Force Feedback Motor / GUI Capabilities

Force Requirements:

- **Pull Force Range**: 0N to 5N
- **Force Increment Setting**: 0.25N increments

LCD Outputs/Inputs:

- **Real-time Displays**:
    + Pull force (always displayed)
    + End effector location (always displayed)
- **User Inputs**:
    + "Forward/Backward" arrows for manual motor actuation
    + "Target Location" input for setting target end effector location
    + "Target Pull Force" input for setting target pull force
    + "Preset Locations" input for saving up to 10 frequently used locations
        - Example: to load the DUT band into the end effector, the user may need to move the end effector forward to, say, location 10mm. They will need to do this repeatedly throughout testing as they swap to different DUTs. The ability to save a few preset locations at the start of their testing session will add convenience and repeatability.
    + "Preset Pull Force" input for saving up to 10 frequently used force values

Control Modes (w/ Examples):

Control Mode 1: Target Pull Force Control

1. Connect the DUT band to the end effector on the stepper motor lead screw
2. Input a target pull force and start the process
3. The stepper motor will actuate the end effector forward/backward to reach and maintain the target pull force

Control Mode 2: Manual Stepper Motor Control

1. Manually control the stepper motor using the "forward/backward" arrows
2. Alternatively, control the motor by inputting a target location

Control Mode 3: Position-Based Control with Force Limiting

1. Input a target position for the end effector
2. Set a maximum allowed pull force

3. The stepper motor will move the end effector to the target position while limiting the pull force to the set maximum value