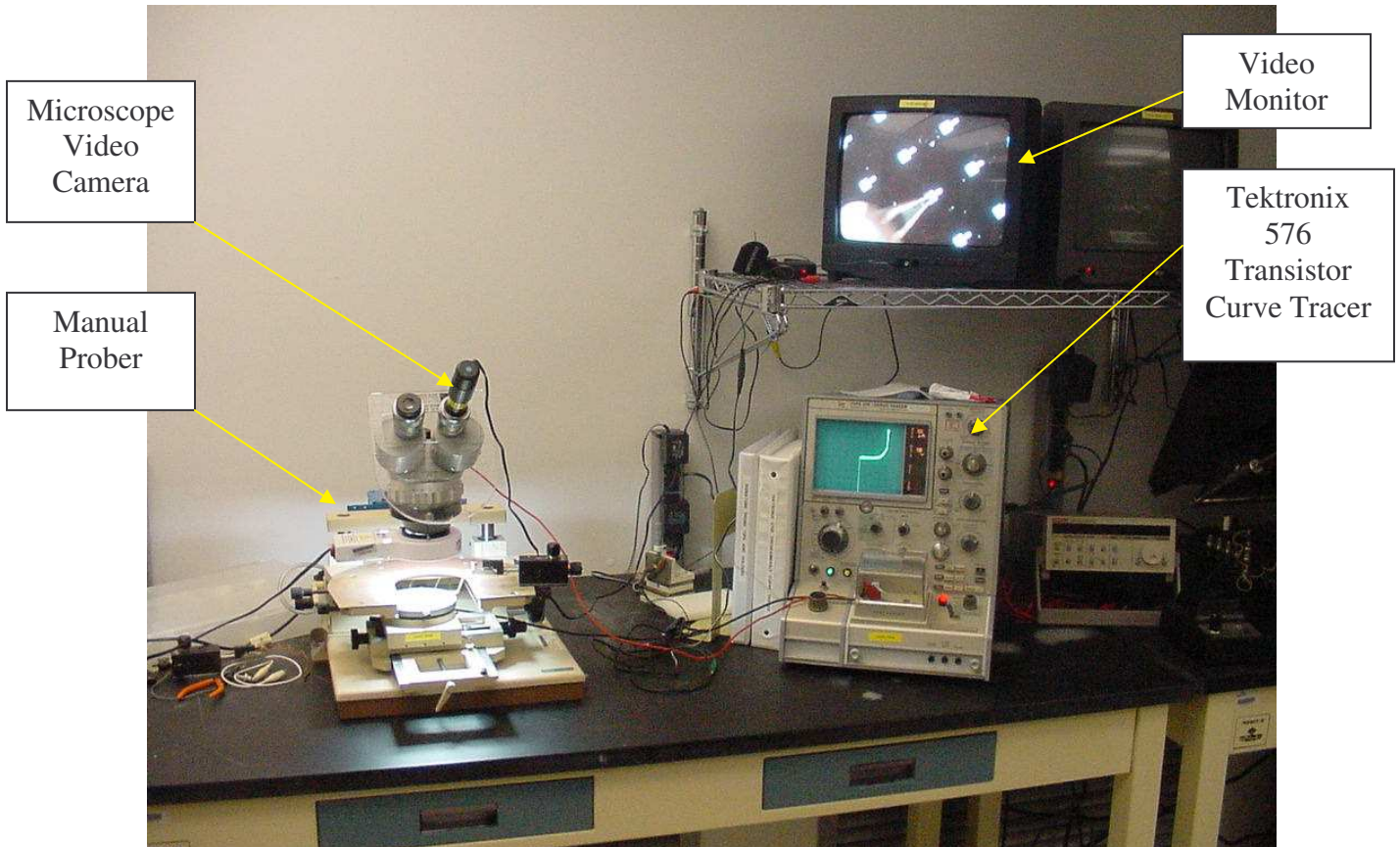


Procedure –P/N Junction DC measurement

Using manual probe station and Tektronix 576 transistor curve tracer

This procedure is for making DC (I vs. V) measurements on a silicon P/N junction fabricated on a silicon wafer or similar structure. This procedure uses a manual probe station, a video camera/monitor, and a Tektronix 576 transistor curve tracer.



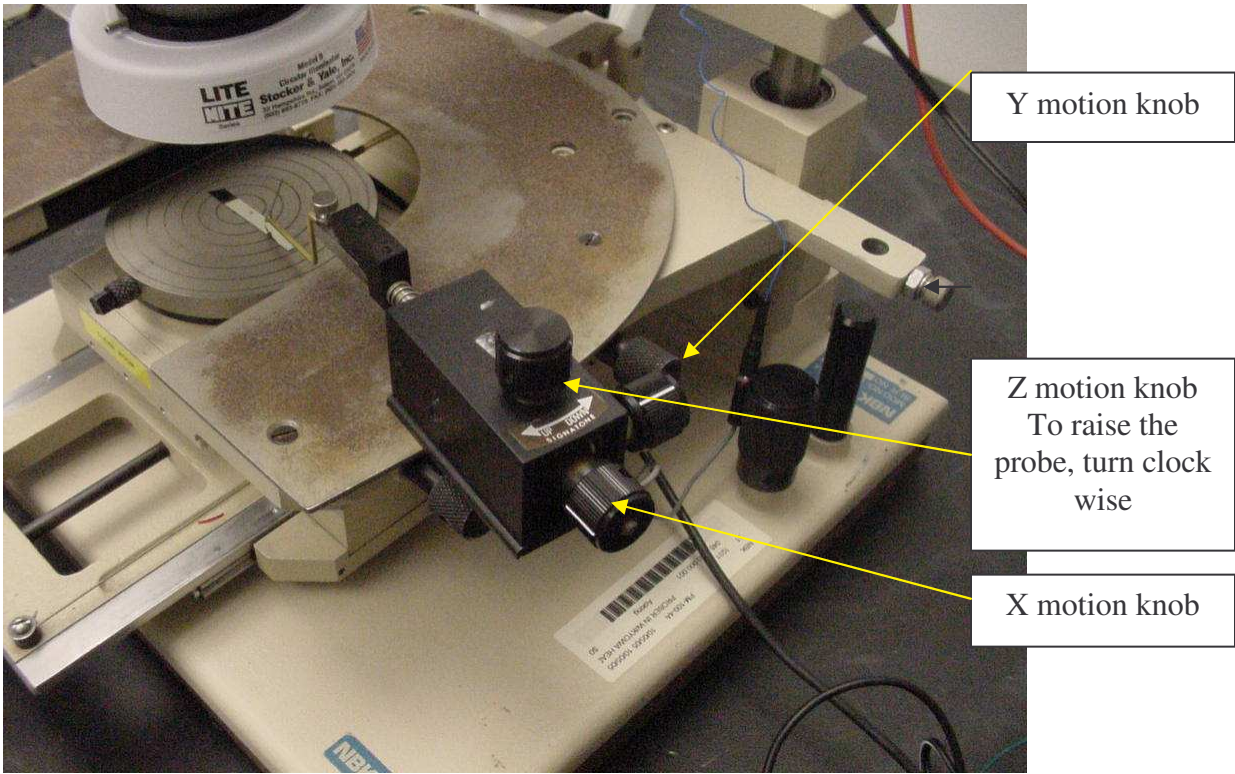
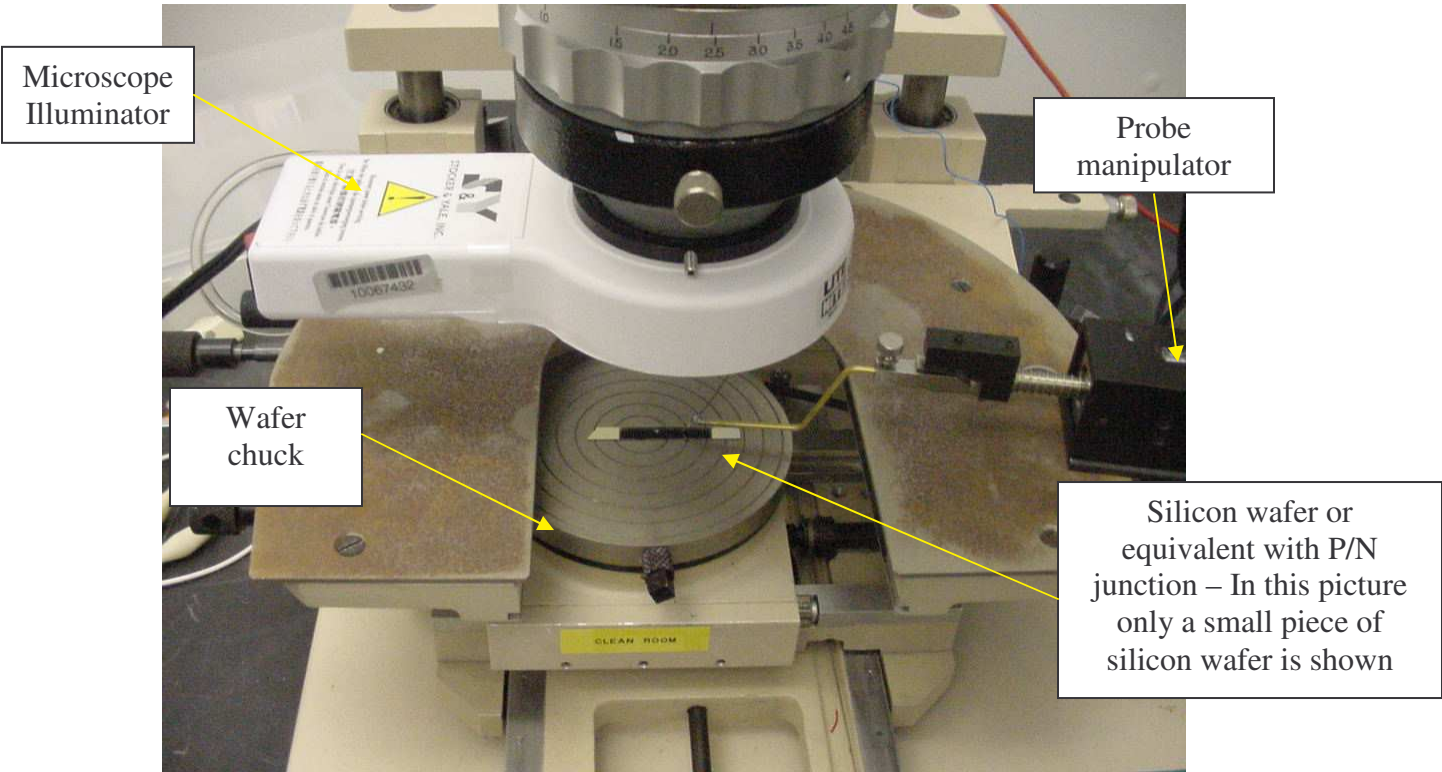
Overall view of DC probe station

For a basic P/N junction fabricated on a silicon wafer, the “N” region is the wafer itself. Electrical connection to the N region is made via the backside. The backside of the wafer contacts the wafer chuck and the wafer chuck is plugged into the collector socket of the transistor curve tracer. The P region is diffused into the silicon and covered with a silicon dioxide layer to protect the junction. A contact in the P region silicon dioxide is made and a metal contact pad, usually aluminum, is deposited and defined with photolithography. The electrical contact for the P region is made via this metal contact pad and a manually manipulated probe. The manual probe wire is then plugged into the base socket of the 576 transistor curve tracer. Measurements can be also be made with other measurement equipment.

A small vacuum pump is located behind the prober to hold down a complete wafer.

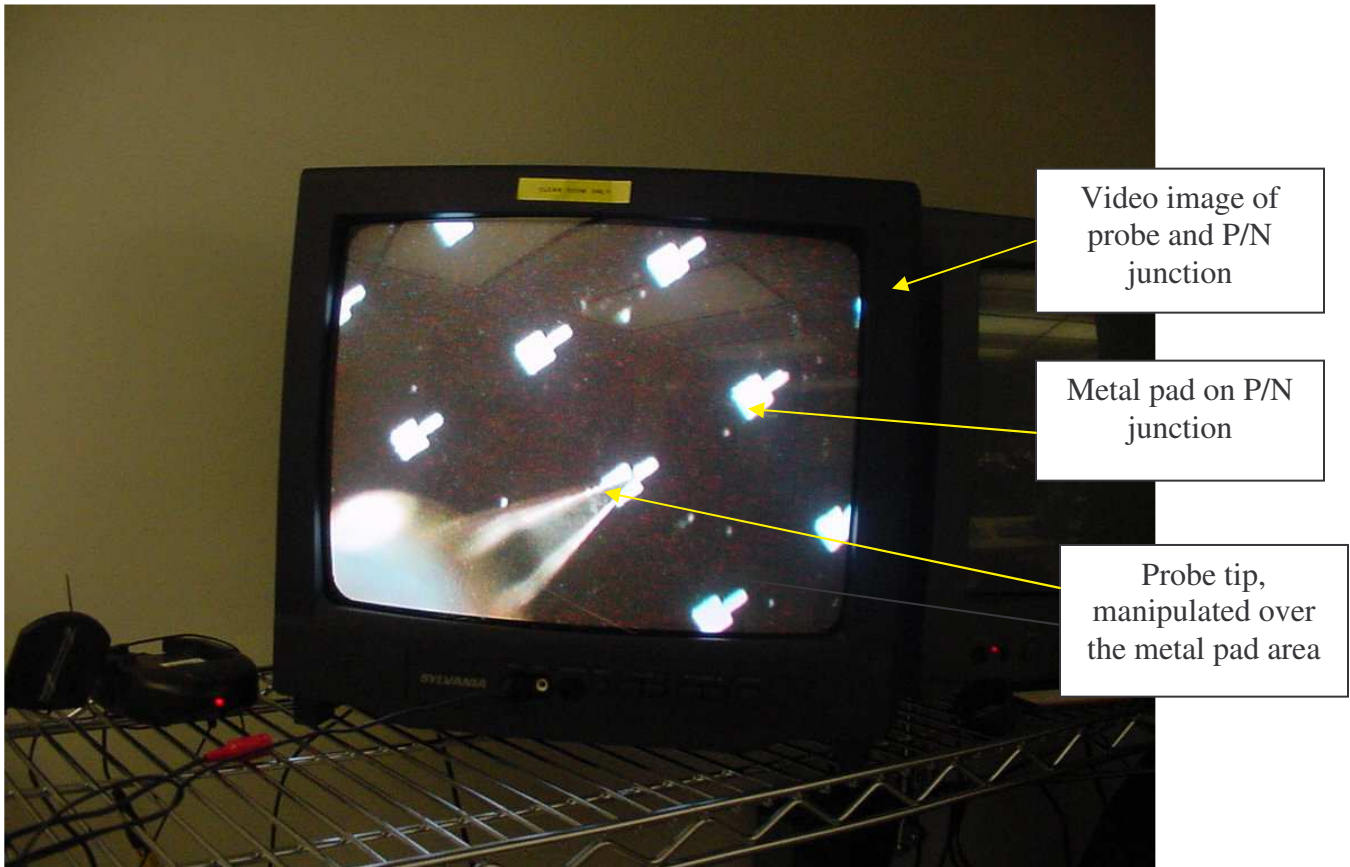
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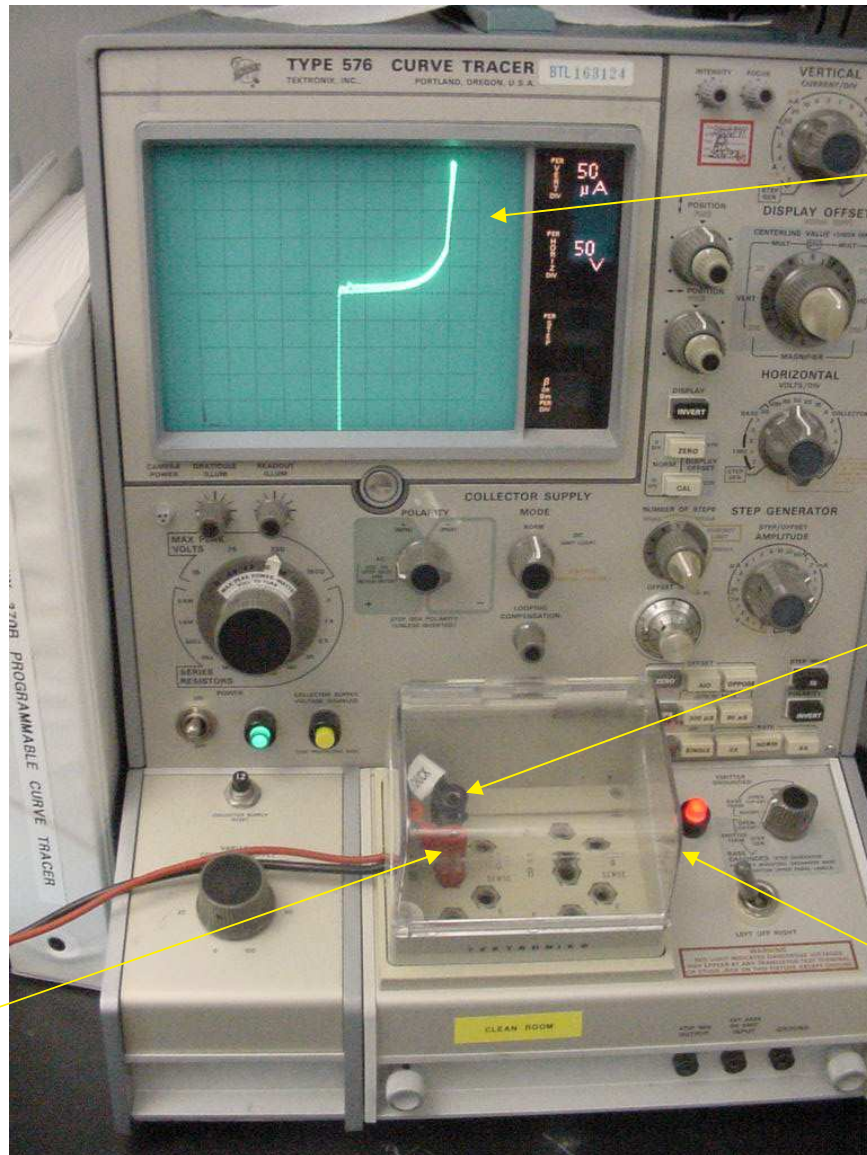


Video image of probe and metal pad covering P/N junction

The P/N junction metal pads are seen on the wafer and centered in the video image. The manual prober must also be centered in the video image. With a video image of both the metal pads and the probe tip visible, the probe tip is carefully placed over the metal pad using the X and Y controls of the probe manipulator. Then the Z motion of the manipulator lowers the probe on to the metal pad and a visual image of the junction characteristics can be seen on the curve tracer. After measurement, the Z motion is used to raise the probe. It can be moved to the next measurement point only if the probe is raised above the wafer to be measured.

Procedure –P/N Junction DC measurement

Using manual probe station and Tektronix 576 transistor curve tracer



P/N Junction
IV characteristics
BVcbo of about
200V at 100 uA

Wire from chuck
plugged into
collector socket

Wire from probe
manipulator
plugged into the
base socket

**For voltages over
15volts**
Safety cover must be
in place and the
red interlock lamp
activated

Tektronix 576 transistor curve tracer
Setup for P/N junction electrical measurement

Addition electrical measurements can be made such as leakage current at a set voltage, breakdown voltage at a set current, and forward voltage drop of the P/N junction. A similar setup can be used for a three terminal device such as a bipolar or MOSFET transistor. A second probe is necessary. If the three terminal device does not use the back side of the wafer as one of the terminals, a third probe will be necessary.