



CRAZY QUAIL TARGET SYSTEMS

Mini & Quad User Guide

2018



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The Mini

The Crazy Quail *Mini* is an automated clay target throwing machine. The *Mini* is equipped with three 12v DC brushless motors powered by dual h bridge drivers with braking control making it capable of rotating 360°, rolling between -30° and +30°, and having a pitch/elevate range between 40° and 60°. The *Mini* runs off of a 12v deep cycle marine battery which can provide up to 6-8 hours of run time on a single charge.

Communication from your mobile device to the machine is done in a 2-step process. First, your mobile device will connect to the *Gateway* via Bluetooth LE (Low Energy). The *Gateway* will then communicate with your machine by passing the messages it receives from the mobile device to the *Mini*. The same process applies to the machine relaying messages to the mobile device.



The Quad

The Crazy Quail *Quad* is an automated clay target throwing machine. The *Quad* is equipped with four MEC throwers on a rotating platform. The *Quad* runs off of three 12v deep cycle marine battery which can provide up to 6-8 hours of run time on a single charge.

Communication to the machine is accomplished through the Crazy Quail Gateway. The *Gateway* will communicate with your machine through button presses on the Gateway face. When you initially power up the *Quad*, it may take up to 10 seconds for the first communication between the gateway and the machine to go through. After this, communication will be seamless and nearly instantaneous. This 10 second delay will only occur after the machine and gateway have both been powered off.



The Gateway

The Crazy Quail *Gateway* is what facilitates the communication between your mobile device and the *Mini*. The *Gateway* is also the main controller for the *Quad*. Tap the **Power** button once to power up the *Gateway* and hold the **Power** button for 3-5 seconds to turn off the *Gateway*. Once your *Gateway* turns to a constantly flashing blue, you are ready to connect!

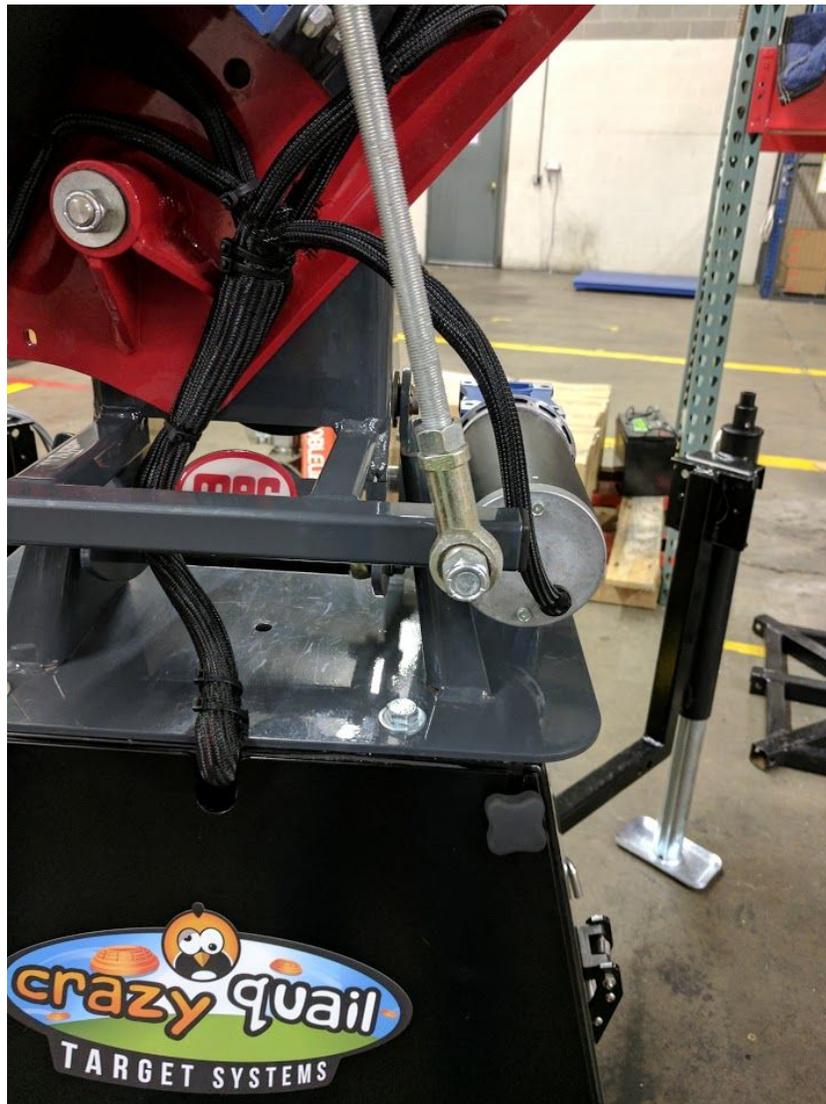
For the Mini - Using the mobile app, your mobile device will connect to the *Gateway* via Bluetooth and your *Gateway* will handle relaying those messages to your machine via 900MHz RF. Bluetooth has a very short range, less than 50 ft. usually, so by utilizing the 900MHz RF we are able to extend your communication range up to 2.5 miles! (Line of sight). Just keep the *Gateway* close to your mobile device and communication range issues are a thing of the past. Once the app, *Gateway*, and *Mini* are all connected you can also control basic features of the *Mini* using the buttons on the *Gateway*. Tapping the **Move** button once will start running the rotate, roll, and tilt motors of your *Mini* at 30% speed, tap it a second time to run these 3 motors at 60% speed, tap once more to run these motors at 100% speed, and finally tapping it a fourth time will stop the motors. Tapping **Throw** will arm your *Mini*, or throw a target if the *Mini* is already armed. Tapping **Stop** will stop all movements and throwing of the *Mini*.

For the Quad - The *Gateway* is your main controller for the *Quad*, no mobile app is needed. Simply turn on your *Quad*, then turn on your *Gateway*, and you can begin running! The "Rotate" or "Run" button on the *Quad Gateway* will start or stop rotating the machine. The 4 numbered buttons correspond to each of the 4 throwers. Just tap the number of the thrower you would like to throw! (Just make sure you manually armed the MEC throwers at the beginning)

Getting Started

Unpacking Your Machine

1. Unstrap your Machine and remove from the palette.
2. Spread out the 4 jacks so that the Mini has a wide stable base.
3. Level the Mini to the best of your ability by raising and lowering the jacks with the provided socket.
4. Remove the side panel that has the wires going into the top of it.
5. Carefully remove any padding/paper that was used to cushion the brain box during transport. **Note*** Later models may not contain any padding inside the base.
 - a. Wires may be short so the brain may not be able to move much. Be gentle when removing this padding.
6. The tilt swing arm may have been disconnected for transport. Connect the swing arm as shown in the image below.



Setting Up Your Machine

Mini Setup

1. Make sure the E-Stop switch is pressed in (off position) and then plug in the battery.



2. Make sure no wires are hanging in the center of the machine. Loose wires can easily get caught in the center pulley. All loose wires must be secured to the housing.
3. Replace the side panel(s) to seal up your Mini.
4. Remove the rotation lock arm that is connecting the Mini base to the bottom frame.
5. Power up your Mini by twisting the E-Stop switch 90° clockwise and then releasing it. The LED puck will begin to light up. As soon as this light turns blue, the Mini is ready to run!
6. Power up the Gateway. The Gateway will flash several colors while it is powering up. At the end of powering up the Gateway will flash green/white. The level of green displayed is the battery level of the Gateway. (You can also view the battery level in the app). Once the Gateway turns to steady blue, you are ready to connect.
7. Connect your mobile device to the Gateway with the app. The gateway will go from blue to green when it is connected to your phone.
 - a. **Android** - Using the blue Auto-Setup button is the easiest solution. With you Gateway and Mini powered on, this feature will connect everything for you! You can also connect to just your Gateway by tapping the green Manual Setup button, and then selecting your Gateway once it pops up.
 - b. **iOS** - Tap the Green search button locate your Gateway. When found, tap the Gateway you would like to connect to.
8. Connect your Minis.
 - a. **Android** - As mentioned in the previous step, the Auto-Setup button will connect your Gateway and Mini(s) for you. This is the recommended method. If using Manual Setup, after you connect

to the Gateway, you can manually find your Mini(s) by going to the “Find Machines” screen. This screen will automatically find and connect to your machines. Your Mini(s) will be displayed once they are located and connected to.

- b. **iOS** - Connect the gateway to your Mini by using the “Machines” screen. Once located, your Mini will display on this screen. Press the circular checkbox to target this Mini.
 - i. **IMPORTANT!** You MUST select this checkbox to target your Mini. Your gateway will not communicate with your Mini unless this checkbox has been selected.

9. Calibrate your Mini by pressing the “Calibrate” button on the status screen.

- a. **IMPORTANT!** Calibrate your Mini every time you move it to a new location.
- b. **IMPORTANT!** Calibrate your Mini WITH AN EMPTY CAROUSEL.
- c. **IMPORTANT!** LED will return to blue or green as soon as calibration has completed.

10. For optimal communication:

- a. Make sure the antenna at the top of the machine is standing up.
- b. Keep the gateway 4ft - 6ft. Above the ground with the antenna standing straight up.

Quad Setup

11. Connect XT-90 plugs for all 4 throwers.
12. Adjust throwers to lean at the desired angles. (Make sure the arms are not going to hit the center brain box, or each other)
13. Make sure the E-Stop switch is pressed in (off position) and then plug in the motor and battery into the bottom of the brain box..
14. Make sure to remove the large rotation lock pin. This pin will be located right next to one of your throwers.
15. Power up the machine by releasing all of the E-Stop switches.
 - a. **IMPORTANT!** It is recommended to power up the Quad before the Gateway as the Gateway will automatically establish and configure the communication to the Quad at its startup. The Quad needs to be powered on so that the gateway can effectively do this. If you do not do this, then the first command(s) the gateway sends to the Quad may not go through. You may then also have to wait up to 15 seconds before the communication between the Gateway and Quad is fully set up.
16. Arm each of the throwers by clicking the grey toggle switch on the thrower to “Arm”.
17. Power up the Gateway.
18. The Gateway will begin to light up white as it is starting up. At the end of its startup routine, the Gateway will then begin to turn blue. Once the gateway has fully turned blue, you may begin controlling your machine.

Basic Operation Recommendations

IMPORTANT! These recommendations can be quite crucial to the successful operation and sustainability of your machine. Please follow these recommendations every time you operate your *Mini*.

Calibration Recommendations

- a. Make sure the machine is as level as possible before calibration and during operation.
- b. Calibrate machine every time you move the machine.
- c. Calibrate the machine WITHOUT any clays in the carousel.
- d. Reset the alignment from the “Tap to Throw” screen every time you startup the machine.

Communication Recommendations

- a. Make sure the antenna on the machine (top of the carousel) is facing up.
- b. Make sure the gateway is (*Minimum*) 3ft off of the ground.
 - For best performance and distance, place gateway 4ft to 6ft above the ground.
- c. Make sure gateway and machine are always within line of sight of each other.

Mechanical Recommendations

- a. Make sure the jack stands are fully extended out with locking pins in place.
- b. Make sure the machine is as level as possible.
- c. Use the provided black deep socket to adjust the spring tension..

Travel Recommendations

- a. Put the machine in travel mode by pressing the Travel Mode button on the Status screen.
- b. Double check that the machine is not armed before moving it anywhere.
- c. Remove the main battery from the machine during transportation.

Safety Recommendations

- a. These machines can be very dangerous. Treat it as so.
- b. If the LED is at all red, the machine is armed. Unless the machine is in Shutdown Mode (See LED chart below)
- c. Reset the alignment from the “Tap to Throw” screen every time you startup the machine.
- d. Make sure you're never throwing a target when you're very close to the machine.
- e. Make sure you can see the arm when you're walking up to it. If you can see the arm, then it is not armed and safe for approaching. If you cannot see the arm, press the nudge button in the app until the arm is released.
- f. Make sure all lock pins are always in place for the jack stands.

The Crazy Quail Gateway

Powering On/Off

1. Power On - Tap the power button to turn on the gateway.
2. Power Off - Hold the power button for 3-5 seconds, or until all the lights turn off.

Charging

1. In the center of the face of your gateway, there is a small 3mm round LED. This is your charging indicator.
2. To charge the gateway, plug in a micro usb charging cable to the port on the bottom of the gateway.
3. Charging indicator LED when micro usb is plugged in:
 - a. Charging - LED On.
 - b. Nearly Completed Charging - LED Blinking.
 - c. Charge Complete - LED Off.

Buttons

Mini Gateway

- a. Starting from the bottom left and rotating up/clockwise.
 - i. **Power** - Turns your gateway on/off
 - ii. **Run:**
 1. Press once to begin running the rotate, tilt, and roll motors at 30% speed.
 2. Press again to run the rotate, tilt, and roll motors at 60% speed.
 3. Press a 3rd time to run the rotate, tilt, and roll motors at 100% speed.
 4. Press a 4th time to stop all motor movement.
 - iii. **Stop** - Stop all motor movement.
 - iv. **Throw** - Arm the Mini if it is not already armed. If the Mini is already armed, pressing this button will throw a clay and then re-arm the Mini.

Quad Gateway

- b. Starting from the bottom left and rotating up/clockwise.
 - i. **Power** - Turns your gateway on/off
 - ii. **Run:**
 1. Press once to begin running the rotating the Quad.
 2. Press again to stop rotating the
 - iii. **1** - Trigger thrower 1
 - iv. **2** - Trigger thrower 2
 - v. **3** - Trigger thrower 3
 - vi. **4** - Trigger thrower 4

LED Bar

The LED bar on the gateway will have the same patterns as the Mini. Please refer to the LED Guide section to view the patterns.

Startup Indicators

The LED bar on the gateway will gradually fill up as the gateway powers on. During this time the gateway will perform various startup/setup procedures that are crucial to the operation of the entire Crazy Quail system.

Below are a few indicators that something could be wrong, and what could be causing the issue.

1. The Gateway freezes during startup.

- a. If this ever happens, the LEDs can help you determine why the gateway froze.
 - i. **Stage 1 - Setup/Config**
 1. Gateway Version \leq v3.2.3
Fill up first 4 LEDs White. 1 LED per component setup.
 - a. 1 - XBEE Setup/Config
 - b. 2 - BLE Setup/Config
 - c. 3 - EEPROM Setup/Config
 - i. Orange - EEPROM is being defaulted. This is normal for a fresh boot.
 - d. 4 - SD Setup/Config
 - i. Light Purple - No SD Card Detected.
 - ii. Red - Initialization Fail.
 2. Gateway Version $>$ v3.2.3
Fill up first 4 LEDs White. 1 LED per component setup.
 - a. White - Load Stored Settings
 - a. Light Green - Xbee Setup
 - a. Teal - BLE Setup
 - a. Purple- EEPROM Setup
 - b. Light Orange - SD Setup
 - ii. **Stage 2 - Battery Level**

LED lights will fill up and flash Light Green 4 times. Number of green LEDs indicates the battery level.

 1. 4 - Battery Full ($>$ 90%)
 2. 3 - Battery High (60% - 90%)
 3. 2 - Battery Medium (30% - 60%)
 4. 1 - Battery Low ($<$ 30%)
 5. RED - Dead Battery
 - a. The Gateway will automatically turn off at this Point
 - iii. **Stage 3 - Communication Initiation**
Quad Gateway or Specified Mini Gateway Only

Slowly sweep up LEDs Blue. When this sweep has completed, setup has completed.

2. The Gateway flashes white and then turns off during startup.

- a. The gateway has a dead battery.

Synchronizing a Gateway with a Mini

The Crazy Quail Gateway acts as an intermediary between your mobile device and your Mini(s). Once your mobile device, gateway, and Mini(s) are all connected, you can then begin controlling some basic functions of your Mini with the buttons on the Gateway.

A new feature of the gateway is you are able to synchronize 1, or all, of your Minis so that the Gateway can communicate with the Mini(s) without need for a mobile device. This feature needs to be set up with the mobile device, but once setup, you can use the basic button functions of the Gateway without having to use a mobile device.

To synchronize your Gateway with your Mini, follow these steps:

i. iOS

1. *Coming soon...*

ii. Android

1. Make sure your mobile device is connected to the gateway, and in the app, make sure that you have connected to the Mini you want to synchronize with.
2. Go to the “**Gateway Settings**” screen in the app. This screen should display all the information about your gateway.
3. Scroll down until you see the bar labeled **Sync Status**.
4. On the right side of this bar you will see 3 buttons. Use these buttons to perform the sync operation with your Gateway and Mini(s). Successful sync operations will cause the gateway to flash light blue 3 times. Flashing red indicates an unsuccessful sync operation.
 1. **Clear Sync** - This button will return the gateway back to its original state. This is the state where the buttons will only work with Minis connected to the gateway. Each command will target every Mini connected.
 2. **Broadcast** - This button will tell the Gateway to broadcast out all commands. This means that all Minis on the network, regardless if they are connected to the gateway/mobile device or not, will receive the button commands.
 3. **Single** - This button is used to sync the gateway with a single Mini. When in this mode, the gateway will always target this Mini, regardless if it is connected to the gateway/mobile device. You can use the basic functions of the gateway buttons to control your Mini, without using the mobile app.
 - i. To do this, target the Mini your wish to sync by targeting it at the bottom of the screen (orange means it is targeted) and then press the **Single** button.

LED Guide

The LED Puck Will be your best friend!

Always use the LED puck on the machine to know what the machine is doing and what problems it may be having. The LED and buzzer will give great feedback if there is ever an issue. Follow the LED guide below for all the possible LED indicators you may come across.

Mini LED

Pattern	Color 1	Color 2	Mode	Description
Alternating Colors	Blue	White	Discovery Mode	Pan ID for machine is 0x2325
Alternating Colors	Blue	Dark Blue	Stable Mode - NOT ARMED	On but not connected to a mobile device controller.
Alternating Colors	Blue	Red	Stable Mode - ARMED	On, and armed, but not connected to a mobile device controller.
Alternating Colors	Green	Dark Green	Connected Mode - NOT ARMED	Connected to a mobile device controller.
Alternating Colors	Green	Red	Connected Mode - ARMED	Connected to a mobile device controller and armed.
Alternating Colors	White	Light White	Stand Alone Mode - NOT ARMED	Nudge button was hit. Must restart the machine to continue control.
Alternating Colors	White	Red	Stand Alone Mode - ARMED	Nudge button was hit
Alternating Colors	Orange	Dark Orange	Calibration Mode	Calibration in progress
Alternating Colors	Magenta	Dark Magenta	Debug Mode	Debug information processing
Alternating Colors	Yellow	Cyan	Network Scan	Network Scan Running
Only 3 Pixels On	Off	Red	Shutdown Mode	Rotate Motor
Only 3 Pixels On	Off	Orange	Shutdown Mode	Roll Motor
Only 3 Pixels On	Off	Yellow	Shutdown Mode	Tilt Motor
Only 3 Pixels On	Off	Purple	Shutdown Mode	Thrower Arm
Only 3 Pixels On	Off	Green	Shutdown Mode	Travel Mode Called
Only 3 Pixels On	Off	Blue	Shutdown Mode	Dead Battery
Only 3 Pixels On	Off	White	Shutdown Mode	Shutdown Called From Mobile App
Only 3 Pixels On	Off	Cyan	Shutdown Mode	Flight Controller Error
Only 3 Pixels On	Off	Magenta	Shutdown Mode	Rotate Positional Encoder Error
4 Pixels Flash On	Off	Yellow	Safety Mode Change	Set Safety Mode On
4 Pixels Flash On	Off	Red	Safety Mode Change	Set Safety Mode Off
Blink When attempting to throw	Red		Safety Mode is ON	

Blink Every 5 seconds	Orange	Low Battery	
3 Long Beeps	Red	Entering Shutdown or Travel mode	WARNING: Machine will discharge the arm after these 3 beeps if it is in an armed position.

Quad LED

Pattern	Color 1	Color 2	Mode	Description
Alternating Colors	Blue	Dark Blue	Stable Mode - Not Rotating	Your Quad is fully powered on and awaiting commands from the gateway.
Alternating Colors	Green	Dark Green	Running Mode - Quad is Rotating	Your Quad is now rotating as a result of pressing the rotate button on the gateway.

Gateway LED Only

The Gateway will have all the same color patterns as the Mini LED table above. The below table is colors that only apply to the Gateway.

Pattern	Color 1	Color 2	Color 3	Color 4	Mode	Description
Shifting Colors	Red	Green	Blue	White	Updating Gateway Settings	Your Gateway will need to update it's unique settings after a firmware update. This will only take a few seconds and the Gateway will restart upon completion.
Alternating Colors	Yellow	Magenta	Yellow	Magenta	Firmware Updating	Your Gateway Firmware is updating. Please do not power off your gateway while it is in this mode. The Gateway will automatically reset when it has completed.

Buzzer Guide

The Buzzer can provide some great additional insight as to what your machine is doing

Follow the guide below to determine what all the buzzer patterns mean

# of Beeps	Pattern	Meaning
4	Ascending	Startup procedure/mode Calibration complete (which just boots through startup again)
3	Stay Same	Manually reset Pan ID to 0x2325 (Boot to discovery mode with nudge switch)
1	Stay Same	Nudge hit, entering Stand Alone mode
2	Low, High	Write Pan ID (Change Pan ID to ID other than Discovery pan)
2	High, Low	Write Pan ID (Change Pan ID to Discovery pan 0x2325)
2	High, Low	Disconnect indicator
2	Low, Low	Machine is armed. It will not process the command until you disarm the machine.

Network Configuration

Discovery Mode

Minis and Gateways can communicate because they are on the same wireless network. Nearly every Gateway operates on its own predefined network that Minis can join and/or leave. If you ever want to control your Mini with a different gateway, then you may have to change the network the Mini is currently on. The discovery network is a dedicated network setup for the exchange of Minis between different Gateways. To control your Mini with a new Gateway you have to move the Mini to the discovery network, and then bring the Mini onto the network of the new Gateway you wish to control it with. You can move your Mini to the discovery network in 2 different ways.

1. Disowning a Mini

If your Mini is already communicating with your Gateway, then you can use the mobile app to push the Mini to the discovery network. To do this, follow the instructions below:

iii.  iOS

1. Go to the “**Machines**” screen.
2. Once your Mini pops up, slide the name of your Mini to the left. This will reveal 2 buttons on the right side. Press the button that says “**Unpair**”.
3. Your Mini should now beep twice in a descending pattern, and the LED should change to Blue/White. This indicates the Mini is now on the discovery network.

iv.  Android

1. Go to the “**Find Machines**” screen.
2. Once your Mini pops up in the top half of the screen (“**My Minis**” section), press the orange **X** button to the right of this Mini.
3. Agree to the alert asking you if you would like to “**Disown**” you Mini.
4. Your Mini should now beep twice in a descending pattern, and the LED should change to Blue/White. This indicates the Mini is now on the discovery network.

2. Manual Discovery Mode Entry

1. Turn your Mini off by pressing the E-Stop switch.
2. Turn your Mini on by releasing the E-Stop switch and hold the nudge button just above this switch.
3. The Mini will begin to start up as normal, and you will see the white lights work their way around the LED puck. Keep the nudge button held throughout the startup.
4. Once the LED puck has completely filled up with white, you will see the final LED turn blue and you will hear a single beep. Keep holding the nudge button at this point.
5. After 3 - 5 more seconds of holding the nudge button, the LED puck will turn red and the machine will begin to beep. Once you see the LED turn red, release the nudge button.
6. Your Mini should now beep twice in a descending pattern, and the LED should change to Blue/White. This indicates the Mini is now on the discovery network.

3. Adopting a Mini

Now that your Mini is on the Discovery network, you can find your Mini with the new Gateway and bring it into the Gateways network. To do this, follow the instructions below:

i.  iOS

1. Go to the “Machines” screen.
2. Press the “Begin Discovery” button at the bottom of the screen.
3. Your Gateway will now turn blue/white, indicating that it is searching for Minis on the discovery network.
4. Once your Mini pops up on this “Discovered Machines” screen, select the checkbox to the right of it.
5. Hit the “Complete Discovery” button at the bottom of the screen to pull all selected Minis onto the Gateway’s network.
6. Your Mini should now beep twice in an ascending pattern, and the LED should change to blue. This indicates the Mini has been successfully moved to the Gateway’s network.
7. Make sure to select the Mini on the “My Machines” screen that you are now brought to and you can then begin controlling the Mini.

ii.  Android

1. Go to the “**Find Machines**” screen.
2. Tap the grey “**Discovered Machines**” header bar.
3. Your Gateway will now turn blue/white, indicating that it is searching for Minis on the discovery network.
4. Once your Mini pops up in this “Discovered Machines” section, click on it to adopt it and select “**Yes**” to the confirmation popup.
5. Your Mini should now beep twice in an ascending pattern, and the LED should change to blue. This indicates the Mini has been successfully moved to the Gateway’s network.
6. You can now return to a control screen to begin controlling your Mini.
 1. **Note*** As mentioned before, you must target a Mini to control it. Connected Mini(s) are targeted by being selected in the bottom bar of the screen. A Mini will be highlighted orange when it is targeted.

Channel Mask

Sometimes there may be a lot of noise in the air where you are trying to run your machine. This noise can be caused by other wireless networks such as wifi and bluetooth, nearby radio towers, atmospheric phenomena, and a large range of other possibilities. If you ever believe you are experiencing communication issues, the Channel Mask feature may be for you. This procedure will scan the air looking for noise and then modify the local network configuration to try and avoid this noise.

IMPORTANT! Only run this if you seem to be having communication issues. This is the case only if everything IS connected and communicating, but the machine is still missing many (NOT ALL) of the commands you are sending it. Make sure both your machine, and Gateway, have fully charged batteries, and make sure to view the troubleshooting section to rule out any other possible causes of your communication issues.

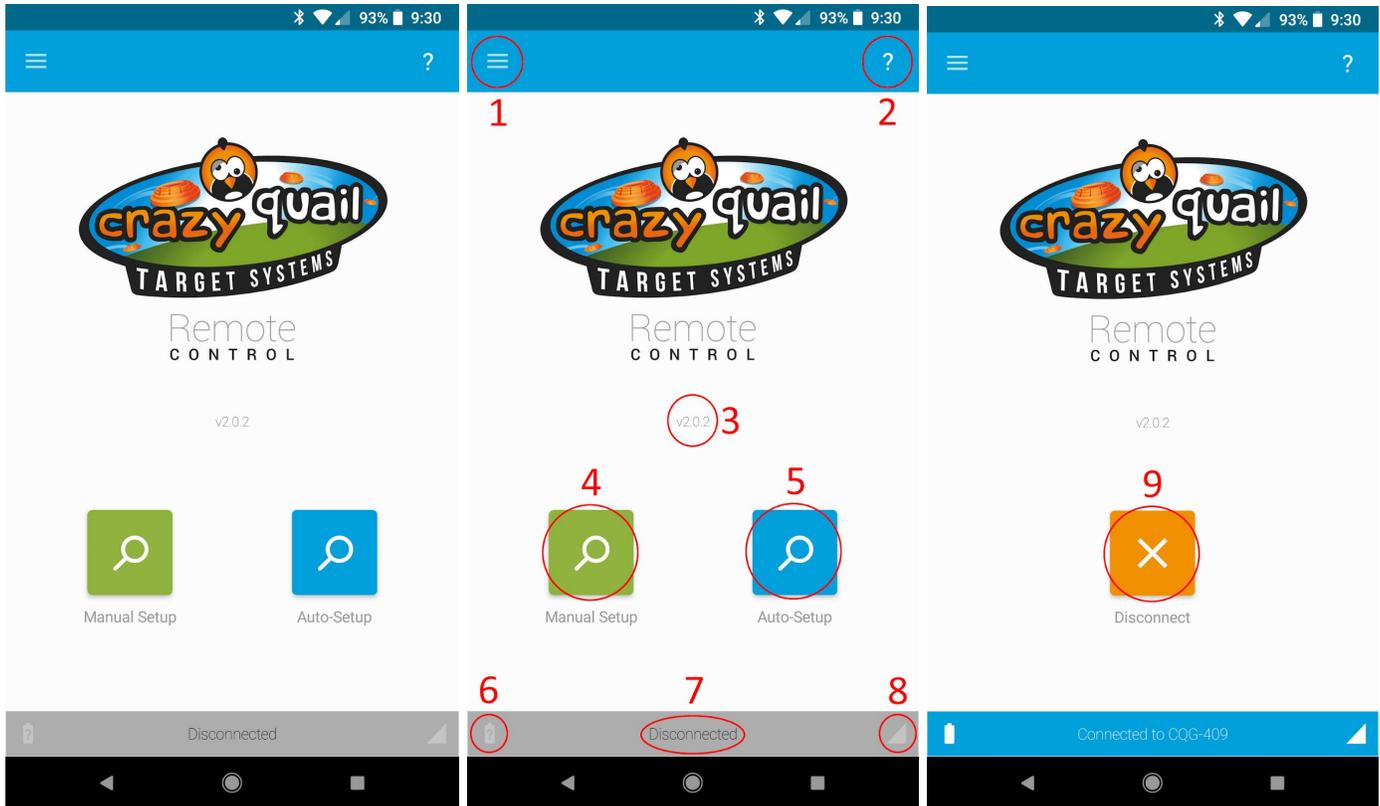
Automatic Configuration

Manual Procedure

1. Make sure the Gateway and Machine are set up and communicating.
2. Turn off all Machines. (leave the Gateway on)
3. Go to the 'Status' screen in the app and press grey 'Read EEPROM' button
4. Watch the Gateway lights. The small red LED on the red Simblee board should stop blinking and the last green led on the bread board will turn green. The last green and red leds on the gateway will flash back and forth a few times. This is how you know it is working. Once the LEDs on the breadboard turn off AND the small red LED on the red Simblee board is blinking again, step 1 is complete.
5. Turn on all Minis.
6. Go to the 'Machines' screen in the app and connect to all minis.
7. Send a couple simple commands to make sure the Gateway and Minis are synced together.
8. Go to the 'Status' screen in the app and press grey 'Stamp Log' button
9. The yellow LED on the bread board will turn on and blink once while it runs this step.
10. Once this yellow LED turns off, and the small red LED on the red Simblee board is blinking again, everything is complete.

Android - Mobile App Overview

Connect (Home Screen)



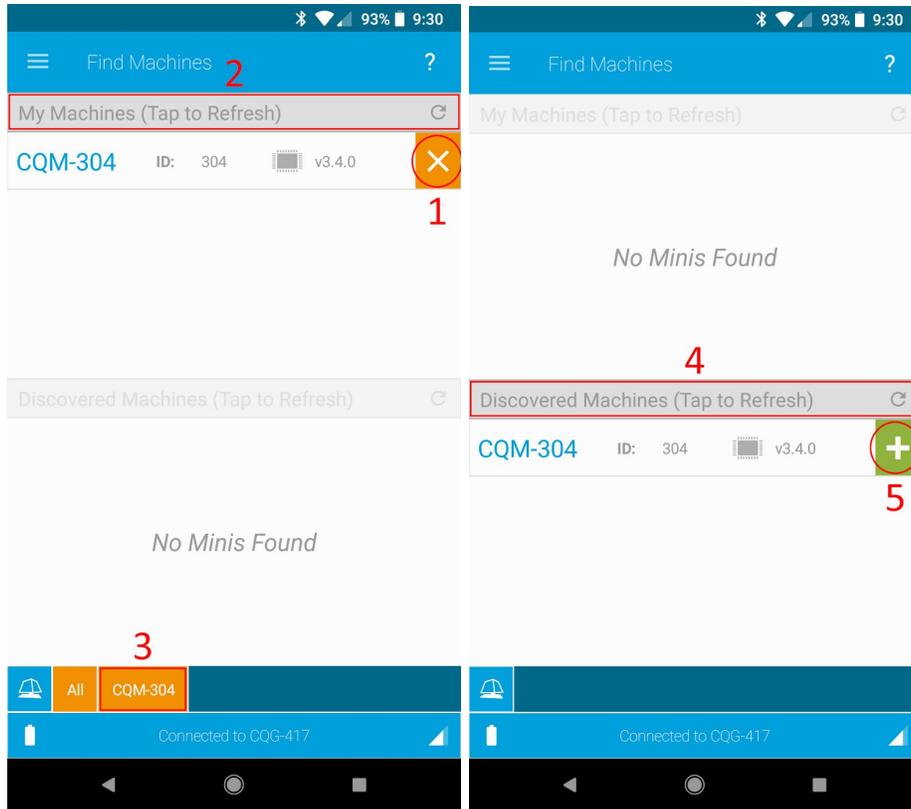
Above is the Connect screen of the Android app. This is the screen where you will connect to your Gateway controller. All the main features of this screen are designated in the middle image. The far right image is how this screen will look when you are connected to a Gateway controller. A description of each designation is below.

- 1. Menu Button** - This button will open the menu drawer. This menu is how you will navigate between screens within the app.
- 2. Help Button** - The help button is used to explain all the features of the current screen. Every screen will have a help button and it will help explain what each screen does and how to use the functions of it.
- 3. App Version** - This is the version of the app you currently have.
- 4. Manual Setup** - Tap this button to scan for nearby Gateway devices. Found devices will be displayed in a popup window. To connect to a Gateway, tap its listing in this popup window. **Note, this will not connect to your machines. If you use this manual setup then you need to manually find and connect your machines through the “Find Machines” screen.**
- 5. Automatic Setup (Preferred Method)** - Tap this button to automatically connect your mobile device to your Gateway and machines. This will automatically find and connect your Gateway controller. This process will also automatically find and connect all of your machines.
- 6. Gateway Battery Level** - Once connected to your Gateway controller, this will display its battery level.
- 7. Gateway Connection Status** - Once connected to your Gateway controller, this will display “Connected to: ” and then the name of your Gateway controller.
- 9. Disconnect** - Tap this button to disconnect from the Gateway controller.

8. **Gateway Bluetooth Signal Strength** - Once connected to your Gateway controller, this will display its Bluetooth signal strength.
9. **Disconnect Button** - Once connected to your Gateway controller, this will display in place of the 2 setup buttons. Tap this button once to disconnect from your Gateway controller.

Find Machines

IMPORTANT! You will not need to use this screen if you use the Auto-Setup process. That process will take care of everything you need to do in this screen.



Above is the Find Machines screen of the Android app. This is the screen where you will connect to your machines once you have connected to your Gateway controller. From this screen you can connect to machines that are already in the Gateway's network, you can adopt machines that are on the discovery network, and you can disown machines by kicking them to the discovery network.

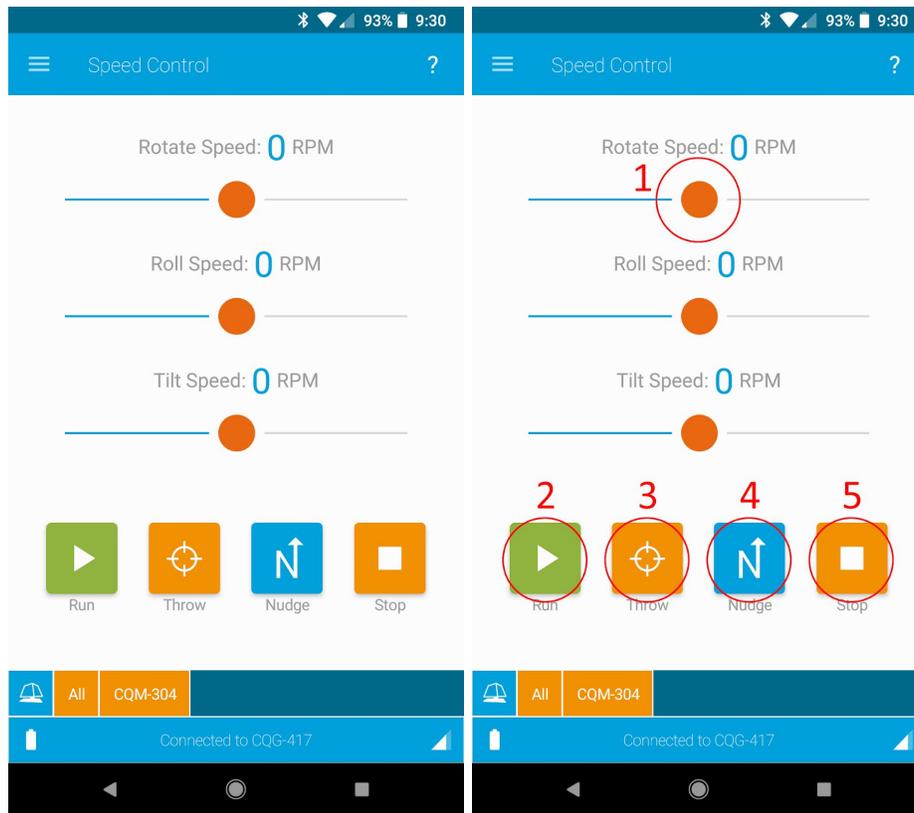
All machines that were found in your Gateway's network will pop up in the top section. An example of this is machine CQM-304 in the left image. All machines that were found in the discovery network will be listed in the bottom section. An example of this is machine CQM-304 in the right image.

Once a machine has been located in your Gateway's network, you can begin controlling it. If a machine is located in the discovery network, you need to "Adopt" the machine and bring it into the Gateway's network. You can do this by pressing the green "+" button on the right side of its listing.

1. **Disown Button** - This button will disown the specific machine. Tapping this button will move the machine from your Gateway's network to the discovery network. This process is known as "Disowning" a machine.
 - a. You may need to do this if you would like to use a new Gateway with your machine.

2. **Refresh Bar (Local Network)** - Tapping this bar will begin searching for more machines in the Gateway's network. The circular arrow on the right side of this bar will be spinning while the Gateway is looking for more machines.
3. **Machine Button** - This button is a toggle switch that allows you to pick and choose which machines you would like to target for each command you give it. When the button is orange, that machine is "Targeted" and every command you give will control that machine. When the button is blue, that machine is not targeted and will not be given any commands. A button for each machine you are connected to will show in this area. You can select or deselect as many machines as you want. This bar that holds all the machine buttons is referred to as the "Machines Bar".
4. **Refresh Bar (Discovery Network)** - Tapping this bar will begin searching for more machines in the Discovery network. The Discovery network is used to move machines between different Gateway's networks. Each Gateway has a unique network that it operates on, so machines must be moved to your Gateway's network before you can begin controlling it. A machine will remain on the last network it was assigned to. All machines and Gateway's will come already on the same network, so out of the box you should not have to worry about this.
5. **Adopt Button** - Tapping this button will bring a machine from the discovery network to your Gateway's network. This process is known as "Adopting" a machine.

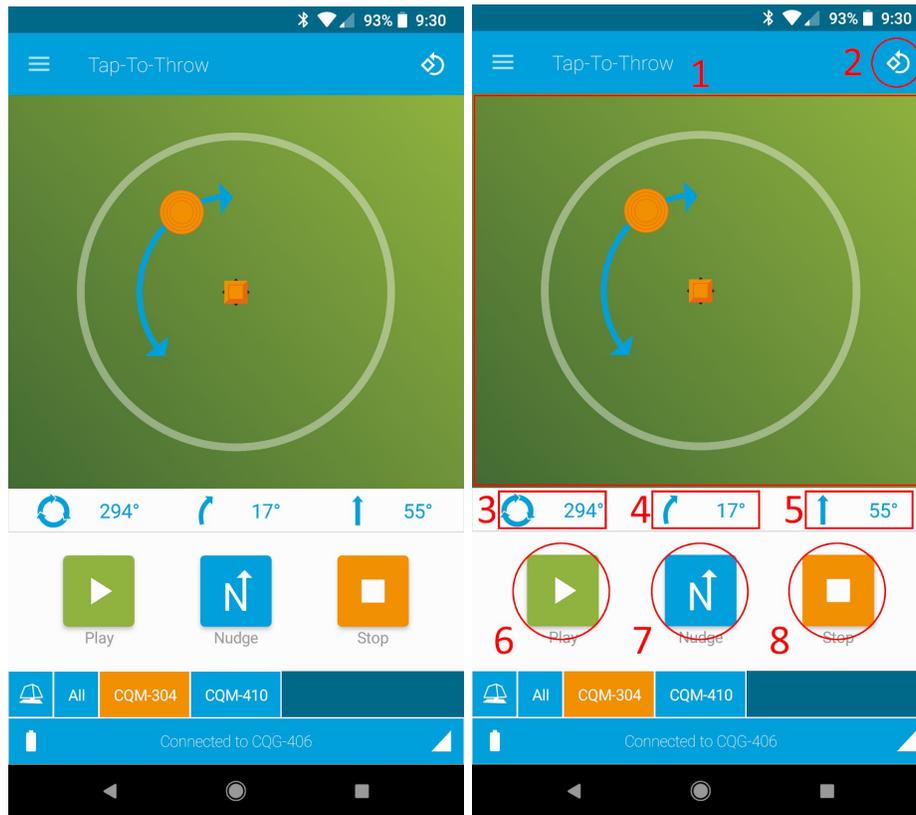
Speed Control



Above is the Speed Control screen of the Android app. This screen is used for controlling the speed of each motor on your machine. Most Crazy Quail machines have a roll motor for leaning the carousel side to side, a tilt motor for tilting the carousel back and forward, and a rotate motor for spinning the entire machine. Using the sliders you can change the speed and which each motor is running. The motors will continuously each run at their specified speeds until the machine is given another command. While the motors are running, you can throw targets using the “Throw” button.

- 1. Motor Sliders** - This is the slider that controls the rotate motor speed. Moving this slider to the left or right will cause your machine to begin rotating. There is a slider for both the roll and tilt motors as well.
- 2. Run Button** - Tapping this button will tell all targeted machines to run their motors at the speeds specified by each slider. When you move a slider, and release the thumb, the targeted machine(s) will begin moving instantly. Pressing the run button accomplishes the same task.
- 3. Throw Button** - Tapping this button will tell all targeted machines to throw a clay. If a machine is not armed, tapping this button will only arm the machine, you must tap it again to throw a clay. But if the machine is armed, tapping this button will cause the machine to throw a clay and then automatically re-arm itself.
- 4. Nudge Button** - Tapping this button will run the throwing arm for 80ms. This is just enough time to disarm the machine if the arm is in an armed state. **WARNING!** Always make sure the machine is fully disarmed when working on it. When standing behind the machine, the arm should be visible on the left side of the carousel. If you do not see the arm, the machine may be armed.
- 5. Stop Button** - Tapping this button will completely stop the machine. All movement will stop and all queued throw commands will be erased.

Tap-To-Throw



Above is the Tap-To-Throw screen. This screen essentially shows an overview of your field with an orange square in the middle. This orange square represents your machine.

Tapping anywhere on the field will tell the targeted machines to throw a clay at a specified position. This example above shows a tap above and to the left of the machine. This tap is telling machine CQM-304 to throw a clay at 294° Rotate, 17° Roll, and 55° Tilt. (The exact degrees may vary per machine and individual mechanical adjustments).

Controlling Rotate - Simply tap around the orange square to throw clays in different directions. To make sure your machine is aligned with this overview in the app, you must use the “Reset Alignment” feature. To use this feature, see number 2 below. Once you have the alignment set, when you tap to the right of the orange square, your machine will throw a clay to the right, when you tap to the left, your machine will throw to the left, etc.

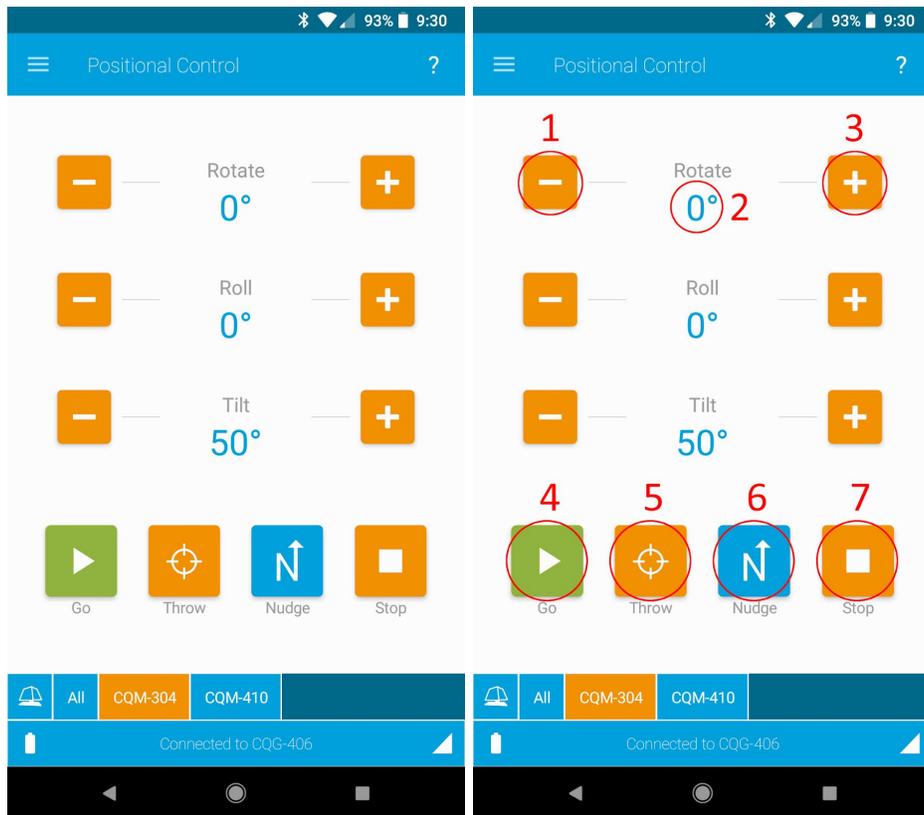
Controlling Tilt - Tapping closer to the orange square results in a higher tilt. This will cause the machine to lean back and throw a clay higher in the air and closer to you. Tapping farther away from the orange square will cause the machine to tilt down, resulting in a clay being thrown lower and farther away from you.

Controlling Roll - When you tap on the field you will notice a blue arrow and a clay that pops up. Keep your finger held down and slide the clay along the arrow. How far you slide the arrow, and to which direction, is how

you change the roll position for each throw.

1. **Tap-To-Throw Field** - This is where you can tap to get the targeted machines to easily throw clays in various directions. You can tap here as much as you want. Every time you tap the field, that command will be sent to the targeted machine(s). The machine(s) will then save every command it has been given and it will run through them as fast as it can.
2. **Reset Alignment Button** - This button is how you reset the alignment of your machine(s) so that touching the field has the same orientation as your machine(s). To do this, follow these steps:
 - a. Stand where you will be shooting from and rotate all your machines until they are pointing away from you. The LED puck on the side of the machine should be facing you.
 - b. Make sure the machines you want to set this new orientation for are targeted in the machines bar in the app. (They should be orange)
 - c. Press the Reset Alignment button.
 - d. Read the popup and then press OK.
 - e. That's it! Tapping on the field in the app will now be reflected with your machine(s).
3. **Rotate Degrees** - This is the exact rotate degree of where you tapped on the field. This is where your targeted machine(s) will rotate to and throw a clay.
4. **Roll Degrees** - This is the exact roll degree of where you slid your finger to on the blue arrow when you tapped on the field. This is where your targeted machine(s) will roll to and throw a clay.
5. **Tilt Degrees** - This is the exact tilt degree of where you tapped on the field. This is where your targeted machine(s) will tilt to and throw a clay.
6. **Play Button** - This button will play the previous tap on the field.
7. **Nudge Button** - Tapping this button will run the throwing arm for 80ms. This is just enough time to disarm the machine if the arm is in an armed state. **WARNING!** Always make sure the machine is fully disarmed when working on it. When standing behind the machine, the arm should be visible on the left side of the carousel. If you do not see the arm, the machine may be armed.
8. **Stop Button** - Tapping this button will completely stop the machine. All movement will stop and all queued throw commands will be erased.

Positional Control

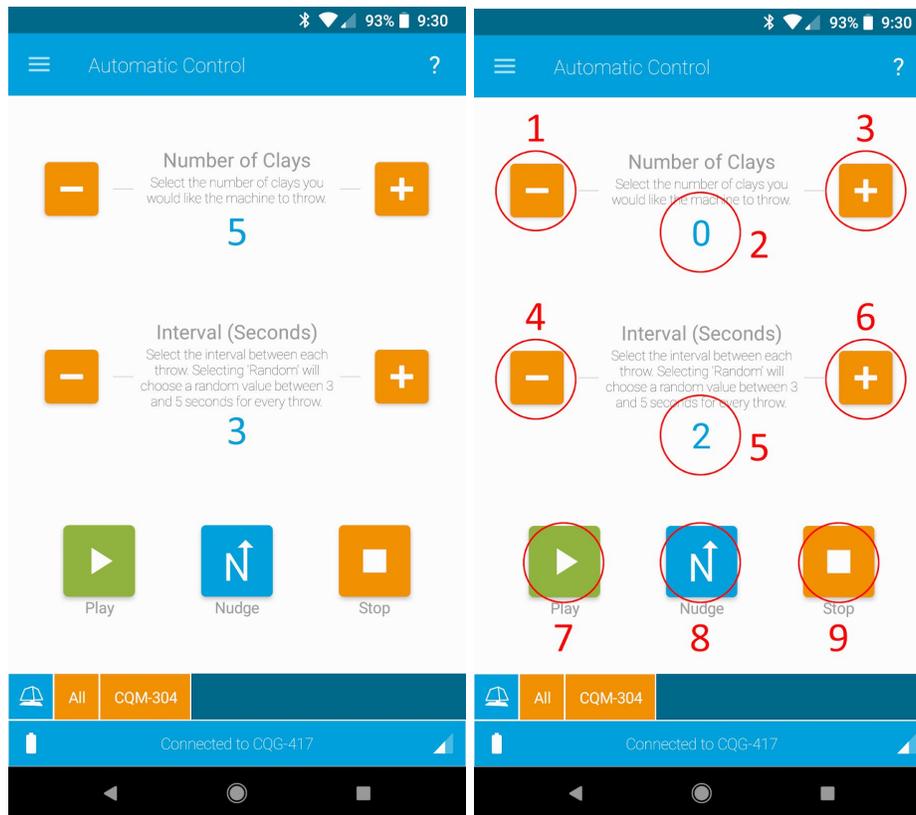


Above is the Positional Control Screen. This screen is used to specify where exactly you would like to throw a clay. All you do is enter the exact rotate, roll, and tilt degrees, press play, and your machine(s) will throw a clay at that exact position. For example, pressing play in the above image will tell machine CQM-304 to throw a clay at 0° Rotate, 0° Roll, and 50° Tilt. (Achievable angles and ranges will vary per machine)

- 1. Minus Button** - This is where you can decrease the rotate degree by 1. As you can see, there is also a button for roll and tilt.
- 2. Rotate Degree** - This is the display for the current rotate degree. You can tap this and manually set the degree as well. As you can see, there is this same option for roll and tilt as well.
- 3. Plus Button** - This is where you can increase the rotate degree by 1. As you can see, there is also a button for roll and tilt.
- 4. Go Button** - Tapping this button will send the specified angles to the targeted machines. The machines will go to that position and throw a clay target.
- 5. Throw Button** - Tapping this button will tell all targeted machines to throw a clay. If a machine is not armed, tapping this button will only arm the machine, you must tap it again to throw a clay. But if the machine is armed, tapping this button will cause the machine to throw a clay and then automatically re-arm itself.
- 6. Nudge Button** - Tapping this button will run the throwing arm for 80ms. This is just enough time to disarm the machine if the arm is in an armed state. **WARNING!** Always make sure the machine is fully disarmed when working on it. When standing behind the machine, the arm should be visible on the left side of the carousel. If you do not see the arm, the machine may be armed.

7. **Stop Button** - Tapping this button will completely stop the machine. All movement will stop and all queued throw commands will be erased.

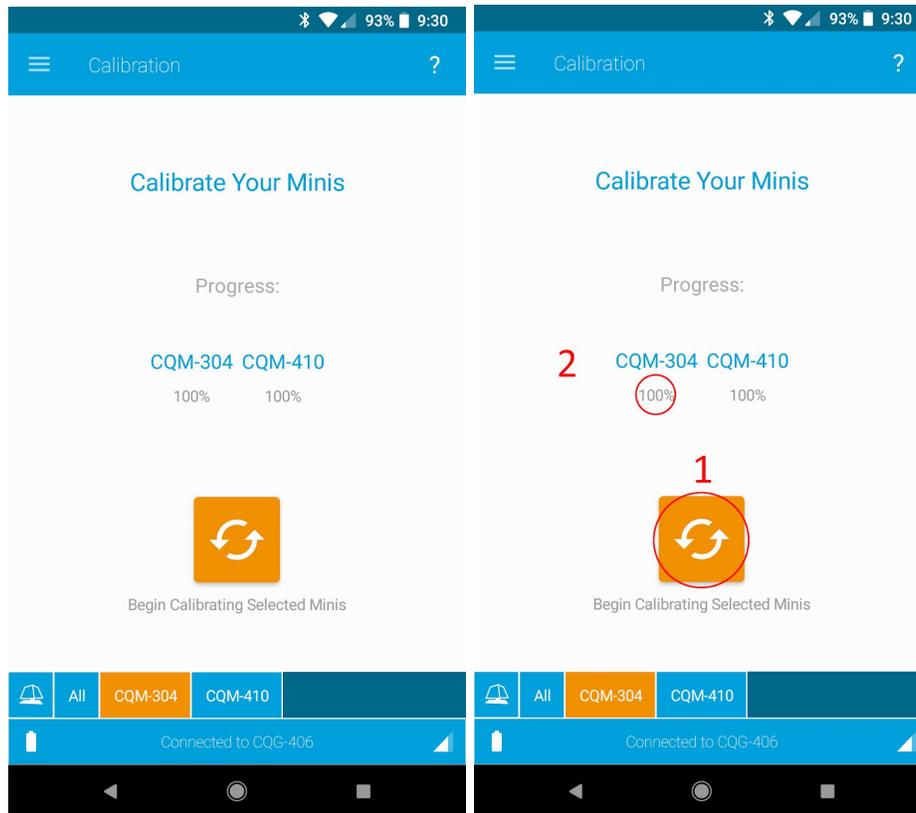
Automatic Control



Above is the Automatic Control screen. This screen is used to throw random clays at varying intervals. All you do is set the number of clays you want the machine to throw and the interval at which you would like those clays to be thrown. For example, the image on the left is setup to throw 5 clays, 1 every 3 seconds. The machine will randomly choose the position of each of these throws.

- 1. Minus Button** - This is to decrease the number of clays you would like thrown.
- 2. Number of Clays** - This is the number of clays you will tell the machine to randomly throw. Tapping this allows you to manually set this number rather than using the plus and minus buttons.
- 3. Plus Button** - This is to increase the number of clays you would like thrown.
- 4. Minus Button** - This is to decrease the interval at which you would like each clay thrown.
- 5. Number of Clays** - This is the interval you would like each clay thrown, in seconds. Tapping this allows you to manually set this number rather than using the plus and minus buttons.
- 6. Plus Button** - This is to increase the interval at which you would like each clay thrown.
- 7. Go Button** - Tapping this button will send the command to the targeted machine(s). The machines will handle choosing the random clays and throwing them at the specified interval.
- 8. Nudge Button** - Tapping this button will run the throwing arm for 80ms. This is just enough time to disarm the machine if the arm is in an armed state. **WARNING!** Always make sure the machine is fully disarmed when working on it. When standing behind the machine, the arm should be visible on the left side of the carousel. If you do not see the are, the machine may be armed.
- 9. Stop Button** - Tapping this button will completely stop the machine. All movement will stop and all queued throw commands will be erased.

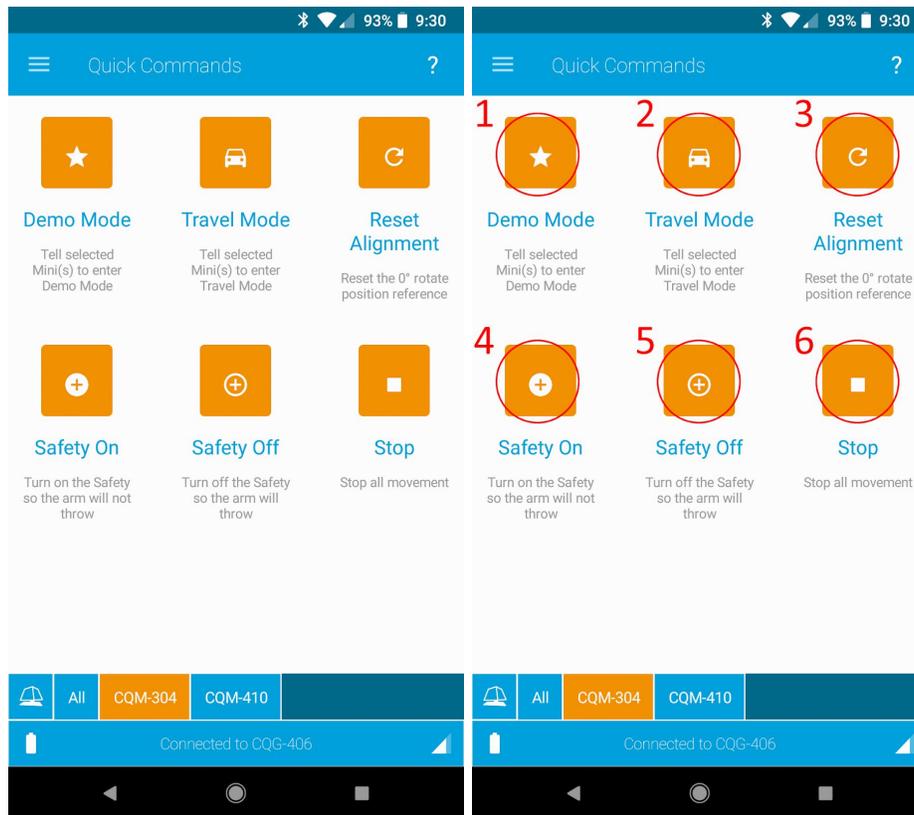
Calibration



Above is the Calibration screen. **You should use this screen to calibrate your machines every time you move them.** All you need to do is tap the orange calibration button and the targeted machines will go through their calibration procedure. For best results, point the machine away from you while calibrating. **Calibrate the machine with no clays in the carousel.**

- 1. Begin Calibration** - Tapping this button will tell the targeted machines to begin calibrating. This process will take about 5 minutes to complete. This only needs to be done when you move the machine. If the machine is set in the same spot and never moved, you do not need to calibrate it again.
- 2. Calibration Progress** - This will show the calibration progress of each machine. Note* It is possible for the app to miss calibration updates from the machines so do not rely on this number to tell you when the machine has completed calibration. The LED on the machine will be orange while calibrating. When the machine has completed calibration the LED on it will turn blue or green.

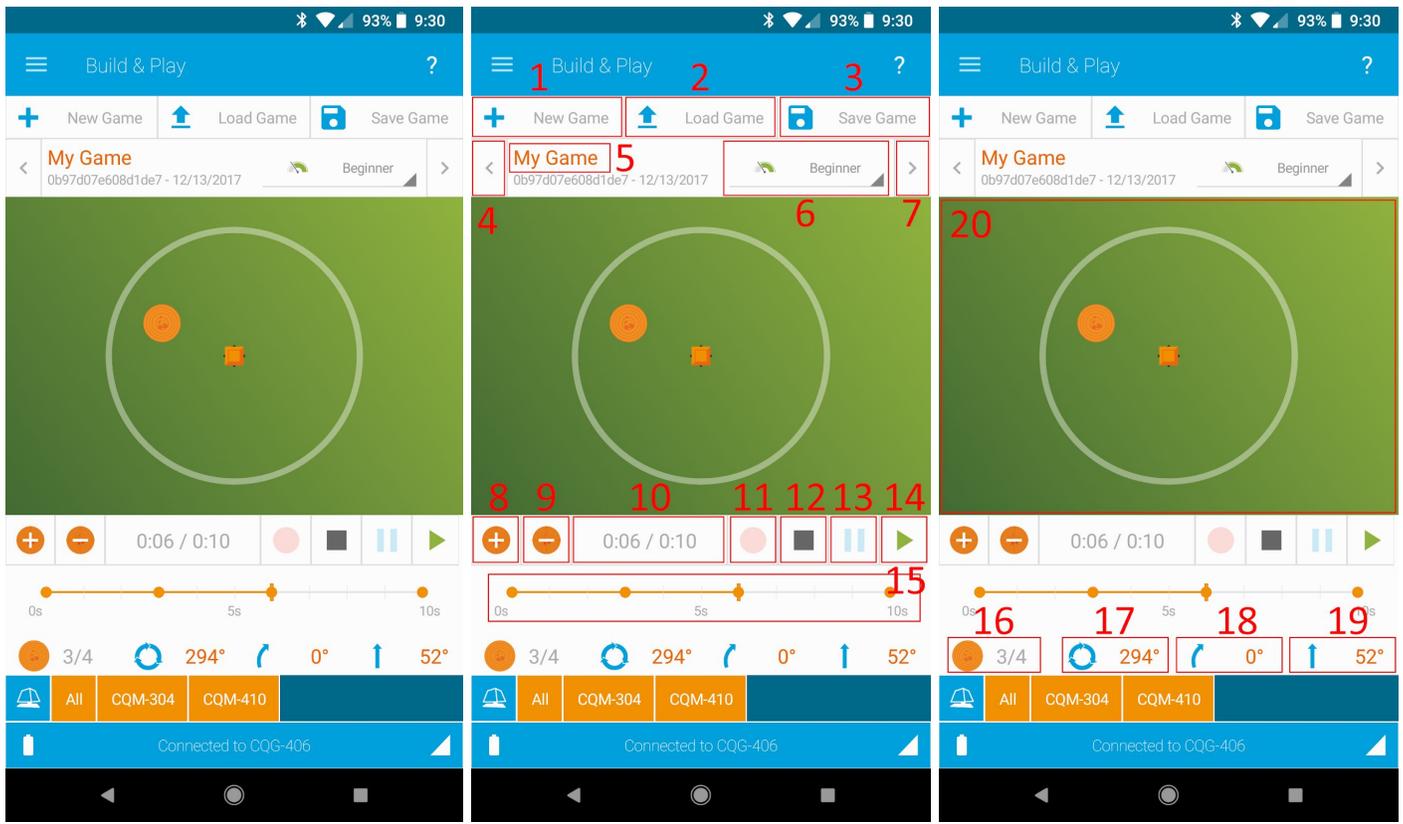
Quick Commands



Above is the Quick Commands screen. This screen is used for various unique commands for your machines. The commands and what they do are listed below.

- 1. Demo Mode** - This puts the machine into Demo Mode. The LED will turn blue, green, and orange, and the machine's motors will speed up and down, back and forth, in a demo sequence. This process will go on continuously. Giving your machine a stop, or any other command, will automatically bring the machine out of demo mode. **Demo mode can only be entered when the machine is not armed.**
- 2. Travel Mode** - This puts the machine into Travel Mode. The machine will bring roll to its center, and it will bring tilt all the way up, making the machine as compact as possible. **Doing this will shut down the machine and you must turn it off and back on to begin controlling it again. Travel mode can only be entered when the machine is not armed.**
- 3. Reset Alignment** - This is the same button as the Reset Alignment button in the top right corner of the Tap-To-Throw screen. For information on how to use this, go to the section about the Tap-To-Throw screen.
- 4. Safety On** - This turns on safety mode for the machine. When the machine is in safety mode it will not throw any targets. The machine will behave as normal, going to all positions and running at specified speeds, but it will not throw any targets. While in this mode, the LED will flash red to signify that a throw has taken place. **Safety mode can only be entered when the machine is not armed.**
- 5. Safety Off** - This turns off safety mode for the machine. Safety mode is off by default for the machines.
- 6. Stop Button** - Tapping this button will completely stop the machine. All movement will stop and all queued throw commands will be erased.

Build & Play



Above is the Build & Play screen. This is where you can build full sets of repeatable positions. Set up games and tournaments where you and your friends can get the same exact set of clays to compete with.

The setup is much like a video editor where you can play, pause, stop, record, and scroll to different points in time. Fine tune the exact set of presentations that you want and save them so you can play them whenever you want.

- 1. New Game** - This button is used to wipe the slate and start fresh creating a new game.
- 2. Load Game** - Load in a game you previously created or one of the demo games that come with the app.
- 3. Save Game** - This button will save the game that is currently on the screen.
- 4. Load Previous Game** - This will load the previous game in memory.
- 5. Game Name** - This is where you can change the name of your game.
- 6. Game Difficulty** - Set the difficulty of this game so future users can choose games that fit their skill level.
- 7. Load Next Game** - This will load the next game in memory.
- 8. Add Clay** - This will add a clay to the timeline at that point in time.
- 9. Remove Clay** - This will remove a clay from the timeline.
- 10. Run Time** - This shows the current time / total run time of the current game.
- 11. Record Button** - This is the live record feature. With a new game, tap this button to begin recording. You can then tap on the field and your taps will be recorded in live time. Once you are done just hit stop

and you will see all of your clays displayed on the timeline. You can then go to each clay and fine tune its position if you wish.

- a. **Note** - Clays will be added 2 seconds apart as that is the fastest rate a machine will be able to throw clays.

- 12. Stop Button** - This button will stop recording and stop playing your game.
- 13. Pause Button** - This button will pause your currently playing game.
- 14. Play Button** - This button will play the game that is currently loaded. **Playing a game will send all commands to the specified machines.**
- 15. Timeline** - This bar shows the timeline of your game. Ticks are in seconds and orange markers mark where a clay is in your game.
- 16. Number of Clays** - This shows the current clay / total number of clays in your game.
- 17. Rotate Degree** - This is the rotate degree of the current clay on the timeline. You can tap this and change the degree to what you wish.
- 18. Roll Degree** - This is the roll degree of the current clay on the timeline. You can tap this and change the degree to what you wish.
- 19. Tilt Degree** - This is the tilt degree of the current clay on the timeline. You can tap this and change the degree to what you wish.
- 20. Field** - This is just like the Tap-To-Throw field, except your tap will be added to the current game as opposed to being sent to a machine right away. You can target any number of machines you want for each throw. Mix and match what machines throw when to confuse your shooters!

iOS - Mobile App Overview

Coming Soon...

Troubleshooting / FAQs

IMPORTANT! Most issues can be solved by simply turning off the machine and gateway for 20 seconds, and then by restarting the app. Please try this up to 3 times before continuing troubleshooting.

How do I connect my mobile device to the gateway?

1. Make sure the gateway is fully charged and no more than 15-20ft from the mobile device.
2. Go to the “Connect” screen of the app.
3. Select “Scan for Gateway”
4. Select your gateway from the list

My app can't find the gateway?

1. Make sure the gateway is fully charged and no more than 10ft from the mobile device.
2. Disconnect the charger from the Gateway, turn off the Gateway of for 20 seconds, turn the Gateway back on.
3. Plug the gateway in with the provided charger.
4. Make sure Bluetooth is enabled on your mobile device.
5. Restart the mobile app. (Clear the mobile app from memory, don't just press the home button on your device.)
6. Leave the Gateway on for 2 minutes. Try connecting again.

How do I connect the app to my machine?

1. Start the machine and make sure it has fully started up by waiting until the LED has turned from white to Blue.
2. Turn on the gateway.
3. Start the app.
4. Press the Scan for Gateway button to search for your gateway. Select your gateway once it is found.
5. Press the machines button in the top left corner to enter the “Machines” screen.
6. Swipe down from the top of this list to refresh the list of found machines and to search for more available machines.
 - a. **Note:** The initial discovery of your machine can take up to 20 seconds. Be patient. Once the machine starts receiving commands from the gateway, the LED on the machine will turn green. Shortly after this your machine will pop up in the Machines list in the app.
7. Once your machine is found, press the check box to the right of your machine. This will complete the pairing of your machine and you can start controlling your Mini!

My app won't find my machine?

1. When viewing the machine screen, swipe down from the top to refresh the list and search for more machines.
2. Restart the app by double tapping the home button on your iPhone or iPad and then swiping up on the Crazy Quail app.
3. Restart the gateway by turning it off, waiting 20 seconds, and on again.
4. Restart the machine by pressing the red E-stop button, wait up to 20 seconds, then release the E-Stop button.

My gateway won't turn on?

Most likely the battery is dead, plug your gateway in with the provided charger.

My machine won't turn on?

1. Check the battery connection and make sure your battery is fully charged and properly plugged in to the relay or brain box.
2. Make sure the LED is plugged in properly. The machine may be on, there may just be an issue with the LED puck.
3. Listen for beeps. The machine will sound 4 ascending beeps about 5 to 20 seconds after you power up the machine. If you hear these beeps but don't see the LED light up, then you have an issue with your LED puck.

How do I get the controller app?

1. The Crazy Quail controller app is currently only available for iOS, the Android version will be available early 2017. You can download the iOS app to your iPhone or iPad by searching for "CQRremote" in the app store.
2. The Android app will be available in the Google Play store early 2017.

How do I reset the alignment of my machine?

1. Resetting the alignment of the machine will configure the "Tap to Throw" screen to direct outgoing targets away from you. Using the control screen, or by manually rotating the machine, face it so that it would be throwing a clay target away from you.
2. Next, in the "Tap to Throw" screen, press the Reset Alignment button in the top right corner of the screen. Confirm the machine is facing away from you and press OK. Your machine is now aligned so that if you hit the top of the field in the "Tap to Throw" screen, the clay will fire away from you.
 - **Note:** You will hear a brief chirp from the machine if it resets the alignment successfully.

My mobile device randomly disconnects from the gateway?

1. Your mobile device may be too far from the gateway or the gateway battery may be low.
2. Check the signal strength of your gateway to see if there is a weak signal.

How can I play and save games/throws and replay them?

Description:

Setting up games for the Crazy Quail *Mini* work as a real-time recording system. You will hit record, run through the throws you wish to save/replicate, and hit stop to save everything. That's it! The system will record your throws in real time, so, for example, if you wait 5 seconds in between each one of your throws, then your game will have 5 second throw intervals per clay.

Steps:

1. Go to the "Tap to Throw" screen in the app.
2. Press the "Record" button to start recording a game.
3. Tap on the field to enter as many throw commands as you wish to record.

How can I load a previously recorded game?

Description:

You can load games you have previously saved by pressing the “Load” button on the “Tap to Throw” screen and then selecting your game.

Steps:

1. Go to the “Tap to Throw” screen in the app.
2. Press the “Load” button to bring up the list of saved games.
3. Select the game you wish to load.
4. Press “Play” to run the recorded game.

What is safety mode and how can I use it?

Description:

When the machine is in safety mode the arm will not fire or move. All other operations of the machine will proceed as normal, but the arm will never fire. For every command, to simulate when the arm would have moved or thrown a clay, the LED puck will flash red once.

Turn ON Safe Mode:

1. Go to the “Status” screen in the app.

Turn OFF Safe Mode:

1. Go to the “Status” screen in the app.

My machine isn't throwing?

1. Check if Safety Mode is enabled.
 - a. Remember, when Safety Mode is enabled, your machine will not throw a clay, the LED puck will only flash red to simulate a clay should have been thrown.
2. Give the machine a command from the “Tap to Throw” screen. If there is an issue with the arm then the machine will detect this issue and then shut down with a Purple LED shutdown message.

How do I discover new machines?

Description:

If you ever want to control your *Mini* with a new gateway, you will need the gateway to *Discover* the *Mini*. This process is described in the **Network Settings** section of this manual. Please view there for further instruction.

What battery can I use?

1. The Minis can run on any 12V DC Deep Cycle Marine battery.
2. The Minis are provided with our recommended 100 Amp Hour battery. Please use this battery if possible.

The Arm on the thrower won't throw?

There are many different things that could cause this to happen. Please try the below steps if your machine turns on, connects to the gateway, and responds to commands from the app properly, but throw, nudge, or positional commands do not make the arm of the thrower move at all.

1. Bad Relay

To check for a bad relay, you need to listen for the relay clicking in the brain box. To do this, follow these steps:

- a. Unplug Rotate and Arm from the brain. You do not want power going to these while you are close to the machine.
- b. Connect everything so that you can control the machine using the “**Control**” screen.
- c. Now that you know you are connected, and controlling the machine, it's time to listen for the relay. Open the side panel and get near the brain box inside. Now, from the app, click **Nudge** on the **Control** screen a few times. Telling the machine to nudge will turn the relay on and off quickly, allowing you to hear a clicking coming from the brain box. If you do not hear this clicking, but the Mini IS responding to all other commands (specifically running the roll or tilt motors on the **Control** screen) then you have a bad relay. You need to open the brain box, carefully pull out the main boards in the center, and replace the top relay (closest to the lid of the brain box) on the board with the yellow XT-90 connectors.

2. Check Thrower Motor Terminal Connections

Make sure the cables on the sides of the thrower motor are securely fastened to the motor's terminals.

The Arm on the thrower won't stop throwing?

There are many different things that could cause this to happen. Please try the below steps if your machine turns on, connects to the gateway, and responds to commands from the app properly, but throw or positional commands cause the arm to run continuously without stopping.

1. Bad Relay

To check for a bad relay, you need to listen for the relay clicking in the brain box. To do this, follow these steps:

- a. Unplug Rotate and Arm from the brain. You do not want power going to these while you are close to the machine.
- b. Connect everything so that you can control the machine using the “**Control**” screen.
- c. Now that you know you are connected, and controlling the machine, it's time to listen for the relay. Open the side panel and get near the brain box inside. Now, from the app, click **Nudge** on the **Control** screen a few times. Telling the machine to nudge will turn the relay on and off quickly, allowing you to hear a clicking coming from the brain box. If you do not hear this clicking, but the Mini IS responding to all other commands (specifically running the roll or tilt motors on the **Control** screen) then you have a bad relay. You need to open the brain box, carefully pull out the main boards in the center, and replace the top relay (closest to the lid of the brain box) on the board with the yellow XT-90 connectors.

2. Roller Switch Positioning

If you have tried the step above, and have verified that the relay IS working, it's time to check the roller switch. Sometimes the roller switch on the thrower needs to be adjusted. Adjust this switch back and forth along the slots, moving very small distances each time (1/16” to 1/8” movements) to see if you can correct the issue.

Mini is behaving very erratically?

1. There is a good chance that the battery is low. Charge the battery of the Mini until it is full.