

**Cardinal Circuit**  
**Refurbished**  
**MPM SCREEN PRINTERS**

**REFURBISHED EQUIPMENT PACKAGE**

**MODEL:** \_\_\_\_\_

**SERIAL #:** \_\_\_\_\_

**SOLD TO:** \_\_\_\_\_

**DATE:** \_\_\_\_\_

At Cardinal Circuit, all refurbished equipment is subject to strict testing procedures to ensure system performance and repeatability. All worn parts are replaced, and the machine is cleaned and painted. All parts are tested and verified for functionality. Voltages are then checked at the drivers and throughout the system. The machine is then completely calibrated. Special attention is given to the print head and the vision system calibrations. The system is then put through extensive burn-in and diagnostic tests.

### **BURN-IN:**

The machine is put through a burn-in test for 3-4 hours. The test moves all axis at an accelerated speed. This checks the integrity of the motors, drivers, and software limits. Voltages are then re-checked for signs of motor or driver deterioration.

### **DIAGNOSTICS:**

A diagnostic test is a special program separate from the machine software. This test is a fully automated data collection and analysis program. The first part of the test checks the vision system's ability to locate trained targets on the board and stencil. Each axis is then tested for backlash and repeatability. By examining the test results in raw data and graphical form, we can ensure the capability of the machine.

Prior to shipping, a minimum of 20 boards are run in print mode. Each board is inspected for paste height and repeatability. This final verification ensures the machine is ready for the production environment.

The six sigma theory of machine capability states that, in order for a machine or a process to have six sigma capability, the machine must be repeatable to twice the process specification limit. The capability index used to track this number is  $C_p$ . Therefore, in order for a machine or process to have six sigma capability it must have a  $C_p$  of 2 or greater. The goal of our stringent refurbish process is to provide used equipment with this capability to the electronics manufacturing community.

# QUALITY CHECKLIST

## VOLTAGES

1. 24 VDC
2. 12 VDC
3. 120 VAC
4. TV 1
5. TV 2

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**The following axis have been calibrated and inspected for functionality:**

1. X AXIS
2. Y AXIS
3. Z AXIS
4. THETA AXIS
5. VISION Y AXIS
6. VISION X AXIS
7. SQUEEGEE STROKE AXIS
8. SQUEEGEE UP/DOWN AXIS
9. STENCIL WIPER
10. DISPENSER

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**All axis passed burn-in and diagnostic tests.**

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**20 boards have been run and inspected.**

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Technician Name: \_\_\_\_\_

Technician Signature: \_\_\_\_\_

Technical Manager Signature: \_\_\_\_\_