Phototrack Manual Quad Setup Procedure

The Settings "Quadrant Order " (set using the LK F command) and "Cal Value" (also referred to as Gain , set using the LR X command) are critical to the proper functioning of the system.

There is an Auto Calibration routine in the controller that will move the stage and figure out the values necessary for Quadrant Order and Cal Value. However if the routine fails, use this manual on how to determine these settings manually with trial and error.

Quadrant Order thru Trial and Error

Quadrant Order is used by the controller to interpret the error seen by the Quad Photo Multiplier Tube(QPMT or PMT) and the direction it needs to move to correct it. Say if the PMT registers the sample has moved from the center to upper right quadrant of the PMT , what direction should the controller move (positive x , positive y , negative x, negative y direction) to bring the sample back to center.

When the system has the correct Quadrant Order , in Ready state, when stage is moved in Positive X direction , you will see PMT have a negative Xerror. (Displayed on the bottom line of the LCD), Then when you move in positive Y direction , PMT will see a negative Yerror. If not the Quadrant Order needs to be corrected.

If moving the sample in one direction causes both Xerror and Yerror to change , then PMT is not Rectilinear with respect to the stage , turn the PMT by 45 degrees or adjust it until you only see either Xerror or Yerror change.
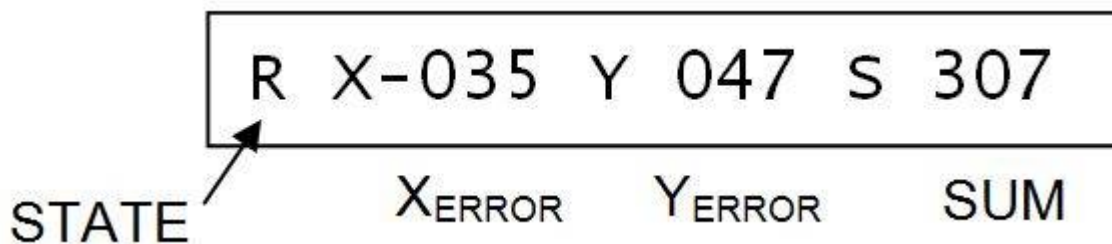

Figure 1: Bottom line of MS2000 controller's LCD. If you don't see this line , then Set Dip switch 2 in UP position.

There are 8 possible Quadrant Order 78, 57, 147, 228, 27, 198, 177 and 108. 78 is the default. A new Quadrant Order is set with the "LK F" command , a system restart is needed for the new setting to take effect, so save setting using "SS Z" command and reset the controller.

1. Find an isolated, stationary fluorescent sample. Center the Field of View on it.
2. Pick a Quadrant Order value , set it with the LK F command , issue SS Z command. Then restart the controller.
3. Quadrant Balance the PMT ie close the IRIS , put the controller in IDLE state, then MONITOR state , open the IRIS , go to BALANCE state, then to ready state.
4. Xerror and Yerror will be zeros, move the sample in positive X , do you see a negative Xerror? Move the sample in positive Y , do you see a negative Yerror ?If not then go back to step #2 , pick another Quadrant Order value and repeat.
5. When moving in +X direction causes negative Xerror , and +Ydirection causes negative Yerror

you have then found the correct Quadrant Order.

Final check is when you lock onto a sample , if the stage doesn't run away or move in spirals your quadrant order is correct.

Unless the PMT is rotated , moved to a different photo port, additional optics mirrors are introduced, Quadrant Order will remain the same.

Cal Value thru Trial and Error

Cal Value or gain is the servo gain factor. Too high a value will result in nervous jerky tracking operation, too low a value will result in sluggish tracking and lost targets.

Default value is "10" , here is how to test and see if it's good enough.

1. Find an isolated, stationary fluorescent specimen. Center the Field of View on it.
2. Get to ready mode
3. Lock onto it by pressing the joystick button, then zero the location.
4. Unlock it by pressing the joystick button again.
5. Move off the specimen until its at the edge of your field of view.
6. Press the joystick button to lock again.
7. You should see the controller , move the specimen back to center of field of view quickly and hold it there with little buzzing.
8. If the controller was too sluggish to bring the sample back to center , or it didn't correct enough, Cal value might be too low. Increase it using the LR X command. Then go back to step #2 and repeat until you are satisfied with the tracking performance.
9. If the controller keep constantly correcting the stage even if the specimen is in the center, then the Cal Value might be too high. Decrease it using the LR X command. Then go back to step #2 and repeat until your satisfied with the tracking performance.
10. If the stage runs away or moves in spirals then Quadrant order may be incorrect.

tech note, phototrack

From:
https://asiimaging.com/docs/ - **Applied Scientific Instrumentation**

Permanent link:
https://asiimaging.com/docs/phototrack_quad_setup_procedure

Last update: **2021/09/23 17:15**