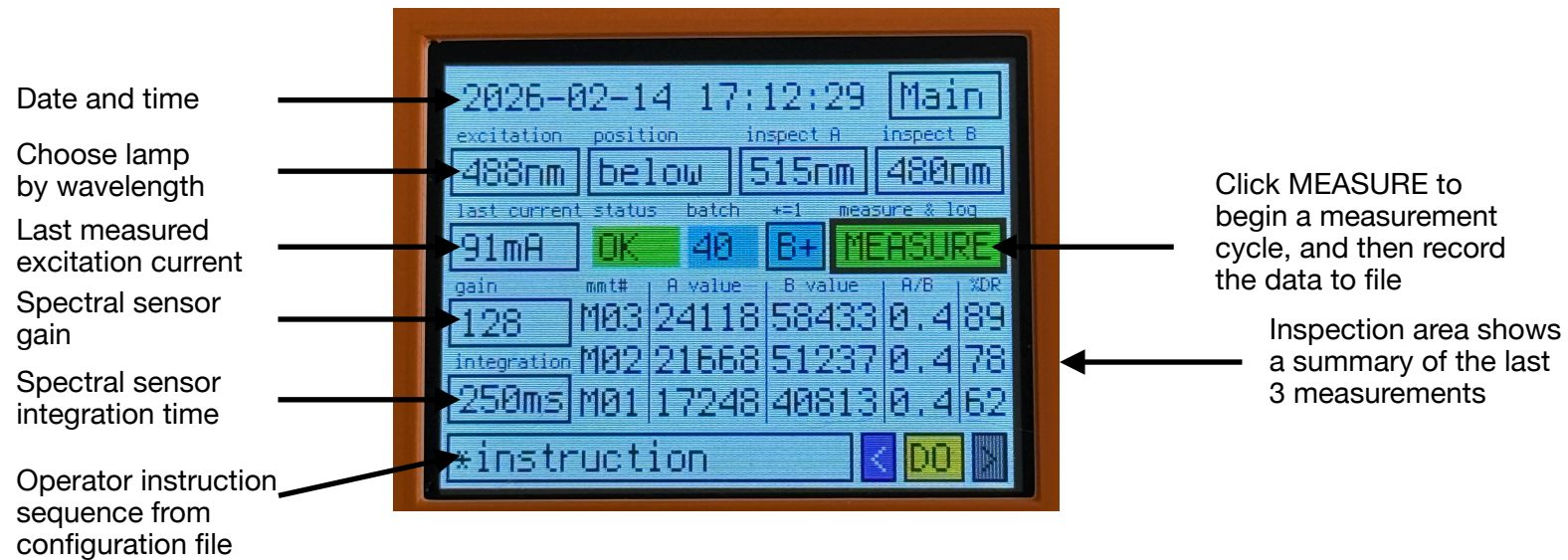


# STELLA Lab Spec Plugin: Interface and measurement cycle



## Measurement Cycle:

1. Begin with excitation lamp off
2. Read the transistor base current
3. Make a spectral measurement
4. Read the transistor base current
5. Turn the lamp on
6. Wait 0.5s for lamp to come fully on
7. Read the transistor emitter current
8. Make a spectral measurement
9. Read the transistor emitter current
10. Turn the lamp off
11. Wait 0.5s between measurements
12. Repeat 5 through 11 two more times

## Onboard data reduction per measurement cycle:

1. Average the current values before and after each measurement.
2. Average the three current values for the measurements made with the lamp on
3. Subtract the base current average from the emitter current average to get the lamp current.
4. Average the spectral data in each of the eight optical bands for the measurements made with the lamp on
5. Subtract the spectral data from the dark measurement from the light average
6. For each of the eight bands, calculate the figure of merit:

$$FM = \text{counts} / \text{channel bandwidth} / \text{gain} / \text{integration time} / \text{lamp current}.$$

$$FM \text{ units} = \text{counts/nm/s/A}$$

7. For each band, calculate the usage of the dynamic range of the sensor.

$$DR\% = 100 * \text{raw counts} / 2^{16}$$

8. Record the data to the SD card