 <b>TRIDENT</b> AN ITW COMPANY INDUSTRIAL INKJET	<b>Customer Refurbishment Procedure for 256Jet-D Print Head</b>
<b>Spec. No.: CS01-0426</b>	<b>Rev. – A</b>
<b>Date: 8 April 2011</b>	

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**Purpose:**

Provide licensed and certified OEM customers with a controlled and standardized procedure for refurbishment of Trident 256Jet-D print heads at their production facilities.

The procedure described in this document is based on Trident's in-house testing and confidential and proprietary intellectual property. Results from this procedure may vary. For questions on this, or related, specifications please contact your Trident representative or Marketing Manager @ 203-740-9333 x3076

**DOCUMENT REVISION CONTROL**

<b>REVISION</b>	<b>DESCRIPTION</b>	<b>DATE</b>
<b>A</b>	<b>Released</b>	

## 256Jet-D Print Head Refurbishment Protocol

This procedure should only be performed by properly trained and certified personnel. Training and certification is provided only by Trident.

Secure the current revision of spare parts drawing P/N 256-9016-01 to assure correct sequence/location of components and that proper parts are used for reassembly.

Within 72 hours of cleaning, parts must be reassembled into a printhead and ink introduced to assure proper prime-ability of the assembly.

### **Disassembly and Cleaning**

Note: Clean room gloves must be used when handling parts during and after cleaning steps to prevent hand oils and skin debris from getting onto parts and as a safety precaution when coming in contact with ink and solvents.



**Proper safety equipment must be worn, including eye/face protection, and protective clothing. Use proper procedures when handling chemicals, including fire and personal protection.**

## **I. Printhead Refurbishment**

Designated Head Ink Type	Sonication Solvent *
Trident shipping fluid	N-Propanol
Customer Ink or Fluid	Appropriate solvent for customer ink or fluid
All	Acetone

\* Solvents should be high purity industrial grade.

### **Disassembly**

Note: Take care not to get ink/solvent on the PCB which could cause a problem.

1. With the shipping cap on, with a Trident holding fixture or equivalent, secure the print head face up as shown in Figure 1. Clamp by the metal body only. Do not clamp by the PCB's.
2. Position absorbent cloths or waste containers under the inlet and outlet to catch ink/fluid. The amount of ink expected to come out of the print head is approximately 5 ml.
3. Open the inlet and vent luer fittings and let the fluid in the print head flow out. If necessary, apply low, steady air pressure (3 – 10 psig) to the inlet luer fitting via a syringe or priming bulb to purge the primary fluid path of ink.
4. Reinstall the luer fittings after the ink flow has slowed to a drip.

5. Remove the print head shipping cap and insert the alignment dowel pins into the print head face and assemble the CP/OP protective guard plate (Trident P/N 187-2129-01) to the face of the printhead. See Figure 1.

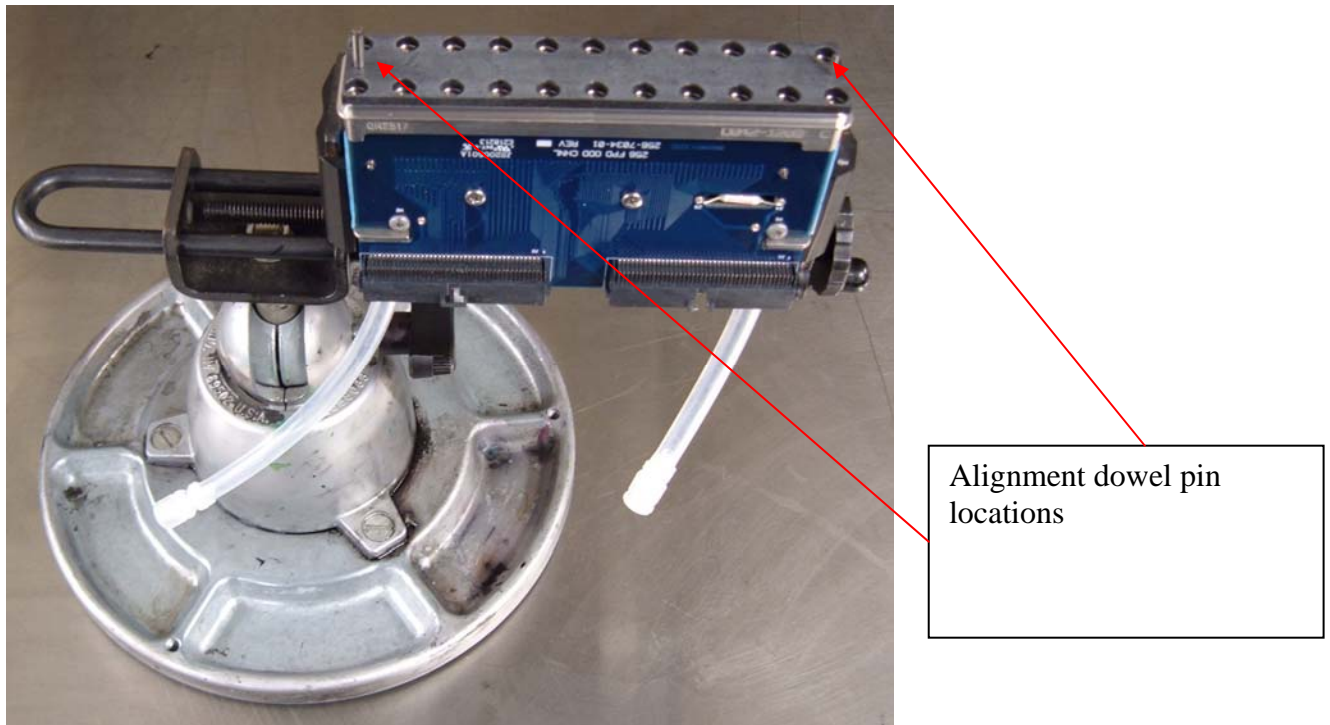


Figure 1: Dowel pin locations and showing guard plate installed.

6. Using Phillips ACR II bit (size 0-1), remove CP/OP screws. Discard CP/OP screws.
  7. Lift out the alignment dowel pins and carefully lift off CPOP protective guard plate.
  8. Separate Restrictor Plate, Manifold Filter/Spacer Plate, and CP/OP from each other.
  9. Clean body, CP/OP, Restrictor Plate and Manifold Filter/Spacer Plate as stated below:
  10. Clean Backbody.
    - A. Not changing ink type – Procedure 1
      - i) While still secured with face up, wipe the diaphragm surface free of ink with the recommended sponge-tip swab manufactured by Lym-Tech Scientific, P/N S-165. Other wipes/swabs could leave fibers and create subsequent rework. **Do not use solvent. Do not wipe in the manifold groove.**
      - ii) Inspect diaphragm surface for damage, scratches and lifting. Check that each of the piezo feet show as individual bumps and are not lifted up between.
      - iii) Place body diaphragm side down onto an approved clean cloth to drain and to protect the diaphragm surface.
    - B. Changing ink type – Procedure 2
      - i) Remove the tubing from the inlet and vent fitting. Discard tubing.
- DANGER: Solvents on or behind the PCB can permanently damage the print head. Make sure not to get solvent or fluid on or behind the PCB.

- ii) Using a chemical spray bottle filled with the appropriate solvent, spray solvent down the inlet and vent ports as shown in Figure X. Note use of cloths to help prevent solvent from contacting PCB or getting behind PCB. Note orientation of print head to assure solvent flows down the print head face.

Figure 2: Technique for flushing ink or fluid from inlet and vent.

- iii) Hold the print head as shown in Figure Y and carefully spray solvent on the face to remove all ink or fluid. Note the orientation of the print head to allow solvent to flow down the face and off the print head. This orientation helps prevent solvent from getting on or behind the PCB.

Figure 3: Technique for flushing ink or fluid from print head body face.

- iv) When all ink or fluid is removed from the print head body, use filtered air to blow off remaining solvent from the body.
- v) Place the body in a 65C oven for no less than 30 minutes to completely dry.

#### 10. Clean CP/OP:

- A. Spray CP/OP with applicable solvent from the chamber (back) side first and then the orifice side to remove excess ink.
- B. Place CP/OP orifice side down in stainless pan filled with enough of the appropriate solvent to cover parts and sonicate at full power, with sweep on high, for 10 minutes.
- C. Discard solvent and rinse pan with solvent to remove any debris. Repeat cleaning step B with fresh solvent.
- D. Discard solvent and rinse pan with solvent to remove any debris. Refill with enough solvent to cover the parts and repeat sonication, orifice side up for 10 minutes.
- E. Discard solvent and rinse pan with solvent to remove any debris. Repeat cleaning step D with fresh solvent.
- F. Discard solvent and rinse pan with solvent to remove any debris. Position CP/OP in pan with the orifice side up and fill the pan with enough acetone to cover the parts. Sonicate with the same power settings for 10 minutes.
- G. Carefully blow excess solvent off the CP/OP with filtered air. Visually check for scratches or damage on both sides of the CP/OP at minimum 10X magnification. Scratches or nicks/dings that connect chambers or run through orifices will present performance problems. Replace CP/OP that has such defects.
- H. Place acceptable CP/OP in an oven at 65°C for 30 minutes or until dry.
- I. Inspect CP/OP orifice holes using 100x magnification and adequate back-lighting to assure all orifice holes are clear of debris and defects. If signs of debris are seen in any orifice holes, repeat cleaning steps B-I.
- J. If CP/OP fails inspection a second time, spray the affected chamber(s) with MICRO CARE PW2 PowerClean II and repeat steps B-I.
- K. Place CP/OP in clean container with cover or suitable condition to prevent contamination. One option is to hang the CPOP in the oven again to protect it from debris. Another option is to place a lint free clean room cloth in the bottom of Nalgene

SAN utility boxes catalog number 5700-0500 purchased through Macalster-Bicknell and then place the parts on the cloth. In the box the CPOP should be positioned with the maintenance plate (orifice side) down.

11. Clean restrictor and manifold/filter spacer plates:
  - A. Spray components with the applicable solvent to remove excess ink.
  - B. Place individual components into separate, clean glass or stainless steel beakers and fill with the applicable solvent until they are fully covered.
  - C. Place beaker(s) in the ultrasonic unit and sonicate clean for 3-5 minutes. Remove the components from the beaker and the beaker from the sonicator. Discard the solvent and rinse the beaker with the applicable solvent to remove any loose debris left in container.
  - D. Repeat steps B-C using fresh solvent.
  - E. Repeat steps B and C using **acetone**.
  - F. **Do not** blow excess solvent off these delicate components. Inspect components for damage, i.e. creases or broken "webs". Discard and replace if there is any damage.
  - G. Place in an oven at 65°C for 30 minutes or until dry.
  - H. .Keep components in the oven or place components in a clean container with cover or suitable condition to prevent contamination as done for the CPOP.
  
12. Clean or wipe down the ship cap or protective cover with a sponge-tip swab and the applicable solvent and dry with filtered air.

## Reassembly

Note: Clean room gloves and clean environment must be used during reassembly.

Use proper fixtures to hold the printhead for reassembly. The printhead may be damaged and/or the torque settings incorrectly applied with inadequate fixtures. Further, safety and ergonomics of repair personnel are maintained when proper fixtures are used.

1. Secure the body subassembly face up. Wipe the diaphragm surface and manifold with the sponge swab moistened with the appropriate solvent.
2. Place Trident part number 9256-5022-02 (.0625 diameter) and 9256-5022-03 (.125 diameter) alignment dowel pins in their respective dowel holes at the front of the body subassembly. See Figure 1. Assemble the new/cleaned manifold filter/spacer plate and new/cleaned restrictor plate to backbody (in that sequence), lining up the alignment marks, ink path areas and screw hole pattern. See Figure 4 for alignment marks. Blow the chamber side of the CP/OP with filtered air. Install the new/cleaned CPOP on the backbody, lining up the alignment marks, ink path areas and screw hole pattern, and then the CP/OP protective guard plate (Trident P/N 187-2129-01).
3. Per Trident drawing 256-9016-01, install Trident designated screws and tighten with a Phillips ACR II bit (size 0-1) to specified torque.
4. Remove the CPOP guard plate and alignment dowel pins.

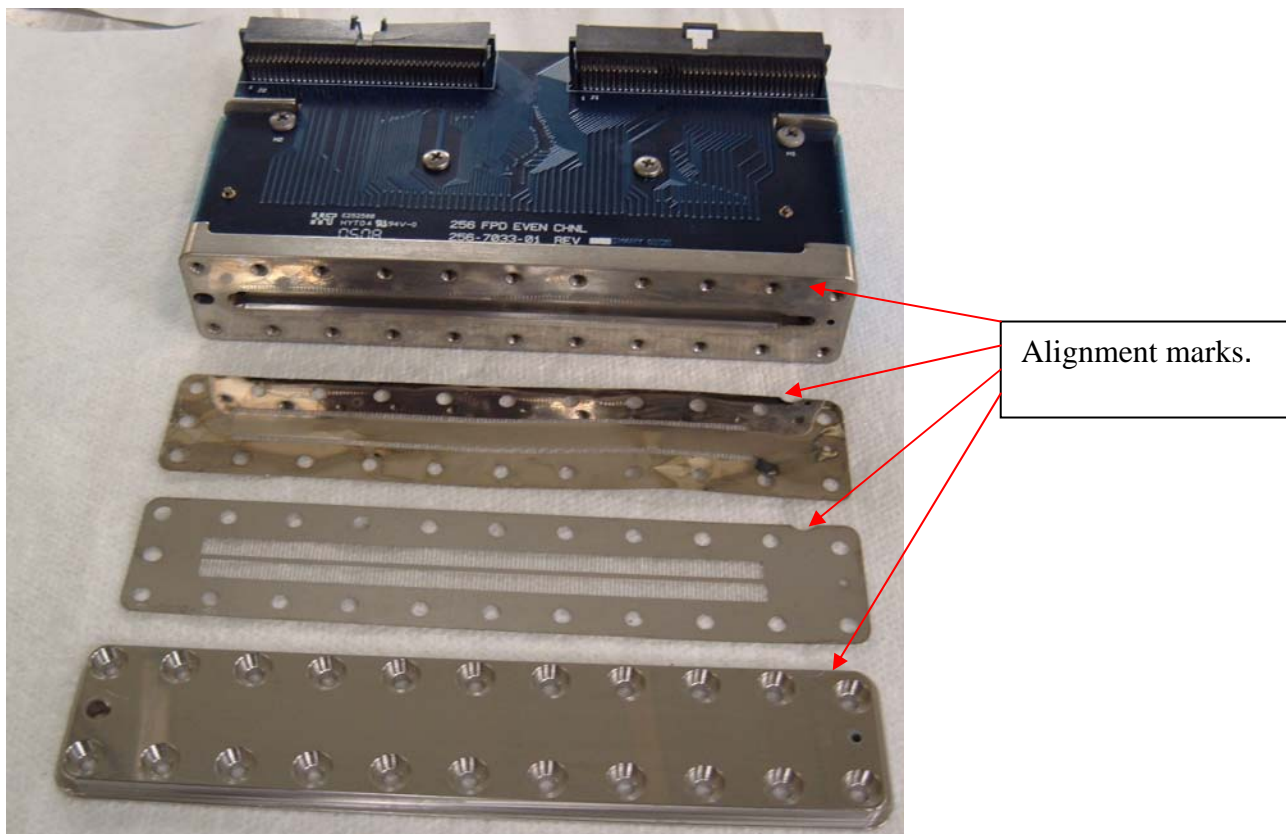


Figure 4: Location of alignment marks on parts.

**Take care not to scratch the CPOP face!**

5. Blow the inside of cleaned ship cap or cover plate with filtered air and assemble against CP/OP.
6. With the printhead held vertically and the outlet luer fittings at the top of the assembly, slowly introduce ink via a gravity fed ink reservoir into the printhead from the inlet luer fitting and prime through the outlet luer fitting until no air bubbles are seen. Cap off the outlet luer fitting. See Figure 5. The ink supply is approximately 25 inches (635 mm) above the print head.
7. Remove the printhead ship cap and continue introducing ink until no air bubbles are seen at the orifices.
8. Wipe the face off with the sponge swab and replace the printhead ship cap and inlet luer cap (in that sequence).

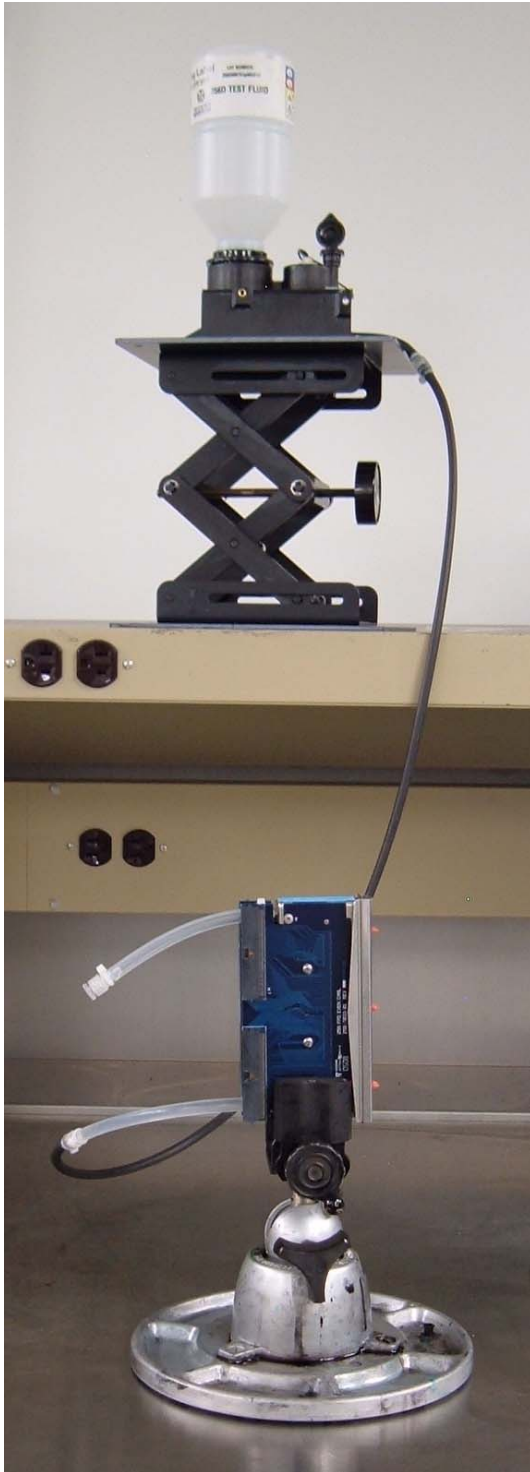


Figure 5: Gravity filling print head with ink after refurbishment.

Note: Introducing ink into the printhead within 72 hours of cleaning printhead components in this manner improves prime-ability.

**Tool and Supply List for Refurbishment of Trident 768Jet-L and 256Jet-D Print Heads**

Details on each listed item below are available from Trident. This includes vendor name and part number for the items. In most cases an equivalent substitute is available and acceptable.

**Required**

Printhead holding fixture, vise with plastic jaws greater than 4.0 inch (100 mm) opening, such as Techni-tool part numbers 620PO201 with 620PO026 base.

Microscope for viewing CP/OP (5-10-20-50-100x mag ). This microscope should have an X-Y micrometer system to move the CPOP smoothly through the full range required (100+ mm). The viewing table should stand up from the base by at least 50 mm so that the additional light source can be positioned underneath to shine from below the CPOP. Photos of Trident equipment are available from the Trident Application Engineer.

Sonicator, 40khz, sized to fit beakers and pans used for holding parts. Power level: Capable of 5-20 watts/inch<sup>2</sup> measured at the center of the unit, with IPA (Iso-Propyl Alcohol) fluid. Trident measures power with a pb-500 tool. See [www.megasonics.com](http://www.megasonics.com) for details.

Metal pan for holding CP/OP in sonicator. Polar Ware E06062, 1-quart capacity, available from Cole-Parmer as A-07242-10. Lid for 1-quart pan, Cole-Parmer number A-07242-60.

Drying oven, sized to fit quantity of parts to be dried, capable of 100 °C max temperature.

Filtered shop air (filtered for particulates and contaminants such as oil and water).

Chemical spray bottles or spray booth for spraying solvent on parts to remove large quantities of ink.

Protective gloves, powder free

Safety glasses

Appropriate high purity industrial grade solvent (dependent on ink type), filtered to 0.5 micron.

<b>Designated Head Ink Type</b>	<b>Sonication Solvent *</b>
Trident shipping fluid	N-Propanol
Customer Ink - Solvent	N-Propanol or customer ink solvent
Customer Ink - UV	UV flushing solution
All	Acetone

Approved clean room wipes, such as Trident Clean Wipes, p/n 9700-0100-01

Swab wipes, Lym-Tech Scientific, P/N S-165 [www.lymtech.com](http://www.lymtech.com)

Manual torque screwdriver capable of 70-120 inch-oz (49-85 Newton-cm) torque. With Philips ACR 1-2 bit.

Syringe or priming bulb (Trident P/N 9183-0596-01)

Tweezers - plastic

CP/OP alignment dowel pins, Trident p/n 9256-5022-02 and 9256-5022-03

CP/OP screws P/N from spare parts drawing.

CPOP protective guard fixture (supplied by Trident after training)

For safety, exhaust hoods in place where chemicals are used.

**Strongly Recommended**

Strongly recommend a clean room environment for the printhead reassembly process. Possible compromises to this are: A HEPA filter/fan combination above a work bench, blowing up, with 3 sides of the workbench enclosed. This creates a clean environment on the work bench where particles can not settle. See Table 1 for information on what Trident has used in the past.

Needle Nose Pliers

Cable Tie Tool

10x Loupe for viewing CPOP

**Optional**

Electric screwdriver with Phillips ACR II bit, such as Milwaukee catalog number 6539-1

Electric torque limiting screwdriver with Phillips ACR II bit , such as Advanced Systems Group HIOS CL-6000 with stand p/n 65027, capable of 70-120 inch-oz (49-85 Newton-cm) torque.

**Table 1**

List of parts Trident has used to build refurbishment clean benches. This information is circa 1997.

Part	Supplier	Contact number	Part number
Booth enclosure	Formus AG	49-2173-9742.60	TRI 100797 1-B (custom)
Bench	Workplace systems	800-258-9700	A10013672T8014
HEPA unit	Envirco	800-545-6598	Mac 10, 2'x4', 115V
Shelves	McMaster-Carr	www.mcmaster.com	5104T426
Mounting plate	McMaster-Carr		5101T45
Power strip	McMaster-Carr		7503K2
Light	McMaster-Carr		1612K22

**REFERENCE:** 768Jet-L Spare Parts Drawing, 256-9014-01  
256Jet-D Spare Parts Drawing 256-9016-01