Little David®

MicroJet I™
MicroJet I Plus™
MicroJet II™
MicroJet III™
MicroJet III HC™

Technician's Manual

INK JET CODER
by

LOVESHAW
an ITW Company

Trouble-Shooting Guide

PART NUMBER: CPM200-TSG

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Introduction

Little David
Ink Jet Printers

This document covers hardware procedures for the Loveshaw MicroJet Printers which include MicroJet I, MicroJet I Plus, MicroJet II, MicroJet III, and MicroJet III HC. Procedures are described in a simple list form keyed to hardware fault, so that technicians can quickly diagnose and fix such problems.

(Personnal Protection Equipment such as safety glasses and other protective gear should be worn when servicing ink jet printers.)

NOTE: Refer to attached assembly drawings when troubleshooting. Further assistance can be obtained by calling your local distributor or Loveshaw factory service technician at 1-800-962-2633.

A) Ink lamp stays on

* New units shipped from the factory contain a solution that will cause the lamp to remain on. This solution must be completely purged out, and ink purged through, before the lamp will go out.
* Purge unit, light should go out.
* If lamp remains on, remove the two screw on the front cover.
* With power disconnected, look for broken wire at reservoir.
* If lamp remains on, remove tie wrap which hold wires to Power Supply Board and lower the wire harness.
* Test resistance across pins 1 and 2 on side “A” of four pin connector. Resistance across reservoir pins should measure approx. 1.5 meg. ohm (See Troubleshooting Chart at end of this list.)
* If lamp remains on, call for service.

B) Ink lamp does not come on when ink container is empty

* If lamp remains on, remove tie wrap which hold wires to Power Supply Board and lower the wire harness.
* Test resistance across pins 1 and 2 on side “A” of four pin connector. Resistance across reservoir pins should measure approx. 1.5 meg. ohm (See Troubleshooting Chart at end of this list.)
Circuit should be open.
* Check resistance of lamp between pins 3 and 4 on four pin connector on side “A”. Resistance should be 25 ohms. If circuit is open replace lamp. See LOW INK LAMP/RESERVOIR LEAD REMOVAL procedure.
* Check voltage between pins 1 and 2 on four pin connector on side “B”. A very small voltage of .075 volts DC should be present. If no voltage is present, replace CPU assembly.
* Check voltage between pins 3 and 4 on four pin connector on side “B”. Voltage should be 25 volts DC. If no voltage is present, replace CPU assembly. (See Quick Reference Chart for part numbers.)
* If lamp remains out, call for service.

C) Unit does not purge

* Test pump pressure. Pressure should be between 2.0 and 3.0 psi. If pressure is zero, proceed to step “M”.
* Check ink level in container and replace if empty.
* Check for kinks in tubing and replace, if necessary.
* Test for ink flow from brass cap/ink container: Crimp tubing going into reservoir from ink container. Remove tubing from inlet of reservoir and test for ink flow by loosening crimp (discharge into container and avoid getting ink on circuit cards). If no flow is present, replace ink container and/or brass cap.
* Test for ink flow from reservoir. Crimp tubing going into reservoir from ink container. Remove tubing from inlet side of filter. Carefully loosen crimp and test for ink flow (discharge into container and avoid getting ink on circuit cards). If a weak ink flow or no flow is present, replace reservoir. See LOW INK LAMP/RESERVOIR LEAD REMOVAL procedure.
* Test for ink flow from filter: Crimp tubing going into reservoir from ink container. Remove tubing from inlet side or off-center port of valve. Carefully loosen crimp and test for flow (discharge into container and avoid getting ink on circuit cards). If a weak flow or no flow is present replace filter.

D) Heavy printing

* Check dot size setting (<SIZE> key). Lower if needed.
* Check incoming voltage from transformer. Voltage between pins 1 and 2 on transformer connector should be approximately 20 volts AC (See Troubleshooting Chart at end of this list.)
* Purge to remove air.
* Check individual valve adjustment (<MENU> then 8). Lower if needed.
* Test pump pressure (2.0_3.0 psi) if higher, adjust. See AIR PUMP PRESSURE ADJUSTMENT procedure.

E) Weak print/output

* Check dot size; increase as needed.
* Check purge output; all nozzles to give a 2 inch stream of ink or greater.
* If weak printing continues, go to letter “C” testing ink flow.

F) Printing starts heavy and weakens when printing long messages

* Purge for air removal.
* Check purge, which should be steady; if not, go to letter “C” testing.

G) Photocell LED(s) does not light

* Test photocell by placing a white piece of paper directly in front of unit; LED(s) should come on. If not, turn photocell holder(s) gently from side to side and note if LED light(s) come on; leave in position that lights LED(s); slowly pull paper back from unit and note distance at which LED goes out; should be 2 inches or more. If not, replace photocell . (See Quick Reference Chart for part numbers.)

H) Photocell LED(s) does not turn off

* Check that there is no reflective material in front of unit. If so, the material should be painted a “flat black” color (infrared does not reflect well off of a flat black surface.)
* Turn photocell holder(s) gently from side to side and note if LED light goes out.
* Power the unit off then on; LED light should be off, if not, look for ink or water on board(s) or unit.
* If ink or water is on boards remove and flush/dry overnight. Retest next day.
* LED light is on, and will not go out, replace CPU board (See Quick Reference Chart for part numbers.)

I) Display does not come up

* Check if pump is running; if not, check that transformer is operating properly. (See Troubleshooting Chart at end of this list.)
* If pump is running, check AC fuse under front cover and replace if blown.
* If fuse continues to blow, replace power supply board. (See Quick Reference Chart for part numbers.)
* If fuse does not blow, test voltage at power board. If proper voltage is present replace CPU.
* If proper voltage is not present, call for service.

J) CPU losing date/time when unit is off

* Reset and monitor for 24 hours with unit off.
* If retest fails, CPU battery must be replaced. See battery replacement procedure.
* If CPU looses date/time with unit on, replace CPU.

K) Valve does not print but purges

* Plug a working valve in that position and test. If printing occurs, replace valve. If no printing occurs, check ribbon cables, replace Valve, CPU or Driver Board.

L) Valves print but will not purge

* Test continuity of purge switch with unit off and purge switch depressed. Replace if defective; should be zero ohms.
* Test valve board resistor/diode for proper values (See Troubleshooting Chart at end of this list.)

M) Pump does not run

* Remove transformer power cord from unit and check for proper AC voltage at connector. (See Troubleshooting Chart at end of this list.) Replace transformer if defective.
* Remove front cover and check electrical connectors on pump. If proper voltage is present at pump and pump is not running, remove wires (2) going to pump, and check resistance across pump coil (See Troubleshooting Chart at end of this list.)
* If no voltage is present at pump connectors check transformer and AC outlet.

N) Ink leaks from ink bottle cap

* Remove brass connector and check for presence of "O" rings on the under side of brass connector and replace if missing or damaged.
* Tighten container cap.
* Reposition container and check for leaks.
* If leak continues, replace bottle with a new one and retest.
* If leak continues, replace ink bottle cap assembly.

O) Product delay/character width changing on product

* Check the orientation of box to MICROJET — it must be perpendicular.
* Clean photocell filters with water, and check that both photocell LED lights come on when product passes by. If photocell LED does not come on, go to procedure "G".
* Check to insure no extraneous spaces are inserted before or after text in message. If so, delete extra spaces.
* If problem continues, check for dark colored bands on box. (Photocells will not detect black). Test with a blank box.
* If product delay/character width continues to move, call for service.

P) Ink not drying on product

* Check dot size setting (<SIZE> key); lower if needed.
* Check pump pressure should be between 2.0 and 3.0 psi. If pump pressure is out of adjustment, see AIR PUMP PRESSURE ADJUSTMENT procedure.
* Check to be sure box is not waxy or oily (make sure substrate surface has not changed).

Q) Nozzle plate weeps ink

* Wipe nozzle plate with a damp paper towel and check to see if ink forms on nozzle plate.
* If ink does not form on nozzle plate, print 5-10 boxes and check. If ink forms, replace nozzle plate tubing.
* Remove valve at location generating weeping.
* Connect valve to a 9 volt battery and flush water into outlet post with a syringe and a piece of .040 tubing.
* Replace valve and retest.
* Connect tubing to outlet of valve from the nozzle plate and purge
* Repeat backflush and purge if necessary
* If weeping persists, replace valve.

R) Nozzle blocked

* Remove tubing from center port of valve that supplies fluid to blocked nozzle.
* Connect drain hose (from maintenance kit) to tubing attached to back of nozzle plate.
* Place other end of drain tubing outside of unit and drain into a container.
* Place tubing end of syringe with cleaner, over orifice that is blocked and apply pressure (you will see fluid move down drain tube).
* Continue flushing until tubing is clear of ink.
* Disconnect syringe and reconnect tubing to valve port.
* Purge and retest.
* Repeat if necessary.
* If nozzle is still blocked, replace the nozzle plate assembly.

S) Tubing loose on valve ports

* If tubing is brittle, replace with new .050 X .070 tubing (p/n CPJ00_024_0).
* If tubing is not hard, remove the valve (clamp off all pressure lines first) and cut off 1/8 inch from ends and reposition on valve.
* Note: Both valve port and tubing end must be dry to ensure a tight fit. Dry tubing end by rolling the corner end of a paper towel into a fine point and insert into tubing end.

T) Unit locks up after installation

* Connect transformer to a Power Backup Supply UPS (available from Loveshaw).
* Supply a dedicated line plus use regulated supply.
* Insure A.C. outlet has a proper ground.
* Make sure the conveyor line is properly grounded to a low impedance ground (less then 5 ohms).
* If you are unable to unlock the MICROJET by turning it on and off, do the 666 SLAM function (see operators manual for additional information on 666 SLAM procedure).

U) Tailing output

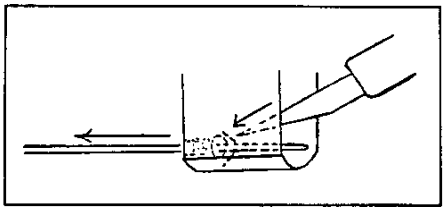
* Check distance between head and substrate; should be 1/2 inch max.
* Check dot size setting, readjust global and individual.
* Make sure unit is level and not being subject to excessive vibration.
* Purge system of air with lid at approximately 45 degrees.
* Check pump pressure (see AIR PUMP PRESSURE ADJUSTMENT procedure).
* Check tubing lengths going from valve to nozzle plate (see nozzle plate drawing).
* Backflush nozzles as needed.
* Change nozzle plate.
* Increase character width and check line speed.

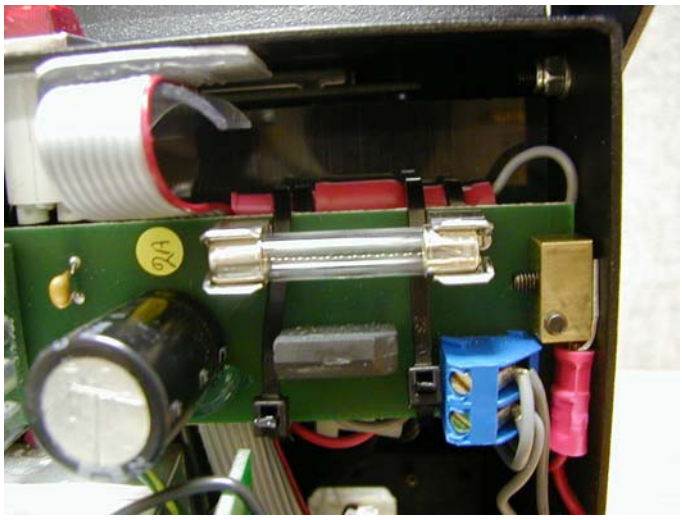
Low ink lamp/reservoir lead removal

To remove either low ink lamp leads or reservoir leads from the four-pin connector, follow steps as listed:

* Turn unit off.
* Open lid.
* Remove ink bottle; place cap on bottle and set aside
* Remove two screws from pump cover, one on each edge, and set aside.

Next to the 2 amp fuse is two Tie Wraps which hold the cable harness in place. They must be cut to loosen this harness so that measurement and rework can be done.

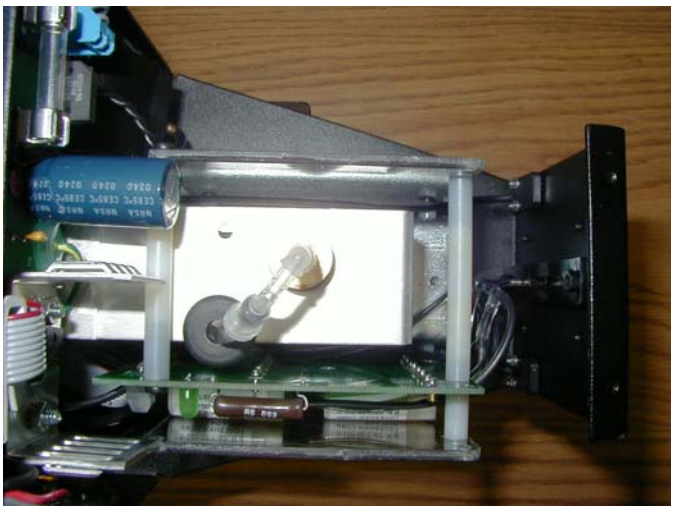




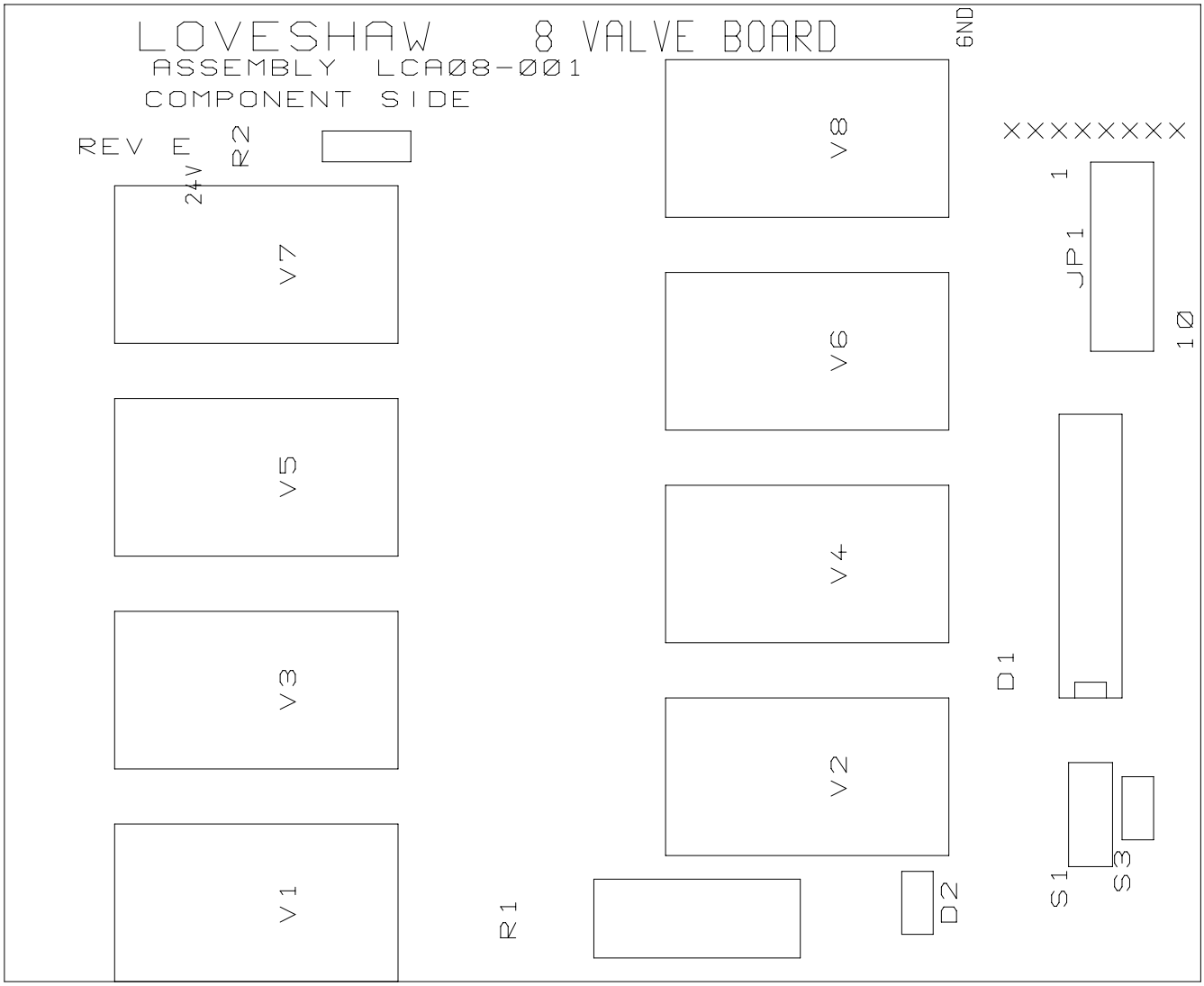
* Disconnect four pin connector from modular board to lamp/reservoir leads by pulling male and female of connector apart.
* If a pin extraction tool is not available, use a fine point object with safety gloves, to push two locks of male pins inward towards pin body.
* As locks of pin are being folded in, firmly tug wire away from connector.
* Repeat for each pin removed.
* Firmly tug wire away from connector.
* Repeat for each pin removed.

Air pump pressure adjustment

* Turn unit off.
* Open front cover.
* Remove ink bottle; place cap on bottle and set aside.



* Turn the brass knob clockwise for higher presser or counter clockwise for lower presser.
* Verify pump pressure at air port of brass bottle cap using gauge assembly and turn the unit on.
* Repeat procedure to obtain desired pump pressure.



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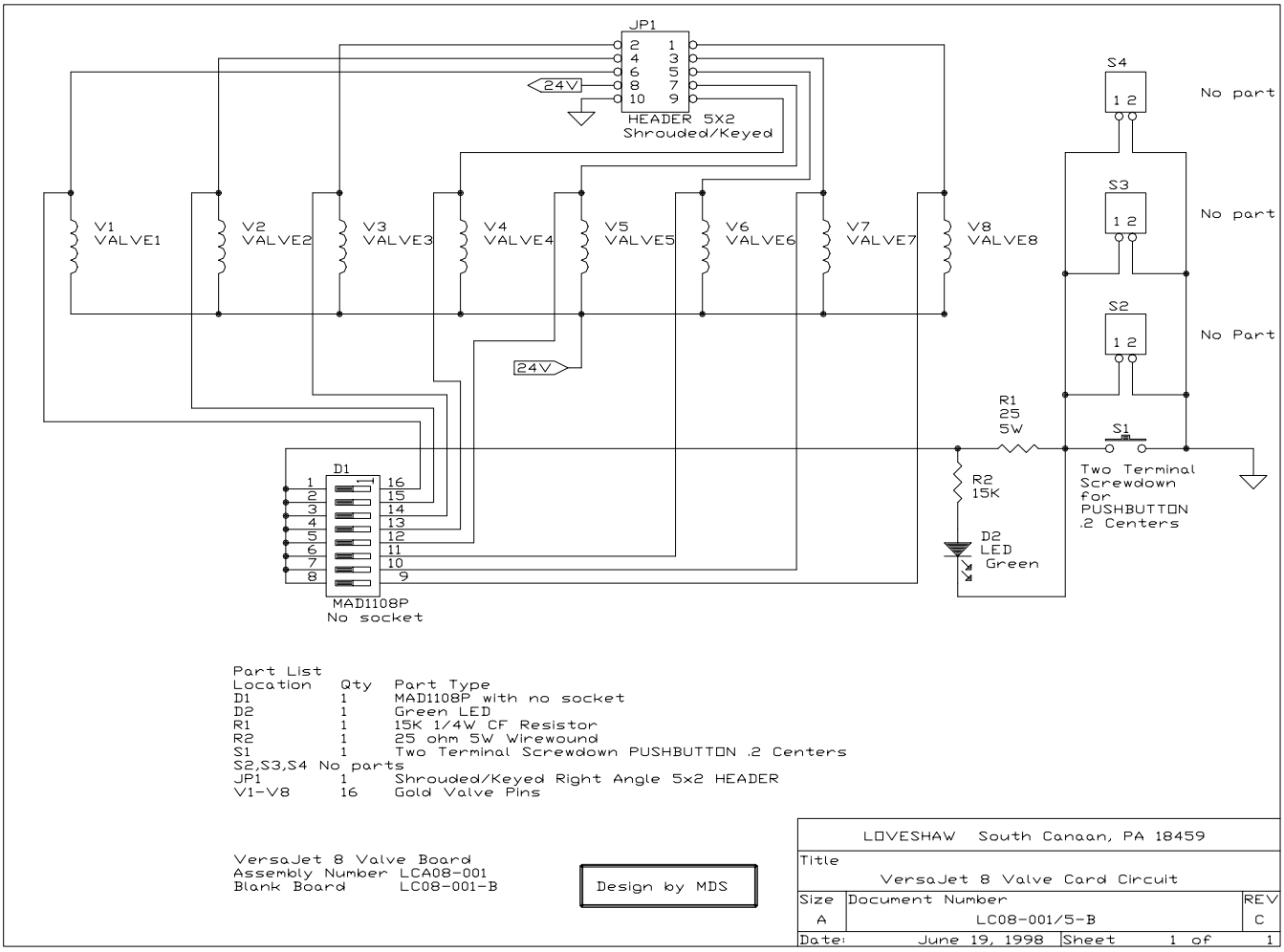


Part List

Location	Qty	Part Type
D1	1	MAD1108P with no socket
D2	1	Green LED
R1	1	15K 1/4W CF Resistor
R2	1	25 ohm 5W Wirewound
S1	1	Two Terminal Screwdown PUSHBUTTON .2 Centers
S2,S3,S4	No parts	
JP1	1	Shrouded/Keyed Right Angle 5x2 HEADER
V1-V8	16	Gold Valve Pins

VersaJet 8 Valve Board
Assembly Number LCA08-001
Blank Board LC08-001-B

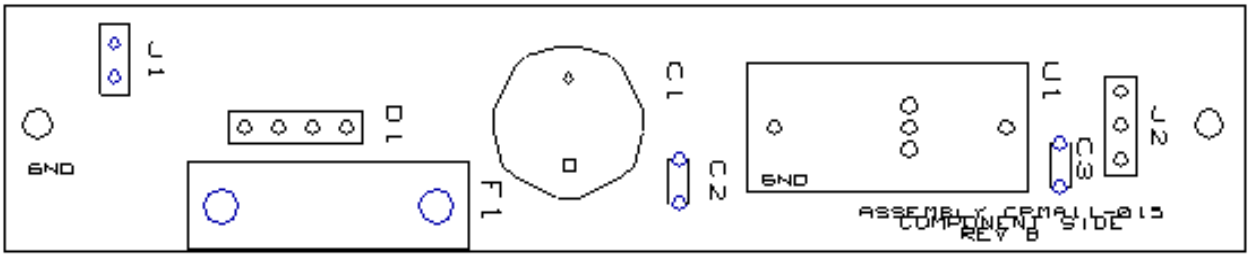
Design by MDS

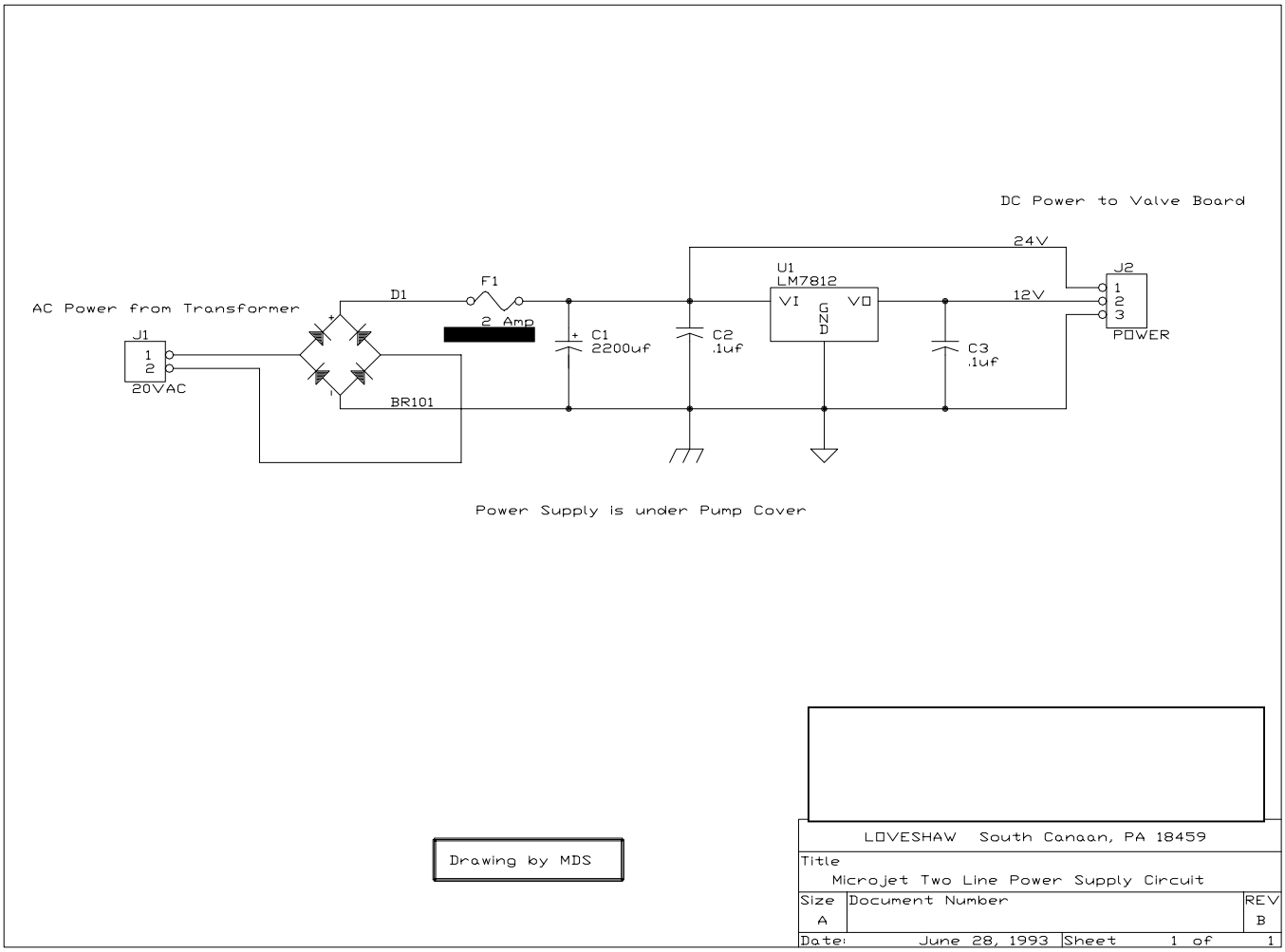
LOVESHAW South Canaan, PA 18459

Title: VersaJet 8 Valve Card Circuit

Size	Document Number	REV
A	LC08-001/5-B	C

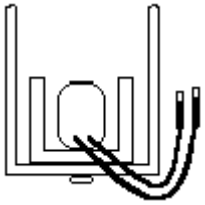
Date: June 19, 1998 Sheet 1 of 1



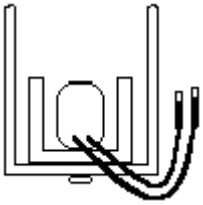


TROUBLESHOOTING CHART

CHECKING AIR PUMP COIL ASSEMBLY CPM75-208-B

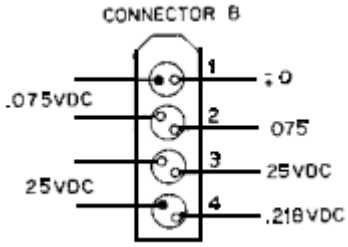


SET METER TO V~ AND TAKE READING ON TWO TEMINAL CONNECT TO POWER. IT SHOULD BE 19.5 VAC. POWER SHOULD BE ON.



SET METER TO OHMS AND TAKE READING ON DISCONNECTED TERMINALS WITH POWER OFF UNIT. IT SHOULD BE 32 OHMS.

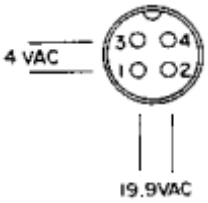
LOW INK LIGHT CONNECTOR CHECK



SET METER TO DC VOLTAGE.
NOTE :
TWO TOP WIRE ARE FROM RESERVOIR AND BOTTOM TWO ARE FROM THE LAMP.
POWER MUST BE ON.

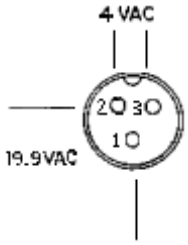
POWER SUPPLY TRANSFORMER CHECK

CPM11-003-120
CPM11-003-240

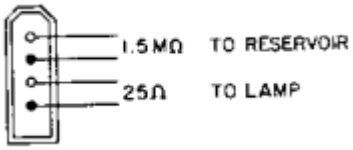


SET METER TO AC VOTAGE.
MEASURE THE TRANSFORMER PLUGED INTO AN AC OUTLET.
PIN #1 + POSITIVE
PIN #2 – NEGATIVE RETURN
PIN #3 GROUND
PIN #4 NO CONNECTION

CPM75-003-115
CPM75-003-240

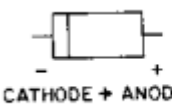


LOW INK LIGHT CONNECTOR

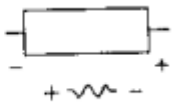


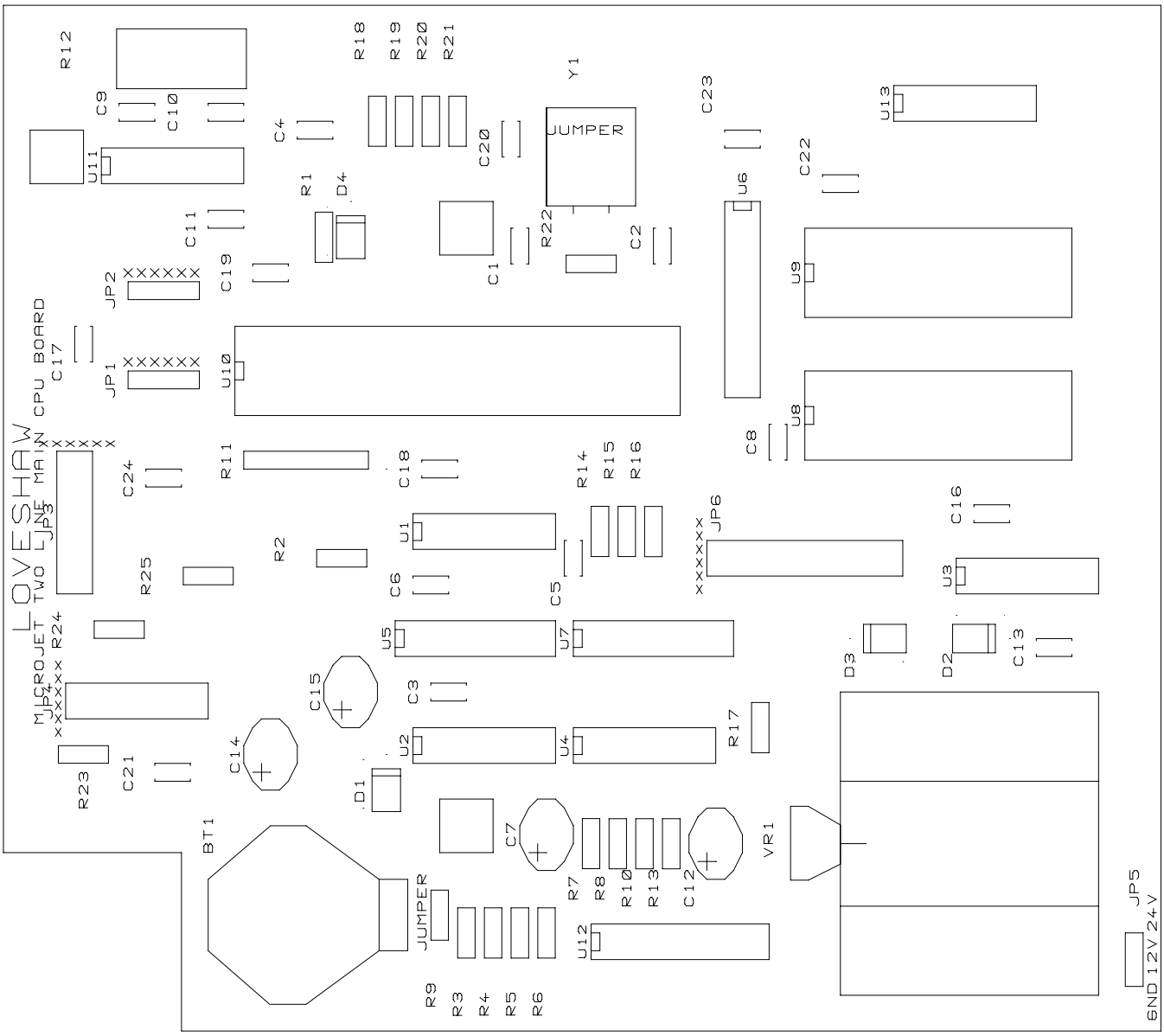
SET METER TO OHMS

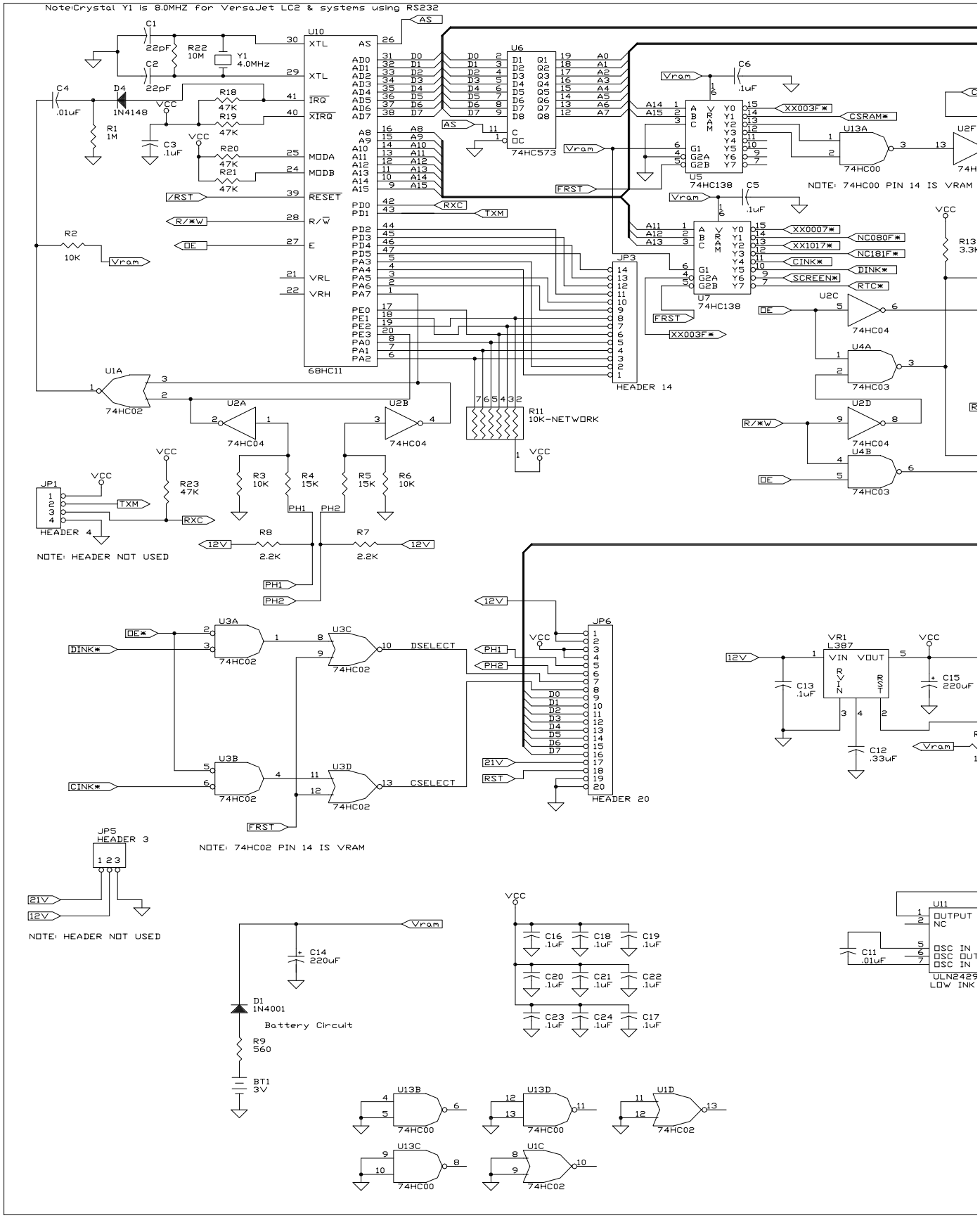
DIODE CPJ00-009-0 &

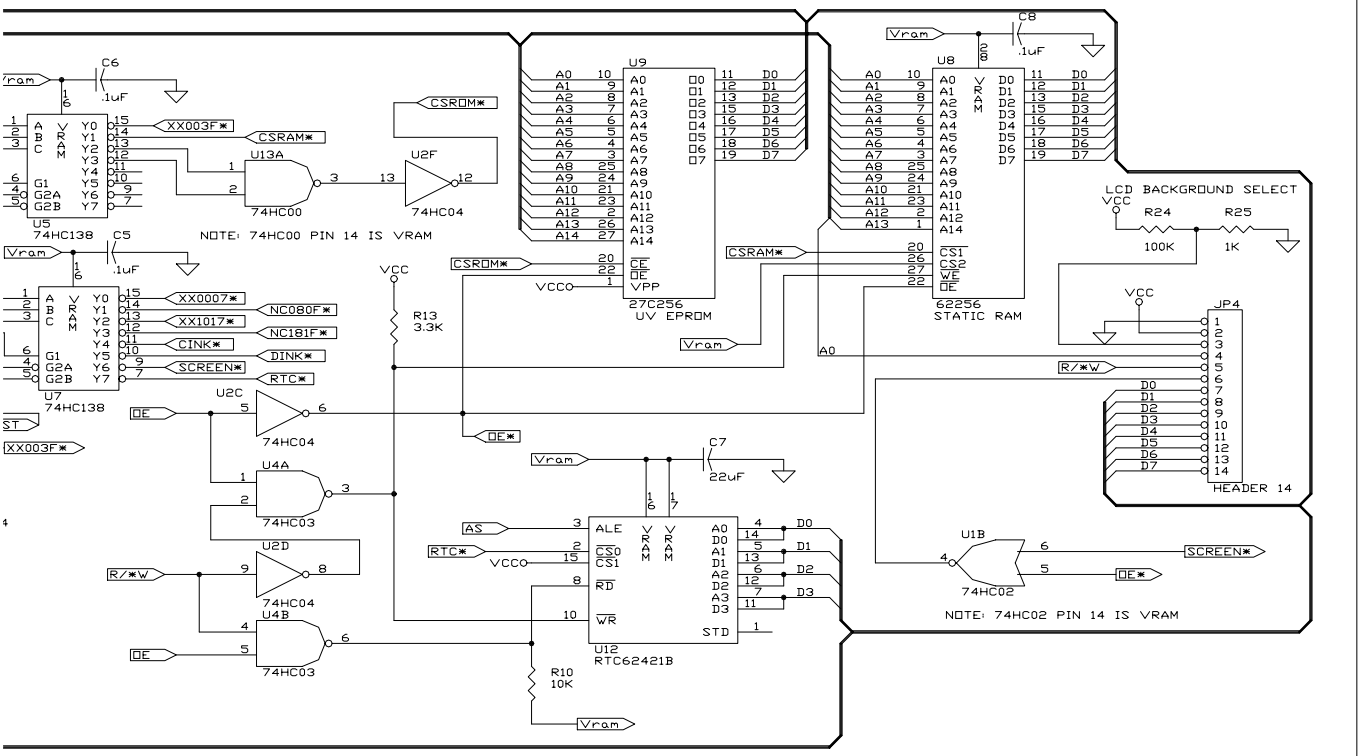


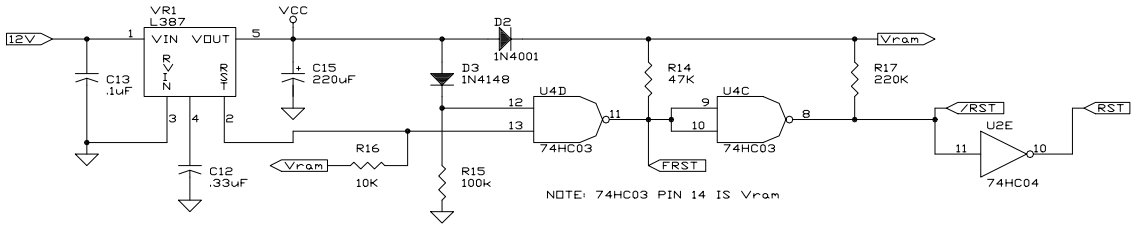
RESISTOR 25 OHM

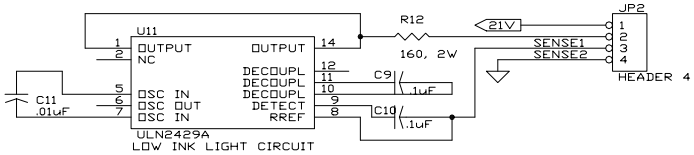






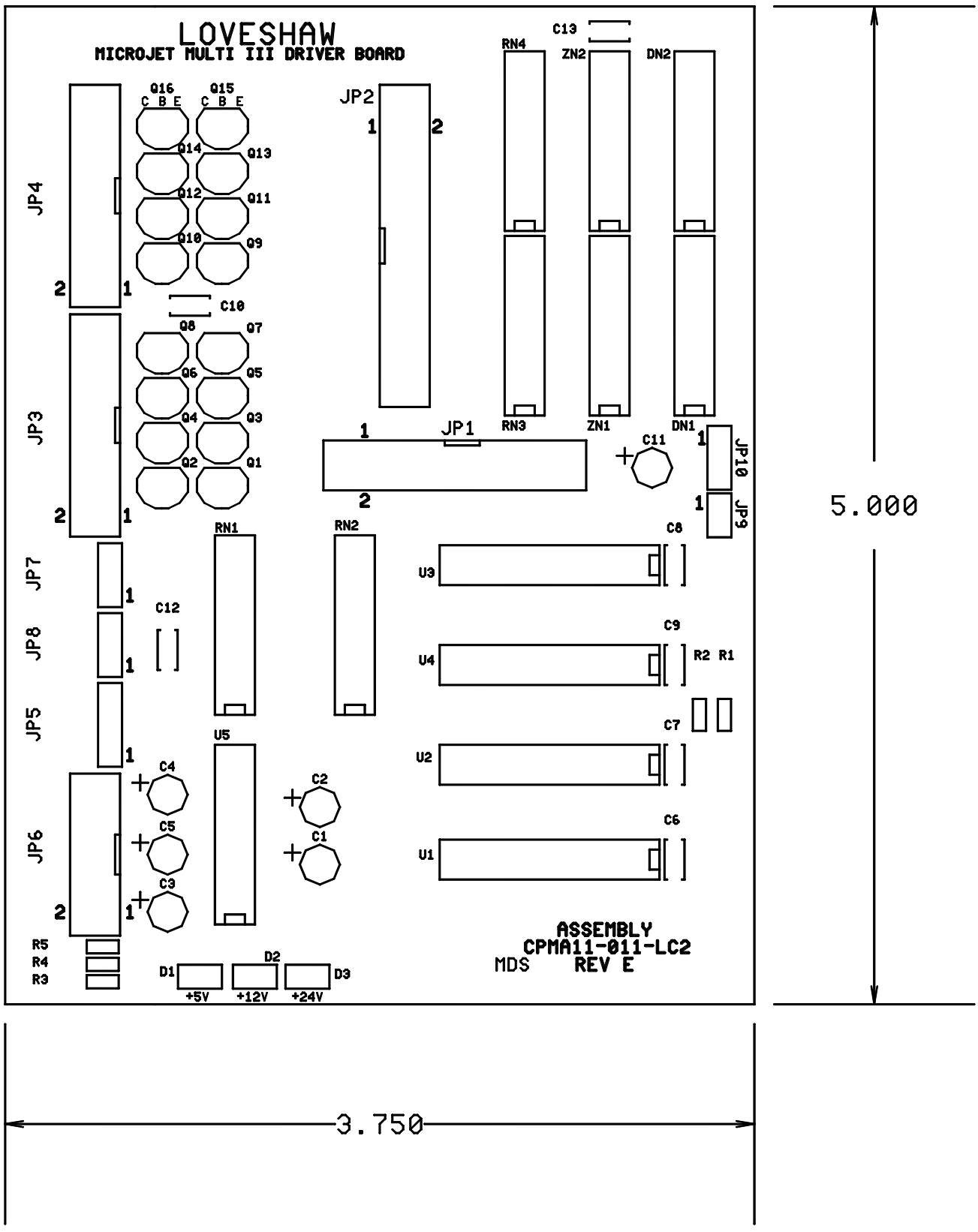


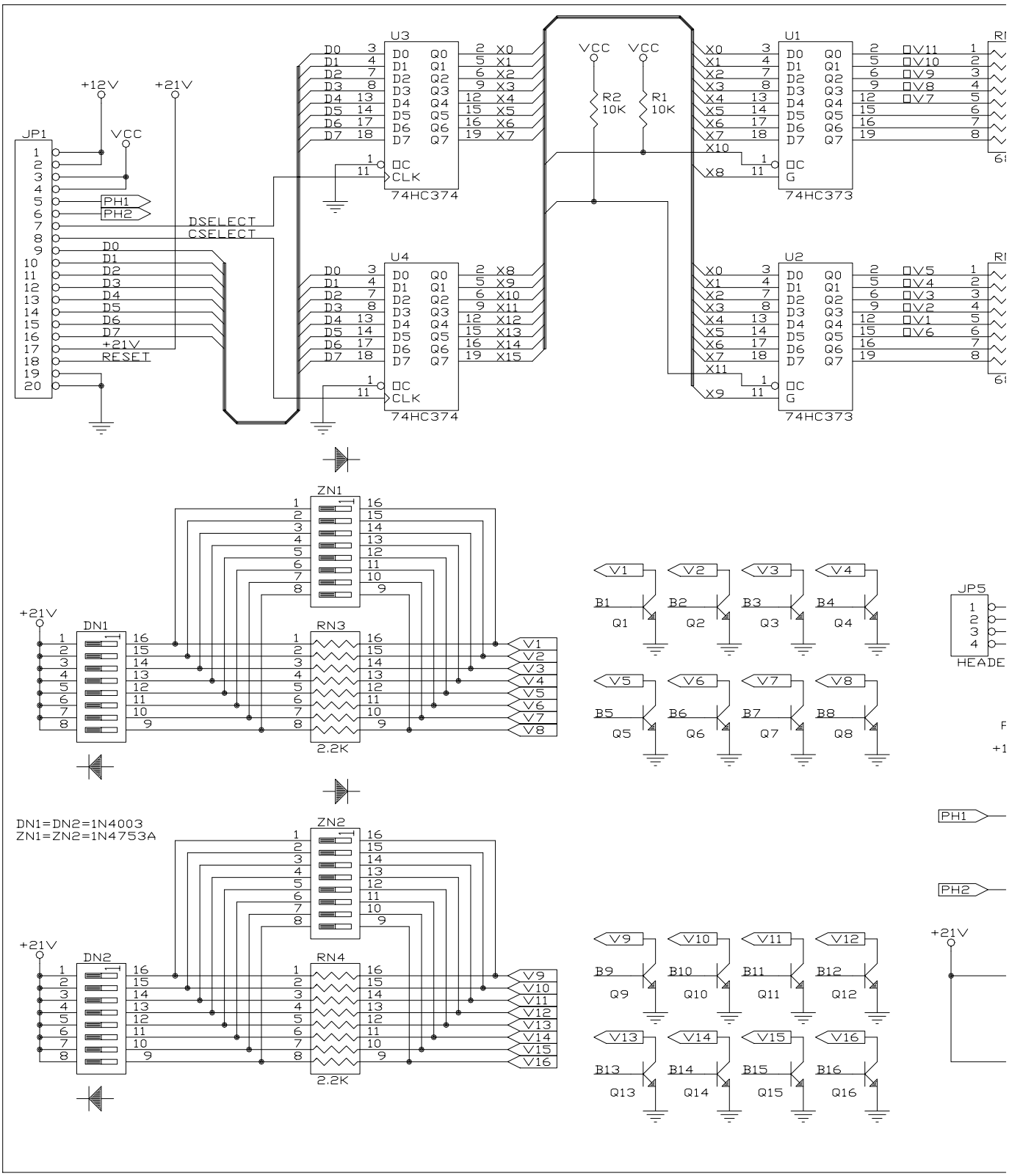


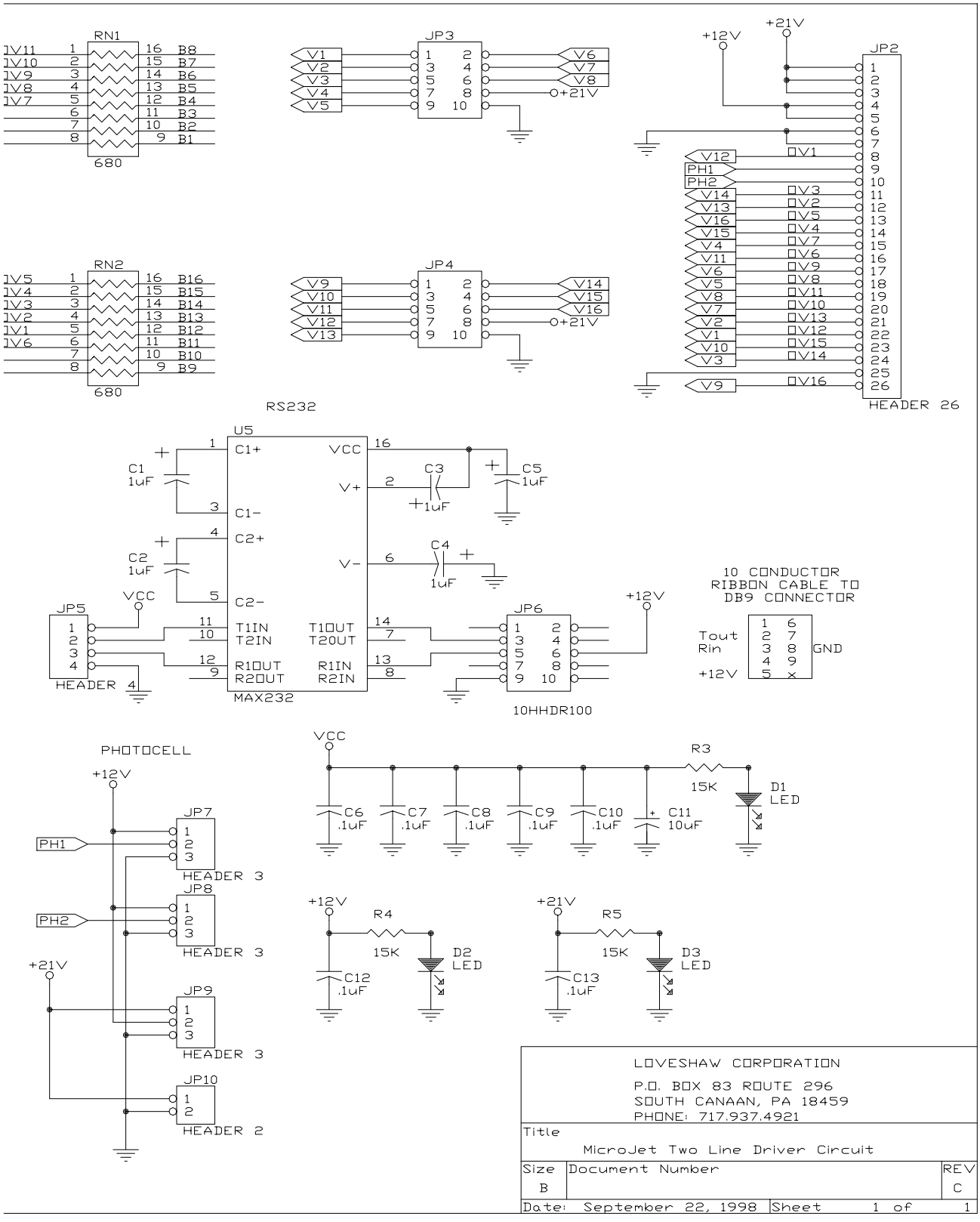


Design by MDS

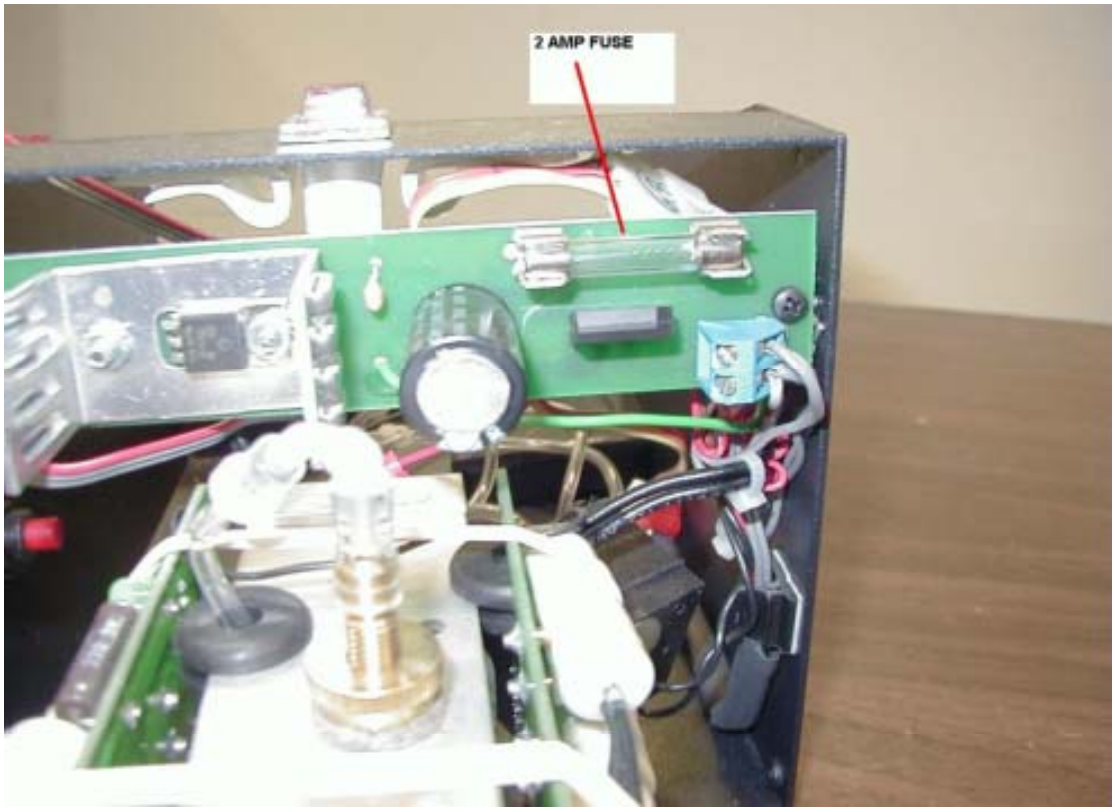
LOVESHAW South Canaan, PA 18459		
Title: Microjet Two Line Main Circuit		
Size: C	Document Number: CPM11-010/5-C	REV: A
Date: October 5, 1998	Sheet 1 of 1	

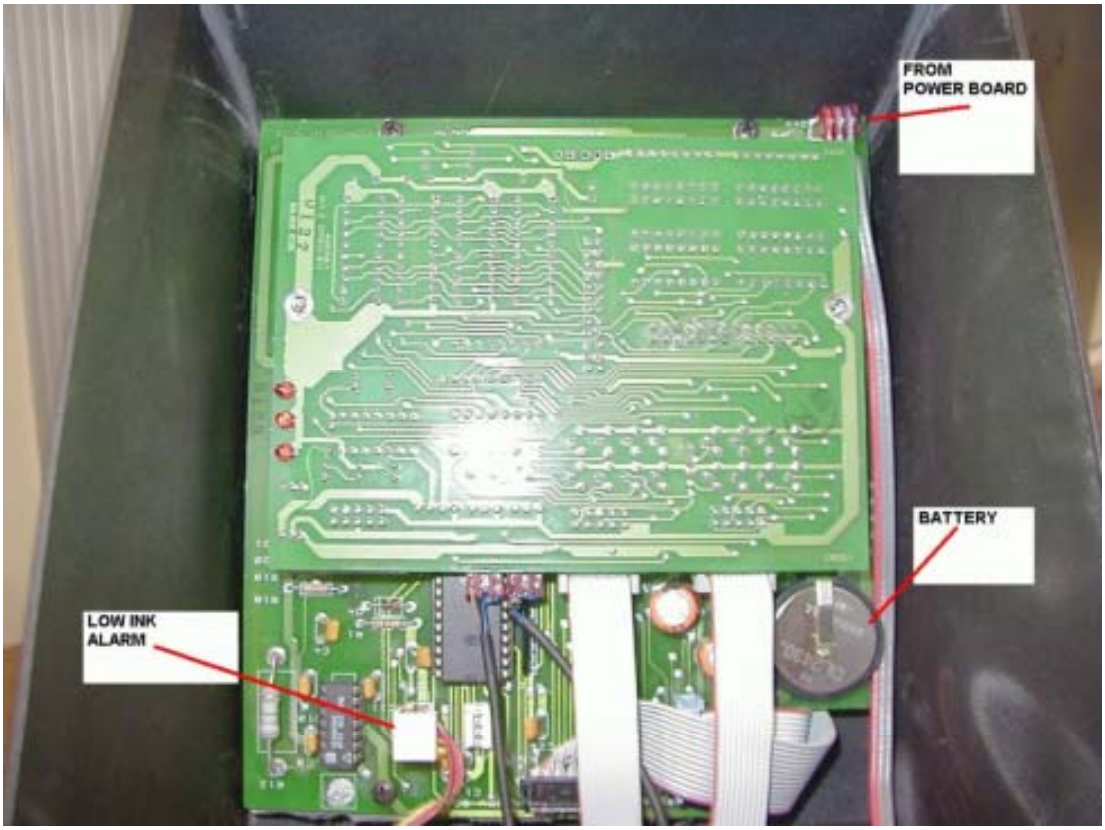


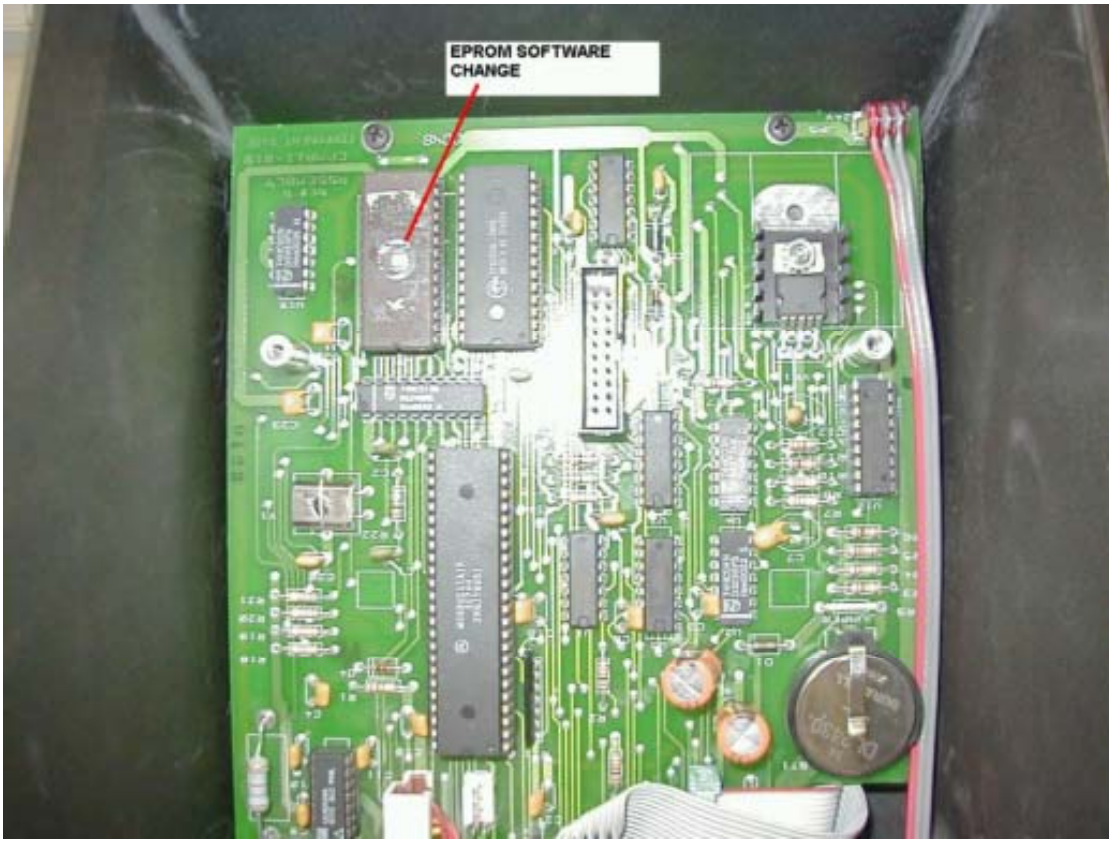


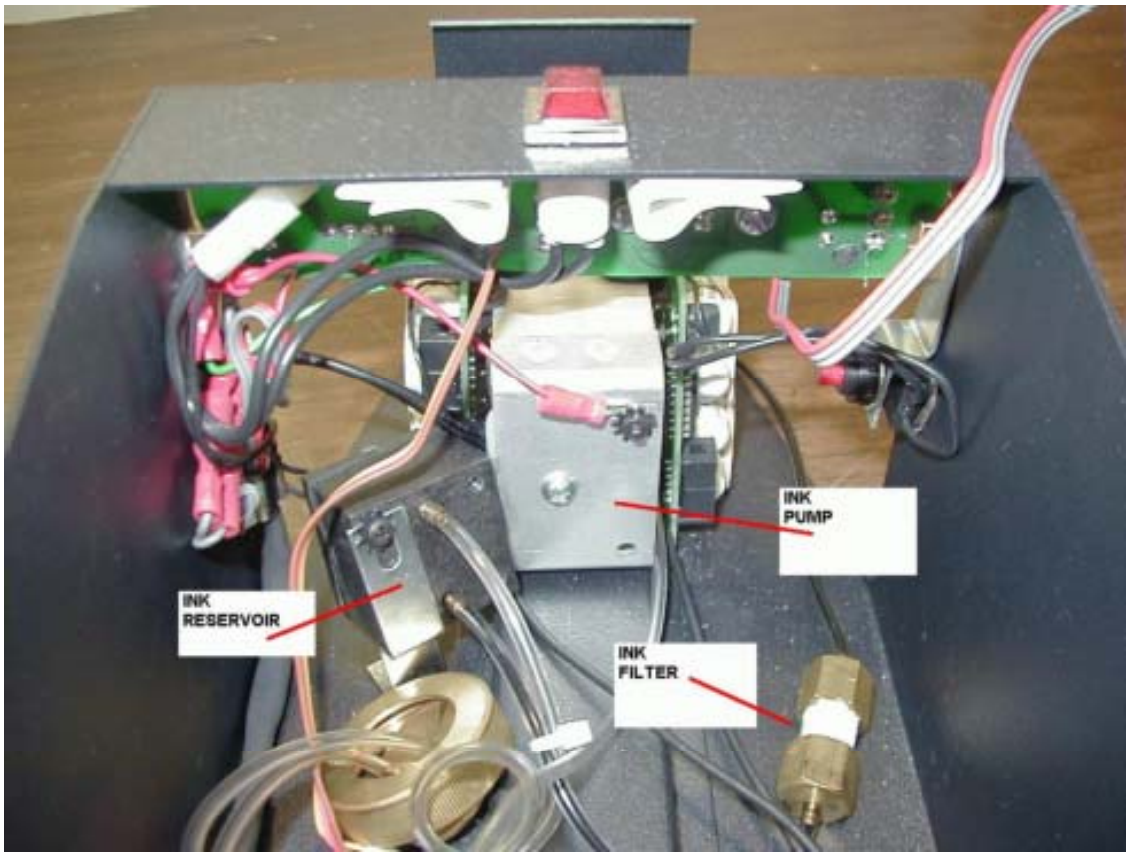


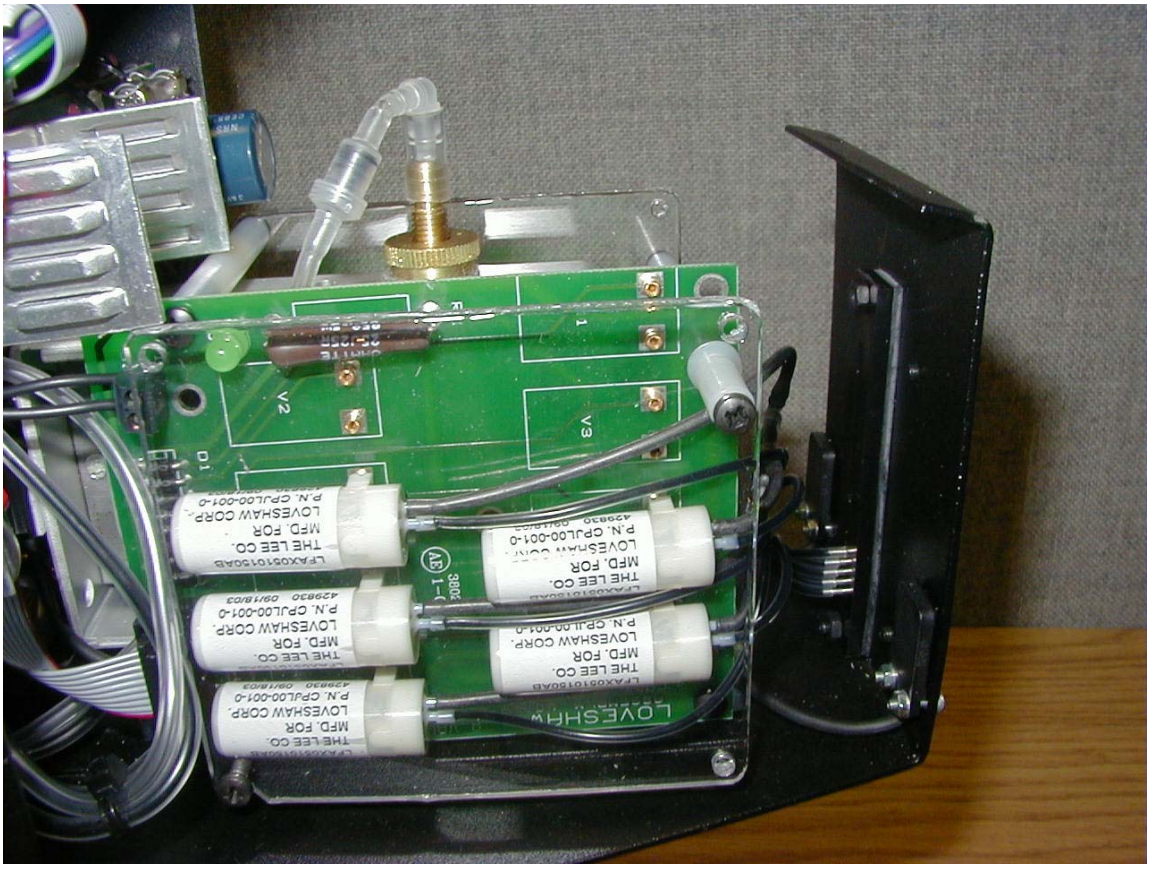

LOW INK LAMP
INK CHECK VALVE
AIR PUMP ADJUSTMENT
PURGE SWITCH

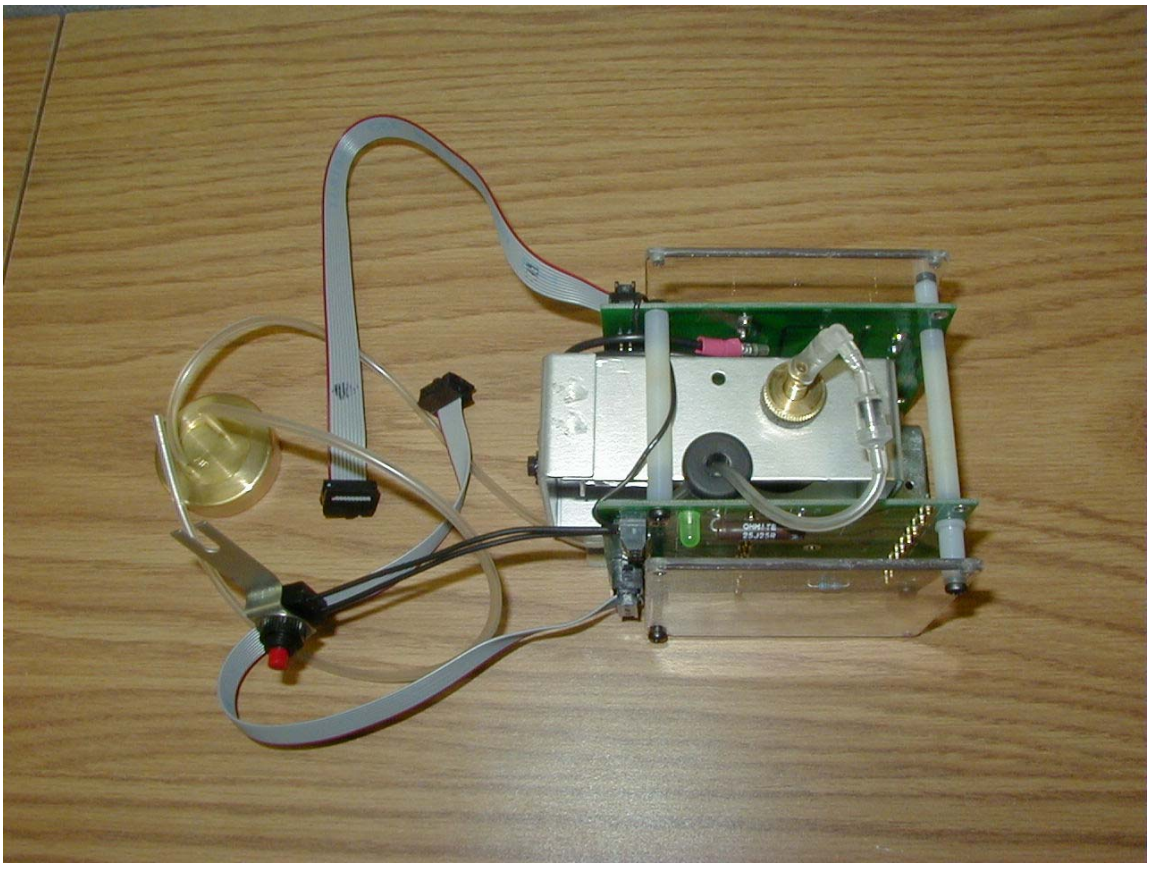

2 AMP FUSE


FROM
POWER BOARD
BATTERY
LOW INK
ALARM


EPROM SOFTWARE
CHANGE


INK
PUMP
INK
RESERVOIR
INK
FILTER

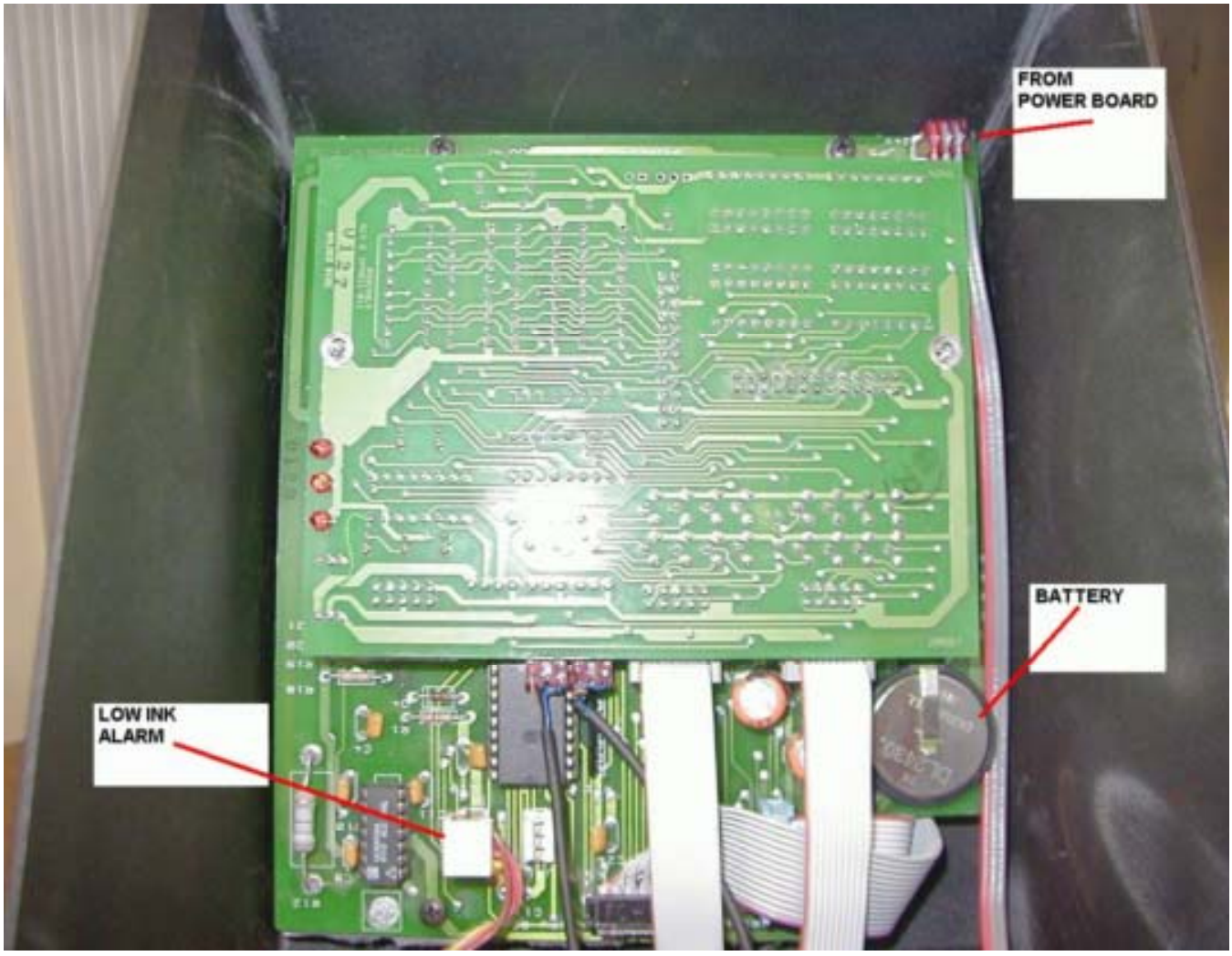

V2
V3
LOVESHAW
THE LEE CO.
MFD. FOR
LOVESHAW CORP.
P.N. CPJL00-001-0



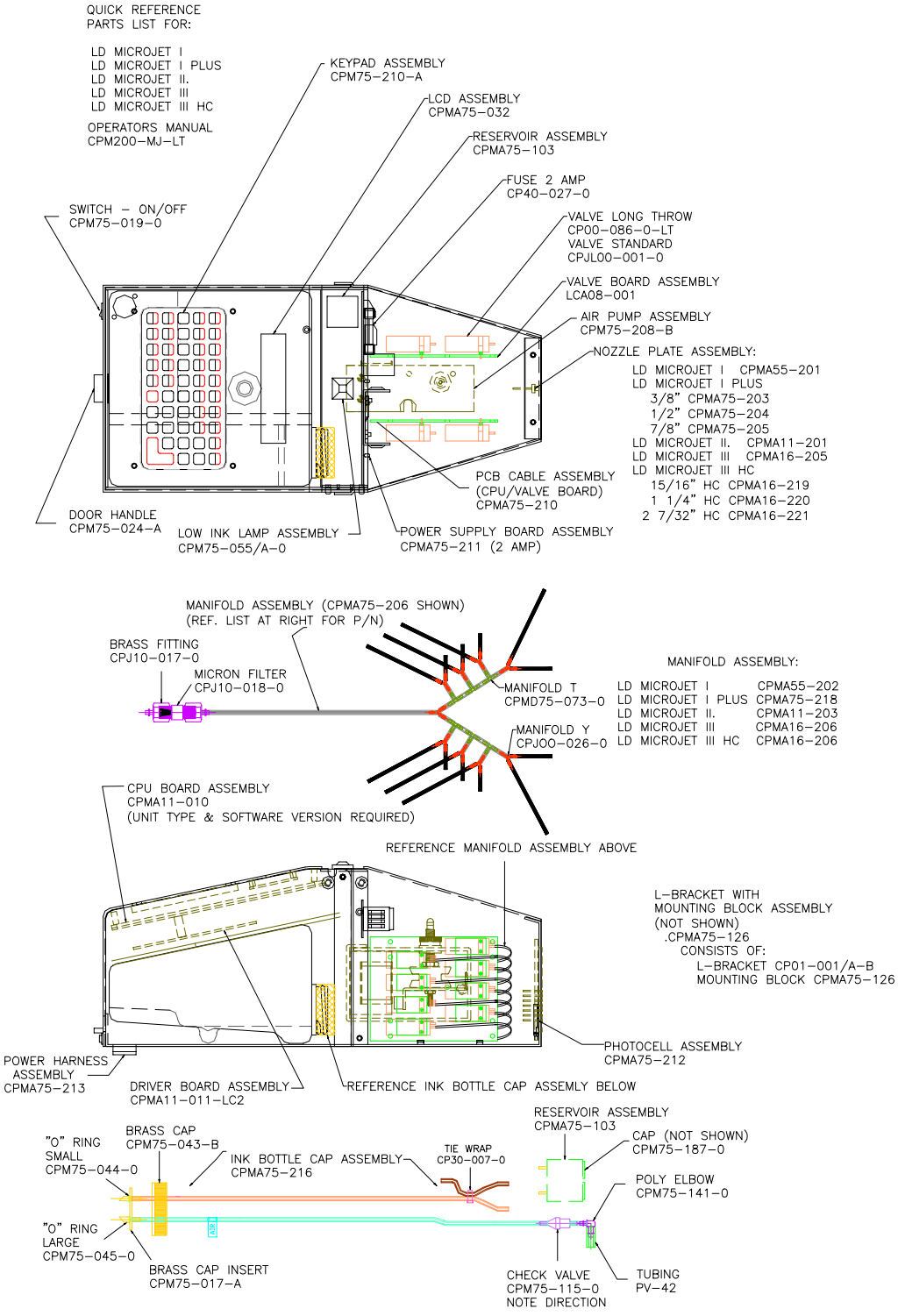
Battery Replacement

1) Turn unit off.
2) Open back lid. Remove 2 screws from inside of top half of unit. Remove DRIVER board from the CPU/KEYPAD assembly.
3) If battery is soldered into CPU board:
    A) Remove old battery.
    B) Note polarity of new battery and solder in place.

    If battery is in battery holder:
    A) Remove old battery.
    B) Note polarity of new battery and slide into holder.
4) Reassemble CPU/KEYPAD assembly and test unit.



Bill of Materials / Quick Reference Chart



MicroJet I

- Prints one line of 5 X 5 dot matrix characters
- 11/32” (8.7mm) character height
- Self-contained non contact coding system
- High speed valves (5) standard
- Messages Save Area = 255 (39 fixed characters per line)

MicroJet I Plus

- Prints one line of 7 X 5 dot matrix characters
- Choose from one of following nozzle plate sizes:
  3/8” (9.5mm) - Prints one line of 3/8” character height or
  1/2” (12.7mm) - Prints one line of 1/2” character height or
  7/8” (22.2mm) - Prints one line of 7/8” character height
- Self-contained non contact coding system
- High speed valves (7) standard
- Messages Save Areas = 255 (39 fixed characters per line)

MicroJet II

- Prints multiple lines and character heights:
  One or two lines of 5 X 5 dot matrix at 11/32” (8.7mm) character height or
  One line of 7 X 5 dot matrix at 1/2” (12.7mm) character height or
  One line of 11 X 7 dot matrix at 13/16” (20.6mm) character height or
  any combination in a message
- Self-contained non contact coding system
- High speed valves (11) standard
- Messages Save Areas = 149 (39 fixed characters per line)

MicroJet III

- Prints multiple lines and character heights:
  One, two or three lines of 5 X 5 dot matrix at 11/32” (8.7mm) character height or
  One line of 7 X 5 dot matrix at 1/2” (12.7mm) character or
  One line of 11 X 7 dot matrix at 13/16” (20.6mm) character height or
  any combination in a message
- Self-contained non contact coding system
- High speed valves (16) standard
- Messages Save Areas = 100 (39 fixed characters per line)

MicroJet III HC

- Prints multiple lines and character heights
- Choose from one of following nozzle plate sizes:
  15/16” (23.8mm) - Prints one line of 15/16” character height and/or
  one or two lines of 7 X 5 dot matrix at 3/8” (9.5mm) character height
  1-1/4” (31.8mm) - Prints one line of 1-1/4” character height and/or
  one or two lines of 7 X 5 dot matrix at 1/2” (12.7mm) character height
  2-7/32” (56.4mm) - Prints one line of 2-7/32” character height
  one or two lines of 7 X 5 dot matrix at 7/8” (22.2mm) character height
- Self-contained non contact coding system
- High speed valves (16) standard
- Messages Save Areas = 149 (39 fixed characters per line)

Warranty

Little David® Warranty

For:
MicroJet I, MicroJet I Plus, MicroJet II, MicroJet III and MicroJet III HC
Ink-Jet printers.

2 YEAR WARRANTY ON VALVES
1 YEAR WARRANTY ON ALL OTHER PARTS

*****LIMITED WARRANTY – ***LOVESHAW,*** an ***ITW*** COMPANY (HEREIN AFTER "***LOVESHAW***")
WARRANTS ONLY THAT THE GOODS SOLD BY IT SHALL BE FREE FROM DEFECTS IN MATERIAL AND WORKMANSHIP, UNDER PROPER AND NORMAL USE AND MAINTENANCE, AS FOLLOWS:

VALVES -	2 YEARS from date of delivery.
ALL OTHER PARTS -	1 YEAR from date of delivery.

THE WARRANTY PERIOD SHALL COMMENCE AS OF THE DATE OF DELIVERY TO THE PURCHASER. THE OBLIGATION OF LOVESHAW UNDER THIS WARRANTY IS STRICTLY LIMITED TO THE COST OF REPAIRING OR REPLACING, AS LOVESHAW MAY ELECT, ANY PART OR PARTS THAT PROVE IN LOVESHAW'S JUDGEMENT TO HAVE BEEN DEFECTIVE IN MATERIAL OR WORKMANSHIP AT THE TIME THE GOODS WERE SHIPPED FROM LOVESHAW'S PLANT. ANY WARRANTY CLAIM NOT MADE IN WRITING TO LOVESHAW AT ITS HOME OFFICE WITHIN THE APPLICABLE WARRANTY PERIOD AND WITHIN 10 DAYS OF FAILURE WILL NOT BE VALID. THIS IS THE SOLE AND EXCLUSIVE REMEDY AVAILABLE UNDER THIS WARRANTY. UNDER NO CIRCUMSTANCES WILL LOVESHAW BE LIABLE FOR INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES.

IF REQUESTED BY LOVESHAW, PURCHASER SHALL RETURN ANY DEFECTIVE PART OR PARTS TO LOVESHAW'S PLANT, FREIGHT PREPAID. ALL WARRANTY PART REPLACEMENTS AND REPAIRS MUST BE MADE BY LOVESHAW OR A LOVESHAW DEALER AUTHORIZED TO HANDLE THE GOODS COVERED BY THIS WARRANTY. ANY OUTSIDE WORK OR ALTERATIONS DONE WITHOUT LOVESHAW'S PRIOR WRITTEN APPROVAL WILL RENDER THIS WARRANTY VOID. ***LOVESHAW,*** an ***ITW*** COMPANY WILL NOT ASSUME ANY EXPENSE OR LIABILITY FOR ANY REPAIRS MADE TO ITS GOODS OUTSIDE ITS WORKS WITHOUT ITS PRIOR WRITTEN CONSENT. THIS WARRANTY SHALL NOT APPLY TO ANY ITEM THAT HAS NOT BEEN USED, OPERATED, AND MAINTAINED IN ACCORDANCE WITH LOVESHAW'S RECOMMENDED PROCEDURES. LOVESHAW SHALL HAVE NO LIABILITY WHATSOEVER WHERE THE GOODS HAVE BEEN ALTERED, MISUSED, ABUSED OR INVOLVED IN AN ACCIDENT.

NO PERSON IS AUTHORIZED TO MAKE ANY WARRANTY OR TO CREATE ANY LIABILITY BINDING UPON LOVESHAW, WHICH IS NOT STATED IN THIS WARRANTY. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES OF ANY KIND, EXPRESSSED OR IMPLIED, WHICH ARE HEREBY EXCLUDED. IN PARTICULAR, THE IMPLIED WARRANTY OF MERCHANTABILITY, AS WELL AS THE IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY EXCLUDED.

Purchaser shall, before purchasing, determine the fitness and suitability of the said product LOVESHAW Ink Jet Printer for its intended purpose and neither manufacturer nor seller shall be liable for any loss or damage, direct or consequential, arising out of the use of or the inability to use the above described equipment.

"USE OF ANY INK NOT CONFORMING TO LOVESHAW'S SPECIFICATIONS WILL VOID THE UNIT WARRANTY."

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