuit. A simple linear regulating transistor in the ground path of the pump reduces the node voltage from the negative motor supply voltage to approximately -12V (-10.5V to 12.0V).

Print Head Drive Circuitry

The print cartridge requires an accurate supply voltage that can deliver high peak current. This accuracy is obtained by trimming resistors in a print head drive precision voltage divider. The trimmed voltage is compared to Vref which then controls a print head drive transistor. The trimming is done at the factory by opening the appropriate resistors in the voltage divider. Therefore, the print head supply is not adjustable by field service personnel and the PCA must be replaced if VHD is out of tolerance. See chapter 8 for VHD tolerance levels.

CPU

The HP QuietJet uses an MC68B09 for the CPU. An 8 MHz crystal oscillator supplies the clock timing and a reset circuit holds the processor reset for at least 100ms after power up to allow the clock circuitry to stabilize.

HP Custom IC

The HP Custom CMOS IC performs many system functions such as:

- Ports for motor and print cartridge control
- I/O processing
- Memory control
- DIP switch and keypad access

This surface mounted device (SMD) reduces the amount of discrete TTL logic circuitry in the printer. Surface mounted devices are not field replaceable components. Therefore, the PCA must be replaced if the HP custom IC is faulty.

Memory

The HP QuietJet memory is divided into two types:

- System Memory
- Optional Memory

System memory includes the program ROM U104 (U18 on REV B & REV D PCAs), default character ROM U9 (U14 on REV B & REV D PCAs), and RAM U13 (U19 on REV B & REV D PCAs) containing program data and the I/O buffer. System memory also includes control and data registers in the custom CMOS IC U12 (U17 on REV B & REV D PCAs).

Optional memory consists of optional RAM and ROM for IC locations U4 *, and U5 **. Optional ROM includes optional character sets and an HP QuietJet demonstration program called "Demo ROM". Service manual information pertaining to optional character set ROMs also applies to the Demo ROM. Optional RAM allows the QuietJet to accept downloadable character sets. RAM and ROM memory addressing is allocated as shown in Figure 5-1.

* IC location U4 is U9 on REV B & REV D PCAs.
** IC location U5 is U10 on REV B & REV D PCAs.

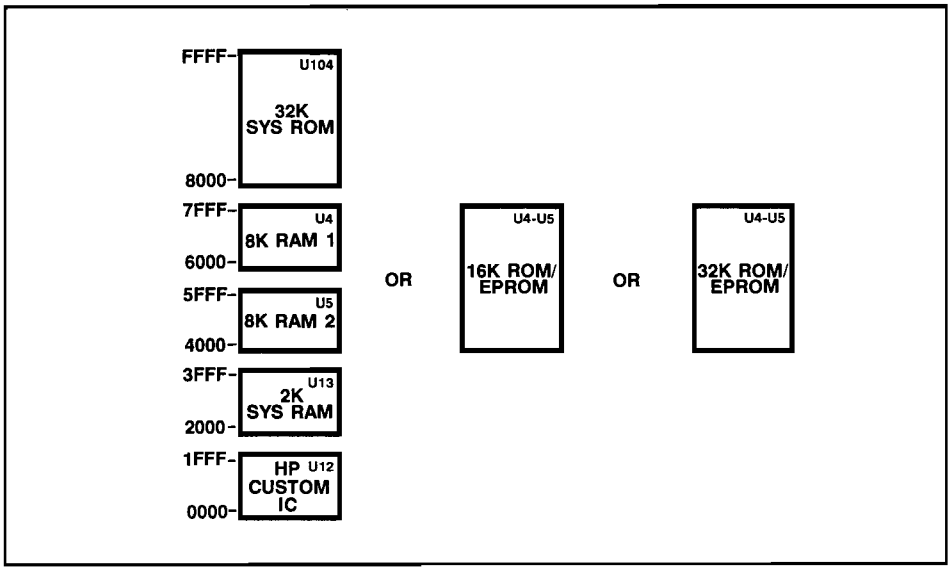


Figure 5-1. HP QuietJet Memory Allocation

Optional memory can consist of any RAM or ROM shown in Table 5-1. The only restriction is the first additonal 8K RAM must be installed in position U5 **. For example, possible optional memory combinations include:

- 8K RAM in U5 ** only
- 8K RAM in U5 ** and 8K RAM in U4 *
- 8K RAM in U5 ** and 32K ROM in U4 *
- 16K ROM in U5 ** and 32K ROM in U4 *
- 32K ROM in U5 ** and 32K ROM in U4 *
- Demo ROM in U5 ** and 32K ROM in U4 *

Table 5-1. Installable Optional Memory

IC LOCATION				
U104	U13	U9	U4	U5
32K System ROM	2K System RAM	32K Character ROM	8K RAM 16K ROM or 32K ROM	8K RAM 16K ROM or 32K ROM

* IC location U4 is U9 on REV B & REV D PCAs.
** IC location U5 is U10 on REV B & REV D PCAs.

Optional Memory Compatability

HP QuietJet optional memory sockets (U4 * and U5 **) are designed to hold an 8K RAM, 16K ROM, or 32K ROM as shown in Table 5-1. Not all pins are compatable between these RAM and ROM ICs. Table 5-2 shows where pin conflicts exist between the different optional RAM and ROM.

Table 5-2. Optional Memory Pin Conflicts

IC LOCATION & PIN NUMBER	INSTALLABLE MEMORY 8K RAM	16K ROM	32K ROM
U4 Pin 26	CS2	A13	A13
U4 Pin 27	R/W	NC*	A14
U5 Pin 26	CS2	A13	A13
U5 Pin 27	R/W	NC*	A14

* For an EPROM this pad is PGM but can be neglected if Vpp is not connected.

Pin 27 of both U4 * and U5 ** is controlled by the custom IC (U17) line E32K. System program control multiplexes the E32K line for A14 and R/W operation.

U5 ** pin 26 has a jumper to select between CS2 (chip select for 8K RAM) and A13 (address bit for 16K or 32K ROM). Connect pins 1 and 2 of jumper J5 when a 16K or 32K ROM is installed in IC position U5 **. Connect pins 2 and 3 of jumper J5 when an 8K RAM is installed in U4 *.

U4 * pin 26 is connected to A13. Therefore, an 8K RAM in U4 * uses the A13 line as one of the chip selects. U5 ** pin 26 is held high by jumper J5 and does not require A13 high to select RAM in U5 **. The result is an 8K RAM installed in location U4 * accesses the upper half of allocated memory space for downloadable character sets (6000 through 7FFF). U5 ** accesses the lower half of allocated memory space for downloadable character sets (4000 through 5FFF). The printer will not access RAM installed in U4 * unless RAM is installed in U5 **. If only 8K of optional RAM is installed, place the RAM in location U5 **.

* IC location U4 is U9 on REV B & REV D PCAs.
** IC location U5 is U10 on REV B & REV D PCAs.

Memory Selection

The 6809 microprocessor can directly access 64K of memory. Therefore, more memory can be installed in the QuietJet Printer than the 6809 microprocessor can address. The HP custom IC overcomes the 6809 limitation by selecting memory in banks using memory control lines.

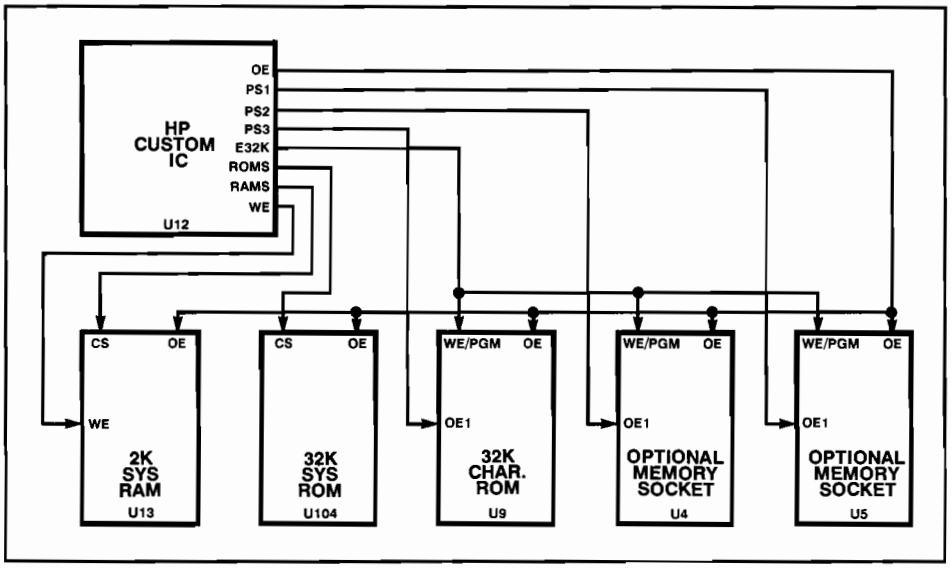


Figure 5-2. HP QuietJet Memory Selection

Optional Memory Specifications

The HP QuietJet power and timing constraints require optional memory to meet specific read and write cycle capabilities. See Table 5-3 and Figure 5-3 for read cycle specifications and Table 5-4 and Figure 5-4 for write cycle specifications.

Table 5-3. Optional Memory Read Cycle Specifications

PARAMETER	DEFINITION	MINIMUM	MAXIMUM
t_{ACC}	Address Access Time	—	330ns
t_{CO}	Chip Select Access Time	—	160ns
t_{OE}	Output Enable Time	—	110ns
t_{OH}	Output Hold Time	0ns	—
t_{CHZ}	Output in High-Z from CS	—	10ns
t_{OHZ}	Output in High-Z from OE	—	10ns

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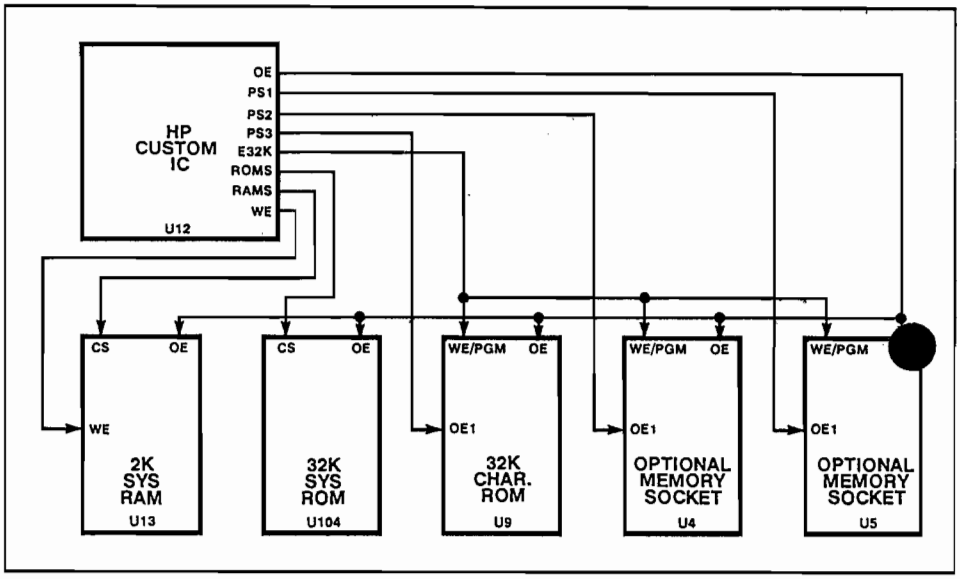

Figure 5-2. HP QuietJet Memory Selection

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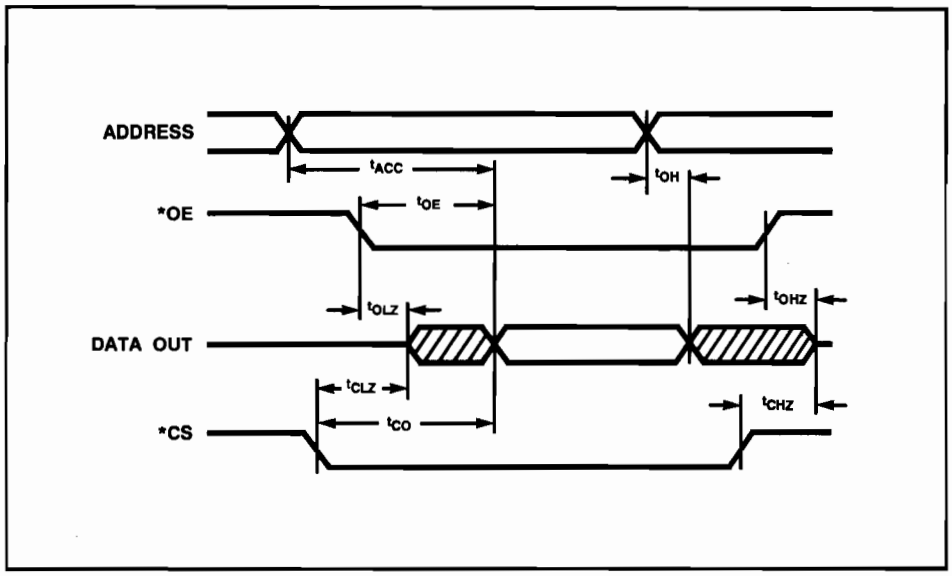


Figure 5-3. Optional Memory Read Cycle Specifications

Table 5-4. Optional Memory Write Cycle Specifications

PARAMETER	DEFINITION	MINIMUM	MAXIMUM
t_{CW}	Chip Selection to End of Write	200ns	—
t_{AS}	Address Set Up Time	20ns	—
t_{WP}	Write Pulse Width	200ns	—
t_{WR}	Write Recovery Time	0ns	—
t_{DS}	Data Set Up Time	220ns	—
t_{DH}	Data Hold Time	20ns	—
t_{OHZ}	Output in High-Z from OE	0ns	—

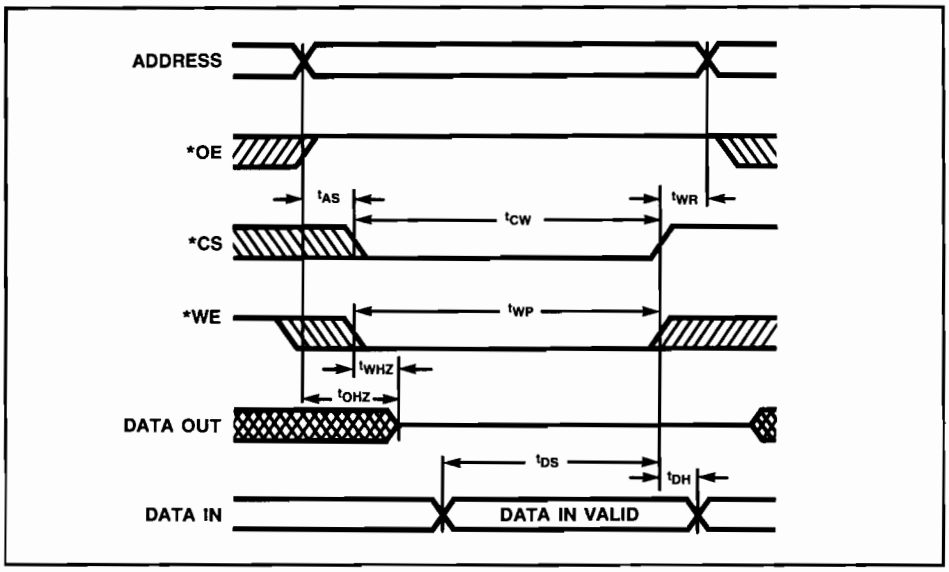


Figure 5-4. Optional Memory Write Cycle Specifications

Keypad and DIP Switches

The HP QuietJet has dip switches and a keypad to provide operator control. Both the keypad and dip switches directly connect to the HP custom IC. The ON-LINE key is sensed continuously. Other keypad buttons are sensed between lines of print and when the printer is idle. dip switches are monitored only while the printer is idle. See Chapter 1 on "Getting Acquainted" to learn more about the keypad operation and Chapter 3 for dip switch function information.

Print Head and Stepper Motor Drive

Print head, carriage stepper motor, and paper stepper motor signals are controlled by dedicated ports on the HP custom IC (U17). These control lines connect to the print cartridge and stepper motors via drivers U6, U7, and U8. Timing is accomplished by a timer circuitry internal to the HP custom IC U12 (U17 on REV B & REV D PCAs).

Stepper motor supply voltages are fused. The paper stepper motor circuitry has a 1 amp fuse and the carriage stepper motor circuitry has a 3/4 amp fuse mounted on the PCA.

Sensors

The HP QuietJet Printer has two sensors:

- Home Switch Sensor
- Out of Paper Switch

Home Switch Sensor

The home switch sensor monitors the "home position" of the carriage. If the actual carriage position differs from the expected carriage position, the carriage position is considered "lost" and the Aa lights will indicate an error condition. The home sensor, consisting of a light emitting diode (led) and light detector, is mounted on the logic PCA. As the carriage moves to the home position (left end of the mechanism), a vane on the bottom of the carriage breaks the light beam, thereby locating the carriage home position.

Out of Paper Switch

The out of paper switch consists of a lever mounted below the mechanism platen and a reed switch on the logic PCA. The lever has an arm with a magnet at the end of the arm that protrudes down from the mechanism toward the logic PCA reed switch. As long as paper is installed in the printer, the lever does not ride in a groove on the platen and the magnet at the end of the lever arm is held away from the reed switch (reed switch open). Once the printer runs out of paper, the lever rides in the platen groove, causing the magnet on the lever arm to come in close contact with the reed switch. The magnet closes the reed switch contacts, signaling an out of paper condition.

Switch B7 up disables the out of paper switch sensor.

Parallel (Centronics) Interface

The HP QuietJet has a standard eight-bit parallel (Centronics) interface for connection to both HP and non-HP devices. Implementation of the parallel interface is achieved by fifteen lines (* indicates the line is active low):

- Eight data lines
- Three input handshake lines:
  - *Strobe (*STR)
  - *Acknowledge (*ACK)
  - Busy
- Three status lines:
  - Select (SLCT)
  - Paper Empty (PE)
  - *Error (*ERR)
- One reset line:
  - *Initialize (*INIT)

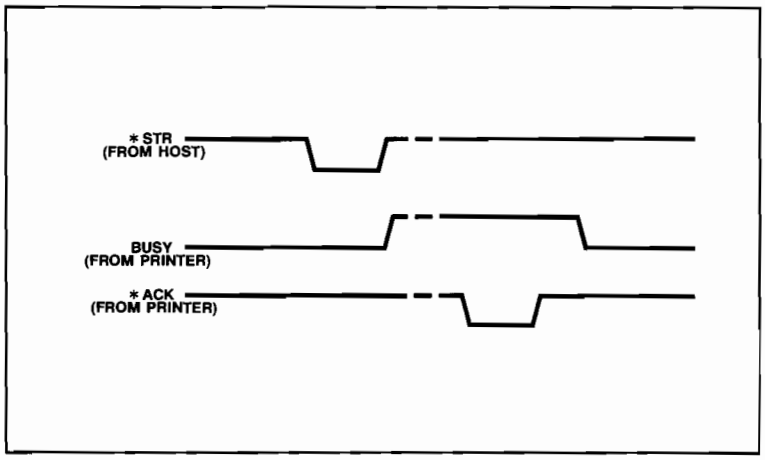


Figure 5-5. Parallel (Centronics) Handshake

The strobe line (*STR) is set low when the computer is ready to send data. The HP custom IC clocks data into an external latch on the *STR falling edge and sets busy high to indicate the printer cannot accept more data until the current byte is processed. When the printer is ready to receive more data, it pulses the acknowledge line (*ACK) low and sets busy low.

Minimum strobe pulse width is 500ns. The time for BUSY to be asserted after the falling edge of *STR should not exceed 500ns. The *ACK pulse width is 3 to 5 us long.

If a paper-out or carriage position lost error occurs (i.e. PE high or *ERR low, respectively), the printer will accept data until the buffer is full. If the self test fails, the busy line remains high (its powered up state). The select line (SLCT) is always high because the printer is always selected.

Parallel Interface Pin-out

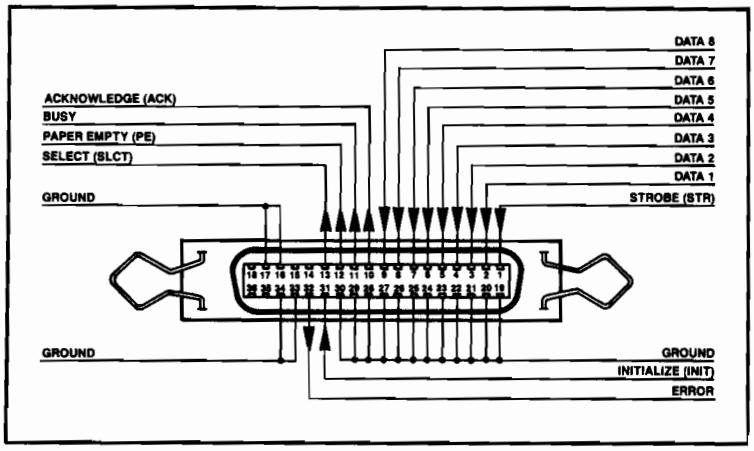


Figure 5-6. Parallel I/O Connector

RS 232-C Serial Interface

The HP 2227A & 2228A serial interface is fully compatible with EIA RS 232-C standards. The printer supports two methods of handshaking to prevent a printer buffer overflow condition, resulting in a loss of data:

- DTR (Data Terminal Ready or Hardware Handshake)
- XON/XOFF (DC1/DC3)

The handshaking mode is selectable by setting a dip switch:

- Switch B2 up selects DTR
- Switch B2 down selects XON/XOFF

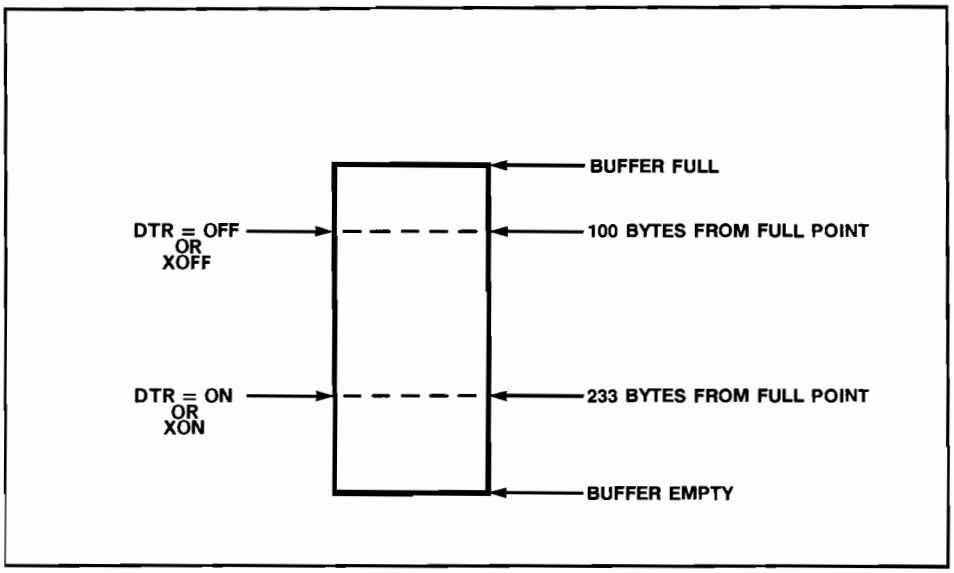


Figure 5-7. Serial Interface Handshaking

DTR (Data Terminal Ready)

DTR, also known as hardware handshake mode, controls the transmission of data from the host to the printer by the logic level of DTR, pin 20. When the buffer is 100 bytes from being "full", the printer sets DTR "OFF" (-12 volts) requesting data transmission to stop. The printer continues printing, reducing the I/O buffer level until the buffer drops to 233 bytes from "full". The printer then sets DTR to "ON" (+12 volts) requesting data transmission to resume.

XON/XOFF

XON/XOFF is similar to the DTR (Hardware Handshake) mode exept the printer sends a command to the host indicating I/O buffer status rather than setting a hardware logic level. When the buffer is 100 bytes from "full", the printer sends the ASCII code DC3 (XOFF) to request the computer to stop sending data. Firmware REV 2.5 and greater also sends an XOFF after every character when the buffer has 50 bytes or less available. The printer requests data transmission to resume when the buffer is 233 bytes from the "full" by sending the ASCII code DC1 (XON).

Serial Pin-out Information

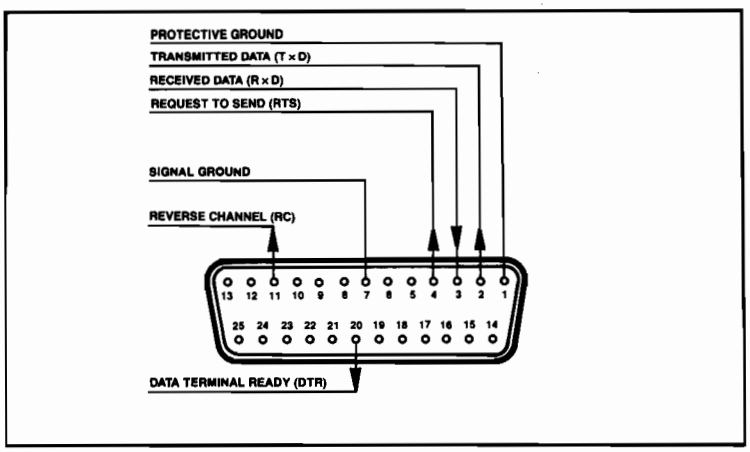


Figure 5-8. RS 232-C I/O Pin Connector

Pin 1, Protective Ground. This conductor serves as an electrically grounded line for connecting the cable shield.

Pin 2, Transmitted Data. Bit serial data transmitted to the computer from the printer. This line is used with XON/XOFF handshaking.

Pin 3, Received Data. Bit serial data transmitted to the printer from the computer.

Pin 4, Request to Send. An output from the printer that is always "ON" (+12V) when the printer is powered on.

Pin 7, Signal Ground. The established reference potential for all data communication.

Pin 11, Reverse Channel. This pin is directly tied to pin 20, Data Terminal Ready.

Pin 20, Data Terminal Ready. Signal line for hardware handshake mode. Data Terminal Ready is "ON" (+12 volts) when the printer is powered on and is able to receive data. DTR is set "OFF" (-12 volts) to stop transmission of data from the host.

6 Removal and Replacement

Introduction

This chapter contains the following removal and replacement procedures:

- Printer Enclosure (6.A)
- Keypad (6.B)
- PCA (6.C)
- Mechanism (6.D)
- Tractor Assemblies (6.E)
- Platen and Pressure Rollers (6.F)
- Paper Bail and Rollers (6.G)
- Carriage and Print Cartridge Cable (6.H)
- Carriage Cable (6.I)
- Carriage Motor Assembly (6.J)
- Installing the Carriage Cable (6.K)

The letter and number in parentheses in each removal procedure title helps to locate the desired removal/replacement procedure in the chapter.

Caution 

Remove Power Module 1 from the printer prior to removing any parts or assemblies. Always use a grounded wrist strap when handling the PCA to prevent ESD damage to the circuitry.

Removal and Replacement Procedures

The following procedures explain how to remove HP QuietJet Printer parts and assemblies. With the exception of the carriage motor and cable assembly procedure, simply reverse the removal order for the replacement procedure. Read "Installing the Carriage Cable (6.K)" when reinstalling the carriage motor or cable assembly. Be sure to read all notes for removal/replacement ease and reducing the risk of damage the printer.

Enclosure and Front Cover (6.A)

1. Turn the printer off and disconnect Power Module 1 from the printer.
2. Pull the tractor release levers toward you to the engaged position.
3. Pull off the paper advance knob.
4. Remove the four screws from the bottom of the printer base.

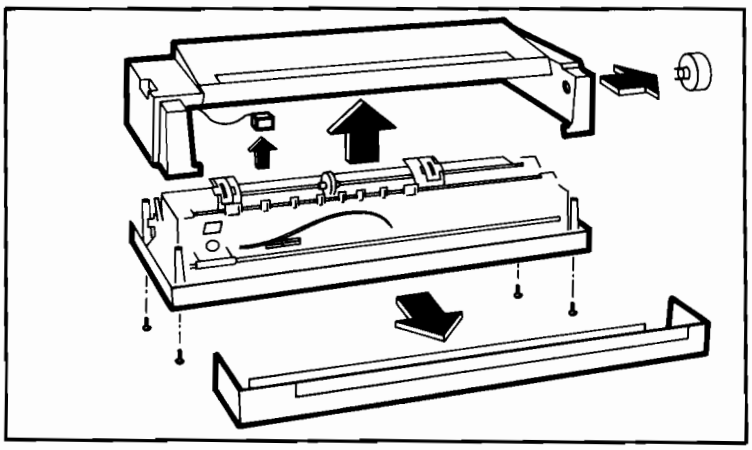


Figure 6-1. Removing the Enclosure

5. Open the front cover and slide the carriage to the center. Carefully lift the enclosure from the printer base and remove the keypad cable from the PCA. The front cover is free to remove once the enclosure is lifted from the base.

Keypad (6.B)

1. Turn the printer off and disconnect Power Module 1 from the printer.
2. Remove the enclosure (Removal 6.A).
3. Remove the three screws inside the enclosure holding the keypad to the enclosure.

PCA (6.C)

1. Turn the printer off and disconnect Power Module 1 from the printer.
2. Remove the enclosure (Removal 6.A).
3. Slide the carriage to the extreme left (left of the platen).
4. Disconnect the mechanism ground wire, carriage motor cable, and paper motor cable from the PCA.
5. Disconnect the carriage flex cable from the PCA connector by pulling up on the PCA connector cap. Then, pull the cable from the connector.

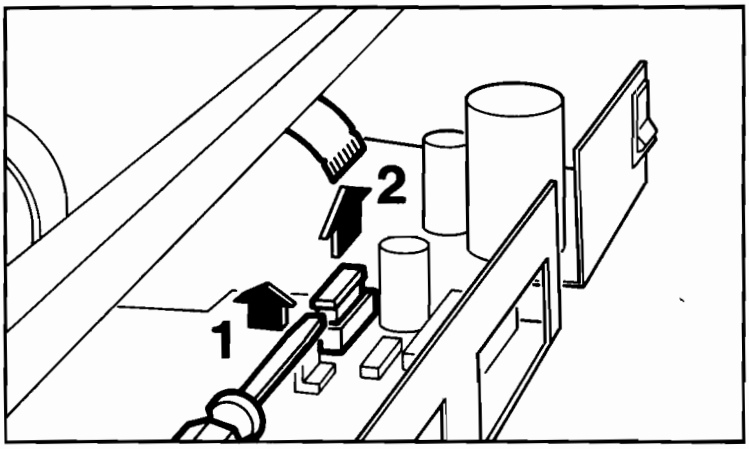


Figure 6-2. Disconnecting the Carriage Flex Cable

6. Press on PCA tabs (A and B) and carefully lift up on the back of the PCA, far enough for the PCA to clear the base rear wall.

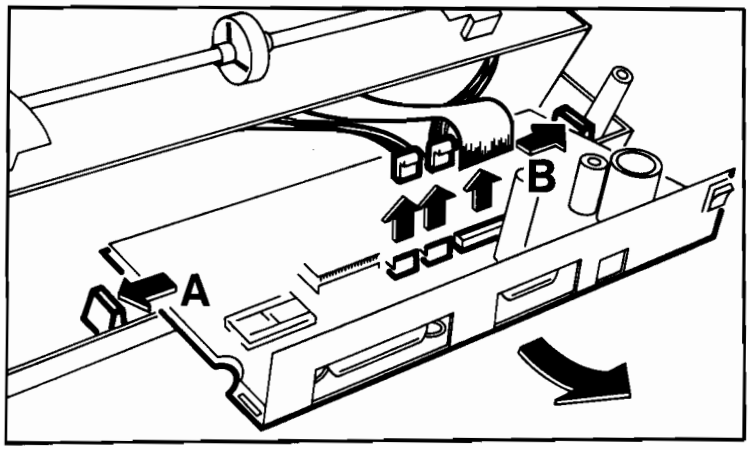


Figure 6-3. Removing the PCA (Rear View)

7. Slide the PCA out the back of the printer

Note To remove the shield and ground plane from the PCA, disconnect the power switch at connector J1 and remove the screws holding the shield and ground plane to the PCA.

Note When reinstalling the PCA, avoid breaking the paper-out lever with the PCA by lifting the paper-out lever from the path of the PCA. Verify all wires and flex cables are away from the paper-out lever.

Mechanism (6.D)

Note

The QuietJet Plus Printer can have the mechanism removed with the PCA installed. The QuietJet Printer must have the PCA removed prior to removing the mechanism.

1. Turn the printer off and disconnect Power Module 1 from the printer.
2. Remove the enclosure (Removal 6.A).
3. Disconnect the paper bail ground wire, carriage motor cable, paper motor cable, and print cartridge flex cable.
4. Disconnect the paper bail ground wire and the grounding wire from the printer's base plate that attaches to the paper motor/mechanism.
5. Remove the four mechanism screws and washers, shown in Figure 6-4.

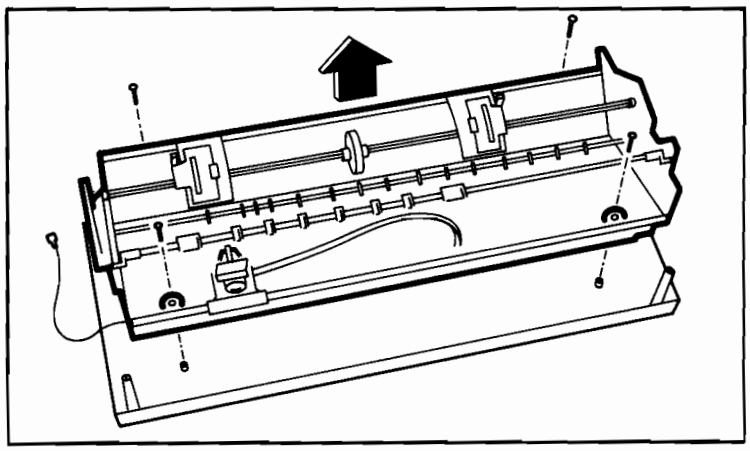


Figure 6-4. Removing the Mechanism

6. Lift the mechanism from the printer base.

Tractor Assemblies (6.E)

1. Turn the printer off and disconnect Power Module 1 from the printer.
2. Remove the enclosure (Removal 6.A).
3. Press the tractor release levers back (disengaged position) to allow the tractors to slide on the tractor shaft.

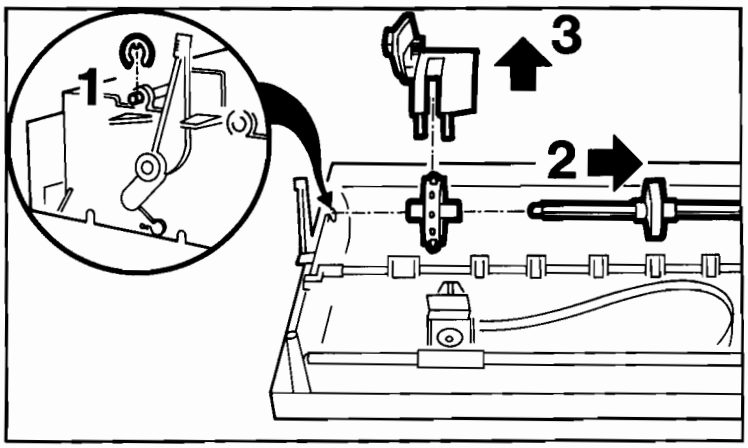


Figure 6-5. Removing the Tractor Assemblies

4. Remove the tractor shaft E-ring.
5. Slide the tractor shaft out through the right.
6. Lift and remove the tractor assemblies.

Note

When reinstalling the tractor pinwheels and idler wheel on the tractor shaft, turn the pinwheels and idler wheel until the notches on all three parts fit together. Then slide the tractor shaft through all three parts. The pinwheel and idler wheel notches ensure proper pinwheel pin alignment.

Platen and Pressure Rollers (6.F)

1. Turn the printer off and disconnect Power Module 1 from the printer.
2. Remove the enclosure (Removal 6.A).
3. Open the paper bail and set the paper release lever forward.
4. Remove the platen E-ring. Lift the paper-out sensor out of the platen groove and slide the platen to the right and up, out of the mechanism.
5. Remove the tractor assemblies (Removal 6.E).
6. Disconnect the paper release lever spring from the paper release lever (step 1 in Figure 6-6).

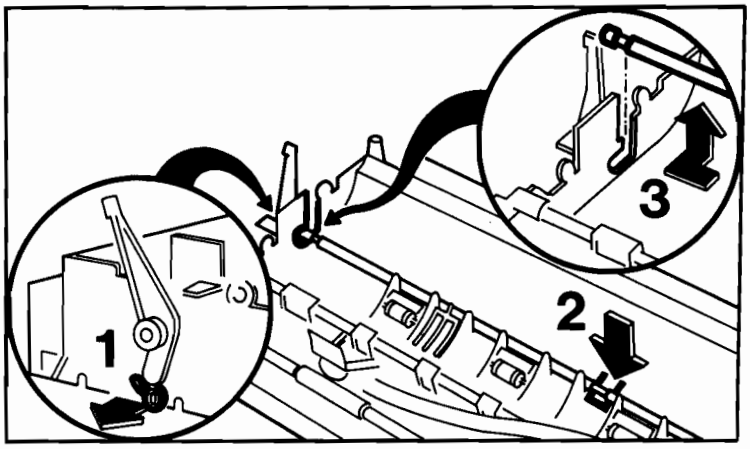


Figure 6-6. Removing the Pressure Roller Shaft

7. Press on the pressure roller shaft release (step 2 in Figure 6-6) and slide the pressure roller shaft to the left until the groove on the pressure roller shaft aligns with the mechanism's left wall.

8. Push the left end of the pressure roller shaft back (step 3 in Figure 6-6). Then slide the pressure roller shaft out of the mechanism.

9. Snap the pressure rollers out of the pressure roller supports.

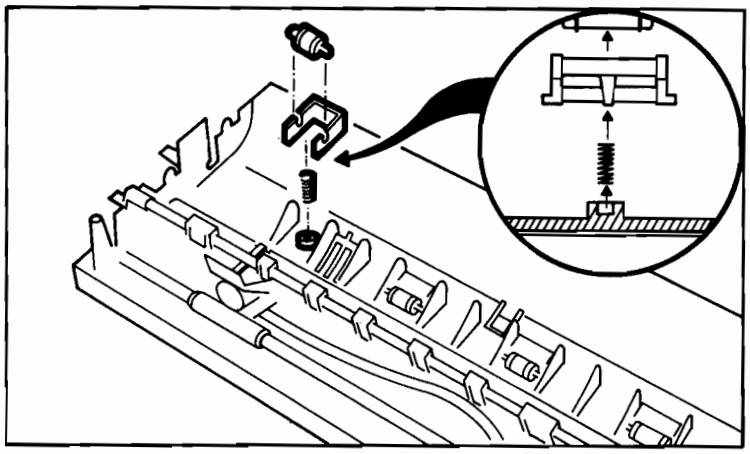


Figure 6-7. Removing the Pressure Rollers

10. Remove the pressure roller supports by squeezing the front of the supports together.

Note

There is a spring between each pressure roller support and the mechanism. Be careful not to lose them when removing the pressure roller supports. When reinstalling pressure rollers and supports, make sure the pressure roller springs are positioned between the mechanism hole to the pin on pressure supports.

Paper Bail and Rollers (6.G)

1. Turn the printer off and disconnect Power Module 1 from the printer.
2. Remove the enclosure (Removal 6.A).
3. Disconnect the paper bail ground wire.
4. Remove the paper bail arm springs (left spring "A" shown).
5. Starting with the right paper bail arm, gently squeeze the snaps and push outward at the bail arm pivot points. Lift the paper bail from the mechanism.

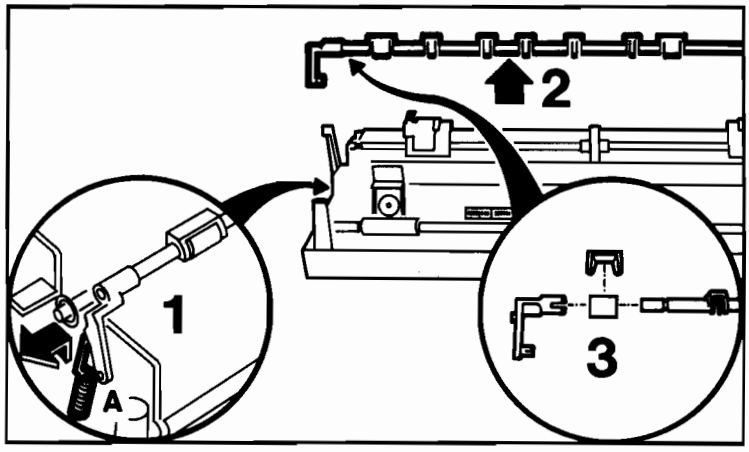


Figure 6-8. Removing the Paper Bail

6. With a small flat blade screwdriver, gently pry the bail arm fingers from the paper bail shaft grooves and pull the bail arm off the paper bail shaft.
7. Slide the paper bail rollers off the paper bail shaft.

Note

When reinstalling, be sure to assemble the rollers and bail arms in the order shown in Figure 6-8. The star rollers are mounted between the two flat-wide rollers.

Carriage and Print Cartridge Cable (6.H)

1. Turn the printer off and disconnect Power Module 1 from the printer.
2. Remove the enclosure (Removal 6.A).
3. Remove the mechanism (Removal 6.D).
4. Disconnect the carriage cable from the carriage.

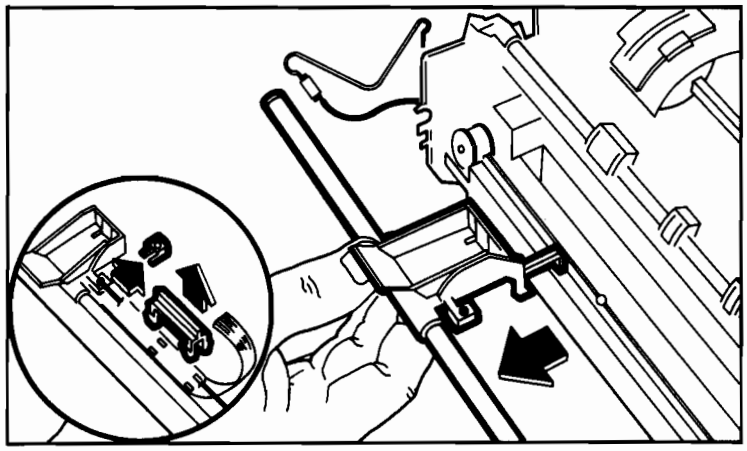


Figure 6-9. Removing the Carriage and Print Cartridge Cable

5. Remove the mechanism print cartridge cable clamp.
6. Remove the carriage rail ground clip.
7. Snap the carriage and carriage rail off the mechanism by pulling forward on the carriage rail.
8. Slide the carriage off the carriage rail.

Carriage Cable (6.I)

1. Turn the printer off and disconnect Power Module 1 from the printer.
2. Remove the enclosure (Removal 6.A).
3. Disconnect the carriage cable from the carriage (see Figure 6-10).
4. Turn the left carriage cable pulley clockwise until the top portion of the cable does not loop around the left pulley. The ball on the carriage cable will travel around the right pulley to the lower portion of the cable.

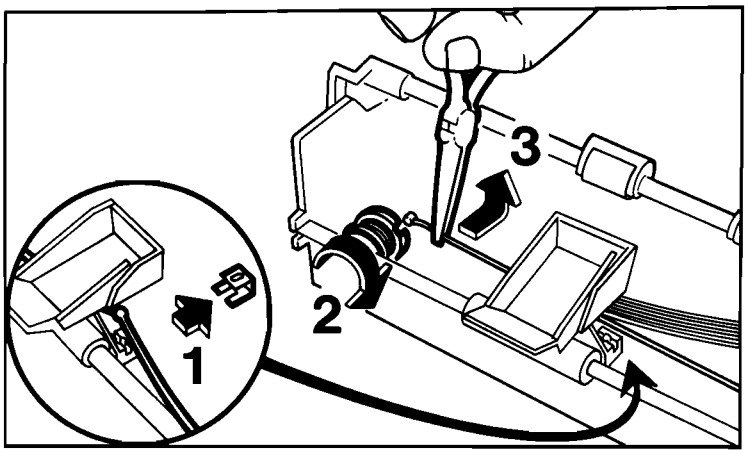


Figure 6-10. Removing the Carriage Cable

5. Using long nose pliers, detach the carriage cable end that does not loop around the left carriage pulley from the left carriage pulley. Release it gradually to avoid loss of the turnaround pulley, spring, and wedge on the right side of the mechanism.
6. Pull the left pulley cap off the left pulley and remove the cable from the left pulley.

Note 

See "Installing the Carriage Cable (6.K)" when reinstalling the carriage motor and cable assembly.

Carriage Motor Assembly (6.J)

1. Turn the printer off and disconnect Power Module 1 from the printer.
2. Remove the enclosure (6.A).
3. Remove the mechanism (6.D).
4. Remove the carriage cable (6.I)
5. Remove the two carriage motor mounting screws and remove the carriage motor assembly from the mechanism.

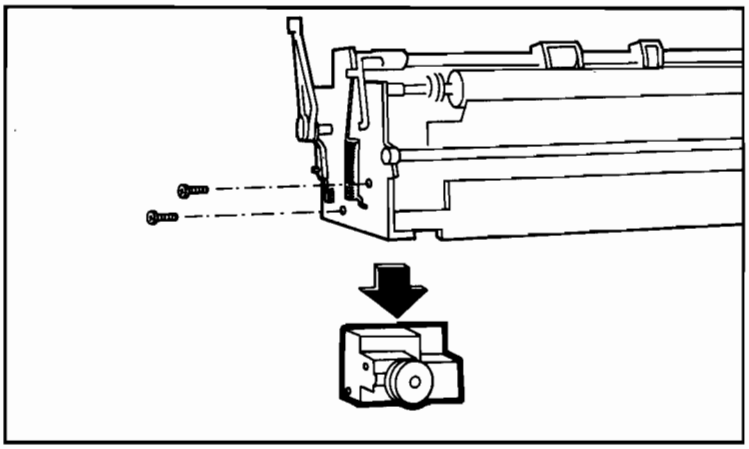


Figure 6-11. Removing the Carriage Motor Assembly

Installing the Carriage Cable (6.K)

You may want to remove the carriage rail from the printer and place the carriage assembly on the platen for greater carriage cable access during this installation procedure.

1. Attach the carriage cable end farthest from the carriage cable ball to the front groove on the left pulley with the groove oriented up. Align the left pulley cover pins in the left pulley and snap the pulley cover in place.

2. Remove the wedge, ledge, spring, and pulley from the right side of the mechanism. The ledge, mounted above the turnaround pulley slot opening, snaps out of the mechanism structure wall. See Figure 6-14 for part identification.

3. Place the turnaround pulley (without the wedge, ledge, and spring) in position on the mechanism structure wall. Loop the carriage cable counterclockwise around the turnaround pulley and back through the turnaround pulley slot.

4. While holding the carriage cable taut, manually rotate the left carriage pulley clockwise until the free end of the cable just reaches the left pulley.

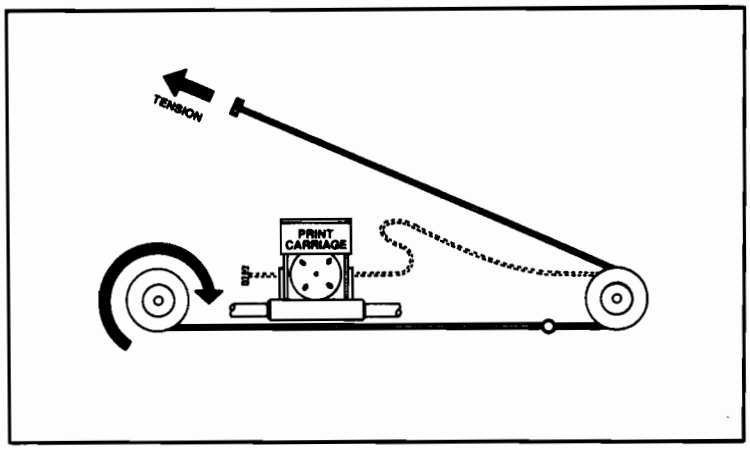


Figure 6-12. Routing the Carriage Cable

Note

Make sure the cable does not cross over other turns on the left pulley. Otherwise, the carriage will not operate properly.

5. Attach the free end of the cable to the left pulley.

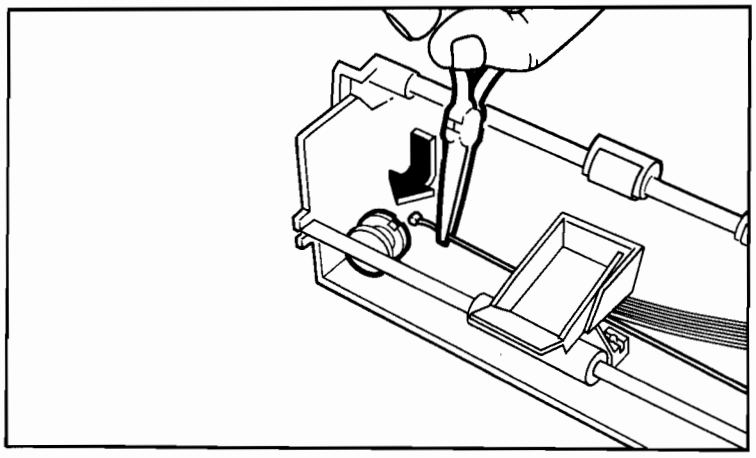


Figure 6-13. Attaching the Cable End

6. Place the tip of the wedge between the turnaround pulley and mechanism wall. (Flat side of the wedge toward the wall.) Place the spring and ledge on the wedge arm.

7. Compress the spring and snap the ledge into the mechanism wall. The wedge applies an outward pressure on the turnaround pulley, causing tension on the carriage cable.

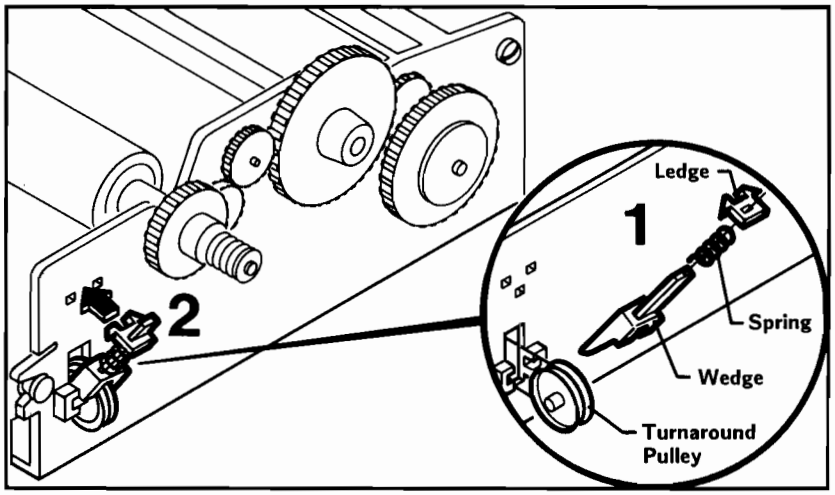


Figure 6-14. Installing the Wedge, Ledge, and Spring

8. If removed, slide the carriage assembly onto the carriage rail and attach the carriage rail to the mechanism.

9. Turn the left pulley counterclockwise until the ball on the carriage cable is repositioned to the upper portion of the carriage cable. Attach the ball to the carriage assembly (See step 1 of Figure 6-10).

7 Adjustments

There are no field service adjustments on the HP QuietJet Printer.

8 Troubleshooting

Introduction

This chapter contains the following troubleshooting information:

- Self Tests
  - Non-Printing Self Test
  - Printing Self Test
- Error Recovery
  - Out of Paper
  - Carriage Position Lost
  - Self Test Failure
- Troubleshooting
  - Fuse Module
  - Voltage Levels
  - Print Head Voltage (VHD)
  - Nonreplaceable Components
  - Troubleshooting Hints

Self Tests

The HP QuietJet has two internal self tests:

- Non-Printing Self Test
- Printing Self Test

Non-Printing Self Test

The non-printing self test checks the following:

System RAM
System ROM
HP Custom IC

The non-printing self test occurs automatically when the printer is powered-on or as the first part of the internal self test. The printer "homes" the carriage position during this self test.

If the printer fails the non-printing self test, a single keypad Aa light will flash, identifying the failing portion of the non-printing self test See Table 8-1). If the carriage home positioning fails, the carriage position is "lost" and the Aa light will cycle in a rapid sequential flashing pattern (See "Carriage Position Lost" in this chapter).

Table 8-1. Non-Printing Self Test Error Indication

Aa Light Flashing	Non-Printing Self Test Error
NLQ (top Aa light)	RAM
Draft (middle Aa light)	ROM
Compressed (lower Aa light)	HP Custom IC

The non-printing self test will not indicate if optional memory fails. The printing self test identifies failing optional memory.

Printing Self Test

The printing self test aids in determining proper printer operation. The printing self test can be selected in two ways:

1. Press the line feed (LF) key while turning on power. Release the LF key. The non-printing self test will occur prior to the printing self test.

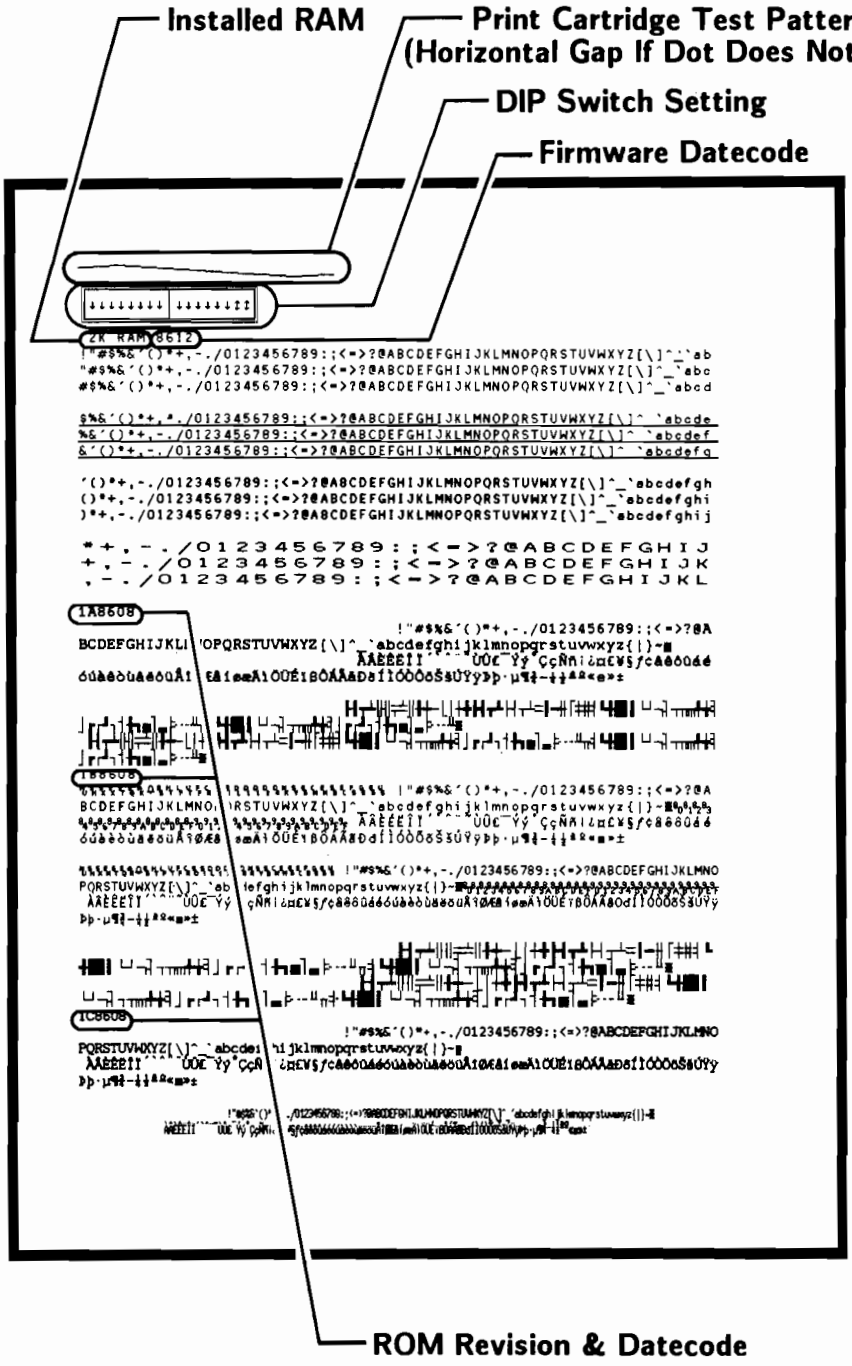
2. Send an Esc z to the printer from the computer (HP mode only). Unlike method 1, an Esc z does not select the non-printing self test prior to the printing self test.

The printing self test pattern consists of:

- a print cartridge test pattern
- a box with the dip switch settings
- the amount of installed RAM (2K + optional)
- the firmware datecode
- the default symbol set in all algorithmic modes
- ROM revision numbers and datecodes
- all characters from each font followed by a hard reset

The printing self test verifies optional memory by printing the amount of usable RAM and/or functional ROM fonts installed. The base printer has 2K of RAM. Two additional 8K RAMs may be installed, totaling 18K of RAM. If the first of these 8K RAM fails (U5 or U10 on REV B & REV D PCAs), the printer is unable to use either 8K RAM and the self test will print 2K of RAM available. If the second 8K RAM fails (U4 or U9 on REV B & REV D PCAs), the printer is able to use the first 8K RAM and the self test will print 10K of RAM.

PRINTING SELF TEST STARTS . . .



. . . HARD RESET

Figure 8-1. Printing Self Test Example

Error Recovery

This section explains how to recover from three types of error conditions:

1. Out of Paper
2. Carriage Position Lost
3. Self Test Failure

Out of Paper

The HP QuietJet has a paper switch lever below the platen. An arm with a magnet protrudes down from the lever toward a reed switch on the logic PCA. Paper holds the paper switch from riding in the platen groove. This paper switch lever position holds the magnet away from the reed switch. Once paper is past the bottom of the platen, the paper switch lever rides in the platen groove and positions the magnet close to the reed switch. The magnet closes the reed switch contacts, detecting an out of paper condition. As the paper passes the print cartridge, the Aa lights will start a rapid sequential flashing, indicating an error state. The printer will continue to take data until the buffer is full. The out of paper detection can be disabled by setting switch B7 up.

To recover from an out of paper condition, load paper:

1. Open the front and top cover.
2. Pull paper bail away from the platen and remove the paper.
3. Load new paper and use the knob to position the top-of-form position. Once paper is installed, the printer displays an off-line condition by a slow sequential flashing of the Aa lights.
4. Close the bail, front cover and top cover.
5. Press the On-Line key. The printer will set top-of-form and return to the print mode (draft, near letter quality, or compressed) selected prior to detecting out-of-paper.

Carriage Position Lost

The HP QuietJet has a carriage position sensor located near the left margin. If the sensor loses the carriage position, the Aa lights will begin a rapid sequential flashing, indicating an error condition.

To recover from a carriage position lost condition and resume printing:

1. Remove crumpled paper or any other obvious obstructions in the carriage path.
2. Press the On-Line key. The printer will try to determine the carriage position.

If the printer locates the carriage position, printing resumes from the line that was being printed when the error occurred. If it cannot determine the carriage position, the keypad Aa lights will resume the rapid sequential flashing.

To clear the carriage position error and reprint the document:

1. Remove any crumpled paper or other obvious obstructions.
2. Turn the printer off and turn the paper advance knob to position the paper to the next top-of-form position.
3. Turn the printer back on. This will clear the buffer and set the top-of-form position.
4. Retransmit the data from your computer.

Self Test Failure

Non-printing self test failures are not recoverable. However, some printing self test failures are "recoverable" in the sense that the HP QuietJet can operate as a printer in a reduced capacity. An example is a failure in the optional memory RAM or ROM. Using the printer with this error could result in a reduced buffer size or fewer selectable character sets. The printing self test will indicate the amount of usable RAM and ROM. Remember, proper printer operation cannot be guaranteed when using a printer recovered from a self test error condition.

Troubleshooting

The HP QuietJet can be repaired by replacing faulty assemblies (PCA, mechanism, etc.) or troubleshooting to the component level. Chapter 12 contains foldout diagrams and schematics to aid in troubleshooting your printer. See Chapter 9 for replaceable parts lists.

Fuse Module Accessory

The HP QuietJet uses a power module (called Power Module 1) to supply power to the printer. However, these power modules contain non-replaceable fuses. Therefore, we recommend connecting fuse module, P/N 02227- 60030, between Power Module 1 and the printer before troubleshooting an HP QuietJet Printer. The replaceable fuse module fuses will protect the power module non-replaceable fuses. LEDs on the fuse module light when the power module fuses are good. If the Logic PCA causes one of the fuse module fuses to blow, the corresponding LED will go out. See Figure 8-2 for installing the fuse module.

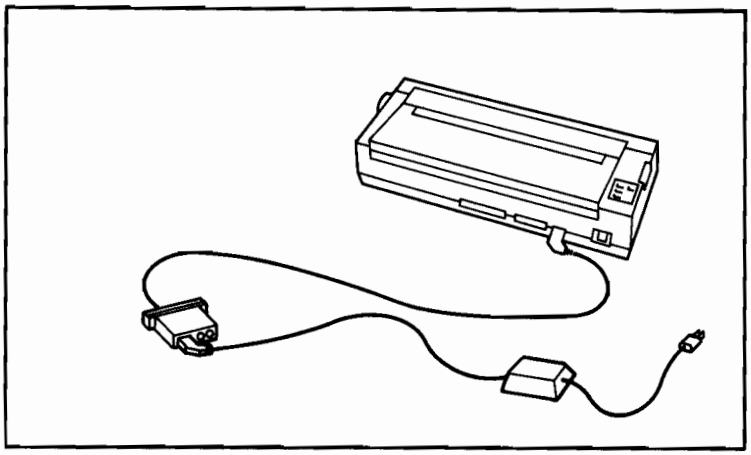


Figure 8-2. Connecting the Fuse Module Accessory

Voltage Levels

Table 8-2 lists the voltage tolerances when the printer is in an idle state.

Table 8-2. Table of QuietJet Voltages

Voltage Supply	Voltage Range	Output Current
Vraw	8.75 to 16 volts	
Vcc (ICs)	4.75 to 5.25 volts	500mA
RS 232 (-12V)	-10.5 to -12.5 volts	20mA
RS 232 (+12V)	11.4 to 12.6 volts	25mA
Vm (Motors)		
Vsel "high"	22.7 to 25.1 volts	480mA (800mA)*
Vsel "low"	25.8 to 28.3 volts	350mA (550mA)*
VHD (No Load)	24.810 +/-.247 volts	50mA (800mA)*
Vref	2.5 +/- .25 volts	
Power Module 1 Pin 2 to Pin 4	17.2 to 22.8 volts	

* Peak Current

Print Head Voltage

The print head voltage (VHD) may be out of tolerance if a component is replaced on the PCA, the print quality is unacceptable, or print cartridges go bad one after another. To determine if VHD is out of tolerance:

1. Remove the print cartridge.
2. Turn the QuietJet Printer on.
3. With a DMM, measure VHD, as shown in Figure 8-3.

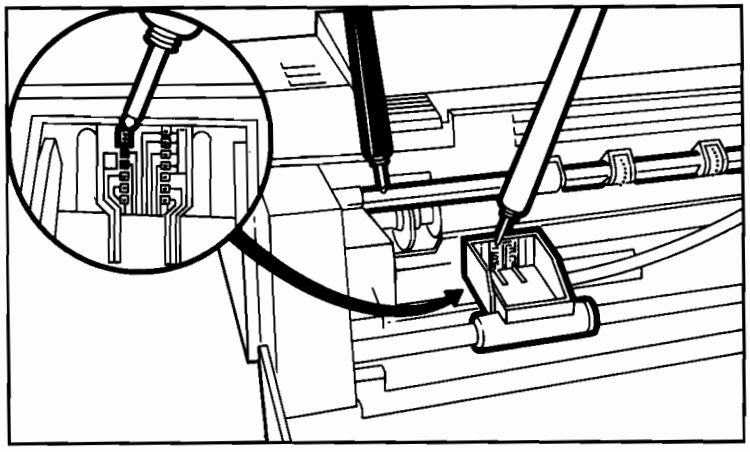


Figure 8-3. Measuring VHD

VHD should fall within the voltage range shown in Table 8-2. If the voltage is out of the tolerance range, replace the logic PCA. Resistors mounted on the PCA are opened at the factory to bring VHD within the voltage tolerance. Therefore, the print head voltage is not a field adjustable voltage.

Nonreplaceable Components

The following two components on the PCA are not field service replaceable:

1. HP custom IC U12 (U17 on REV B & REV D PCAs)
2. Voltage reference U10 (U15 on REV B & REV D PCAs)

If the HP custom IC or voltage reference is faulty, replace the PCA.

9 Replaceable Parts

Introduction

This chapter lists replaceable parts and assemblies for the HP QuietJet Series Printers. For Power Module 1 and print cartridge part numbers, see Table 1-1, HP QuietJet Series Accessories. Each parts list is referenced to a figure for part identification. This chapter includes the following parts lists:

- Table 9-1. HP QuietJet Series Overall Parts List
- Table 9-2. QuietJet Series Mechanisms Parts List
- Table 9-3. 02227-60074 Logic PCA Parts List

Note 

For previous revision PCA parts lists, see Chapter 11, Product History.

Ordering Information

To order replaceable parts, assemblies, or accessories, contact your local Hewlett-Packard Sales and Service Office. A list of Hewlett-Packard Sales and Service Offices can be found prior to the index. Include the following information for each part ordered:

1. Complete printer model and serial number.
2. Hewlett-Packard part number.
3. Complete part description as provided in the replacement parts lists.

Table 9-1. HP QuietJet Series Overall Parts List

Fig Ref	Part Description	Part Number	Qty
1	Top Cover		
	HP 2227A	02227-40029	1
	HP 2228A	02228-40029	1
2	Enclosure		
	HP 2227A	02227-60076	1
	HP 2228A	02228-60076	1
3	Overlay (order enclosure)		1
4	Keypad Assy	02227-60025	1
5	Knob, Platen	02227-40007	1
6-8	Front Cover Assembly		
	HP 2227A	02227-60072	1
	HP 2228A	02228-60072	1
9	Mechanism Assy		
	HP 2227A	02227-60049	1
	HP 2228A	02228-60049	1
10	Grounding Strap	02227-22001	1
11	Paper Motor Assembly *	02227-60053	1
12	Carriage Stepper Motor *	3140-0786	1
13	Logic PCA	02227-~~69074~~	1
14	Shield, Logic PCA**	02227-00009	1
15	Ground Plane		
	HP 2227A	02227-00015	1
	HP 2228A	02228-00015	1
16	Power Switch Assy **	02227-60021	1
17	Base Assembly		
	HP 2227A	02227-60073	1
	HP 2228A	02228-60073	1
18	Foot	02225-00010	4
19	Label, Base	02227-80025	1
20	Grounding Fingers	8160-0443	2
21	Paper Motor Screw	0515-0842	2
22	Screw, 4-20 x 0.375	0624-0314	10
23	Washer	02227-00011	4
24	Keypad Screw, 4-20	0624-0333	3
25	PCA Screw, M3X6	0515-0803	9

* Included with mechanism assembly
** Included with Logic PCA

HP51604A Plain paper cartridge
HP92261A Jet paper cartridge

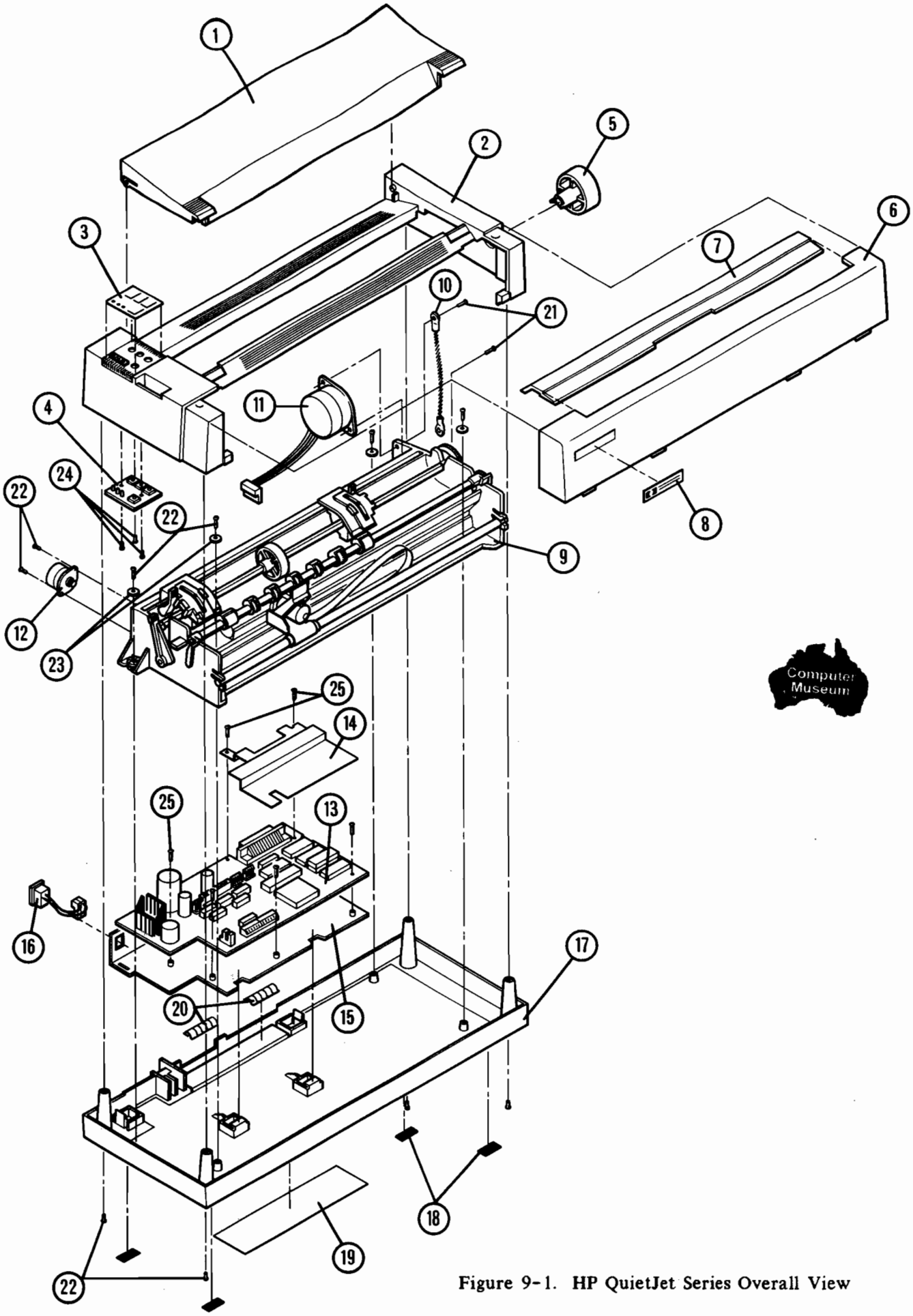


Figure 9-1. HP QuietJet Series Overall View

Table 9-2. HP QuietJet Series Mechanism Parts List

Fig Ref	Part Description	Part Number	Qty
1	Tractor Guide Assembly, Left	02227-60042	1
2	Tractor Guide Assembly, Right	02227-60043	1
	Tractor Guide Assemblies include:		
3	Clip, Tractor Right	02227-40055	1
	Clip, Tractor Left (not shown)	02227-40054	1
4	Clip, Shaft	02227-20025	2
5	Nonreplaceable, order assembly		
6	Lever, Tractor Release	02227-40059	2
7	Spring, Tension	02227-20004	2
8	Nonreplaceable, order assembly		
9	Wheel, Idler	02227-40020	1
10	Wheel, Tractor Pinfeed	02227-40008	2
11	Bracket, Wiper-Wiper	02227-00017	1
12	Absorber	02227-80045	1
13	Wiper-Wiper	02227-80048	1
14	Platen Assembly (2227A)	02227-60045 60088	
	Platen Assembly (2228A)	02228-60045	1
	Platen Assemblies include:		
15	Wiper (2227A)	02227-40003	1
	Wiper (2228A)	02228-40003	1
16	Nonreplaceable, order assembly		
17	Bail Shaft Assembly (2227A)	02227-60041	1
	Bail Shaft Assembly (2228A)	02228-60041	1
	Bail Shaft Assemblies include:		
18	Friction Clip, Star Roller	02227-40048	5
19	Friction Clip, Bail Roller	02227-40047	2
20	Roller, Star	02227-40041	5
21	Roller, Bail	02227-20040	2
22	Bail Arm, Left	02227-40036	1
23	Bail Arm, Right	02227-40037	1
24	Shaft, Paper Bail (2227A)	02227-20017	1
	Shaft, Paper Bail (2228A)	02228-20017	1
25	Spring, Tension	02227-20020	2
26	Lever, Paper Out	02227-40033	1
27	Magnet	0490-1575	1
28	Pinch Roller	02227-20013	4
29	Clip, Pinch	02227-40031	4
30	Spring	02227-20019	4

Table 9-2. HP QuietJet Series Mechanism Parts List (Cont.)

Fig Ref	Part Description	Part Number	Qty
31	Print Structure Assembly (2227A/2227B)	02227-60046	1
	Print Structure Assembly (2228A)	02228-60046	1
	Print Structure Assemblies include:		
32	Gear, Idler	02227-40039	1
33	Gear, Reduction	02227-40021	1
34	Gear, Tandem	02227-40022	2
35	Ledge	02227-40051	1
36	Spring, Wedge	02227-00007	1
37	Wedge	02227-40050	1
38	Turnaround Assembly	02227-60023	1
39	Label, DIP Switch	02227-80032	1
40	Shaft, Paper Release (2227A)	02227-20016	1
	Shaft, Paper Release (2228A)	02228-20016	1
41	Handle, Paper Release	02227-40034	1
42	Spring, Torsion	02227-20018	1
43	Carriage Mtr Dr Assembly (2227A)	02227-60047	1
	Carriage Mtr Dr Assembly (2228A)	02228-60047	1
	Carriage Mtr Dr Assemblies include:		
44	Cap, Drum	02227-40017	1
45	Cable, Carriage Drive (2227A)	02227-80026	1
	Cable, Carriage Drive (2228A)	02228-80026	1
46	Tractor Shaft Assembly (2227A)	02227-60044	1
	Tractor Shaft Assembly (2228A)	02228-60044	1
47	ESD Grounding Assembly	02227-60024	1
48	Rail, Carriage (2227A)	02227-20006	1
	Rail, Carriage (2228A)	02228-20006	1
49	Carriage Assembly (2227A)	02227-60048 55	1
	Carriage Assembly (2228A)	02228-60048 78	1
	Carriage Assemblies include:		
50	Clip, Flex	02227-40043	1
51	Head Latch	02225-40002	1
52	Clip, Cable	02227-00006	1
53	Wear Shoe	02227-40052	1
54	Copper Grounding Strip	02227-60032	1
	Foam Strip (attached to strip)	02225-00009	2
55	Screw, Tapping	0624-0333	1
56	E-Ring	0510-0083	3
57	Screw, 4-20 x 0.375	0624-0314	2
58	Grommet		4
	Torroid Assy, Head Flex Cable (attached under mech)	02228-60074	1

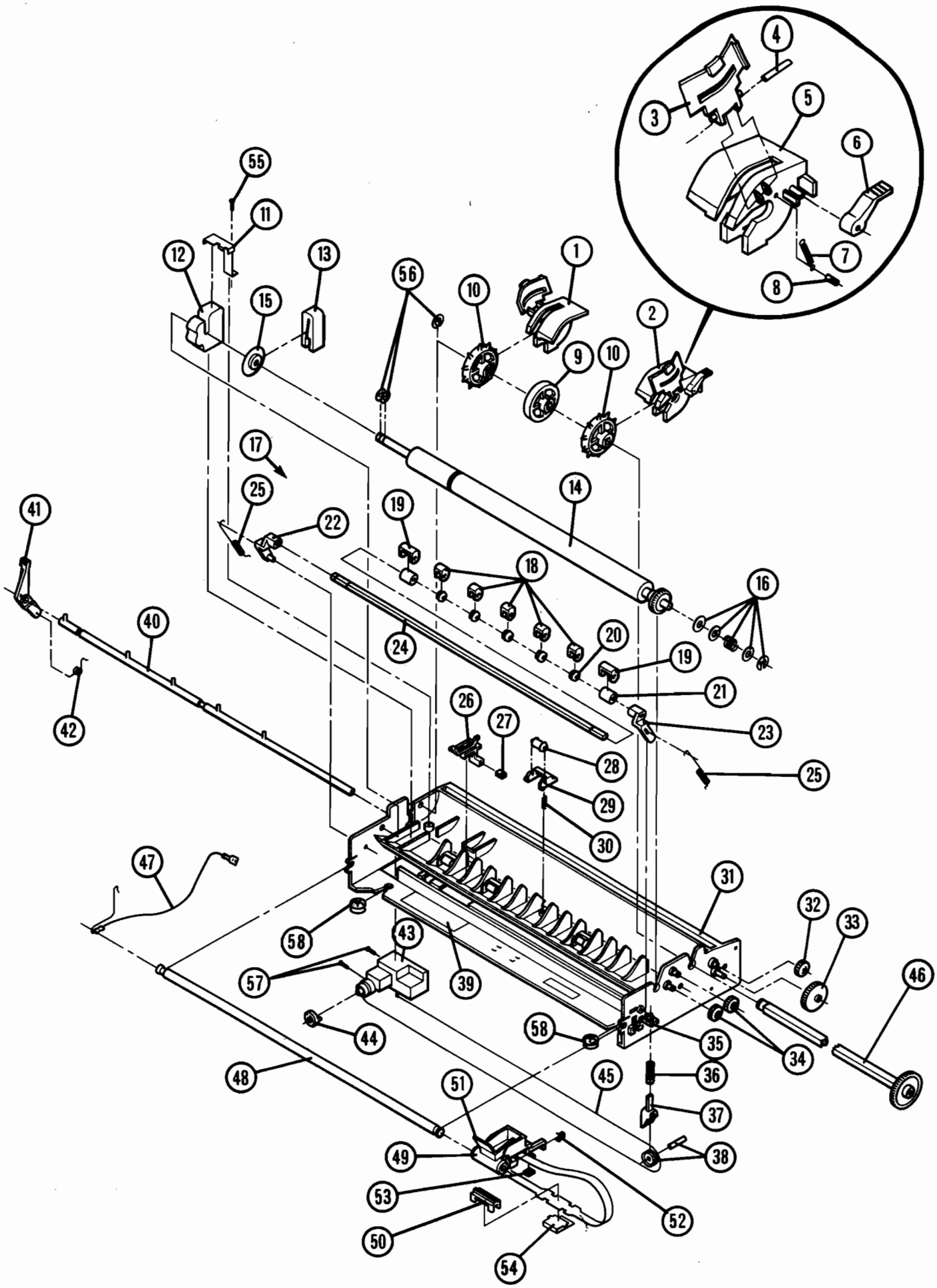


Figure 9-2. HP QuietJet Mechanism

Table 9-3. 02227-60074 Logic PCA Parts List

Fig Ref	Part Description	Part Number	Qty
C1	CAP, Fixed	0180-3839	1
C2,16,28,101	CAP 1000pF, 10%	0160-4574	4
C3,13,15,18,19,21, 23,25,27,29,30,31, 32,102,103,106	CAP .01uF, 20%	0160-4554	16
C4	CAP .1uF, 5%, 50V	0160-5471	1
C5,7,8,14,17,26	CAP .1uF, 20%	0160-4557	6
C6	CAP 100uF, 50V	0180-3512	1
C9	CAP, Fixed	0180-3856	1
C10,104	CAP 10uF, 50V	0180-2881	1
C11,12	CAP 18pF, 5%, 100V	0160-4788	2
C20	1uF, 50V, 20%	0180-3314	1
C22	CAP 2200uF, 25V	0180-3470	1
C24,107	CAP 470pF, 10%	0160-3335	2
CR1,2	DIO Pwr Rec	1901-0838	2
CR3	DIO JEDEC 1N4936	1901-1065	1
CR101,102	DIO Sw 80V	1901-0050	2
C105	CAP 22uF, 25V	0180-2879	1
F1	FUSE 4A, 125V	2110-0712	1
F2	FUSE 1A, 125V	2110-0665	1
F3	FUSE .75A, 125V	2110-0683	1
J1	CONN ML 2 Pin	1252-0761	1
J2	CONN Post Type	1252-1783	1
J3,5,6	CONN 6 Pin HDR	1252-1667	3
J4	CONN, Flex Ckt 17	0360-2319	1
J7	CONN Post Type	1252-1700	1
J101	CONN 25 Pin F	1252-1661	1
J102	CONN 36 Pos	1252-1784	1
L1	INDUCTOR Coil	9140-1210	1
Q1	IC Volt Reg 309	1820-0430	1
Q2,101	TRANS 2N4403	1853-0419	2
Q3	TRANS Fld Effect	1855-0683	1
Q102	IC Volt Reg 7812	1826-0147	1
R1,32	RES 46.4K, 1%	0698-3162	2
R2,31,101,102	RES 121 Ohm, 1%	0757-0403	4
R3,18	RES 26.1K	0698-3159	2
R4,15,29	RES 100K, 1%	0757-0465	3
R5,104	RES Fuse Fixed	0699-2123	2
R6,20,22,23	RES 21.5K, 1%	0757-0199	4
R7	RES 2.49K, 1%	0698-4435	1
R8	RES 64.9K, 1%	0698-4502	1
R9	RES 121K, 1%	0757-0467	1
R10	RES 261K, 1%	0698-3455	1
R11	RES 1K, 1%	0757-0159	1

Table 9-3. 02227-60074 Logic PCA Parts List (Cont.)

Fig Ref	Part Description	Part Number	Qty
R12,21	RES 10K, 1%	0757-0442	2
R13,14,16,17,24,26 30,33,103,106	RES 11K, 1%, .125W	0757-0443	10
R19	RES 2.61K, 1%	0698-0085	1
R25,28	RES 1M, 1%, .125W	0698-8827	2
R27	RES 68.1K	0757-0461	1
R34	RES 2.15K, 1%	0698-0084	1
R35	RES 215K, 1%	0698-3454	1
R105	RES 1.96K, 1%	0698-0083	1
SW1	OPTO SENSOR	1990-1142	1
SW2	Switch, Reed	0490-1574	1
SW3,4	Switch, Rkr 8-1A	3101-2243	2
U1,2	XSTR ARRAY, 7NPN	1858-0099	2
U3	IC ULN 2023A	1858-0097	1
U6,7	IC Linear LM339	1826-0138	2
U8	IC MPU 68B09	1820-2624	1
U9	IC Memory	1818-3979	1
U10	IC Volt Ref 1403	Replace PCA	1
U11	IC Timer, 555	1826-0180	1
U12	IC	Replace PCA	1
U13	IC RAM	1818-1611	1
U101	IC Digital	1820-4666	1
U102	RES NET 2.2K x 15	1810-0235	1
U103	IC MC74HC374N	1820-3082	1
U104	ROM	1818-3980	1
VR1,101-105	DIO ZNR 47V, 5%	1902-1415	6
VR2	DIO ZNR	1902-1509	1
VR106-110	DIO ZNR 5.6V, 5%	1902-0952	5
XU4,U5	SOCKET, IC, 28 Pin	1200-0567	2
Y1	CRYSTAL	0410-1851	1
	Screw, Machine	0515-0842	9
	Heatsink	1205-0668	1
	Jumper, Removable	1258-0229	1

Table 9-3. 02227-60074 Logic PCA Parts List

Fig Ref	Part Description	Part Number	Qty
C1	CAP, Fixed	0180-3839	1
C2,16,28,101	CAP 1000pF, 10%	0160-4574	4
C3,13,15,18,19,21, 23,25,27,29,30,31, 32,102,103,106	CAP .01uF, 20%	0160-4554	16
C4	CAP .1uF, 5%, 50V	0160-5471	1
C5,7,8,14,17,26	CAP .1uF, 20%	0160-4557	6
C6	CAP 100uF, 50V	0180-3512	1
C9	CAP, Fixed	0180-3856	1
C10,104	CAP 10uF, 50V	0180-2881	1
C11,12	CAP 18pF, 5%, 100V	0160-4788	2
C20	1uF, 50V, 20%	0180-3314	1
C22	CAP 2200uF, 25V	0180-3470	1
C24,107	CAP 470pF, 10%	0160-3335	2
CR1,2	DIO Pwr Rec	1901-0838	2
CR3	DIO JEDEC 1N4936	1901-1065	1
CR101,102	DIO Sw 80V	1901-0050	2
C105	CAP 22uF, 25V	0180-2879	1
F1	FUSE 4A, 125V	2110-0712	1
F2	FUSE 1A, 125V	2110-0665	1
F3	FUSE .75A, 125V	2110-0683	1
J1	CONN ML 2 Pin	1252-0761	1
J2	CONN Post Type	1252-1783	1
J3,5,6	CONN 6 Pin HDR	1252-1667	3
J4	CONN, Flex Ckt 17	0360-2319	1
J7	CONN Post Type	1252-1700	1
J101	CONN 25 Pin F	1252-1661	1
J102	CONN 36 Pos	1252-1784	1
L1	INDUCTOR Coil	9140-1210	1
Q1	IC Volt Reg 309	1820-0430	1
Q2,101	TRANS 2N4403	1853-0419	2
Q3	TRANS Fld Effect	1855-0683	1
Q102	IC Volt Reg 7812	1826-0147	1
R1,32	RES 46.4K, 1%	0698-3162	2
R2,31,101,102	RES 121 Ohm, 1%	0757-0403	4
R3,18	RES 26.1K	0698-3159	2
R4,15,29	RES 100K, 1%	0757-0465	3
R5,104	RES Fuse Fixed	0699-2123	2
R6,20,22,23	RES 21.5K, 1%	0757-0199	4
R7	RES 2.49K, 1%	0698-4435	1
R8	RES 64.9K, 1%	0698-4502	1
R9	RES 121K, 1%	0757-0467	1
R10	RES 261K, 1%	0698-3455	1
R11	RES 1K, 1%	0757-0159	1

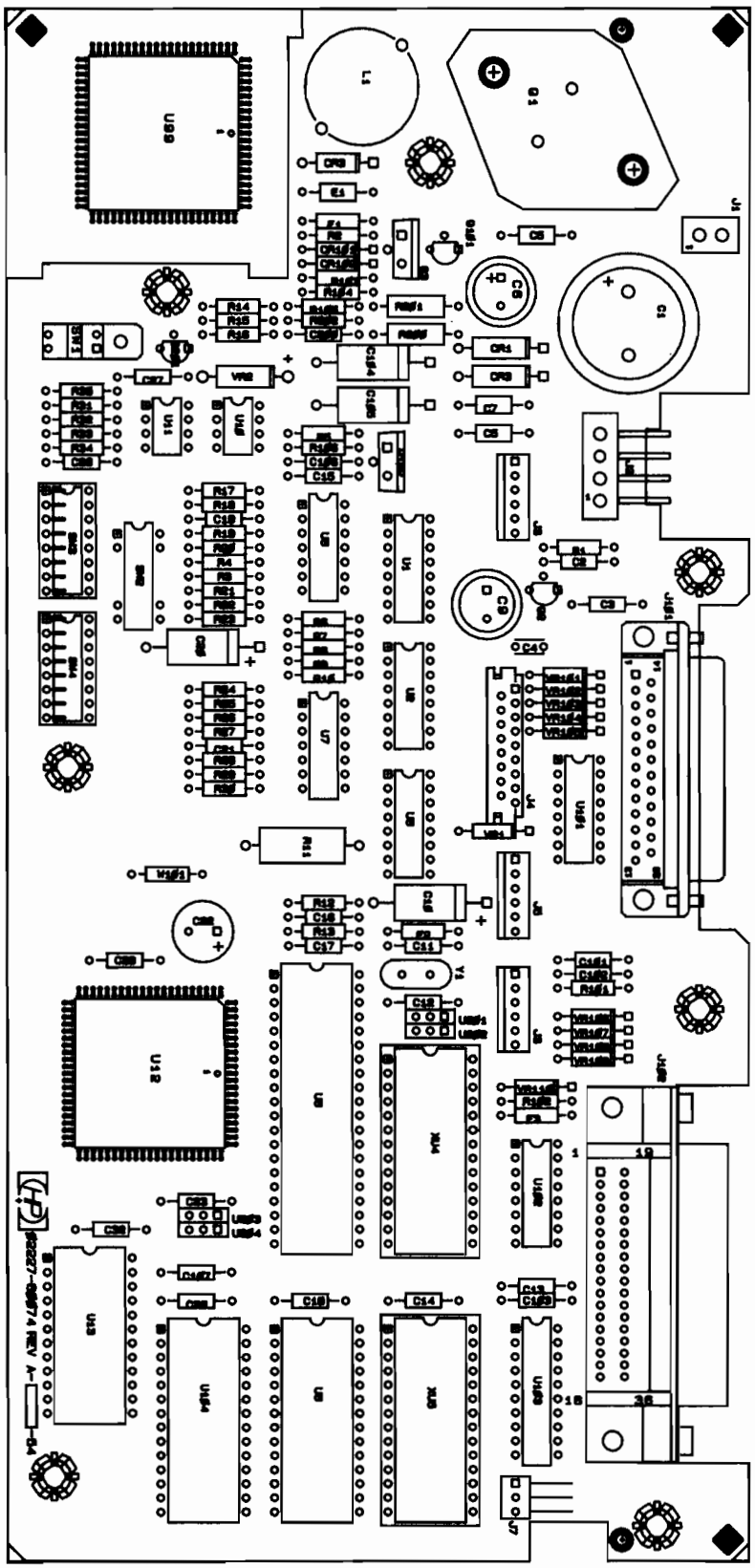


Figure 9-3. 02227-60074 Logic PCA

10 Reference

Documentation Summary

Table 10-1. HP QuietJet Documentation

Part Number	Documentation
02227-90004	HP QuietJet Multi-Language Operator's Guide
02227-90019	HP QuietJet Series Owner's Manual
02227-90031	HP QuietJet Series Service Manual
02227-90037	HP 2227B QuietJet Series Service Manual Supplement

Explanation of DIP Switch Functions

Carriage Return Definition. When the host sends a carriage return command to the printer, it expects the printer to do a carriage return and line feed or a carriage return only (no line feed). The printer executes a carriage return and line feed if the host sends a carriage return command and dip switch A1 is up. The printer does not automatically execute a line feed after a carriage return command with dip switch A1 down.

Switch A1 down with the host expecting the printer to execute a carriage return and line feed will cause the printer to print on the same line of print. Switch A2 up with the host expecting the printer to execute a carriage return only will cause the printer to print in a double spacing format.

Normal Pitch Selection. The HP QuietJet Printer has a "normal print pitch" of 10 or 12 cpi (characters per inch). Switch A2 selects the default print pitch (10 or 12 cpi). A 12 cpi selection provides compatibility to the HP ThinkJet Printers default pitch. Expanded print pitch is dependent on normal print pitch (5 cpi for a normal pitch of 10 cpi or 6 cpi for a normal pitch of 12 cpi).

Perforation Skip. The perforation skip mode causes the printer to avoid printing on the paper's perforation when using Z-fold paper. Most software packages control the perforation skip mode and thus require the perforation skip mode disabled on the printer. Otherwise, both printer and host will advance the paper for a perforation skip, resulting in an incorrect top-of- form position.

Page Length. The printer cannot detect the length of Z-fold paper. Therefore, switch A4 informs the printer the length of paper installed. Page length setting is necessary for proper form feeding and perforation skip.

Programming Command Set. The HP QuietJet Printer can accept HP PCL level I or select IBM/Epson control sequences. Switch A5 determines which command set is selected.

Character Set. Switches A6 through B1 select a character set. See the HP QuietJet Owner's Manual for a HP QuietJet character set listings.

RS 232C Control. Switches B2 through B6 determine the RS 232C I/O configuration. These functions include handshake method (DTR or XON/XOFF), parity, word length, and baud rate. These switches do not affect the parallel I/O.

Out of Paper Detection. Switch B7 enables and disables the paper out switch. The out of paper detection is unnecessary when printing single page reports on single cut sheet paper. Enable the out of paper detection when using Z-fold paper to avoid printing on the printer's platen.

Width Detection. The width detection switch selects a print region of 13.2 (switch B8 down) or 8 (switch B8 up) inches. Selecting an 8 inch print region avoids printing on the platen when using standard 8 1/2 inch wide paper.

11 Product History

Chapter 11 adapts this revision of the service manual to earlier version HP QuietJet Series printers.

Note

For the latest version parts list as of the listed manual release date, see Chapter 9, "Replaceable Parts". For the latest version schematics as of the listed manual release date, see Chapter 12, "Diagrams".

Earlier Rev PCAs

Table 11-1. 02227-60001 REV B Logic PCA Parts List

Fig Ref	Part Description	Part Number	Qty
C1	Capacitor, 4700uF, 35V	0180-3839	1
C2,6,20,23,27	Capacitor, 1000pF, 100V (10%)	0160-4574	5
C3,7,11,15,19,22,25, C26,29,32,100-104	Capacitor, .01uF (20%)	0160-4554	15
C4	Capacitor, .1uF, 50V (5%)	0160-5471	1
C5	Capacitor, fixed	0180-3856	1
C8	Capacitor, 100uF, 50V AL	0180-3512	1
C9,10,16,21,31,90	Capacitor, .1uF (20%)	0160-4557	6
C12,17	Capacitor, 10uF, 50V	0180-2881	2
C13,14	Capacitor, 18pF, 100V (5%)	0160-4788	2
C18	Capacitor, 22uF, 25V	0180-2879	2
C24	Capacitor, 1uF, 50V (20%)	0180-3314	1
C28	Capacitor,220uF, 25V	0180-3470	1
C30	Capacitor, 470pF (10%)	0160-3335	2
CR1,2	Diode, Power Rectifier	1901-0838	2
CR3	Diode, JECED 1N4936	1901-1065	1
CR24,25	Diode, Switching 80V	1901-0050	2
F1	Fuse, 4A, 125V	2110-0712	1
F2	Fuse, 1A	2110-0665	1
F3	Fuse, .75A	2110-0683	1
J1	Connector, 2 pin	1252-0761	1
J2	Connector, 4 pin	1252-1699	1
J3	Connector, RS-232-C	1252-1661	1
J4	Connector, Centronics	1252-1784	1
J5	Header, 3 pin right angle	1252-1700	1
J6,7,8	Header, Locking Tab	1252-1667	3
J7	Flex Connector	0360-2319	1
L1	Inductor, 220uH	9140-1210	1
Q1,4	Transistor, 2N4403	1853-0419	2
Q2	MOSFET	1855-0683	1
R2,41	Resistor, 46.4K (1%)	0698-3162	2
R3,40	Resistor, 200, .25W (5%)	0683-2015	2
R4	Resistor, 1K (1%)	0757-0280	1
R5	Resistor, 100	0757-0401	1
R6	Resistor, 121 (1%)	0757-0403	1
R7,9,13,20,21,24, R25,35,39,42,46	Resistor, 11K, .125W (1%)	0757-0443	11
R8	Resistor, 1.96K (1%)	0698-0083	1
R10,26	Resistor, 26.1K (1%)	0698-3159	2
R11,23,38	Resistor, 100K (1%)	0757-0465	3

Table 11-1. 02227-60001 REV B Logic PCA Parts List (Cont.)

Fig Ref	Part Description	Part Number	Qty
R12,100,101,102,11	4.7 ohm, 1/4W fuseable	0699-2123	5
R14,32,33,38	Resistor, 21.5K (1%)	0757-0199	4
R15	Resistor, 2.55K	0698-3179	1
R16	Resistor, 28.7K	0698-3449	1
R17	Resistor, 61.9K (1%)	0757-0460	1
R18	Resistor, 121K (1%)	0757-0467	1
R19	Resistor, 1K (1%)	0757-0159	1
R27	Resistor, 2.61K (1%)	0698-0085	1
R31	Resistor, 10K	0757-0442	1
R34,37	Resistor, 1M (1%)	0698-8827	2
R36	Resistor, 68.1K	0757-0461	1
R43	Resistor, 2.15K	0698-0084	1
R44	Resistor, 215K	0698-3454	1
SW1	Opto Sensor	1990-1142	1
SW2	Sensor, Reed Switch	0490-1574	1
SW3,4	Switch, Rocker 8-1A	3101-2243	2
U1	IC, Voltage Regulator 309	1820-0430	1
U2	RS-232 Driver/Receiver	1820-4666	1
U3	Resistor Network, 16 pin	1810-0235	1
U4	IC	1820-3082	1
U5	IC, Voltage Regulator	1826-0147	1
U6,7	Transistor Array, 7 NPN	1858-0099	2
U8	IC, ULN 2023A	1858-0097	1
U11,12	IC, Linear LM 339	1826-0138	2
U13	IC, MPU 68B09	1820-2624	1
U14	IC, Character ROM	1818-3979	1
U15	IC, Voltage Reference	Replace PCA	1
U16	IC, 555 Timer	1826-0180	1
U17	HP Custom IC	Replace PCA	1
U18	ROM 32K	02227-80082	1
U19	IC, RAM	1818-1611	1
VR1-6	Diode, Zener 33V (5%)	1902-0970	6
VR7	Diode, 3.3V, 5W (5%)	1902-1509	1
W2	Jumper, Wire	8151-0013	1
XU9,XU10	Socket, 28 pin IC	1200-0567	2
Y1	Crystal, 8Mhz	0410-1851	1
	Heatsink	0410-1851	1
	Jumper, Removable	1258-0229	1

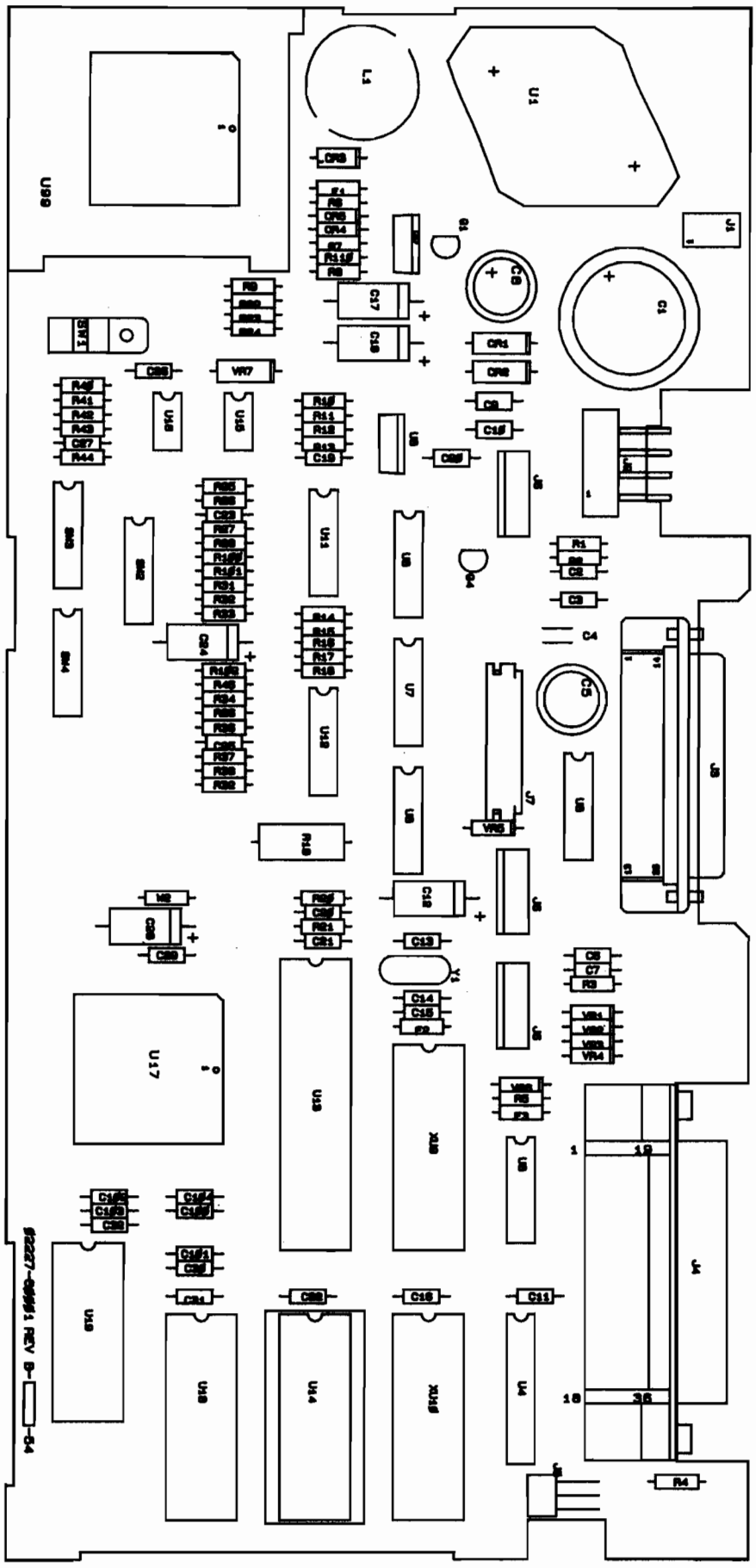


Figure 11-1. 02227-60001 REV B Logic PCA

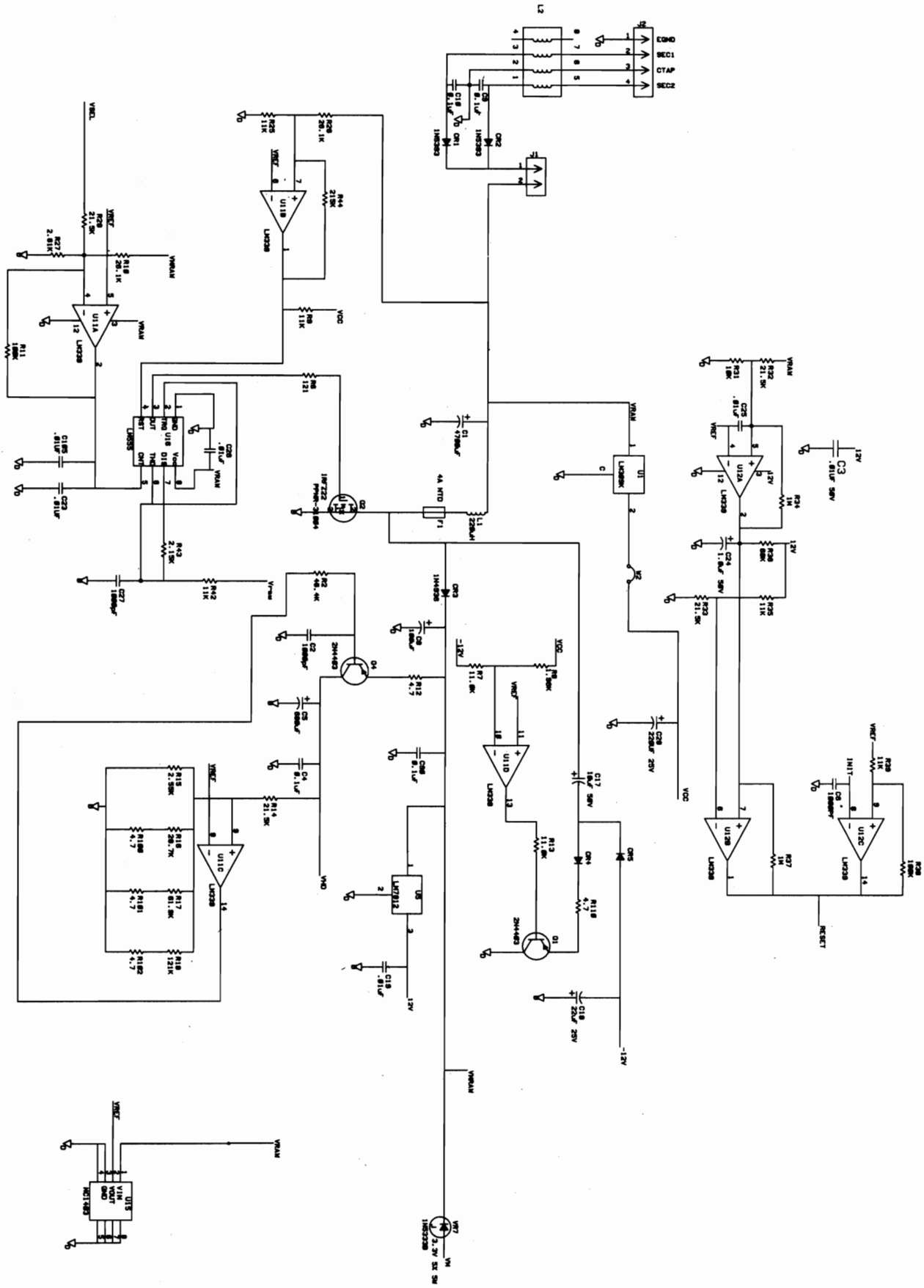


Figure 11-2. 02227-60001 REV B Logic PCA Schematics (1 of 3)

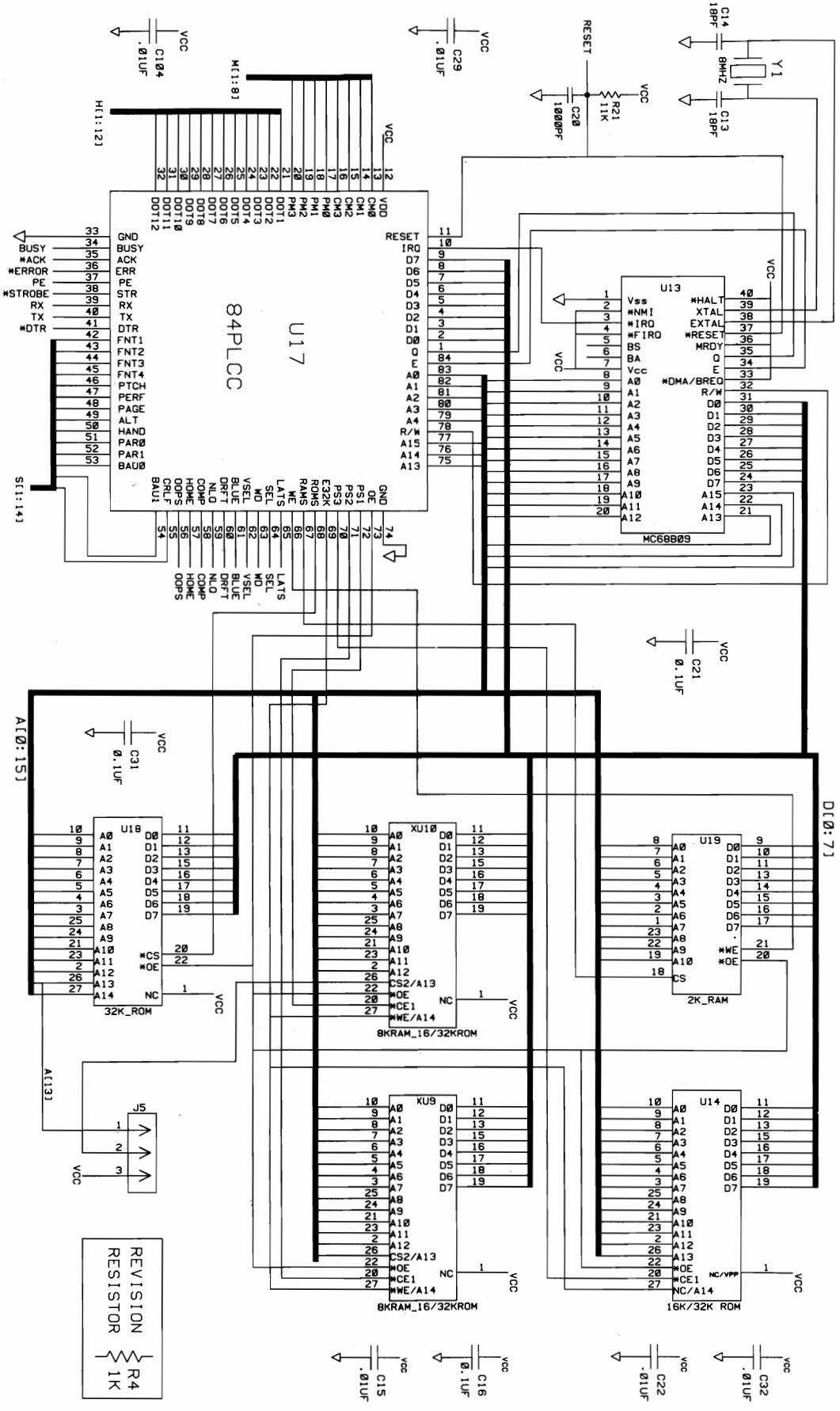


 Figure 11-2. 02227-60001 REV B Logic PCA Schematics (2 of 3)

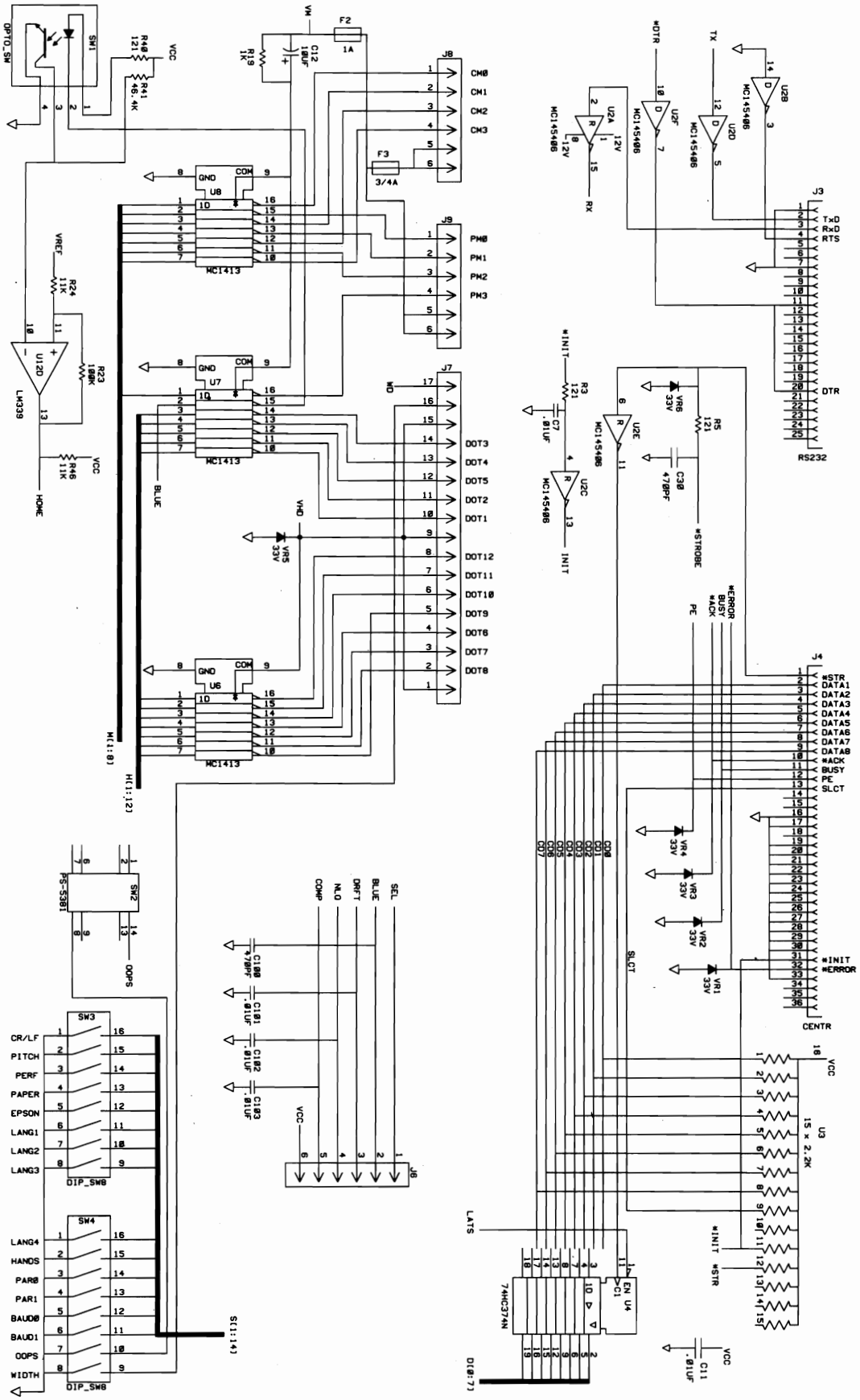


Figure 11-2. 02227-60001 REV B Logic PCA Schematics (3 of 3)

Table 11-2. 02227-60001 REV D Logic PCA Parts List *

Fig Ref	Part Description	Part Number	Qty
C1	Capacitor, 4700uF, 35V	0180-3839	1
C2,6,20,27	Capacitor, 1000pF, 100V (10%)	0160-4574	4
C3,7,11,15,19,22,23, C26,29,32,100-104	Capacitor, .01uF (20%)	0160-4554	16
C4	Capacitor, .1uF, 50V (5%)	0160-5471	1
C5	Capacitor, fixed	0180-3856	1
C8	Capacitor, 100uF, 50V AL	0180-3512	1
C9,10,16,21,31,90	Capacitor, .1uF (20%)	0160-4557	6
C12,17	Capacitor, 10uF, 50V	0180-2881	2
C13,14	Capacitor, 18pF, 100V (5%)	0160-4788	2
C18	Capacitor, 22uF, 25V	0180-2879	1
C24	Capacitor, 1uF, 50V (20%)	0180-3314	1
C28	Capacitor, 220uF, 25V	0180-3470	1
C30,100	Capacitor, 470pF (10%)	0160-3335	2
CR1,2	Diode, Power Rectifier	1901-0838	2
CR3	Diode, JECED 1N4936	1901-1065	1
CR4,5	Diode, Switching 80V	1901-0050	2
F1	Fuse, 4A, 125V	2110-0712	1
F2	Fuse, 1A	2110-0665	1
F3	Fuse, .75A	2110-0683	1
J1	Connector, 2 pin	1252-0761	1
J2	Connector, 4 pin	1252-1699	1
J3	Connector, RS-232-C	1252-1661	1
J4	Connector, Centronics	1252-1784	1
J5	Header, 3 pin right angle	1252-1700	1
J6,8,9	Header, Locking Tab	1252-1667	3
J7	Flex Connector	0360-2319	1
L1	Inductor, 220uH	9140-1210	1
Q1,4	Transistor, 2N4403	1853-0419	2
Q2	MOSFET	1855-0683	1
R2,41	Resistor, 46.4K (1%)	0698-3162	2
R4	Resistor, 5.11K (1%)	0757-0438	1
R3,5,6,40	Resistor, 121 (1%)	0757-0403	4
R7,9,13,21,24, R25,35,39,42,46	Resistor, 11K, .125W (1%)	0757-0443	10
R8	Resistor, 1.96K (1%)	0698-0083	1
R10,26	Resistor, 26.1K (1%)	0698-3159	2
R11,23,38	Resistor, 100K (1%)	0757-0465	3
R12,110	4.7 ohm, 1/4W fuseable	0699-2123	2
R14,28,32,33	Resistor, 21.5K (1%)	0757-0199	4
R15	Resistor, 2.49K	0698-4435	1
R16	Resistor, 64.9K	0698-4502	1
R17	Resistor, 121K (1%)	0757-0467	1
R18	Resistor, 261K (1%)	0698-3455	1

Table 11-2. 02227-60001 REV D Logic PCA Parts List * (Cont.)

Fig Ref	Part Description	Part Number	Qty
R19	Resistor, 1K (1%)	0757-0159	1
R27	Resistor, 2.61K (1%)	0698-0085	1
R31	Resistor, 10K	0757-0442	1
R34,37	Resistor, 1M (1%)	0698-8827	2
R36	Resistor, 68.1K	0757-0461	1
R43	Resistor, 2.15K	0698-0084	1
R44	Resistor, 215K	0698-3454	1
SW1	Opto Sensor	1990-1142	1
SW2	Sensor, Reed Switch	0490-1574	1
SW3,4	Switch, Rocker 8-1A	3101-2243	2
U1	IC, Voltage Regulator 309	1820-0430	1
U2	RS-232 Driver/Receiver	1820-4666	1
U3	Resistor Network, 16 pin	1810-0235	1
U4	IC	1820-3082	1
U5	IC, Voltage Regulator	1826-0147	1
U6,7	Transistor Array, 7 NPN	1858-0099	2
U8	IC, ULN 2023A	1858-0097	1
U11,12	IC, Linear LM 339	1826-0138	2
U13	IC, MPU 68B09	1820-2624	1
U14	IC, Character ROM	1818-3979	1
U15	IC, Voltage Reference	Replace PCA	1
U16	IC, 555 Timer	1826-0180	1
U17	HP Custom IC	Replace PCA	1
U18	ROM 32K	02227-80082	1
U19	IC, RAM	1818-1611	1
VR1-4,6	Diode, Zener 5.6V (5%)	1902-0952	5
VR5,7-11	Diode, 47V, 5W (5%)	1902-1415	6
W2-6	Jumper, Wire	8151-0013	5
XU9,XU10	Socket, 28 pin IC	1200-0567	2
Y1	Crystal, 8Mhz	0410-1851	1
	Heatsink	0410-1851	1
	Shunt	1258-0229	1
	Jumper, Removable	1258-0229	1

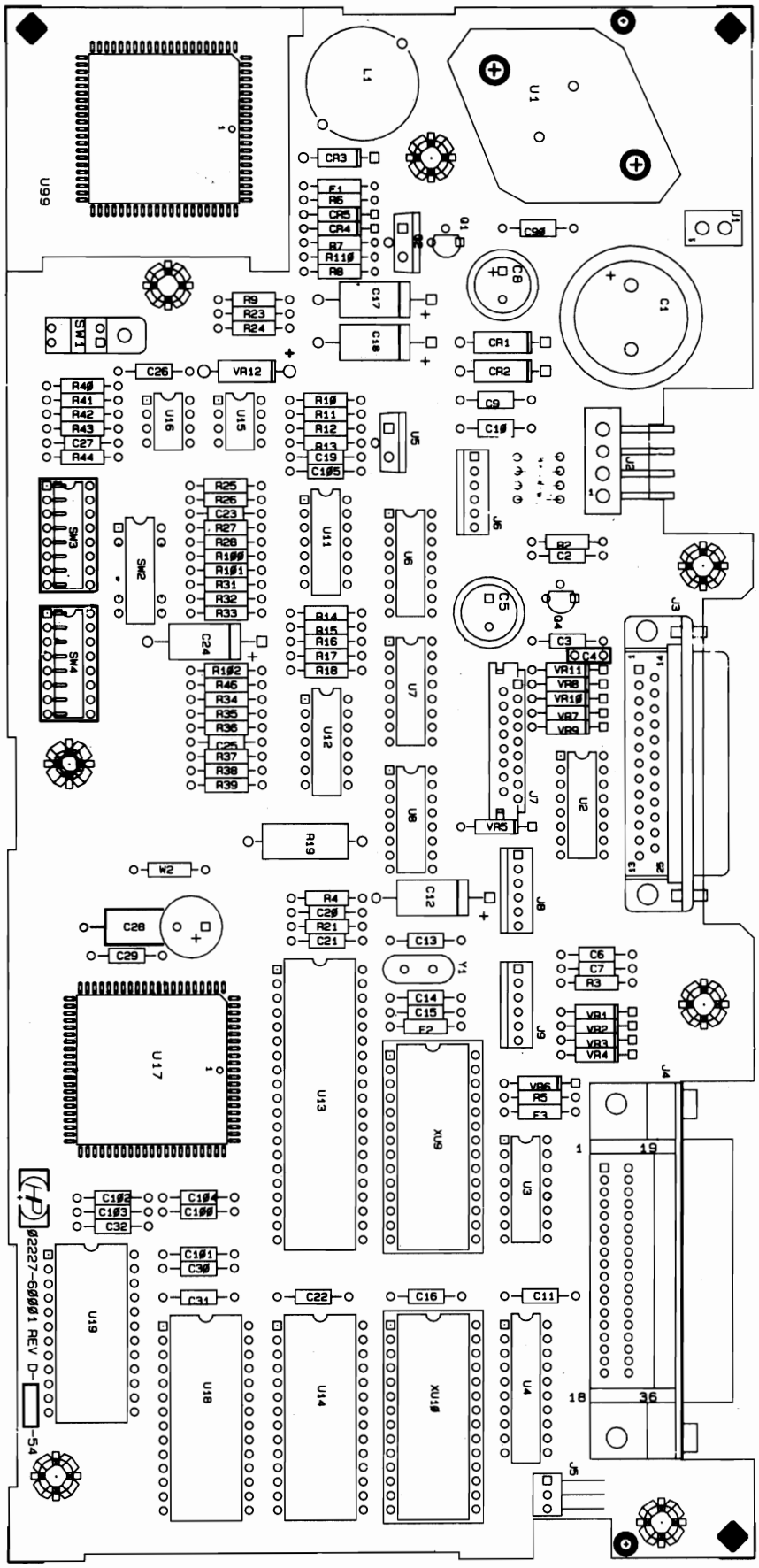


Figure 11-3. 02227-60001 REV D Logic PCA

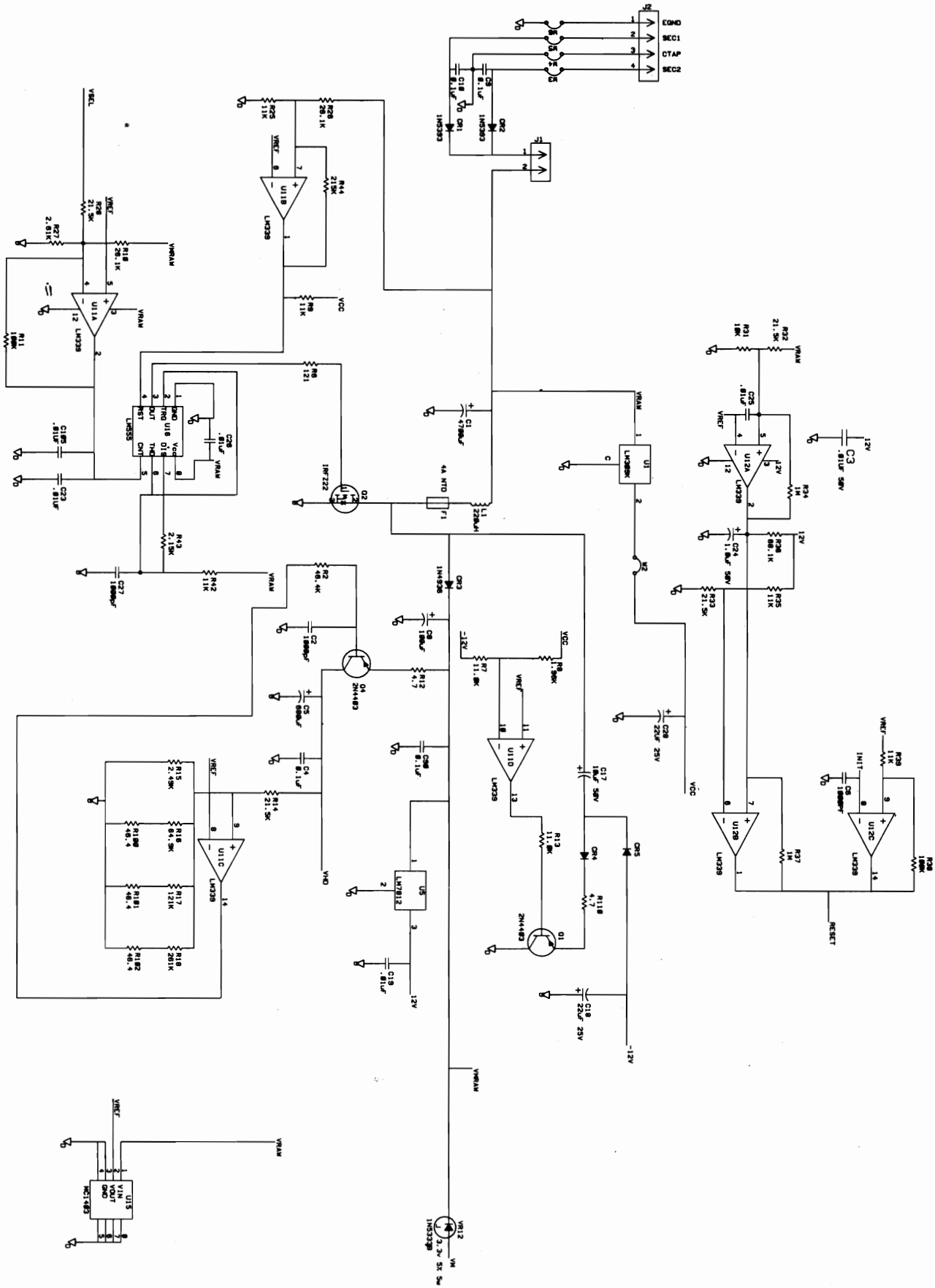


Figure 11-4. 02227-60001 REV D Logic PCA Schematics (1 of 3)

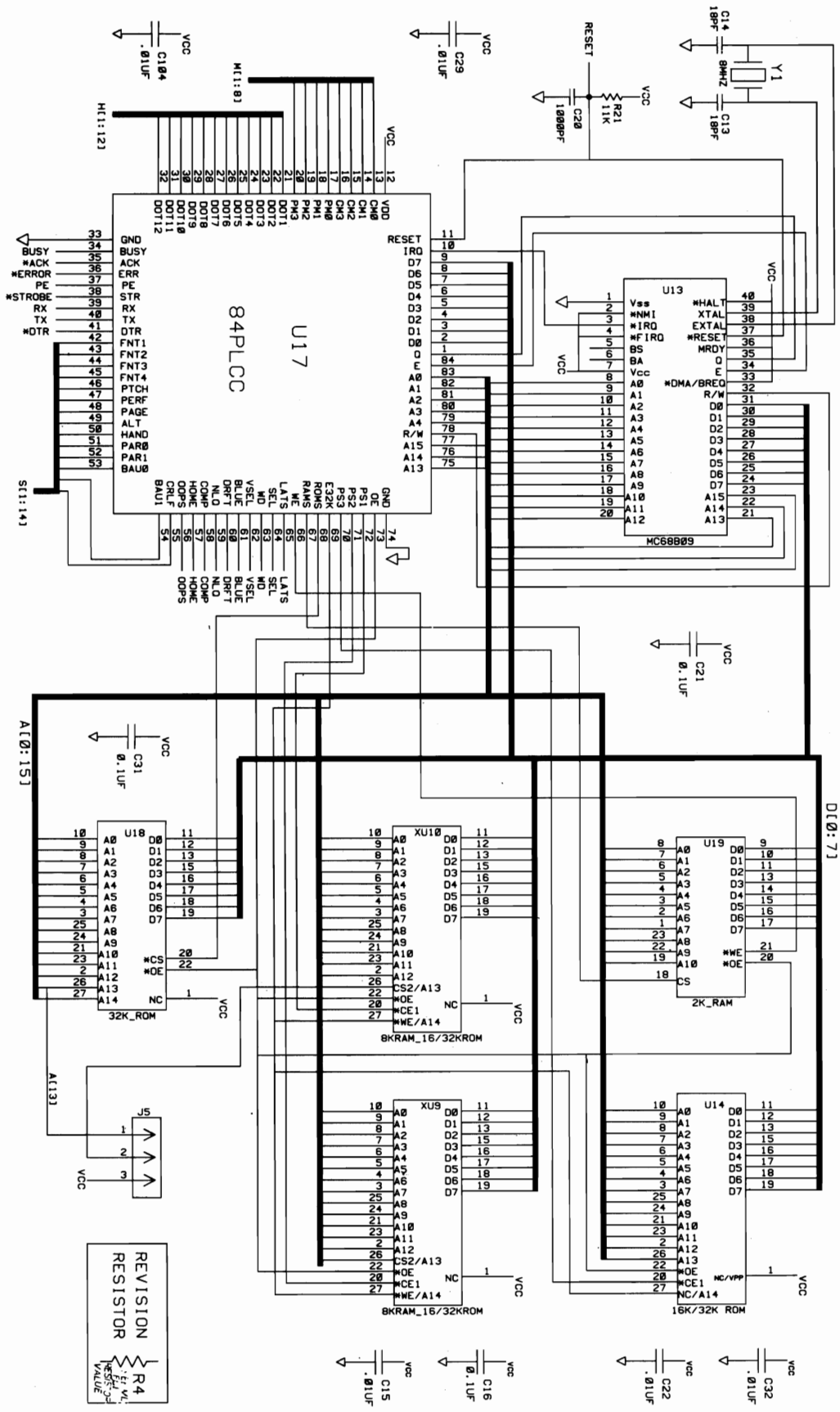


Figure 11-4. 02227-60001 REV D Logic PCA Schematics (2 of 3)

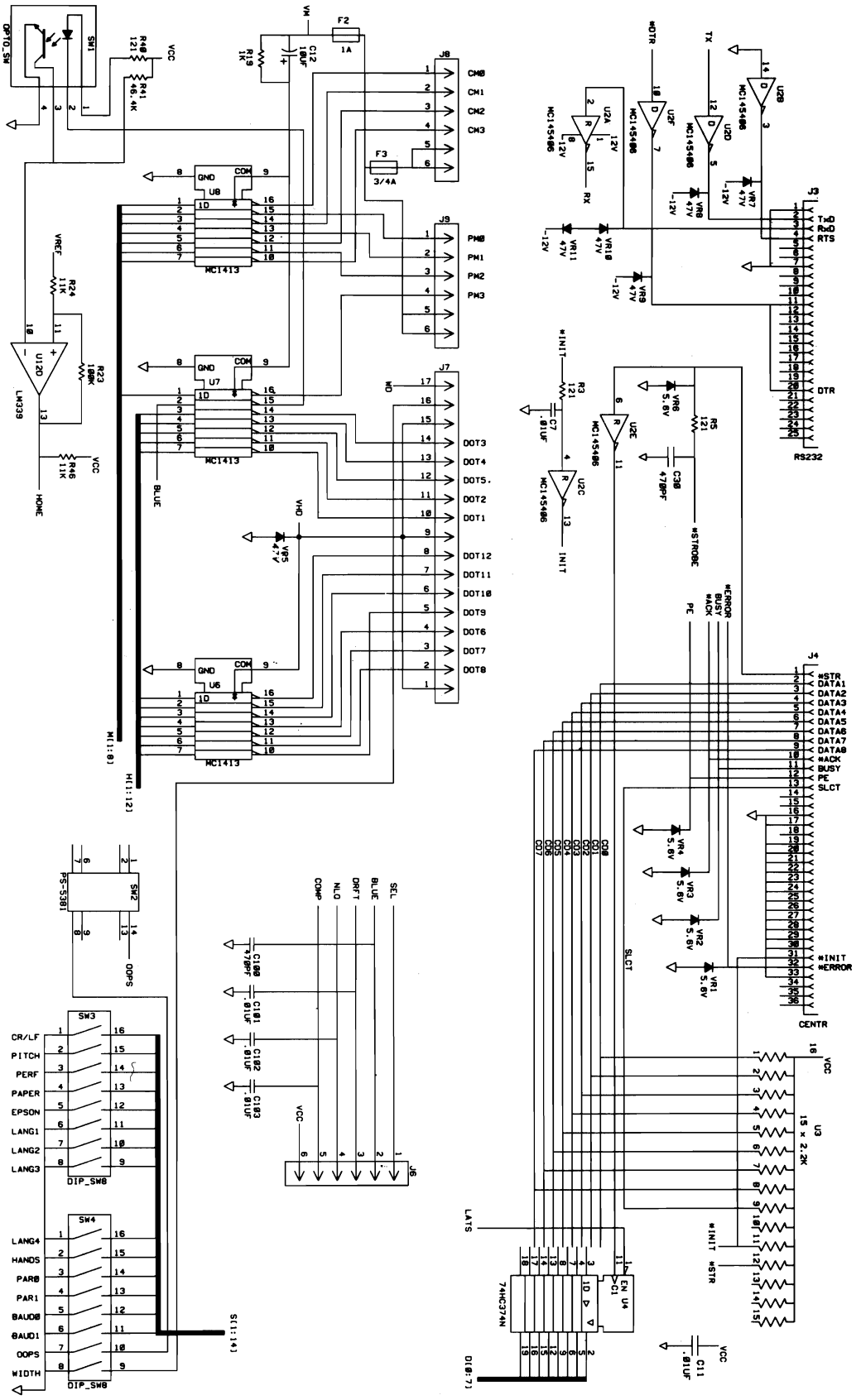


Figure 11-4. 02227-60001 REV D Logic PCA Schematics (3 of 3)

Table 11-3. 02227-60001 REV E Logic PCA Parts List *

Fig Ref	Part Description	Part Number	Qty
C1	CAP, Fixed	0180-3839	1
C2,16,28,101	CAP 1000pF, 10%	0160-4574	4
C3,13,15,18,19,21, 23,25,27,29,30,31, 32,102,103,106	CAP .01uF, 20%	0160-4554	16
C4	CAP .1uF, 5%, 50V	0160-5471	1
C5,7,8,14,17,26	CAP .1uF, 20%	0160-4557	6
C6	CAP 100uF, 50V	0180-3512	1
C9	CAP, Fixed	0180-3856	1
C10,104	CAP 10uF, 50V	0180-2881	1
C11,12	CAP 18pF, 5%, 100V	0160-4788	2
C20	1uF, 50V, 20%	0180-3314	1
C22	CAP 2200uF, 25V	0180-3470	1
C24,107	CAP 470pF, 10%	0160-3335	2
CR1,2	DIO Pwr Rec	1901-0838	2
CR3	DIO JEDEC 1N4936	1901-1065	1
CR101,102	DIO Sw 80V	1901-0050	2
C105	CAP 22uF, 25V	0180-2879	1
F1	FUSE 4A, 125V	2110-0712	1
F2	FUSE 1A, 125V	2110-0665	1
F3	FUSE .75A, 125V	2110-0683	1
J1	CONN ML 2 Pin	1252-0761	1
J2	CONN Post Type	1252-1699	1
J3,5,6	CONN 6 Pin HDR	1252-1667	3
J4	CONN, Flex Ckt 17	0360-2319	1
J7	CONN Post Type	1252-1700	1
J101	CONN 25 Pin F	1252-1661	1
J102	CONN 36 Pos	1252-1784	1
L1	INDUCTOR Coil	9140-1210	1
Q1	IC Volt Reg 309	1820-0430	1
Q2,101	TRANS 2N4403	1853-0419	2
Q3	TRANS Fld Effect	1855-0683	1
Q102	IC Volt Reg 7812	1826-0147	1
R1,32	RES 46.4K, 1%	0698-3162	2
R2,31,101,102	RES 121 Ohm, 1%	0757-0403	4
R3,18	RES 26.1K	0698-3159	2
R4,15,29	RES 100K, 1%	0757-0465	3
R5,104	RES Fuse Fixed	0699-2123	2
R6,20,22,23	RES 21.5K, 1%	0757-0199	4
R7	RES 2.49K, 1%	0698-4435	1
R8	RES 64.9K, 1%	0698-4502	1
R9	RES 121K, 1%	0757-0467	1
R10	RES 261K, 1%	0698-3455	1
R11	RES 1K, 1%	0757-0159	1

Table 11-3. 02227-60001 REV E Logic PCA Parts List * (Cont.)

Fig Ref	Part Description	Part Number	Qty
R12,21	RES 10K, 1%	0757-0442	2
R13,14,16,17,24,26 30,33,103,106	RES 11K, 1%, .125W	0757-0443	10
R19	RES 2.61K, 1%	0698-0085	1
R25,28	RES 1M, 1%, .125W	0698-8827	2
R27	RES 68.1K	0757-0461	1
R34	RES 2.15K, 1%	0698-0084	1
R35	RES 215K, 1%	0698-3454	1
R105	RES 1.96K, 1%	0698-0083	1
SW1	OPTO SENSOR	1990-1142	1
SW2	Switch, Reed	0490-1574	1
SW3,4	Switch, Rkr 8-1A	3101-2243	2
U1,2	XSTR ARRAY, 7NPN	1858-0099	2
U3	IC ULN 2023A	1858-0097	1
U6,7	IC Linear LM339	1826-0138	2
U8	IC MPU 68B09	1820-2624	1
U9	IC Memory	1818-3979	1
U10	IC Volt Ref 1403	Replace PCA	1
U11	IC Timer, 555	1826-0180	1
U12	IC	Replace PCA	1
U13	IC RAM	1818-1611	1
U101	IC Digital	1820-4666	1
U102	RES NET 2.2K x 15	1810-0235	1
U103	IC MC74HC374N	1820-3082	1
U104	ROM	1818-3980	1
VR1,101-105	DIO ZNR 47V, 5%	1902-1415	6
VR2	DIO ZNR	1902-1509	1
VR106-110	DIO ZNR 5.6V, 5%	1902-0952	5
XU4,U5	SOCKET, IC, 28 Pin	1200-0567	2
Y1	CRYSTAL	0410-1851	1
	Screw, Machine	0515-0842	9
	Heatsink	1205-0668	1

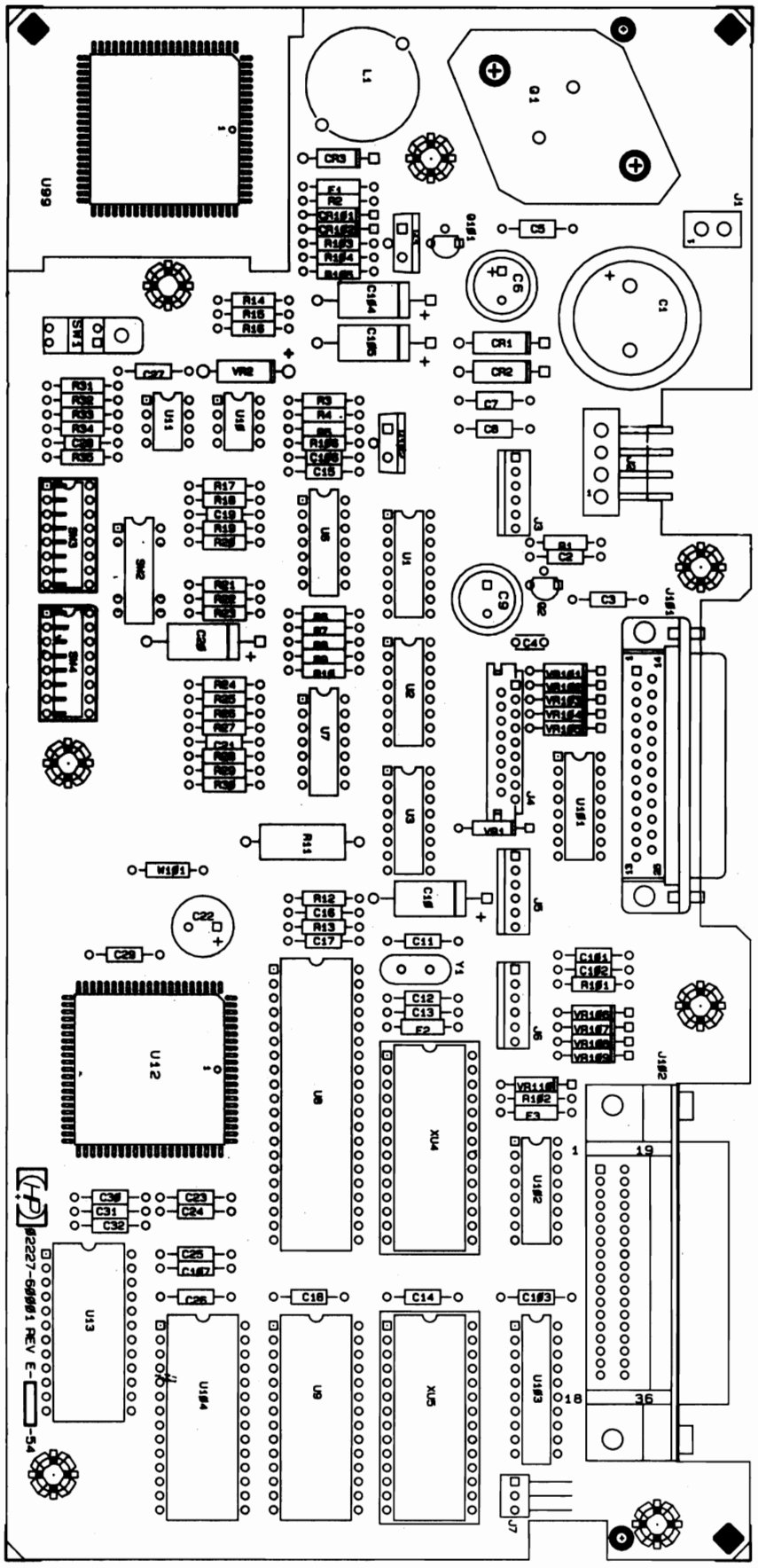


Figure 11-5. 02227-60001 REV E Logic PCA

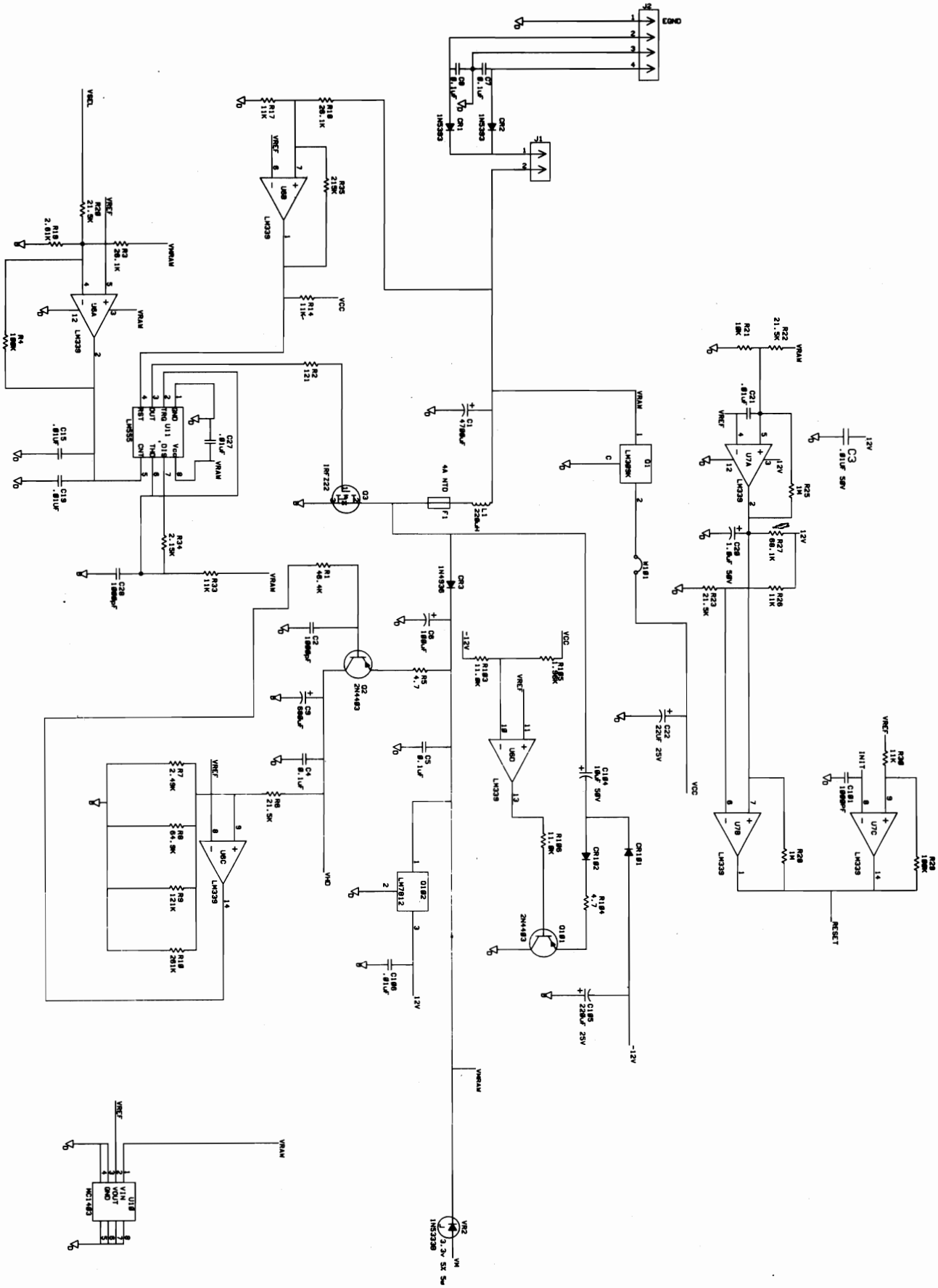


Figure 11-6. 02227-60001 REV E Logic PCA Schematics (1 of 3)

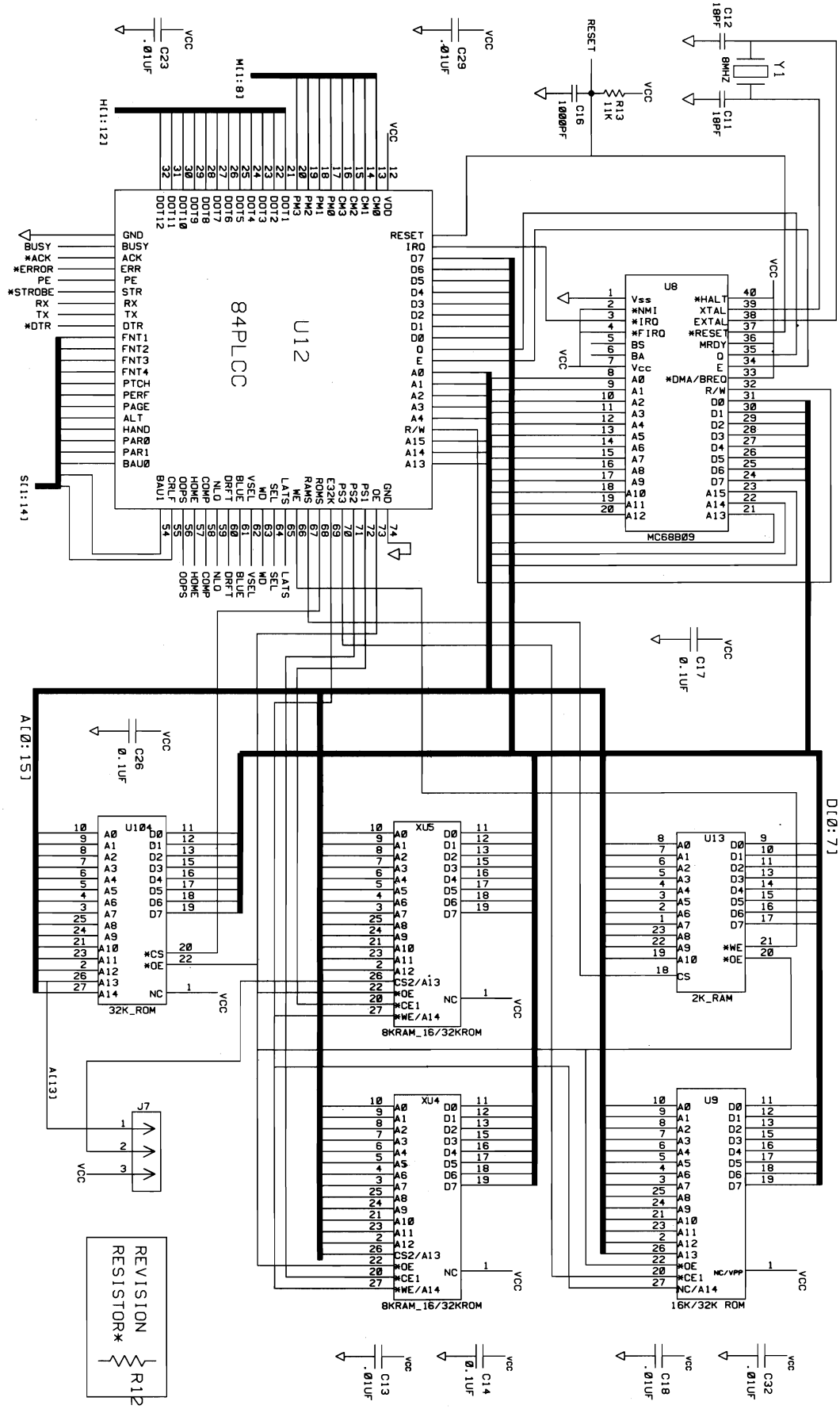


Figure 11-6. 02227-60001 REV E Logic PCA Schematics (2 of 3)

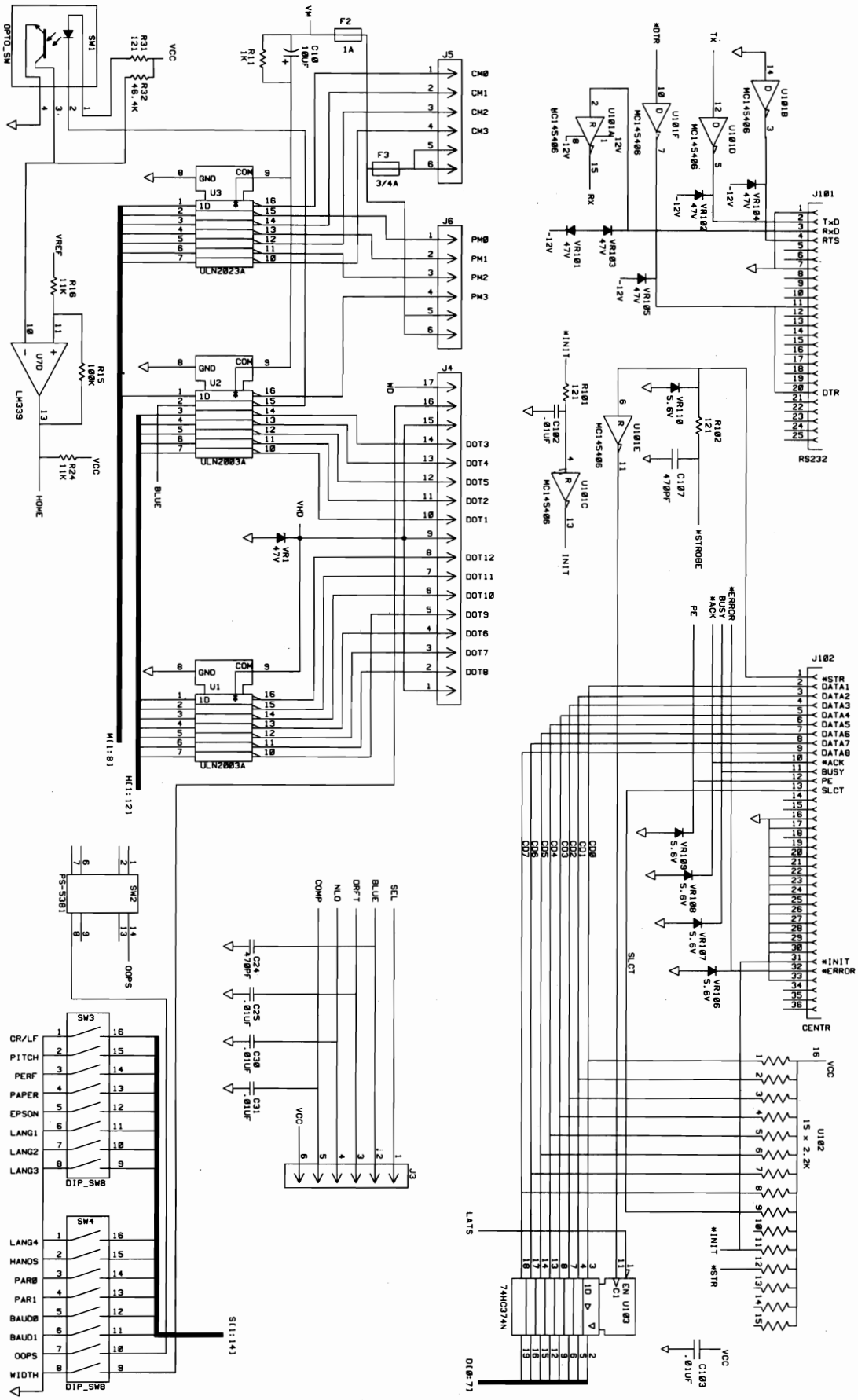


Figure 11-6. 02227-60001 REV E Logic PCA Schematics (3 of 3)

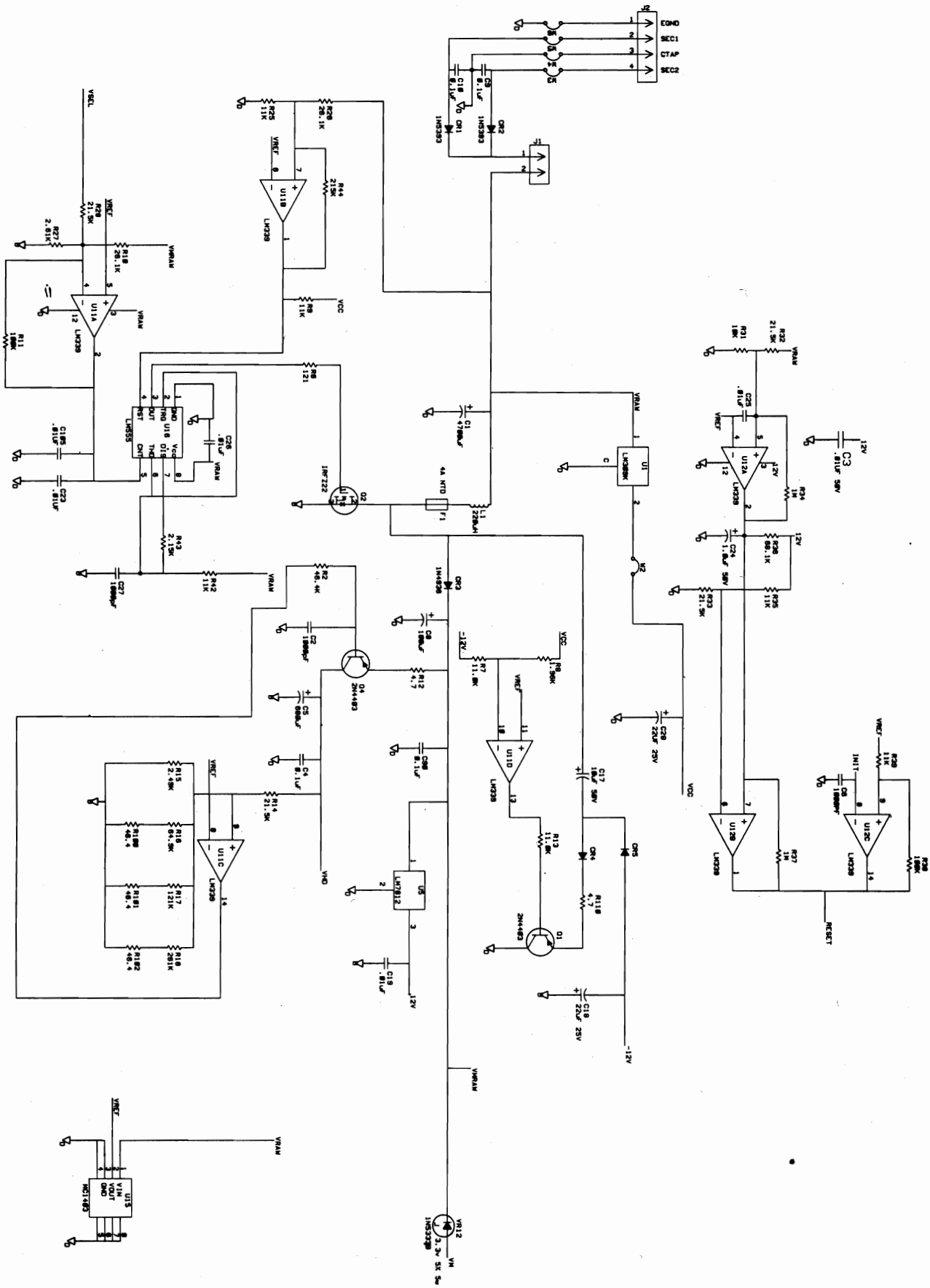


Figure 11-4. REV D Logic PCA Schematics (1 of 3)

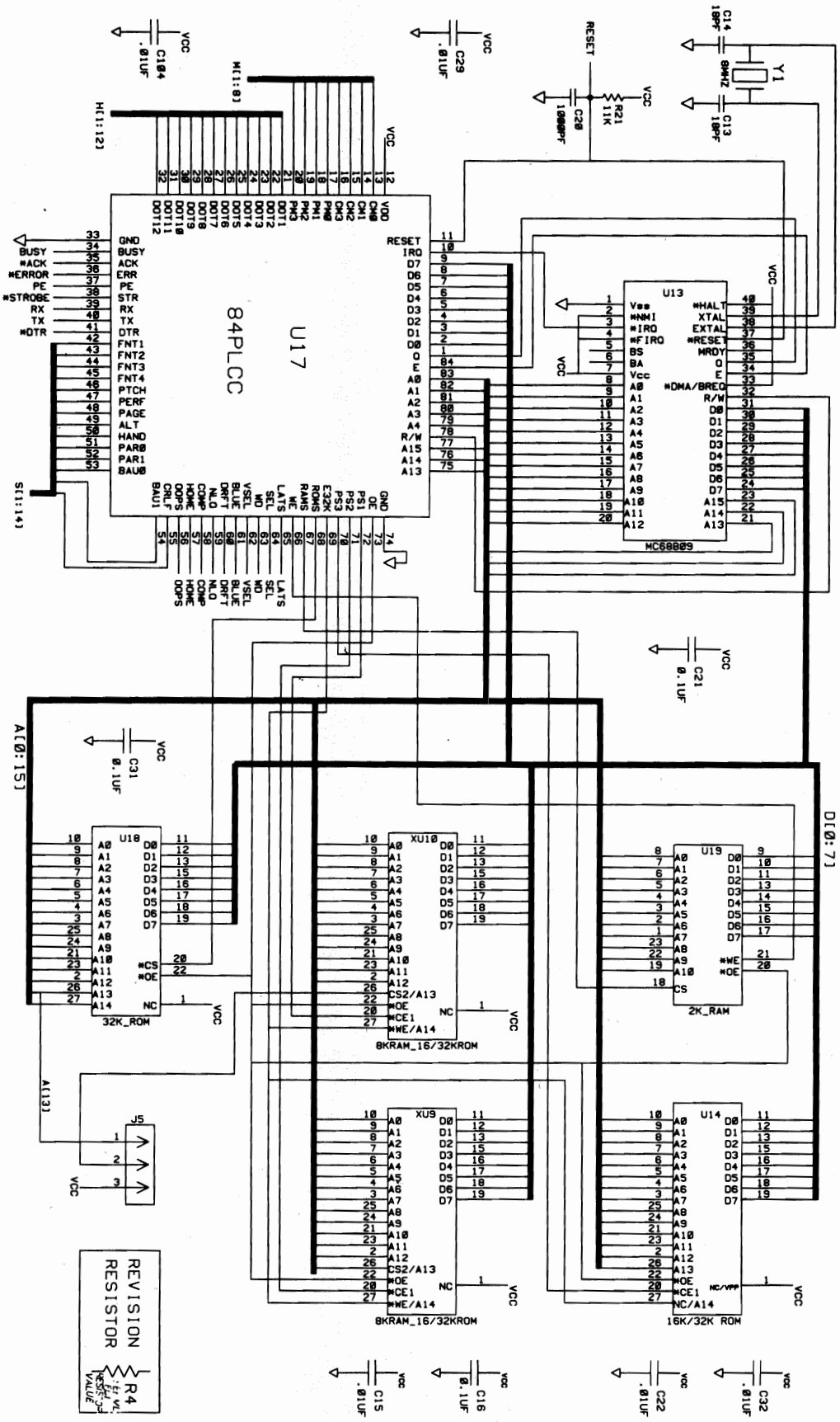


Figure 11-4. REV D Logic PCA Schematics (2 of 3)

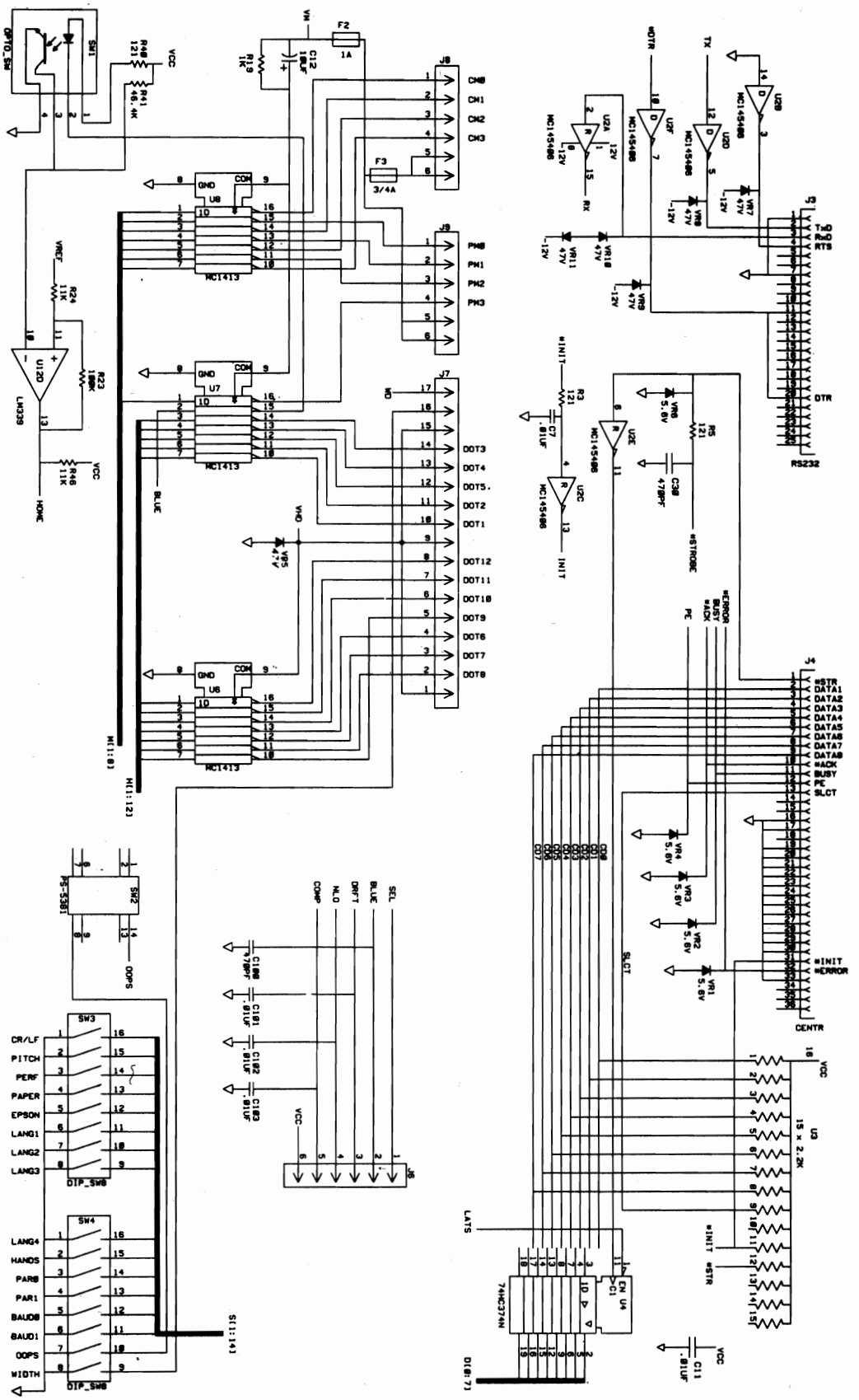


Figure 11-4. REV D Logic PCA Schematics (3 of 3)

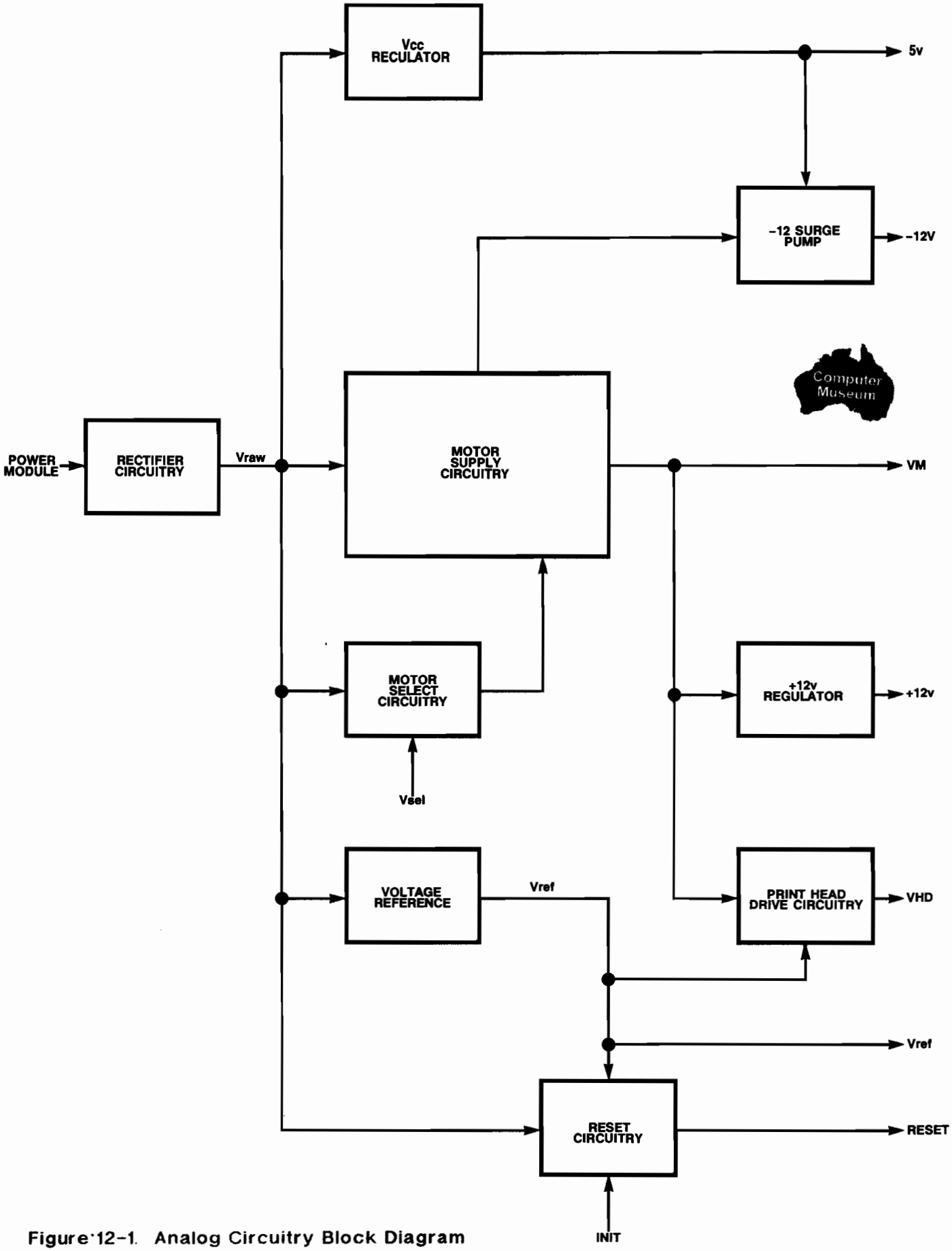


Figure 12-1. Analog Circuitry Block Diagram

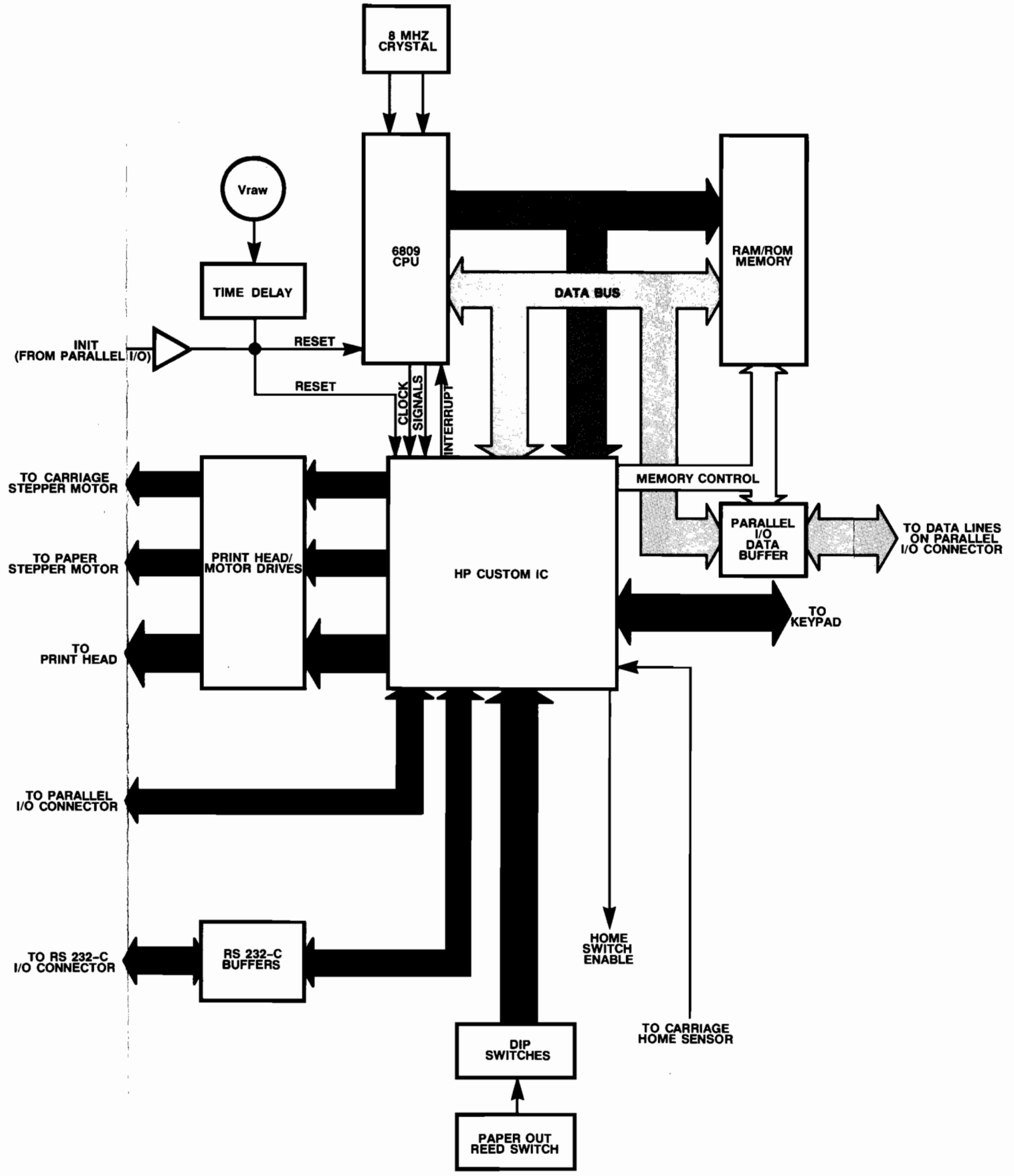


Figure 12-2. Digital Circuitry Block Diagram

HP QUIETJET PRINTER TROUBLESHOOTING TREE

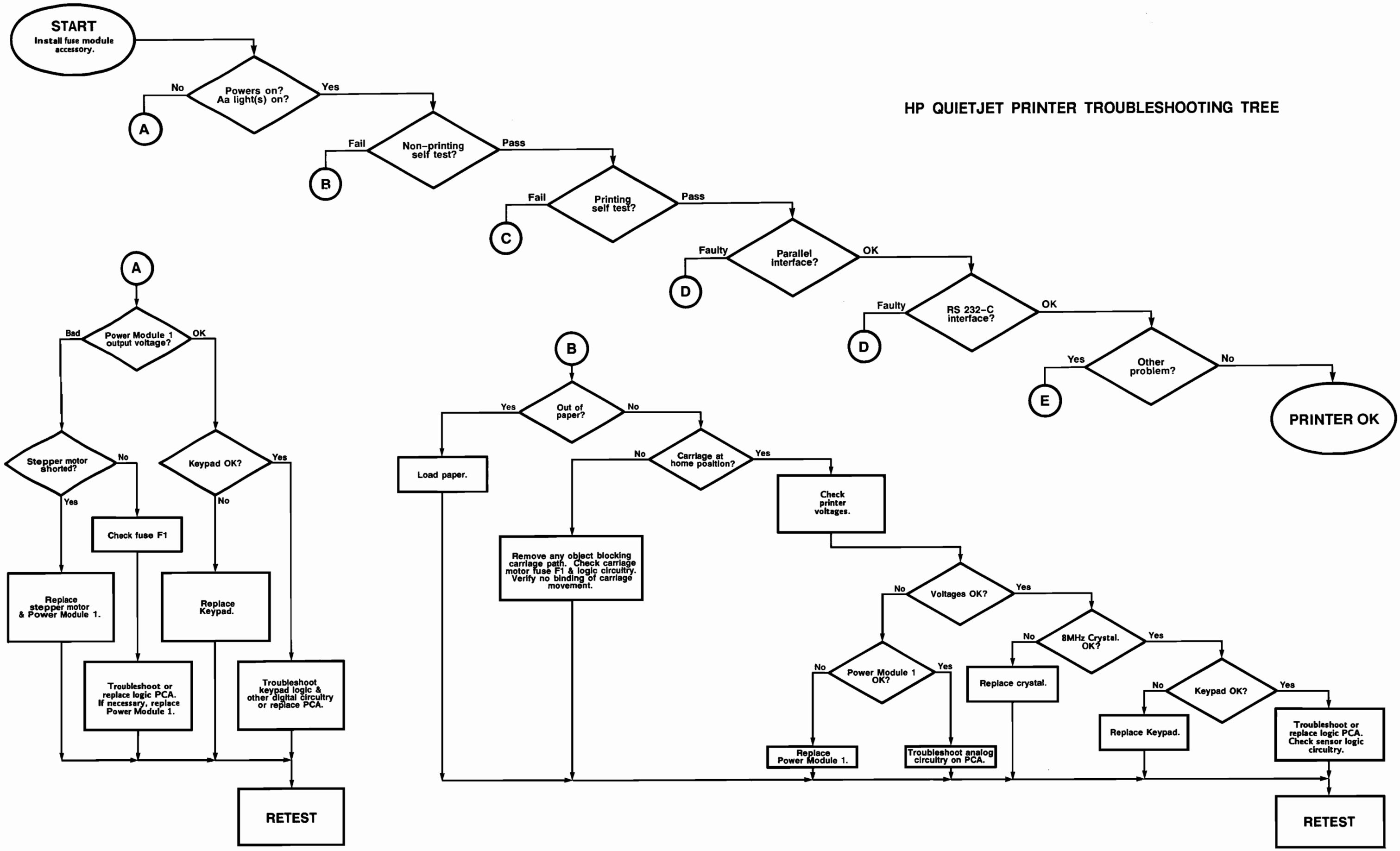
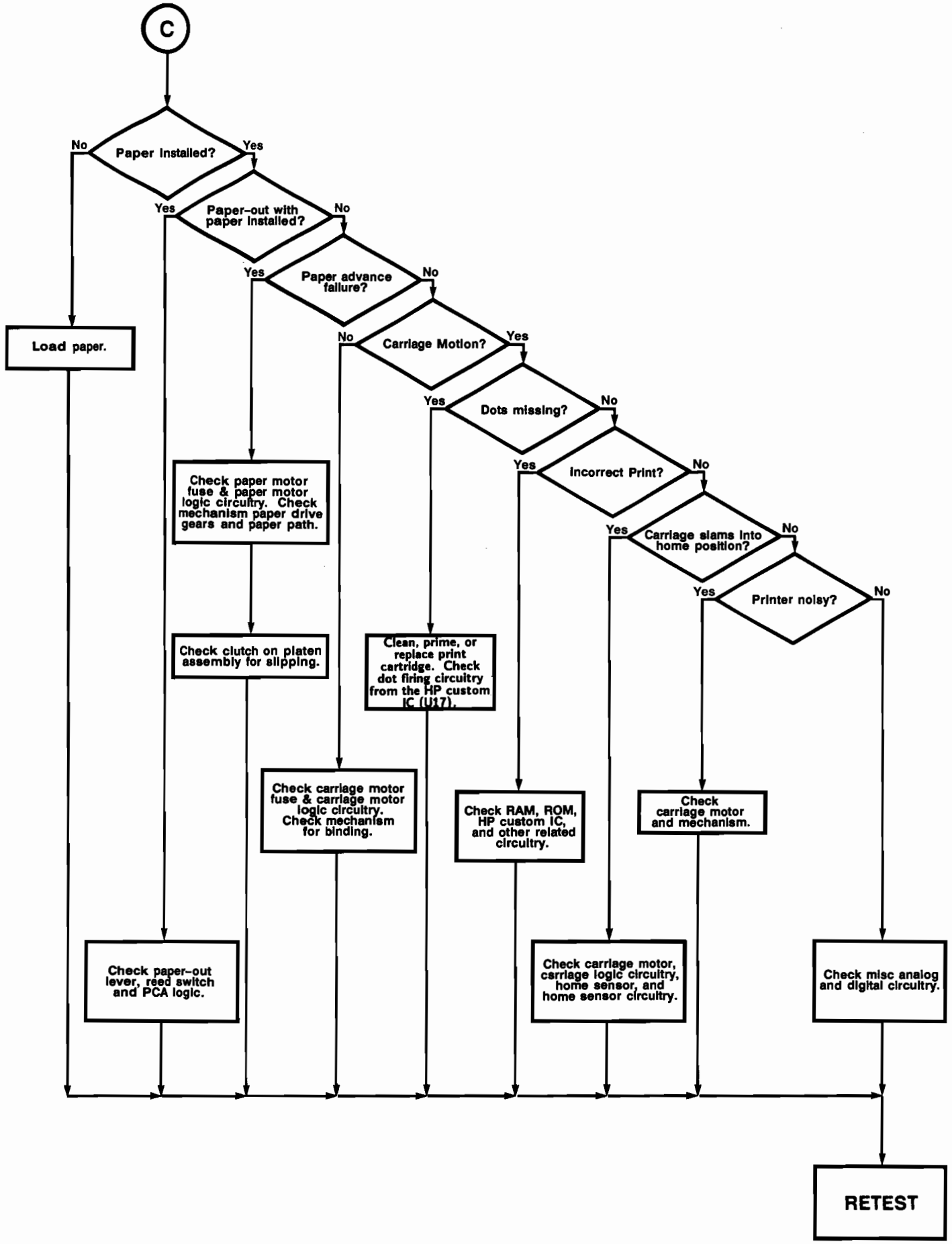


Figure 12-3. HP QuietJet Troubleshooting Tree



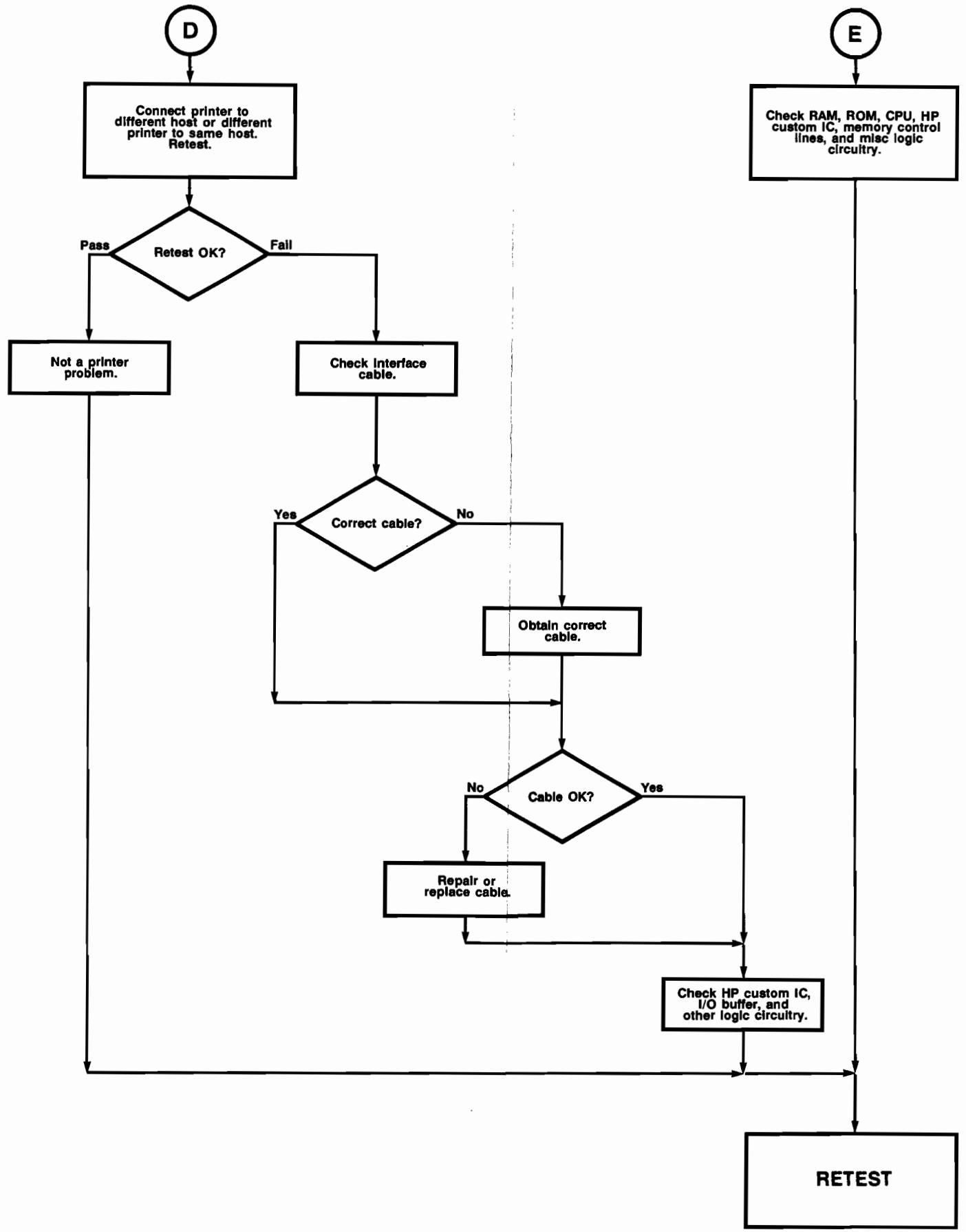


Figure 12-3. HP QuietJet Troubleshooting Tree (Cont'd)

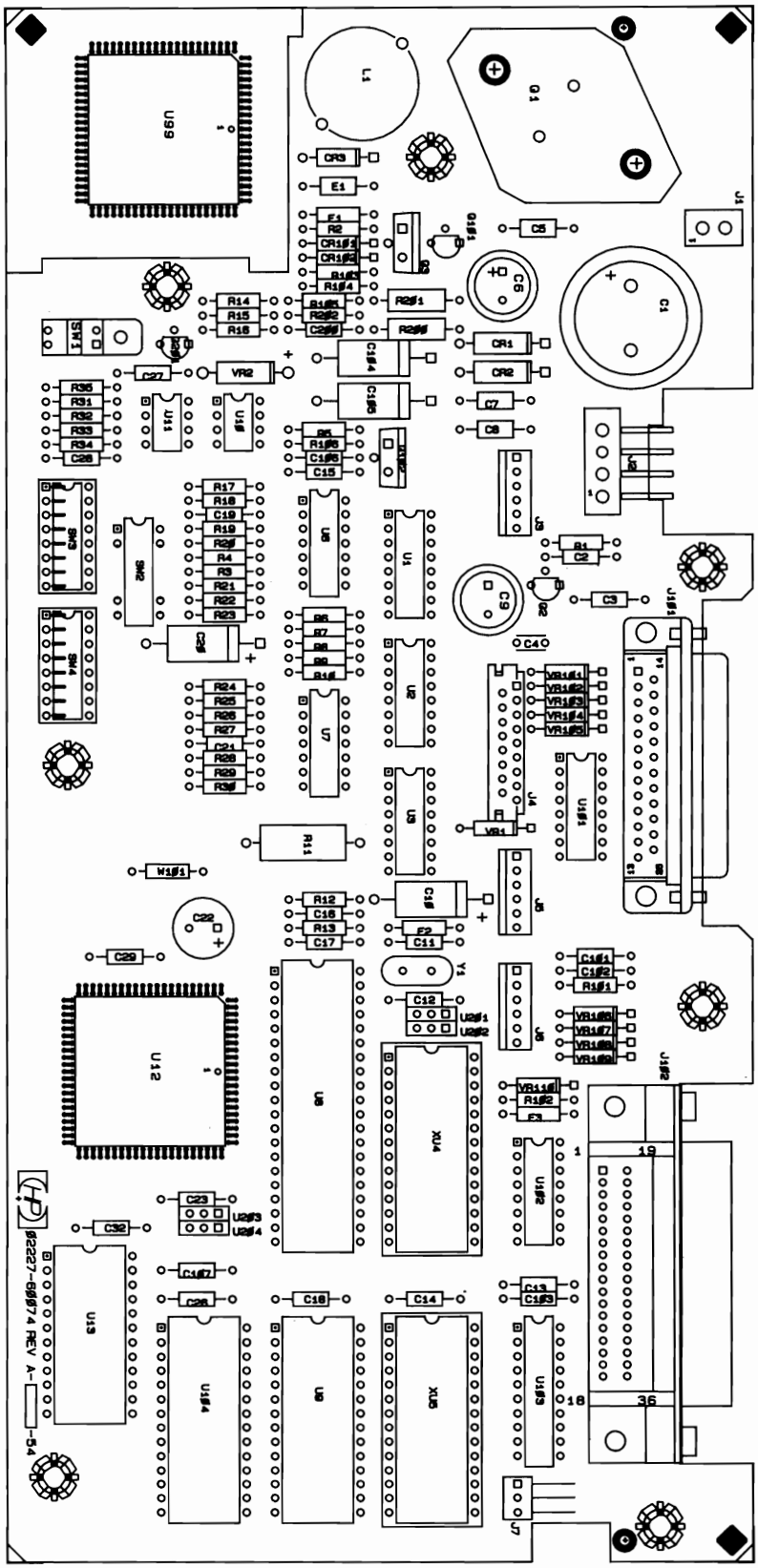


Figure 12-4. 02227-60074 PCA

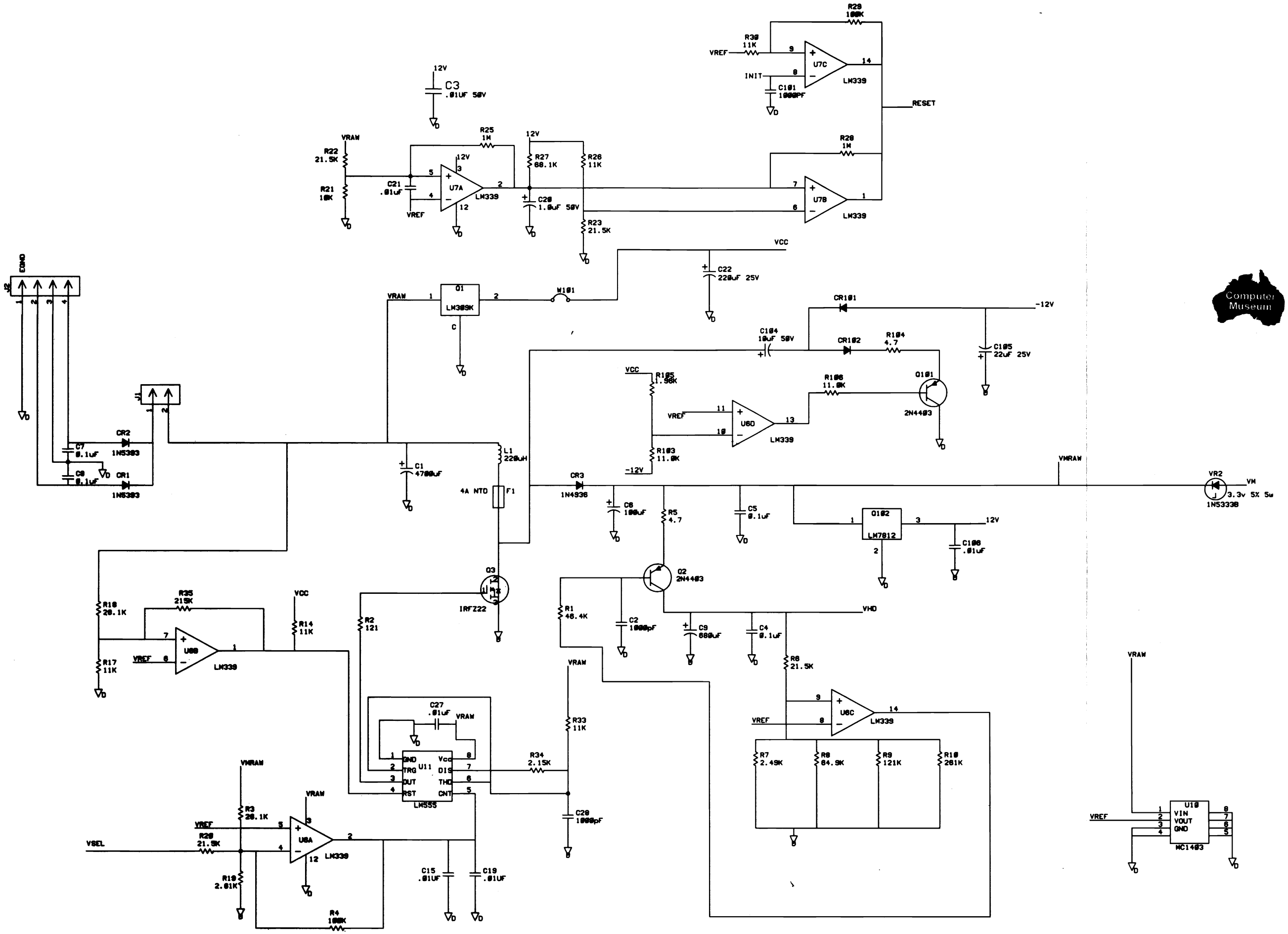


Figure 12-5. 02227-60074 PCA Schematic (1 of 3)

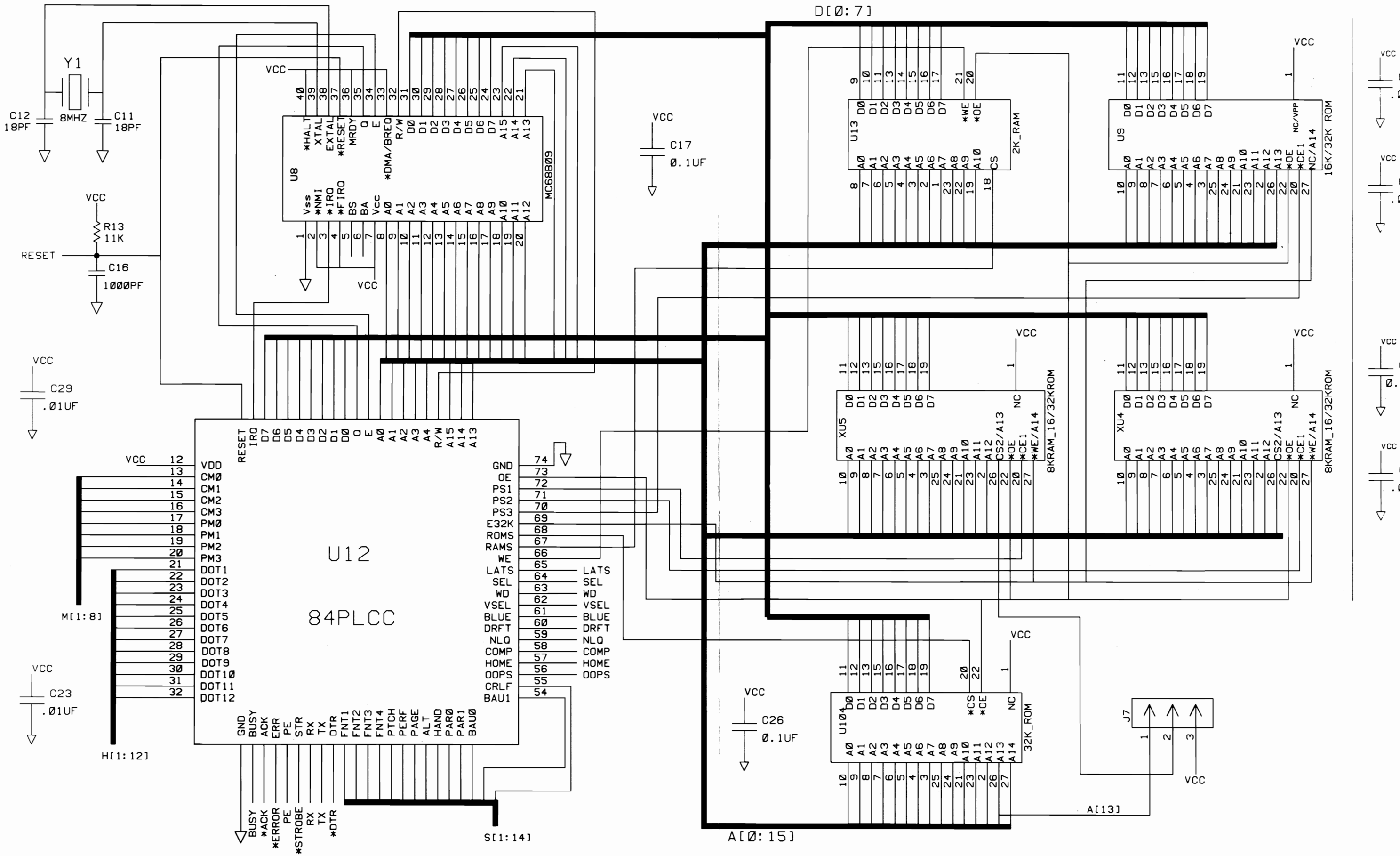


Figure 12-5. 02227-60074 PCA Schematic (2 of 3)

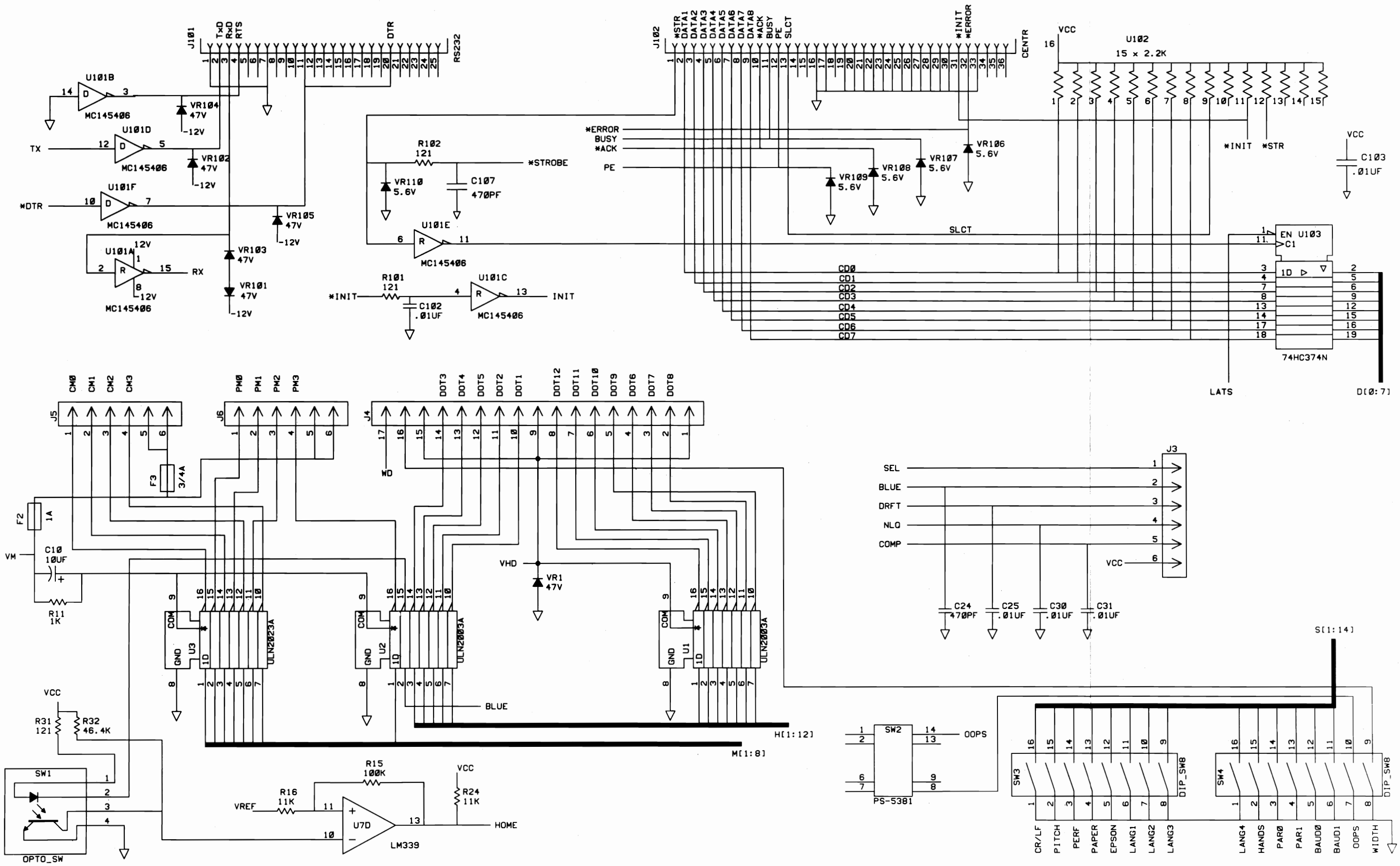
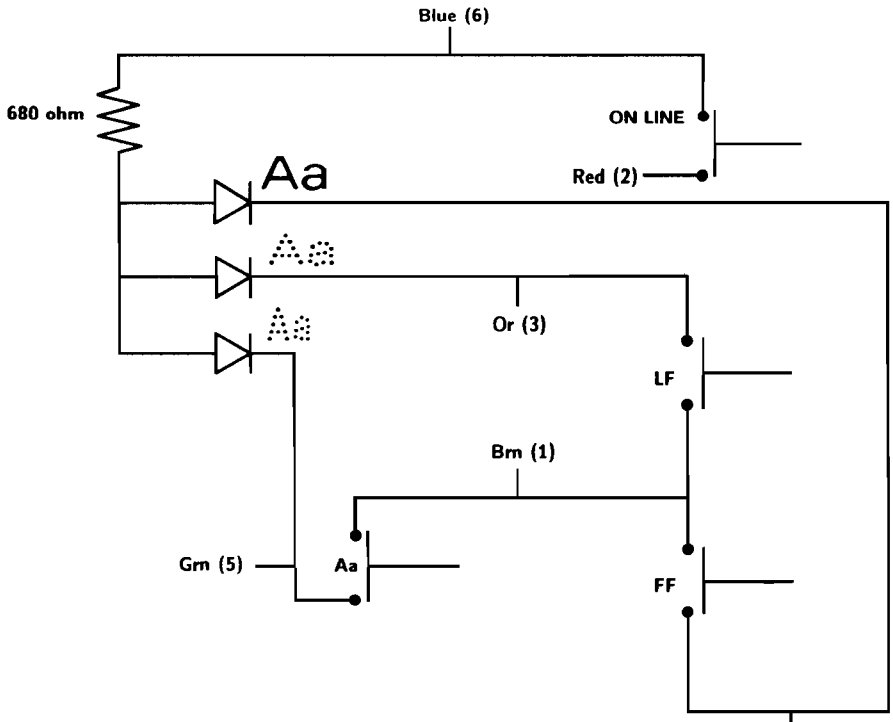
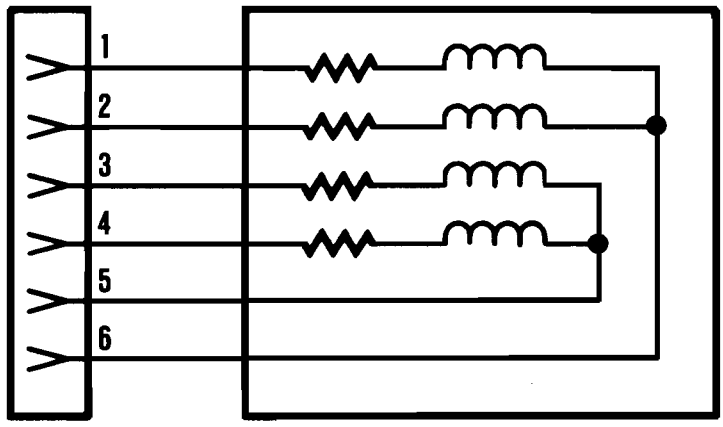


Figure 12-5. 02227-60074 PCA Schematic (3 of 3)



Keypad Circuitry



Motor Circuitry

Figure 12-6. Miscellaneous Circuitry

Appendix

Escape Sequence & Control Code Summary

HP Mode

Print Features	Escape Sequence or Control Code	ASCII Decimal Equiv.	ASCII Hex. Equiv.
Select HP Mode	ESC % A	27, 34, 65	1B, 25, 41
Select Default Mode	ESC % @	27, 34, 64	1B, 25, 40
PRINT PITCH			
Change print pitch to Normal (10 or 12 cpi)*	ESC & k 0 S	27, 38, 107, 48, 83	1B, 26, 6B, 30, 53
Change print pitch to Expanded (5 or 6 cpi)*	ESC & k 1 S	27, 38, 107, 49, 83	1B, 26, 6B, 31, 53
Change print pitch to Compressed (21.3 cpi)	ESC & k 2 S	27, 38, 107, 50, 83	1B, 26, 6B, 32, 53
Change print pitch to Expanded/Compressed (10.6 cpi)	ESC & k 3 S	27, 38, 107, 51, 83	1B, 26, 6B, 33, 53
Set print pitch to 21.3 cpi	ESC (s 21.3 H	27, 40, 115, 50, 49, 46, 51, 72	1B, 28, 73, 32, 31, 2E, 33, 48
Set print pitch to 12 cpi	ESC (s 12 H	27, 40, 115, 49, 50, 72	1B, 28, 73, 31, 32, 48
Set print pitch to 10.6 cpi	ESC (s 10.6 H	27, 40, 115, 49, 50, 46, 54, 72	1B, 28, 73, 31, 30, 2E, 36, 48
Set print pitch to 10 cpi	ESC (s 10 H	27, 40, 115, 49, 50, 72	1B, 28, 73, 31, 30, 48
Set print pitch to 6 cpi	ESC (s 6 H	27, 40, 115, 54, 72	1B, 28, 73, 36, 48
Set print pitch to 5 cpi	ESC (s 5 H	27, 40, 115, 53, 72	1B, 28, 73, 35, 48
PRINT MODE			
Select NLQ Printing	ESC (s 1 Q	27, 40, 115, 49, 81	1B, 28, 73, 31, 51
Select Draft Printing	ESC (s 0 Q	27, 40, 115, 48, 81	1B, 28, 73, 30, 51
BOLD MODE			
Bold Printing ON	ESC (s 1 B	27, 40, 115, 49, 66	1B, 28, 73, 31, 42
Bold Printing OFF	ESC (s 0 B	27, 40, 115, 48, 66	1B, 28, 73, 30, 42
UNDERLINE			
Underline ON	ESC & d D	27, 38, 100, 68	1B, 26, 64, 44
Underline OFF	ESC & d @	27, 38, 100, 64	1B, 26, 64, 40
SUB/SUPERSCRIPTS			
Subscripts ON	ESC (s −1 U	27, 40, 115, 45, 49, 85	1B, 28, 73, 2D, 31, 55
Superscript ON	ESC (s 1 U	27, 40, 115, 49, 85	1B, 28, 73, 31, 55
Return to Normal (default)	ESC (s 0 U	27, 40, 115, 48, 85	1B, 28, 73, 30, 55

* Dependent on position of function switch A2.

Print Features (Cont.)	Escape Sequence or Control Code	ASCII Decimal Equiv.	ASCII Hex. Equiv.
SELECTING SYMBOL SETS			
Printer Default Set	ESC (0 @	27, 40, 48, 64	1B, 28, 30, 40
Roman 8	ESC (8 U	27, 40, 56, 85	1B, 28, 38, 55
ASCII	ESC (0 U	27, 40, 48, 85	1B, 28, 30, 55
Swedish 1	ESC (0 S	27, 40, 48, 83	1B, 28, 30, 53
IBM 8–US	ESC (10 U	27, 40, 49, 48, 85	1B, 28, 31, 30, 55
French	ESC (1 F	27, 40, 49, 70	1B, 28, 31, 46
German	ESC (1 G	27, 40, 49, 71	1B, 28, 31, 47
UK	ESC (1 E	27, 40, 49, 69	1B, 28, 31, 45
Spanish	ESC (2 S	27, 40, 50, 83	1B, 28, 32, 53
Portuguese	ESC (4 S	27, 40, 52, 83	1B, 28, 34, 53
Swedish 2	ESC (3 S	27, 40, 51, 83	1B, 28, 33, 53
IBM 8–Euro	ESC (11 U	27, 40, 49, 49, 85	1B, 28, 31, 31, 55
Norwegian 1	ESC (0 D	27, 40, 48, 68	1B, 28, 30, 44
Norwegian 2	ESC (1 D	27, 40, 49, 68	1B, 28, 31, 44
ISO IRV	ESC (2 U	27, 40, 50, 85	1B, 28, 32, 55
Italian	ESC (0 I	27, 40, 48, 73	1B, 28, 30, 49
Line Draw	ESC (0 L	27, 40, 48, 76	1B, 28, 30, 4C
TYPEFACE			
Select Courier. Prints in NLQ regardless of quality selected without additional ROM.	ESC (s 3 T	27, 40, 115, 51, 84	1B, 28, 73, 33, 54
Select Gothic. Prints in draft regardless of quality selected without additional ROM.	ESC (s 6 T	27, 40, 115, 54, 84	1B, 28, 73, 36, 54
PERFORATION SKIP			
Perforation Skip ON	ESC & ℓ 1 L	27, 38, 108, 49, 76	1B, 26, 6C, 31, 4C
Perforation Skip OFF	ESC & ℓ 0 L	27, 38, 108, 48, 76	1B, 26, 6C, 30, 4C
TEXT LENGTH			
# lines per text area	ESC & ℓ # F	27, 38, 108, #, . . .#, 70	1B, 26, 6C, #, . . .#, 46
Default lines per text area	ESC & ℓ 0 F	27, 38, 108, 48, 70	1B, 26, 6C, 30, 46
PAGE LENGTH			
# lines per page	ESC & ℓ # P	27, 38, 108, #, . . .#, 80	1B, 26, 6C, #, . . .#, 5C
Default lines per page	ESC & ℓ 0 P	27, 38, 108, 48, 80	1B, 26, 6C, 30, 5C
LINE SPACING			
Print at 8 lpi	ESC & ℓ 8 D	27, 38, 108, 54, 68	1B, 26, 6C, 36, 44
Print at 6 lpi	ESC & ℓ 6 D	27, 38, 108, 56, 68	1B, 26, 6C, 38, 44
PRINT POSITIONING			
Carriage Return	CTL M	13	0D
Back Space	CTL H	8	08
Line Feed	CTL J	10	0A
Form Feed	CTL L	12	0C
Half Line Feed	ESC -	27, 61	1B, 3D

Print Features (Cont.)	Escape Sequence or Control Code	ASCII Decimal Equiv.	ASCII Hex. Equiv.
Vertical Dot Row Positioning	ESC * p # Y	27, 42, 112, #, . . .#, 89	1B, 2A, 70, #, . . .#, 59
Vertical Decipoint Positioning	ESC & a # V	27, 38, 97, #, . . .#, 86	1B, 26, 61, #, . . .#, 56
Horizontal Dot Positioning	ESC * p # X	27, 42, 112, #, . . .#, 88	1B, 2A, 70, #, . . .#, 58
Horizontal Decipoint Positioning	ESC & a # H	27, 42, 97, #, . . .#, 86	1B, 26, 61, #, . . .#, 48
GRAPHICS			
Single Density	ESC * t 96 R	27, 42, 116, 57, 54, 82	1B, 2A, 74, 39, 36, 52
Double Density	ESC * r 1280 S	27, 42, 114, 49, 50, 56, 48, 83	1B, 2A, 72, 31, 32, 39, 30, 53
Quad Density	ESC * t 192 R	27, 42, 116, 49, 57, 50, 82	1B, 2A, 74, 31, 39, 32, 52
Begin Raster Graphics Transfer	ESC * r A	27, 42, 114, 65	1B, 2A, 72, 41
Raster Dot Row	ESC * b # W	27, 42, 98, #, . . .#, 87	1B, 2A, 62, #, . . .#, 57
End Graphics Transfer	ESC * r B	27, 42, 114, 66	1B, 2A, 72, 42
BIDIRECTIONAL/ UNIDIRECTIONAL PRINTING			
Print Unidirectionally	ESC & k 0 W	27, 38, 107, 48, 87	1B, 26, 6B, 30, 57
Return to Bidirectional Printing	ESC & k 1 W	27, 38, 107, 49, 87	1B, 26, 6B, 31, 57
END-OF-LINE WRAP			
End-of-line Wrap ON	ESC & s 0 C	27, 38, 115, 48, 67	1B, 26, 73, 30, 43
End-of-line Wrap OFF (default)	ESC & s 1 C	27, 38, 115, 49, 67	1B, 26, 73, 31, 43
DISPLAY FUNCTIONS MODE			
Display Functions Mode ON	ESC Y	27, 89	1B, 59
Display Functions Mode OFF (default)	ESC Z	27, 90	1B, 60
MISC.			
Transparent Data Transfer	ESC & p # X	27, 38, 112, #, . . .#, 88	1B, 26, 70, #, . . .#, 5B
Self Test	ESC z	27, 122	1B, 7A
Reset	ESC E	27, 69	1B, 45
Automatic Line Termination	ESC & k # G	27, 38, 107, #, 71	1B, 26, 6B, #, 47

Select IBM/Epson Escape Sequences

Print Features	Escape Sequence or Control Code	ASCII Decimal Equiv.	ASCII Hex. Equiv.
Select HP Mode	ESC % C	27, 37, 67	1B, 25, 43
Select Default Mode	ESC % @	27, 37, 64	1B, 25, 40
PRINT PITCHES			
Expanded ON	CTL N	14	0E
Expanded OFF (default)	CTL T	20	14
Compressed ON	CTL O	15	0F
Compressed OFF (default)	CTL R	18	12
Expanded-compressed ON	CTL N CTL O	14, 15	0E, 0F
Expanded-compressed OFF (default)	CTL T CTL R	20, 18	14, 12
BOLD MODE			
Bold mode ON	ESC E	27, 69	1B, 45
Bold mode OFF (default)	ESC F	27, 70	1B, 46
PRINT MODE			
NLQ ON	ESC G	27, 71	1B, 47
NLQ OFF	ESC H	27, 72	1B, 48
UNDERLINE			
Underline ON	ESC-1	27, 45, 49	1B, 2D, 31
Underline OFF (default)	ESC-0	27, 45, 48	1B, 2D, 30
SUB/SUPERSCRIPTS			
Subscript ON	ESC S 1	27, 83, 1	1B, 53, 1
Superscript ON	ESC S 0	27, 38, 0	1B, 53, 0
Normal	ESC T	27, 84	1B, 54
LINE SPACING			
6 lines/inch (default)	ESC 2	27, 50	1B, 32
8 lines/inch	ESC 0	27, 48	1B, 30
7 dot row line spacing	ESC 1	27, 49	1B, 31
# dot row line spacing	ESC A CHR$(#)	27, 65, #	1B, 41, (# Hex)
Advance n/288"	ESC J #	27, 74, #	1B, 4A, #
PERFORATION SKIP			
Set perforation skip length (in lines)	ESC N CHR$(#)	27, 78, #	1B, 4E, (# Hex)
Perforation skip OFF (switch 3 sets default)	ESC O	27, 79	1B, 4F
PAGE LENGTH			
# lines/page	ESC C CHR$(#)	27, 67, #	1B, 43, (# Hex)
# inches/page	ESC C CHR$(0) CHR$(#)	27, 67, 0, #	1B, 43, 0, (# Hex)
(switch 4 sets default)			
UNIDIRECTIONAL OR BIDIRECTIONAL PRINT			
Unidirectional print	ESC U 1	27, 85, 49	1B, 55, 31
Bidirectional text print (default)	ESC U 0	27, 85, 48	1B, 55, 30
PRINT POSITION			
Line Feed	CTL J	10	0A
Carriage Return	CTL M	13	0D
Back Space	CTL H	8	08
Form Feed	CTL L	12	0C
GRAPHICS			
Low density column graphics	ESC K #1 #2	27, 75, #1, #2	1B, 4B, (#1 Hex), (#2 Hex)
High density column graphics	ESC L #1 #2	27, 76, #1, #2	1B, 4C, (#1 Hex), (#2 Hex)
RESET			
Perform reset	ESC @	27, 64	1B, 40

Index

R

S

T

V

W

X

Z