Message Handling Flow

State	Action	Action Complete	UART/CAN Message Recived	Set Position Message	Report Position Message	Config Update Message	PID update Message	External Force Detected
Start	Init System Go to HOME MOTOR		x	x	x	x	x	x
HOME MOTOR	Rotate Motor in Anticlockwise driection untill endstop pressed, set refernce angle, set position to default position	PID loop	x	x	x	x	x	x
PID loop	Run PID loop based on set position	x	Go to Message Interpret	x	x	x	x	External force Reporter
Message Interpret	Determine type of message	x	x	Set Position	Report Position	Update Config	Update PID vals	External force Reporter
Set Position	Update set position	Send Acknowledgement	x	x	x	x	x	External force Reporter
Report Position	Construct and send Position message out	PID loop	x	x	x	x	x	External force Reporter
Update Config	Update config values	Send Acknowledgement	x	x	x	x	x	External force Reporter
Update PID Vals	Update PID Vals	Send Acknowledgement	x	x	x	x	x	External force Reporter
Send acknowledgement	Send Acknowldegement of recieved command	PID loop	x	x	x	x	x	External force Reporter
External force Reporter	Construct and send external force message out	PID loop	x	x	x	x	x	x

PID loop Flow

State	Action	Action Complete	Limit Switch
Determine Position	Read Encoder	Determine Error	Out of bounds
Determine Error	Calculate Error	Determine Externa Force	Out of bounds
Determine if external force	Determine if external force is acting on system	LED Update	Out of bounds
LED update	Based on error value recalculate and update LED PWM signals	Determine Controller Output	Out of bounds
Determine Controller Output	Calculate controller output based on PID algorium and Error signal	Update Step rate	Out of bounds
Update Step rate	Update new steprate	Determine Position	Out of bounds
Out of bounds	Turn off motor, wait 2 seconds, reset reference angle	Determine Position	x