Hackerboat Arduino State Description

# Start

|  |  |
| --- | --- |
| **System** | **State** |
| Indicator Lights | Solid Amber |
| Motor | Off |
| Steering | Off |

This state is the state that the Arduino enters upon power-up. It transitions to Self-Test after initializing all peripherals.

# Self-Test

|  |  |
| --- | --- |
| **System** | **State** |
| Indicator Lights | Flashing Amber |
| Motor | Off |
| Steering | On |

In this state, the Arduino runs a self-test on its internal systems and determines whether it is suitable for operation. The tests are as follows:

1. Check battery voltage is above 12V
2. Check that the compass is providing a valid, stable output
3. Check that the accelerometer is indicating that the boat is upright and close to level
4. Check that the gyro is indicating that the boat has sufficiently low rates
5. Check that the beaglebone is transmitting

If the test is successful, the Arduino transitions into the Disarmed state. Otherwise, it transitions into the Fault state.

# Disarmed

|  |  |
| --- | --- |
| **System** | **State** |
| Indicator Lights | Flashing Blue |
| Motor | Off |
| Steering | Off |

This is the wait state with the physical enable switch in the ‘off’ position. Turning off the enable switches returns the control system to this state. Turning the enable switches on transitions to the Halt state.

# Halt

|  |  |
| --- | --- |
| **System** | **State** |
| Indicator Lights | Solid Blue |
| Motor | Off |
| Steering | On |

This is the armed wait state. The Arduino will transition to the Steering state upon command from the Beaglebone. If the physical enable switch is turned off, it will return to the Disarmed state.

# Steering

|  |  |
| --- | --- |
| **System** | **State** |
| Indicator Lights | Solid Green |
| Motor | On |
| Steering | On |

This is the normal operational mode of the system. In this state, it accepts course and throttle commands from the Beaglebone. It also monitors the battery voltage and the presence of signal from the Beaglebone as well as the motor current, charge current, and main battery current.

# Low Battery

|  |  |
| --- | --- |
| **System** | **State** |
| Indicator Lights | Flashing Yellow |
| Motor | Off |
| Steering | Off |

When the battery voltage drops below the lower threshold, the Arduino enters this state. It turns off the propulsion system but leaves the radio on. When the battery voltage rises above the upper threshold, it returns to its previous state.

# Fault

|  |  |
| --- | --- |
| **System** | **State** |
| Indicator Lights | Solid Red |
| Motor | Off |
| Steering | Off |

If any part of the initial test fails, the Arduino enters this state. It will leave this state if the Beaglebone commands it to repeats its startup test.

# Panic

|  |  |
| --- | --- |
| **System** | **State** |
| Indicator Lights | Flashing Red |
| Motor | On |
| Steering | On |

If the Arduino loses connection with the Beaglebone, it enters this state. It will then steer a pre-determined course and speed until the Beaglebone returns or it is deactivated by turning the physical enable switch off.