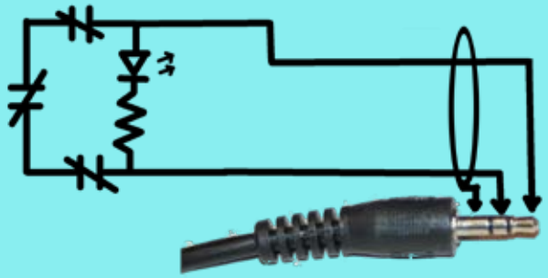
resistor will pull the signal voltage low when a breakout board pullup resistor is much larger than the probe resistor & LED.

The solution for this case is to reverse the wiring between the tip + and the - middle ring or open the probe and clip one lead on the resistor or LED (the probes LED will not be functional in this case but the signal will be seen in your controller). There may be other solutions, you can check with me or your controller manufacturer for wiring details to your specific controller.



To order probe or camera
Contact:
aminear@wyomingwireless.com

Machining Camera

Mach3 screen shot of a dime

For highly accurate positioning, this machining camera is hard to beat. Multiple tools in the Mach3 Video window allow accurate measuring and positioning. The angle slider can also measure the degrees of an angle. With centering adjustments that allow you to accurately align the crosshair center to spindle center, WHAT YOU SEE IS WHERE YOU ARE AT. This is a tool that will let you get more than close enough.

Touch Probe or

Tool Height Setting

This tool is both, an accurate 3 axis touch probe, or a tool height setting pad. It is easily converted from one use to the other in just a few seconds by simply swapping tips and adding or removing the screw-on arbor.

The basis of the design is around the proven concept of a 3 point kinematical support. This 3 point design is made up by a moveable contactor supported at 3 points. The contactor is held on the 3 point support by spring pressure. This arrangement holds the contactor in a precise 3 axis position until a force is applied to it. Once the force is removed it returns back to the exact original position. The force to move it can be in any combination of the three axes. Once the contactor moves from its rest position the contacts open signaling the control system that a touch has occurred.

The probe body is made from 3 pieces of aluminum. It is composed of the top cap, shell & bottom cap; these are threaded and screw together.

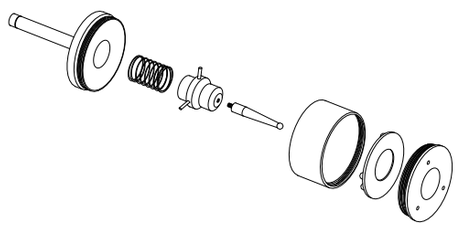
The movable contactor is made from a hard polyester resin plastic with 3 brass rods. Three brass rods are molded into the plastic and extend out from the plastic piece 120 deg from each other. This plastic piece is designed to be the weakest link in the system. If a crash should occur it should tear the probe tip from the plastic piece, which is easy to replace.

The rods rest on three pairs of balls. The contact of the brass rods to the balls forms the switches. These switches are arranged in a series circuit so whenever any one or more or the switches open, the controller is signaled that touch has been made. A circuit board holds the balls in a fixed position and completes the series circuit between the switches.

This particular tool design has several unique features. The first one, already described, is the ability to use it as a touch probe or a tool height setting pad.

Another feature I have designed is the probe is fully adjustable for centering the probe tip. This is accomplished thru the mounting of the circuit board to the probe with flexible RTV and supported by 3 setscrews. The set screws are adjusted just slightly to tilt the plane of the circuit board thus centering the probe tip. When using the tool height setting pad, the same adjusting screws will allow accurate leveling of the pad.

The electrical grid is made from a blank pc board with balls soldered on it. The balls are soldered on it to ensure a positive electrical contact, thus eliminating erroneous false triggers caused by poor ball to circuit board contact.



The shaft is a hardened steel shaft screwed into the top cap. This is removable to convert it to a tool height setting pad.

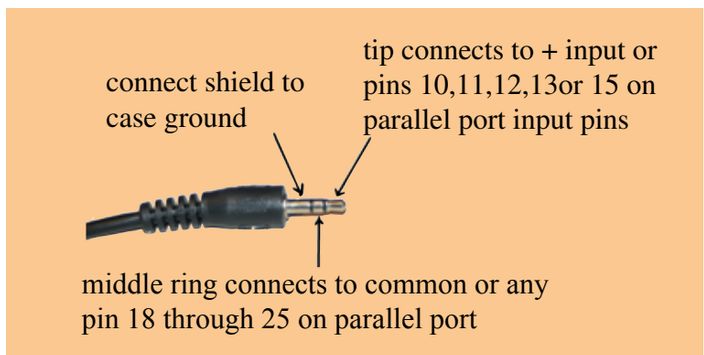
One other feature I included is an indicating LED. It lights up when the probe makes contact in any of the 3 axis. The LED gets its power from the parallel port or breakout board. Electrically the power from the port is applied across the contacts that are normally closed, when the probe touches an object the contacts open and allow the power to light up the LED while also signaling the controller that a touch has occurred. The connector is a standard mini-stereo plug, a matching jack can be purchased for $2 or 3 at Radio Shack.

When calibrating be careful to not adjust the screws in too far, this could cause the circuit board to separate from the RTV holding it. If this happens it will be necessary to disassemble it and re-attach it using RTV after cleaning off the old RTV.

To align it I have been using an indicator mounted to the table indicating on the ball tip with the probe mounted in the spindle, then rotate the spindle by hand and adjust the set screws until the run out on the ball tip is 0.0005 or less. It is best to back off all three set screws and then tighten them up until you just start to feel them touch against the circuit board. Have your dial indicator mounted and touching when doing this. Then adjust the appropriate set screws to center the alignment.

It is very easy to disassemble and repair, in case you have a crash. Just unscrew the top. I put it in a vice holding onto the probe tip to keep it from turning and hold the body in one hand to also keep that from turning. Then with the other hand unscrew the top cap from the body.

My testing results show excellent repeatability in all axis. Centering of the stylus works well and it eliminates the need to apply offsets in the software.



If your breakout board has a very large pull up resistor the probe will not work correctly wired this way, the LED on the probe will work but the signal will not be seen at the input. This is because the LED and .....Continued on back.....