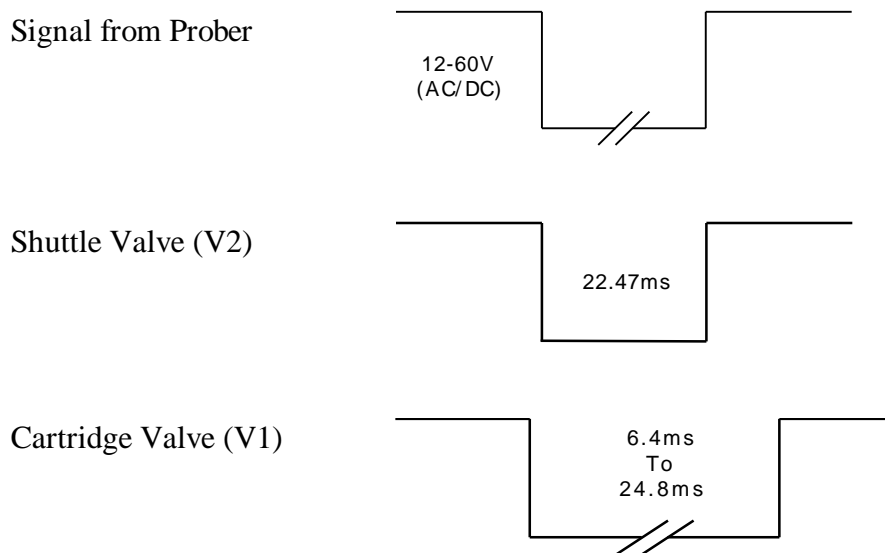


### Controller Maintenance and Diagnostics

#### Controller Sequence of Operation

To initiate an ink dot, the prober sends a 12-60 V (AC/DC unregulated) active-low signal to the Controller. After receipt of the signal, the microcontroller performs various checks of system status prior to firing the pneumatic valves.

Upon completion of the status checks, a 22.47ms pulse is sent to the Shuttle Valve (V2), while at the same time a 6.4-24.8ms pulse (depending on position of the Dot Size Thumbwheels) is sent to the Cartridge Valve (V1).



As the shuttle extends to the lower position, the air pulse from Valve 1 forces ink out of the cartridge barrel and forms a drop at the end of the needle tip. When the shuttle is at its lowest position, the drop makes contact with the wafer surface and forms a dot. The shuttle then returns to the normal position.

At the completion of each dot, a small amount of vacuum is developed in the cartridge by the closure of the valve, preventing dripping. If another dot sequence is not initiated within 10 seconds, a short “puff” pulse, equal to 1/2 the dot size duration (10-20ms) is sent to the cartridge to displace a small amount of ink back into the Teflon® tube. This function is an aid in maintaining proper dot size after a long delay between dots.

**Controller Diagnostics**

There are four internal diagnostic tests available for testing the Controller. To enter the Diagnostics mode, apply power to the Controller with the “RESET” button to the right of the thumbwheels depressed. All references to “mode switch” in the following tests refer to the top mode (toggle) switch. The bottom mode switch should be set to RUN during testing.

**A. Test Thumbwheels**

1. Place the mode switch on the front panel to SETUP, set the DOTS X1000 thumbwheels to 12345, then reset the LCD Counter.
2. Press the RESET button and verify that the counter increments 15 counts.
3. Place the toggle switch to RUN, set the thumbwheels to all 1’s, reset the LCD Counter, and press RESET. The counter should increment one count.
4. Repeat the procedure for the rest of the digits (2 through 9). With the thumbwheels set for 00000, the counter increments 10 counts.

**B. Test Cartridge Valve**

To test fire the Cartridge Valve 20 times:

1. Set the DOT SIZE thumbwheels to 02
2. Place the mode switch to DISABLE
3. Reset the LCD Counter
4. Press RESET.

The cartridge valve fires 20 times, each time incrementing the LCD Counter.

**C. Test Shuttle Valve**

To test fire the Shuttle Valve 20 times:

1. Set the DOT SIZE thumbwheels to 03
2. Place the mode switch to DISABLE
3. Reset the LCD Counter
4. Press RESET.

The shuttle valve fires 20 times, each time incrementing the LCD Counter.

**D. Test Pressure Valve**

To test fire the Pressure Valve 20 times:

1. Set the DOT SIZE thumbwheels to 09
2. Place the mode switch to DISABLE
3. Reset the LCD Counter
4. Press RESET.

The pressure valve fires 20 times, each time incrementing the LCD Counter.

**E. Life Test**

This test will continuously fire the Cartridge, Shuttle and Pressure valves for a predetermined number of cycles as set on the thumbwheels.

1. Set the DOT SIZE thumbwheels to 10
2. Place the mode switch to DISABLE
3. Set the DOTS X1000 thumbwheels for the desired number of cycles X1000 (i.e.: 250 Equals 250,000 cycles). If the thumbwheel count is zero, the valves cycle 6,553,600 times.
4. Reset the LCD Counter.
5. Press RESET.

The Controller begins continuous firing, incrementing the LCD Counter each cycle. To discontinue the Life Test prior to reaching the set amount, remove power.

**F. Alarm Test**

Pressing the reset button will toggle the state of the alarm signal. This signal controls the red STATUS LED and the LOUD audio alarm.

1. Set the DOT SIZE thumbwheels to 06
2. Place the mode switch to DISABLE
3. Press RESET to change the state of the alarm.

The alarm alternately is on and off.

**Controller Internal Maintenance****Controller Logic Board Removal**

**CAUTION:** Use appropriate ESD precautions when working inside of the Controller!

**With Power and Main Air removed:**

1. Remove the cover of the Controller.
2. Disconnect the *Molex connectors* from J2 through J7 on the **top** of the *controller logic board*.
3. Push back both locking devices on the card guides to unlock position, then lift the *logic board* from the mounting location.
4. Disconnect the *connector* from J1 on the face of the *logic board* and remove the board from the *controller*.
5. Place the *logic board* on an ESD protective surface or store in ESD protective anti-static bag.

Reverse this procedure for installation of *logic board*.

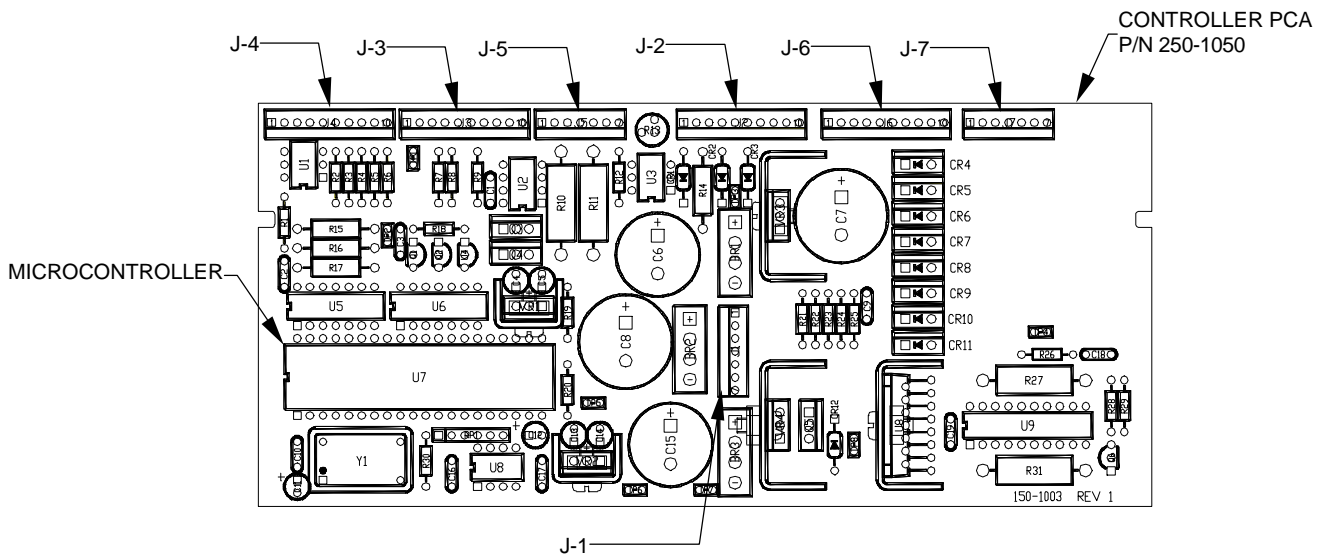
**Removal/Replacement of Microcontroller****With the Logic Board removed:**

1. Carefully remove the Motorola 6870R3 *microcontroller* from the socket (U7) using the appropriate IC Removal Tool or flat blade screwdriver.
2. *Use caution when removing the Microcontroller to prevent damage to the leads.*
3. Place the *microcontroller* on anti-static foam, then in ESD protective anti-static bag for storage.

**To re-install:**

1. Match pin one markings on *microcontroller* and *logic board*, line up component leads with socket (verify correct orientation of *microcontroller* and gently press to install, using caution to prevent bending or damage to the leads.
2. Visually inspect the socket and *microcontroller* to insure the integrity of the installation prior to re-installation of *logic board*.

3. After installing the *microcontroller*, re-install the *logic board* by reversing the procedure outlined in the “Controller Logic Board Removal” above.
4. Install the cover, apply power and main air, and test to verify operation. If problems are noted, review the installation of the *microcontroller* to insure none of the component leads are bent, and verify connection of J1 through J-7 connectors on the *logic board*.



### Adjusting Alarm Volume

*Note: The alarm is factory set to comply with SEMI S2 ergonomic standard (<80dB). Adjusting the volume louder than the factory setting will make the unit non compliant with SEMI S2.*

#### With Power and Main Air removed:

1. Remove the cover of the Controller.
2. Locate the alarm on/off jumper located next to the J7 connection. When the jumper is in place on both pins the alarm is on. When the jumper is removed, the alarm is off. Place the jumper over one pin only when disconnecting the alarm so the jumper is not lost.
3. The alarm volume is adjustable via the screw in the top of the pot. The Alarm Test diagnostic is useful here to turn on and off the alarm signal.

