

## Calibrating the Photomultiplier Tube (PMT)

The photomultiplier tube (PMT) requires calibration after replacing power supplies, any printed circuit boards, the PMT itself, or after a firmware upgrade.

If the PMT is not calibrated, the W2420 generates a warning message when:

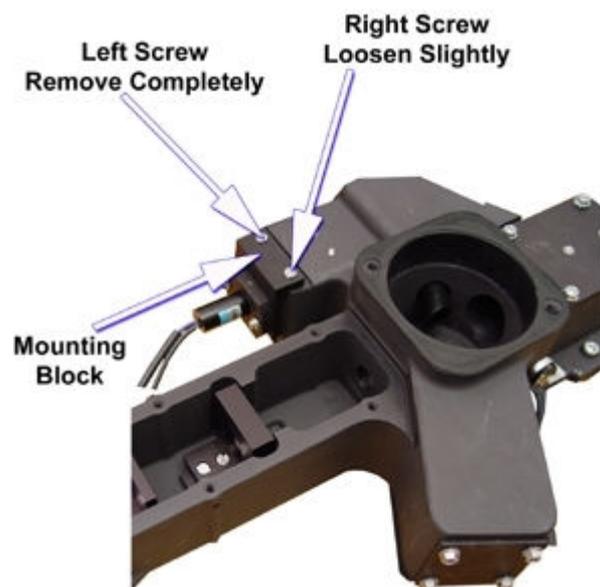
- the W2420 enters its IDLE state
- the W2420 starts to acquire data

### Tools/Materials Required:

- Slotted screwdriver

### Procedure:

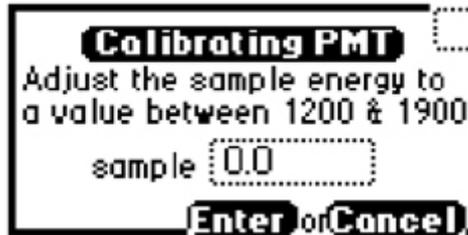
1. Enter the Diagnostics mode.
2. Select 8 or scroll down to Service, then press **Enter**.
3. Enter the password, **1147**.
4. From the Service diagnostics menu, select 2 or Calibrate PMT.
5. Loosen the right screw slightly, and remove the left screw completely on the PMT mounting block to expose the PMT to some light.



*PMT Mounting Block*

6. In the Calibrating PMT screen, adjust the value between a value of 1200 and 1900, steady-state by slightly moving the PMT mounting block.

**NOTE:** If the value is peaking out at its maximum of 2.0, or fluctuating too much, cover the screw holes referred to in step 5 with a white piece of paper.

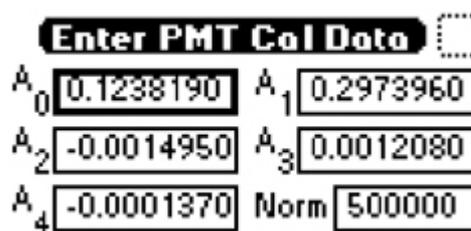


Calibrating PMT Screen

7. Once the value appears to be fairly stable, and while still firmly holding the PMT mounting block in position, press Enter. The screen will read, Calibrating.

**NOTE:** If the mounting block is moved during the calibration you will get an error message at the end of the calibration that reads PMT calibration failed. Light level unstable (> 5% drift). If an error message occurs, cycle the power on the detector.

8. If the calibration is successful, the Ro value will be 0.999. If so, push the PMT mounting block firmly to the optics chassis while re-fastening the mounting block screws. If not, redo the calibration.
9. Access the Detailed calibration data screen from the Service Diagnostics menu and copy all the values.
10. Record the values on a label and stick it over the existing label on the optics bench.



Enter PMT Cal Data Screen

11. Perform the Normalization service diagnostic.

**NOTE:** If the PMT has already been calibrated, and this procedure is taking place as a result of a firmware upgrade that erases the NVRam, then the coefficients can be entered manually using the service diagnostic, Enter PMT Cal Data.

12. Recycle the power on the detector.