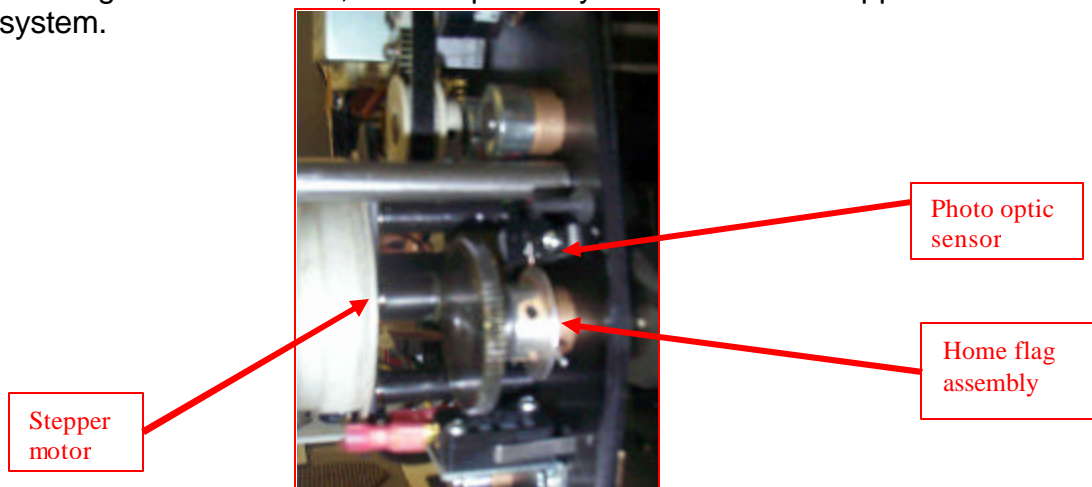




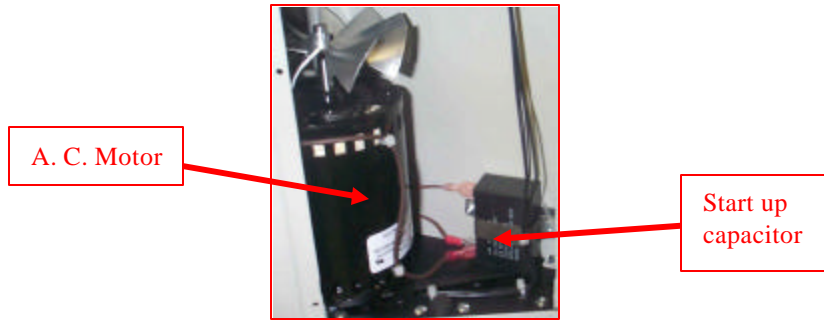
The following information is for logically troubleshooting the 968. It should be noted that “motor sensed off” is a generic error code and could indicate a multitude of mechanical/electronic issues in the unit. Therefore, the only way to approach this unit is by a system to system check for functionality.

The following determinations should be made before going into deep troubleshooting:

1. Does the bursting roller of the unit orient itself when you turn the machine on, or does it immediately give an error? If the machine is not capable of “homing” the burst roller, there is probably an issue in the stepper motor system.



2. When is the error occurring? Does the unit burst at all before the error comes up? If so, how many? If the machine does not burst at all before this issue arises, and does not try to feed paper in, it is probably in association with the AC motor, or encoder disc/sensor. If the unit backs the paper onto the floor, make sure there is not a paper guide covering the photo-optic sensor on the right tractor.

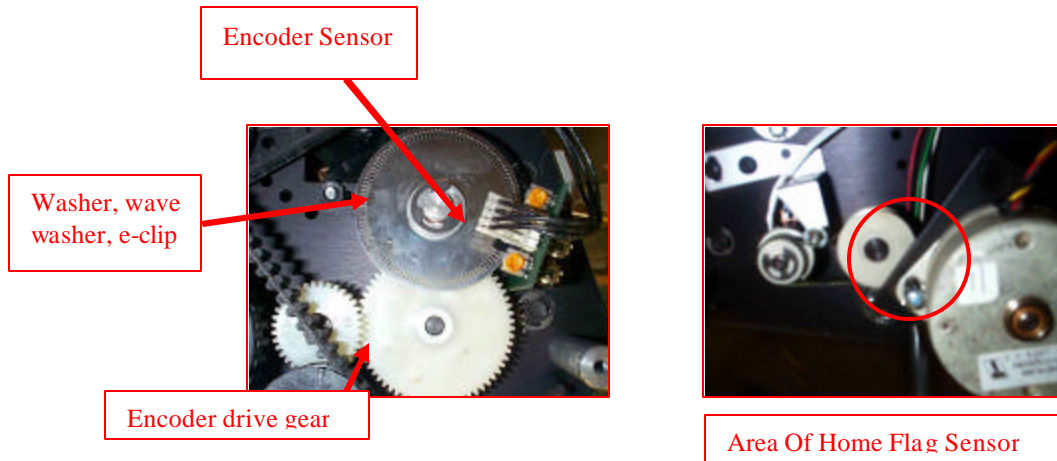


In this picture, the non-operator side cover is facing down.

3. When was the machine last serviced? After a burster has been ran for a period, it will start building up glaze on the rollers in the form of ink, toner, paper finish, paper dust, etc. This will affect the grippage of the rollers (can make slick) and could affect the burstability of the unit. If there is a reason to believe that they should be cleaned you will need a can of Rubber Roller cleaner; a Scotch-Brite pad and an old cloth to mop up any liquid residue that might be left over. **NOTE: if you run your finger down the rollers, they should be porous and have grip. If they feel smooth, as if they have a finish on them, then they need to be cleaned, or possibly replaced.**
4. Has the stock recently changed? Changes from a printer in regard to the perforation in between each page can affect burstability. If possible, compare new and old stock to determine any possible differences. Ideally, machine burstable stock should have between 6-8 perforations per inch. This can be determined by tearing a sheet off and counting the perforations for a one-inch section using a ruler. In addition, multiple ply documents should have a clean perforation that goes all the way through. NCR stock that has the ability to copy through all plies can soil the rollers of a machine very quickly, and if not cleaned for a long period can cause damage to the roller surfaces.

Stackability and the way a document is stacked can be of importance. Having to burst “against the fold”, or in the opposite direction it was stacked can sometimes necessitate a stock having to be ran backwards. This can be a valuable tool in negotiating the machine into operation.

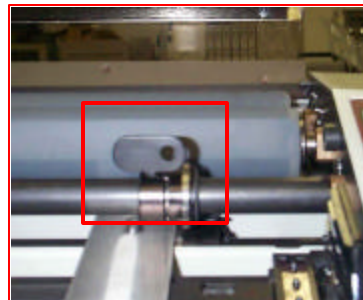
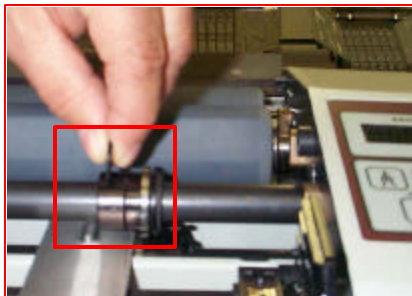
5. Was there a unique incident that occurred directly before the problem developed? Several things can occur during either moving or servicing the unit that could affect operation. Largest among these would be getting oil in the encoder sensor or home flag sensor while lubricating. In addition, movement of the encoder sensor board could knock the machine out of alignment. This most commonly occurs in gear replacement or shipping.



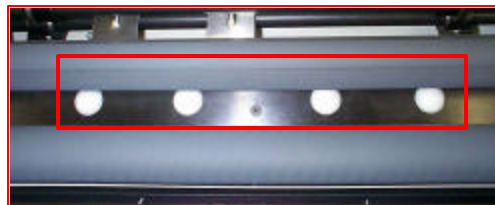
If these issues do not apply, the following sections can be referenced for logical troubleshooting. These areas can also be used to test a machine and help determine where the problem is located.

BASIC AREAS OF CONCERN

1. Slitters; if the slitters are being used on the stock, make sure that the hubs are flexed (see 968 set up instructions) before the upper blade is put in contact with the cutter hub and tightened down.



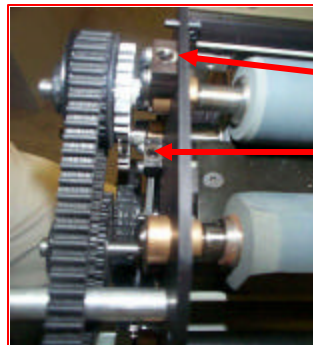
2. Burst Points; when setting the tractors and slitters make sure they are positioned with respect to the machines bursting points (see 968 set up instructions) paper should be centered equally on points.



3. Anti-static tinsel; if each sheet coming out of the unit does not brush across tinsel it could cause stacking issues as well as operational errors. ("Motor sensed off" for no reason.) Depending on how much grab the tinsel has on the paper, it may need to be trimmed depending on the stock size.



4. Length adjustment; make sure proper length is set on machine. If there is doubt, perform a "running measure" (see 968 set up instructions) and verify. **NOTE: if machine runs some quantity of stock through without bursting at all, suspect the length adjustment, timing, or encoder system.**
5. Electrical demands; this unit should be plugged into a surge protector and be on a dedicated line. If installed around other electronic machines, high frequency noise in the electrical supply could cause unexplained problems. Never remove or try to circumvent third prong on power cord.
6. Roller pressure; set at the factory and should not need to be adjusted. However, if rollers have gotten a great deal of wear and tear they could be adjusted to compensate for loss of roller diameter.



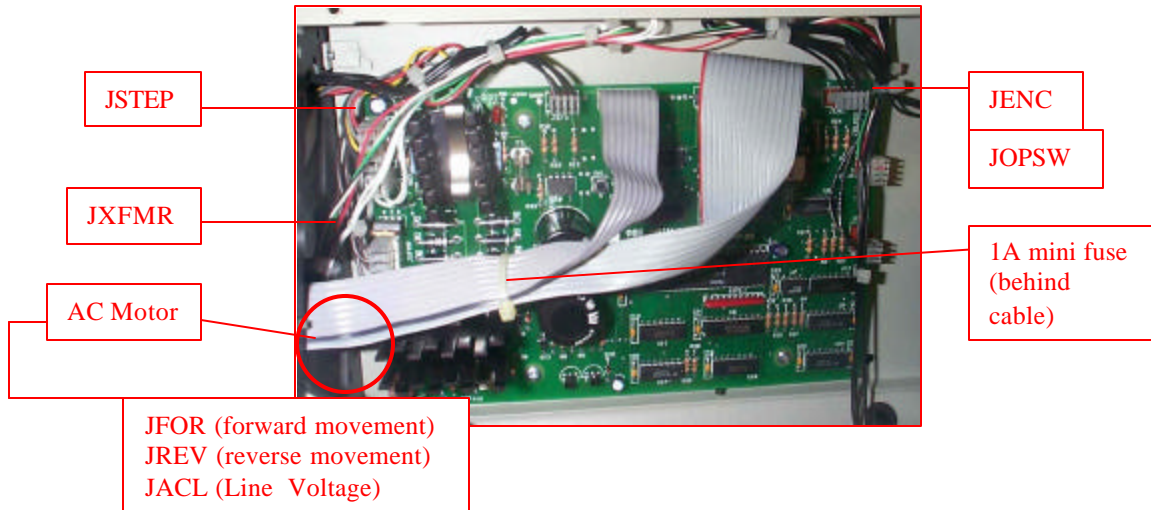
Roller
adjustment
screws, non-
operator side.

TESTING THE STEPPER MOTOR

The stepper motor is responsible for the rotation of the units bursting roller. It can be tested by taking the machine into diagnostics.

1. While turning the unit on hold down the 'SETUP' key (diagnostics). Once in, key can be released.

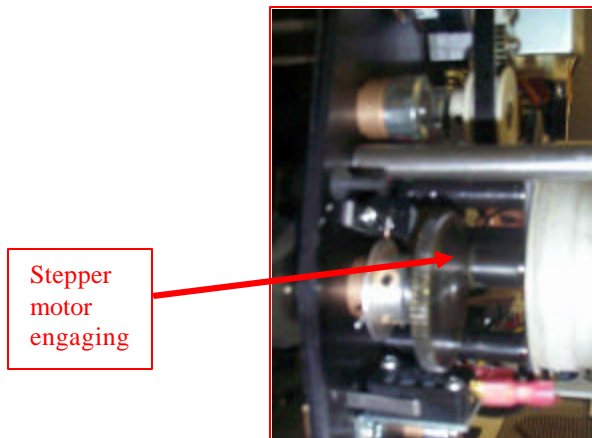
- Using the arrow key go to test # 4 and press 'ENTER'. Press the setup key for "single step mode".
- At this point, the burst roller should energize for one pulse each time the forward/reverse arrow is pressed.



NOTE: if motor has no response, check 1A mini fuse at F1 on main logic board. Remove and reseat the connection at JSTEP. Be careful to not pull on the wires of the connection, it should only be handled by the plastic housing itself.

- After testing for function, make sure you are in diagnostic test 4; press the 'ENTER' key. The stepper motor should energize and rotate the burst roller to "home" position. At this point the reading for home should be "1". Try this several times; by rotating roller out of home by hand and pressing enter again. * **NOTE: once flag is out of sensor, reading should be '0'**. Make sure each of the three flags are utilized by placing them in close proximity to the sensor: (six steps forward, 15 steps backwards).

***NOTE: When rotating roller by hand in diagnostic test 4, it should be energized and as a result, hard to move. If it seems to give little or no resistance, there could be an issue with the engaging gears at the stepper motor and bursting roller. Check these gears for any signs of damage. If gears are not properly engaged, slippage could occur. The stepper motor is mounted in slotted screw holes to allow adjustment.**



If gears are well engaged and resistance is minimal, remove and reseat the connection at JSTEP on the main logic board (make sure you turn the unit off before removing connection and plugging back in). **NOTE: removing or reseating connection at JSTEP with unit powered up could damage board.**

Repeat the above step and see if this is still the problem. IF so, follow steps below to test stepper motor:

1. Unplug machine; verify power switch is in "OFF" position.
2. Locate JSTEP connection on main board. Remove 4- wire connection. Take a reading from the two left or two right wires for resistance. Resistance should be approximately 1.7 – 2.1 OHMS
3. Repeat step for other two wires. Resistance reading for each set should be approximately equal +/- .1 OHM.

If resistance is within specification and the resistance on the field windings of the stepper motor is approximately equal, the motor is probably fine. The next step would be to make sure the unit is preparing and delivering the operating voltage correctly.

ISOLATION OF THE STEPPER DRIVER

The driver chip is located under the metal heat sink directly to the right of JSTEP. Its responsibility is to deliver a "square" operating voltage to the stepper motor. This means that at any given point of operation approximately the same AC voltage (+/- 1VAC) should be delivered to each of the stepper motor windings.

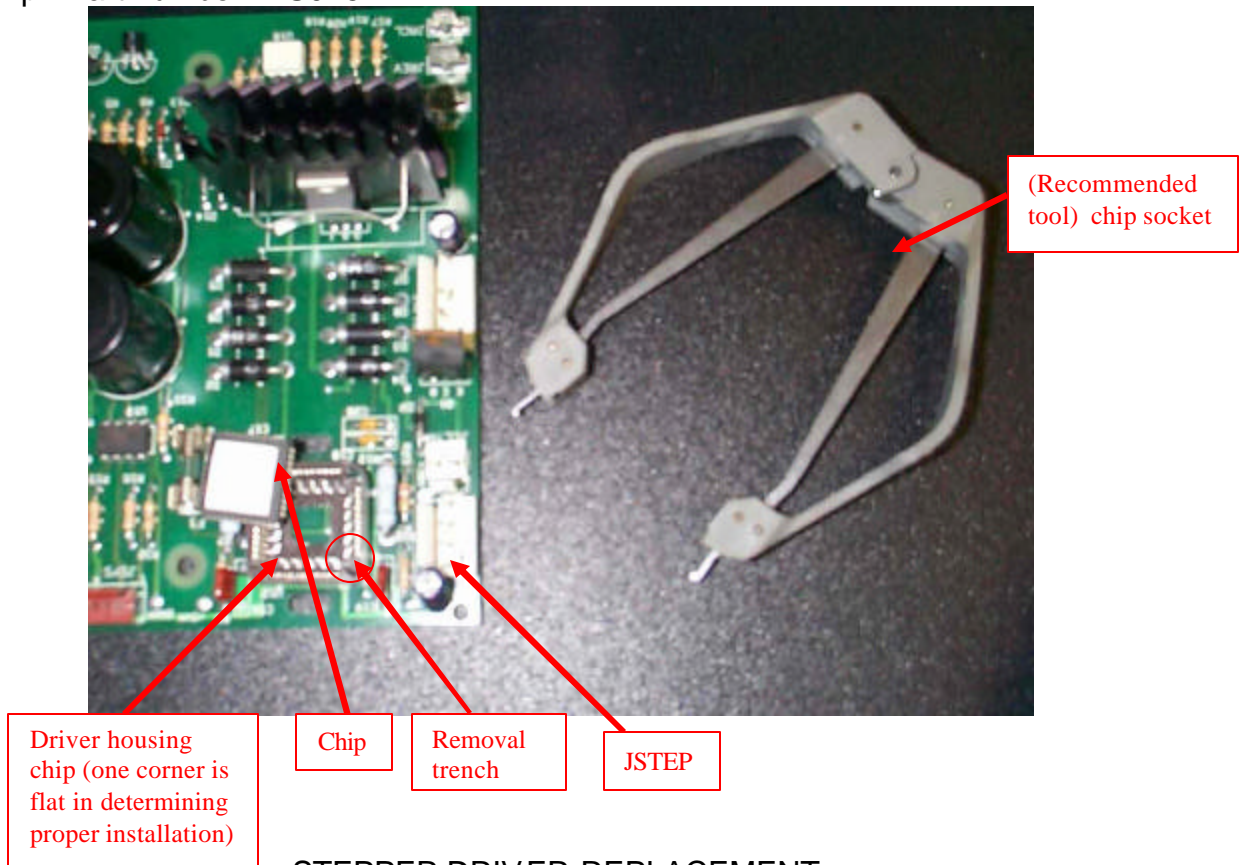
In order to test:

1. Power down.
2. Hook micro-hooks onto either two left or two right pins of JSTEP.

NOTE: Failure to make/break connection with JSTEP while machine is on could damage main logic board.

3. Take machine to diagnostic test 4 and press ENTER, observe AC voltage reading on meter (25VAC max.)
4. Power down; remove hooks and place on other two pins. Repeat step 3.

The voltage reading should be approximately equal. If not, replace stepper driver chip. Part number M-S045212.



STEPPER DRIVER REPLACEMENT

In order to replace the stepper driver the main logic board must be removed from the unit. Remember, when working with an electronic component, it should be done from a static free work environment (including a wrist strap, rubber mat, and

grounded workstation). Martin Yale Industries, Inc. does not warrant work done to electronic components.

Follow steps below to replace stepper driver chip.

1. Remove main logic board from unit. Prepare board on bench.
2. Remove heat sink/extension clip from stepper driver, located in close proximity to connection JSTEP.
3. Carefully extract chip from board, by inserting removal instrument into slotted opening at corner of chip housing. Be careful to not damage housing.
4. Once removed, thoroughly wash hands, and unwrap new driver chip. Install into slot using the flat corner of chip to determine how it goes into housing. Make sure chip goes cleanly and fully into housing.
5. Once installed, do any necessary trimming of sil pad, remove backing, and place onto driver chip.
6. Replace heat sink and heat sink retainer using a flat head to secure the clip.
7. Reinstall the main board; be sure to reinstall the plastic spacers.
8. Reconnect all plug ins. Turn machine on, at this point the stepper motor should energize and home the machine.

By now, you should have a functional stepper motor. If further problems persist, contact Martin Yale Industries, Inc. at 260-563-0641 for further assistance.

Once the stepper motor (and its ability to home the burst roller) has been verified, we need to know that the tracking system of the unit is in order. In order to do this, we will be doing two things with one diagnostic test.

1. Verifying the AC motors ability to energize.
2. Verifying the encoder disc sensor board, and encoder wheel, are properly aligned.

In order to do this we must go to diagnostic test 9. Follow the steps below to perform.

1. Take machine to diagnostics (hold 'setup' down when turning on.)
2. Jog (up/down keys) to diagnostic 9 and press 'ENTER'.
3. At this point, there will be a prompt to test the encoder system, and instruction to press the 'RUN' key.

Once run is pressed all pertinent readings for the encoder system should be displayed, and the AC motor should be energized. If the AC motor energized shortly and then stops ('Motor Sensed Off' displayed). Suspect a bad connection at JENC or at encoder sensor board. If these two are OK, suspect slippage/loose set screw on encoder drive gear on non-operator side of unit.