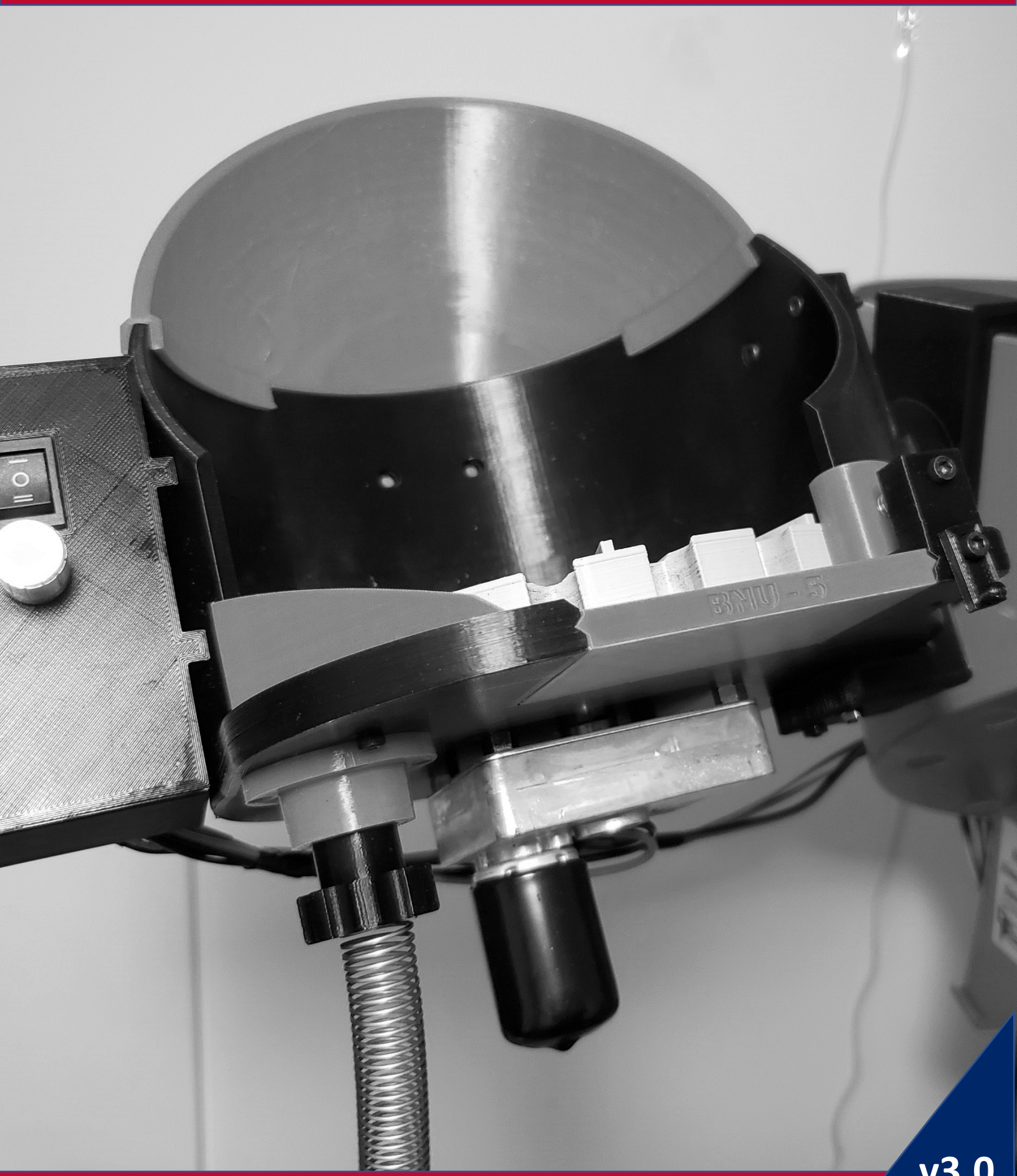
The HomeFree Universal Reloading System



User Manual – bf_v1.4.x

v3.0

Manual Contents

PREFACE

INTRODUCTION

Before 3D printing or engaging in this project's dedicated thread on Cast Boolits, please **read this user manual in its entirety** as it combines the cumulative experience of numerous individuals. Ensure that the downloaded project build matches, or is higher, than the one listed on the cover page of this manual. If you would like to leave feedback on this manual, please do so here.

3D PRINTER

A reliable 3D printer with a minimum bed size of 210mm x 210mm x 140mm, like an Ender 3, will suffice for this project. A properly calibrated 3D printer is **mandatory** as many parts have tight tolerances and will take hours to print. Here is a superb calibration video to watch **before** printing anything; pay close attention to the sections on frame check, E-steps, flow rate and retraction.

FILAMENT

We recommended using PLA/PLA+ from reputable brands like Hatchbox, Overture, Sunlu, E-Sun, AMZ3D.

TEMPERATURES

Print temperature will vary based on filament brand so feel free to experiment a little. We recommend a nozzle/bed temperature of 210˚C/60˚C as a starting point.

NOZZLE SIZE

We recommend printing every part with a 0.4mm nozzle. While this will increase print times, it will also ensure quality parts are printed.

PRINT SPEED

Faster prints often lead to dimensional accuracy issues, artifacts and failed prints. We recommend infill, wall and initial layer speeds of 50, 25 and 20mm/s, respectively.

LAYER HEIGHT/INFILL/SUPPORTS/WALLS/ADHESION

All parts have their recommended print settings listed in this manual. We **highly recommend** following them as they have proven to yield the best quality prints.

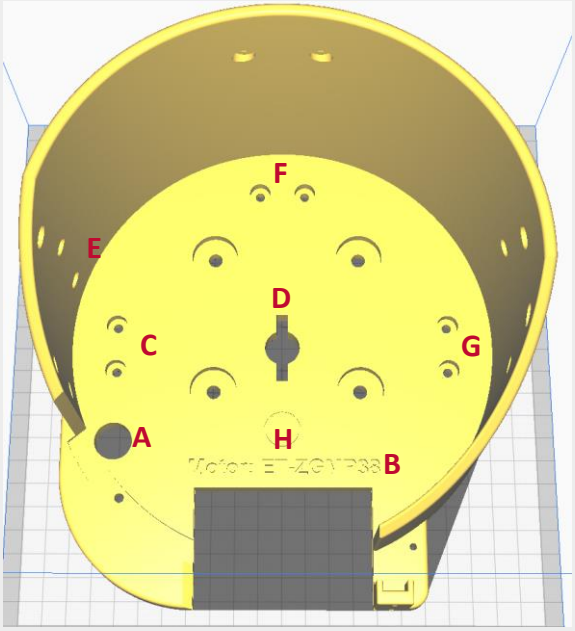
SLICER

We recommend Cura's free slicing software as it has tons of print settings to play around with. Regardless, Cura's default Standard Quality (0.2mm Layer Height) and Super Quality (0.12mm Layer Height) will suffice.

SUB-PROJECTS

BRASS AND BULLET COLLATOR OVERVIEW

Here is a labelled diagram of the main body with all its salient features:



A. **Ramp Housing**
   Houses various flipping ramps.
B. **Flipper Housing**
   Houses the flipper and sweepers.
C. **Drop Hole**
   Hole through which brass/bullets fall.
D. **Motor Mount**
   Secures motor to the main body.
E. **Electronics Box Mount**
   Secures electronics box.
F. **Rear Mount**
   Secures collator for pole mounting.
G. **Right Side Mount**
   Secures collator for Dillon mounting.
H. **Slide Plate Housing**
   Houses various slide plates.

The following videos demonstrate all the operational capabilities of the brass and bullet collator:

- Nose up bullet collation (small bullet/long bullet)
- Nose down bullet collation (small bullet/long bullet)
- Base up brass collation (small brass)
- Base down brass collation (small brass/large brass)

MONGO BRASS COLLATOR OVERVIEW

The MONGO collator has been specifically designed for large scale brass collation. Most parts from the above sub-project are compatible with the MONGO sub-project, but parts specific to this sub-project have the word MONGO attached to their filename. It should be noted that some MONGO parts require a 3D printer with a large print bed (350mm x 350mm), like an Ender 5 Plus. Here are some videos (small brass/large brass) demonstrating the operational capabilities of the MONGO brass and bullet collator.

BULLET FEED DIES OVERVIEW

The caliber specific bullet feed dies interface directly below the drop tubes and thread directly into press toolhead with 7/8”-14 threading. Here is a video showing the bullet feed die in action.

LEE APP ACCESSORIES OVERVIEW

The Lee APP accessories improve press reliability and implement the quick caliber change system for both brass and bullets. They can also work with the brass and bullet collator for super fast component processing. Here is a video showing the accessories in action.

NON-3D PRINTED PARTS

Here is a comprehensive list of necessary parts by sub-project:

BRASS AND BULLET COLLATOR

- Motor – the collator bases work with the following motors:
  - 634JS
  - ETZGMP38
- Switch – a standard switch to power the collator unit on and off.
- Speed Controller – a motor speed controller circuit to adjust the collator plate speed.
- Power Supply – a 12V power supply to power all the electronics.
- Female Adapter Plug – an adapter plug to plug in the power supply.
- XT30 Motor Connectors – a set of XT30 connectors to connect the motor to the electronics box.
- JST Connectors – a set of JST connectors to make a wire harness for the drop tube sensors.
- Screws/Washers/Nuts – a hex nut kit with various sized bolts.
- Springs – a spring kit with various sized springs.
- Sensors – select the parts based on the drop tube system being implementing:
  - Proximity Sensor Drop Tube System
    - Proximity Sensor – a 14mm detection range normally closed (NC) inductive proximity sensor.
    - Relay – a 2A solid state relay.
  - Photoswitch Drop Tube System **(Legacy)**
    - Photoswitch – a 12V photoswitch relay circuit with a photosensor.
    - LED – a 12V LED; white LEDs work best.
  - Micro Switch Drop Tube System **(Legacy)**
    - Micro Switch – a micro switch.
    - Micro Switch – a more sensitive switch for light brass; trim the sides of the arm.
- Spring Tubes – choose from any of the following sizes and styles of spring tubes:
  - Small/Large Spring Tube – for feeding small rifle and large caliber brass and bullets.
  - Extra Large Spring Tube – for more reliable feeding of large caliber brass and bullets.
  - Multi-Diameter Spring Tube – an alternative to the above spring tubes.
  - Multi-Diameter Spring Tube (USA) – an alternative to the above spring tubes
- Hex Couplers – a hex motor coupler alternative to pinning the motor shaft.

BULLET FEED DIE

- Ball Bearings – a set of 3.5mm ball bearings.
- Elastic bands, hooked springs or O-rings.

LEE APP ACCESSORIES

Non-3D printed parts are not required for this sub-project.

3D PRINTED PARTS

The project folders are numbered to reflect the build order of this manual as follows:

1. Main Body
2. Mounts
3. Collator Plates
4. Slide Plates
5. Adapters
6. Drop Tubes
7. Bullet Feed Dies
8. APP
9. Contributors - this folder contains experimental files and therefore not documented.

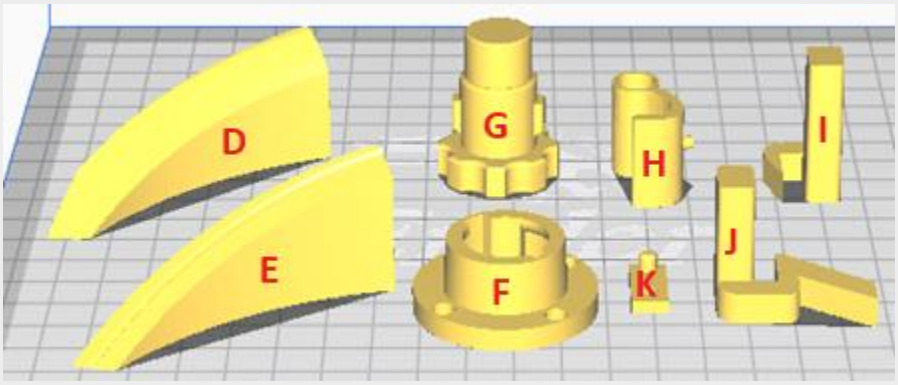
Images – this folder contains reference images.

IMPORTANT – PLEASE READ!

Given that this project contains over 200 files, we **strongly recommend** using the Parts Generator application to ensure that the correct parts are printed. While the app is not a substitute for this manual, most of the required project parts can be acquired through it. The remaining parts, which are optional and/or build specific, can be determined via this manual.

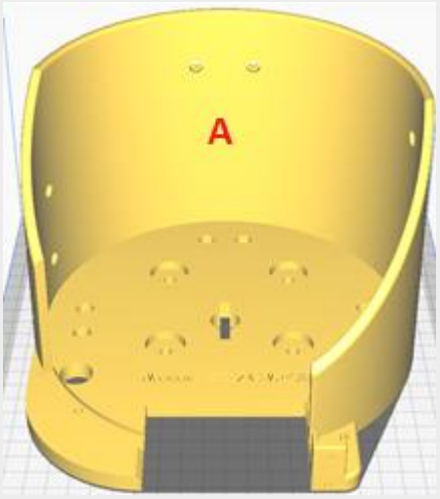
STEP 1 – COLLATOR MAIN BODY

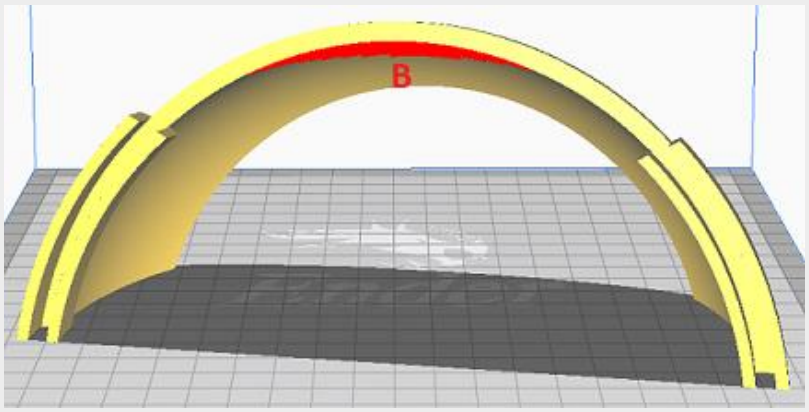
Part	Layer Height	Infill	Supports	Walls	Adhesion
Main Body	0.2mm	30%	None	4	None
Electronics Box	0.2mm	10%	None	2	None
All Other	0.12mm	10-20%	None	2	None



Main Body Folder		
Part	**STL File**	**Description**
A-B	Main_Body_X	All files labelled Main_Body are used to create the collator main body.
C-X	Electronics_Box	All files labelled Electronics_Box are used to create the electronics box.
D	Ramp	This ramp rotates bullets and mounts to the ramp housing with 1 screw; this part is **only** used for nose up/down bullet collation.
E	Ramp_Brass_Base_Up	This ramp rotates brass and mounts to the ramp housing with 1 screw; this part it is **only** used for base up brass collation.
F	Drop_Hole_Adapter	This adapter allows for the quick attachment of the spring tube and mounts to the bottom of the main body's drop hole with 4 screws.
G	Drop_Hole_Plug	This plug screws into the drop hole adapter and disables it; this part is **only** used for base up/down brass and nose down bullet collation.
H	Flipper	This spring-loaded flipper knocks misaligned bullets and mounts onto the flipper housing with 1 screw; a screw located on the front of the flipper housing holds the spring in place.
I	Sweeper	This sweeper arm knocks misaligned bullets and clamps onto the flipper housing; this part is **only** used for base up brass and long bullet collation.
J	Sweeper_Long	This sweeper arm knocks misaligned brass and clamps onto the flipper housing; this part is **only** used for base down rifle brass collation.
K	Slide_Plate_Latch	This latch secures slide plates and screws onto the front of the slide plate housing with 1 screw; this is an **optional** part.

MAIN BODY PARTS



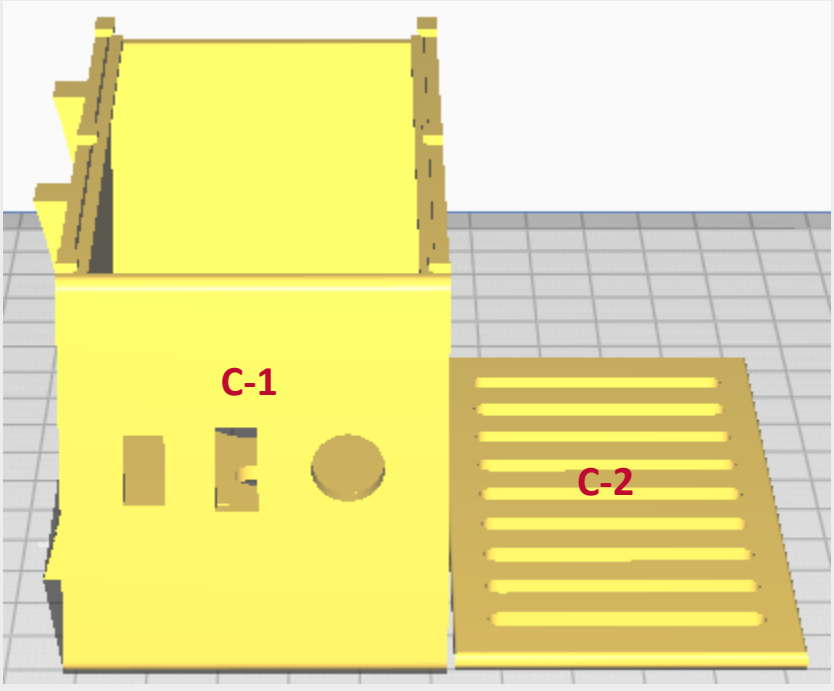


Part **A** is the collator main body and is based on the motor type being used. It requires the most time to print so ensure that the 3D printer is calibrated correctly before printing.

Part **B** is an **optional** part that friction fits to the top lip of the collator and increases collator capacity while preventing component spillage.

ELECTRONICS BOX PARTS

There are two electronics box sizes to choose from, part **C-1**, small and large. While the large electronics box works with any configuration of parts, we recommend the small electronics box with the proximity sensor drop tube system. The lid, part **C-2**, for the electronics box slides into the rear opening.



Files that are labelled Electronics_Box_X_Template do not have any component cut outs and allow for customization through software like Tinkercad.

STEP 2 – COLLATOR MOUNTS

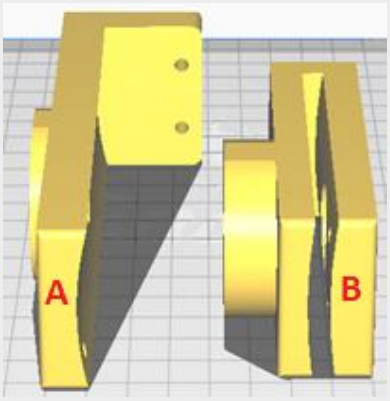
Part	Layer Height	Infill	Supports	Walls	Adhesion
All	0.2mm	30%	None	4	None

Mounts Folder		
Part	**STL File**	**Description**
A-B	Mount_Dillon_Hang_X	These files are used to create a Dillon casefeeder mount.
C-D	Mount_Post_X	These files are used to create mounts that secure to vertical posts.
E	Mount_Square_X	These files are used to create mounts that secure to horizontal posts.
F	Thumb_Screw	This thumb screw cover is used for the adjustment screw option.

The brass and bullet collator can be mounted to a Dillon casefeeder or a circular/square post that is 1” in diameter. A 45˚ collator tilt is normally optimal, but this can vary by brass or bullet caliber.

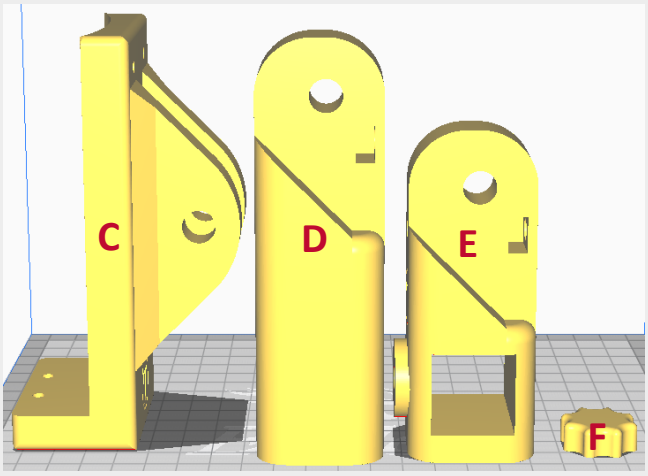
DILLON CASEFEEDER MOUNT

A 3/8” x 1” hex bolt, washer and nut goes through the parts **A** and **B** to control collator tilt. Be sure to insert the hex bolt **before** screwing the Dillon hang base to the main body. Part **A** mounts to the right side of the collator while part **B** slips over the top lip of the Dillon casefeeder.



VERTICAL & HORIZONTAL POST MOUNTS

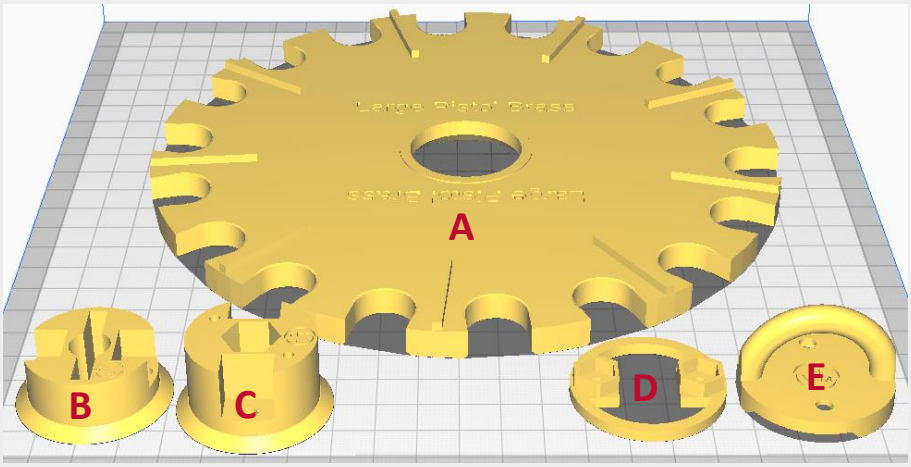
A 3/8” x 2” hex bolt, washer and nut goes through part **C** and parts **D**/**E** to control collator tilt. Part **C** mounts to the rear of the collator while part **D** slips over the top of the post being used; part **D** comes in two styles, one for circular posts and the other for square posts. As an alternative mounting style, part **E** is designed for mounting to a square horizontal post.



For those making regular changes to the collator tilt, we suggest using the adjustment screw option. A 1/4” bolt and nut can be used with parts **D**/**E** to provide an alternative to the friction fit approach of using only a hex bolt. We also recommend using part **F** to act as a thumb screw for the adjustment screw; see the figure on the right.

STEP 3 – COLLATOR PLATES

Part	Layer Height	Infill	Supports	Walls	Adhesion
All Other	0.2mm	10%	None	2	None
Slip_Clutch_X	0.2mm	50%	None	4	None



Collator Plates Folder		
Part	**STL File**	**Description**

A	X_Collator_Plate_X	All files labelled Collator_Plate are used to create brass/bullet collator plates:
		• Rifle_Brass_Collator_Plate_Large.stl
		  ○ a large rifle brass collator plate for base down collation.
		• Rifle_Bullet_Collator_Plate_Large_#4.stl
		  ○ a large rifle bullet collator plate for nose up/down collation that is to be used with a nose up/down #4 slide plate.

B	Slip_Clutch_8.5mm	This clutch is for pinned motor shafts that are 8.5mm or 10mm in diameter.
C	Slip_Clutch_Hex	This clutch is for motor shafts using hex couplers.
D	Slip_Clutch_Ring	This ring secures the slip clutch to the collator plate with 2 screws and nuts.
E	Collator_Plate_Handle	This handle allows for the ease of collator plate insertion/removal and mounts to the top of the collator plate with 2 screws; this is an **optional** part.

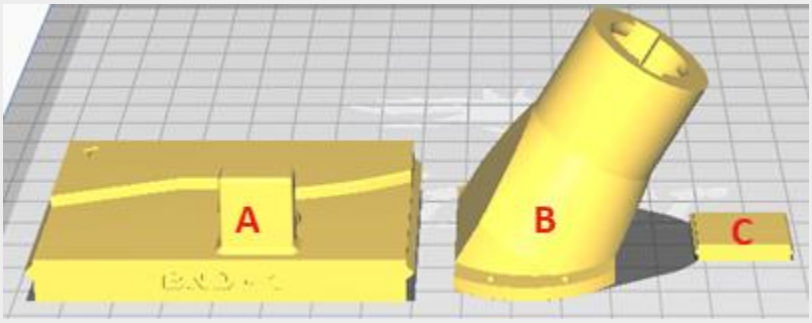
To prevent motor and/or collator plate damage during a jam, a slip clutch system has been implemented that interfaces with the motor shaft and collator plate. The slip clutch is secured to the collator plate with a pair of #6 x 1/2” screws and locknuts using parts **B**/**C** and **D**. In the event of a jam, the motor shaft will continue to rotate freely via the slip clutch system; here is a video of the slip clutch in action. The slip clutch system is compatible with a pinned 8mm motor shaft or a hex motor coupler. If a hex motor coupler is being used, be sure to grind the set screw so that it is flush with the coupler.

Bullets and brass with a base diameter <0.43” or >0.43” should use small or large collator plates, respectively; calibers like 300 Blackout (300BO) and FN 5.7 (5-7) have specific collator plates.

Custom collator plates for specific brass or bullet calibers can be made via the Collator Plate Generator.

STEP 4 – SLIDE PLATES

Part	Layer Height	Infill	Supports	Walls	Adhesion
All	0.12mm	10-20%	None	2	None



Slide Plates Folder		
Part	**STL File**	**Description**
A	X_Slide_Plate_X	All files labelled Slide_Plate are used to create brass/bullet slide plates: • Bullet_Nose_Up_Slide_Plate_#7.stl ○ a ~.45 caliber bullet slide plate for nose up collation. • Brass_Slide_Plate.stl ○ a generic brass slide plate for base down collation.
B	Brass_X_Drop_Hole_Adapter	This adapter mounts to base up/down brass slide plates with 4 screws.
C	Brass_Slide_Adjuster	This adjuster allows for reliable brass collation of all calibers.

The drop hole plug **must** be used when collating **base up/down brass** and **nose down bullets**.

BRASS SLIDE PLATES

The brass slide plates are not caliber specific but do require some assembly. The brass slide adjuster has a slanted end which faces up and to the left of slide plate hole. Both drop hole adapters should face towards the collator when inserted into the slide plate housing. The following chart will assist in choosing the correct parts:

Brass Base Up Slide Plate	Brass Base Down Slide Plate
Brass_Base_Up_Slide_Plate_X	**Brass_Slide_Plate**
Brass_Base_Up_Drop_Hole_Adapter	**Brass_Slide_Adjuster**
	Brass_Drop_Hole_Adapter

When collating base up brass, tilt the collator at an angle of 55-60 degrees for best results.

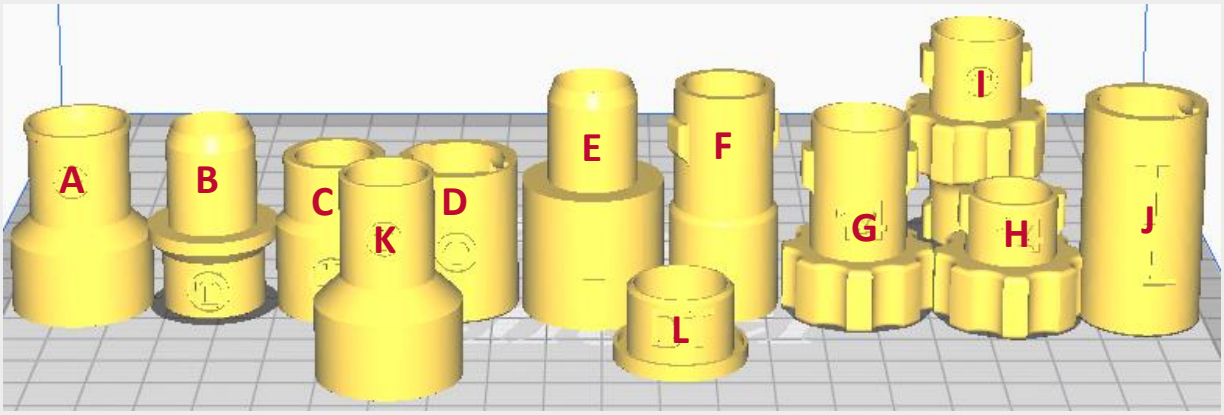
BULLET SLIDE PLATES

The bullet slide plates for nose up/down collation are caliber specific and are numbered, from #1 to #10, for bullets ranging from .22 to .50 caliber, respectively. The right side of these slide plates, called the ridge, decreases by 1mm as the slide plate number increases. In other words, slide plates #1 and #10 have ridge sizes of 14mm and 5mm, respectively. We have shared a spreadsheet where community members can add their bullet caliber experiences with respective slide plate sizes. The slide plates we recommend are in the table to the right.

#	Caliber
2	**.223**
4	**.308**
5	**9mm**
7	**.45 ACP**
11	**.300 BO**

STEP 5 – ADAPTERS

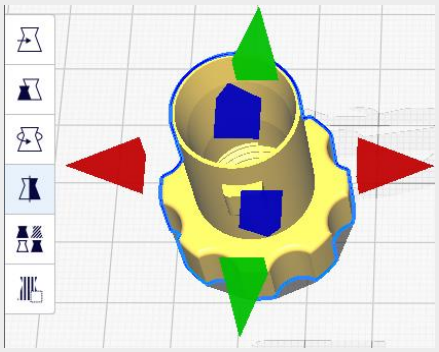
Part	Layer Height	Infill	Supports	Walls	Adhesion
All	0.12mm	10-20%	None	2	None



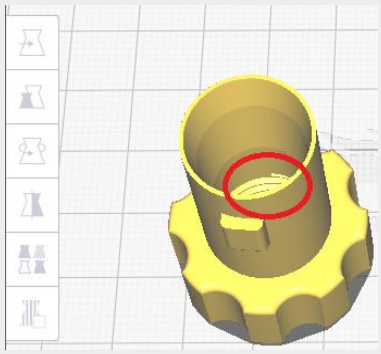
Adapters Folder		
Part	**STL File**	**Description**
A	Dillon_Drop_Hole_Adapter	Dillon Casefeeder → A→ G
B	Dillon_Drop_Tube_Adapter	Dillon Case Feed Adapter → B → Drop Tube (bottom)
C	Dillon_Spring_Adapter	Dillon Case Feed Adapter → C → H
D	Dillon_Spring_Clear_Tube_Adapter	Dillon Clear Tube → D → H
E	Hornady_Drop_Tube_Adapter_X	Drop Tube → E → Hornady Bullet Feed Die
F	RCBS_Drop_Hole_Tube_Adapter_X	Drop Hole Adapter → F → RCBS Clear Tube → RCBS Bullet Feed Die
G	Spring_Adapter_X	Drop Hole Adapter → G → Spring Tube (top)
H	Spring_Adapter_X_DT	Spring Tube (bottom) → H → Drop Tube (top)
I	Drop_Hole_Drop_Tube_Adapter	Drop Hole Adapter → I → Drop Tube (top)
J	Spring_Drop_Tube_X	H → any part designed to fit on the bottom of a drop tube
K	Drop_Tube_Drop_Hole_X	Drop Tube (bottom) → G → Spring Tube → H → J → Bullet Feed Die
L	Drop_Tube_APP_Offset_Adapter	APP Offset Adapter → any part designed to fit on the bottom of a drop tube

Parts **G** and **H** are numbered according to the spring tube's inner diameter (ID); the outer diameter (OD) must not exceed the chart values to the right. If the spring tube's threads are reversed, mirror the z-axis in in Cura through the left icon, fourth from the top, and clicking the blue arrow.

Pre-mirrored



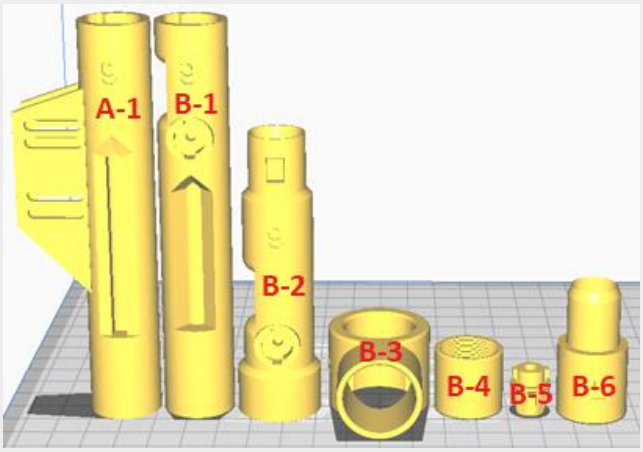
Post-mirrored



#	Spring ID	Spring OD
7	7mm (1/4")	9.5mm
8	8mm (5/16")	10.5mm
9	9mm	11.5mm
10	10mm (3/8")	12.5mm
11	11mm	13.5mm
12	12mm	14.5mm
13	13mm (1/2")	15.5mm
14	14mm	16.5mm

STEP 6 – DROP TUBES

Part	Layer Height	Infill	Supports	Walls	Adhesion
Drop Tubes	0.12mm	10-20%	None	2	Brim
All Other	0.12mm	10-20%	None	2	None



Drop Tubes Folder		
Part	**STL File**	**Description**
A-1	Switch_Drop_Tube_X	This drop tube is used for implementing the micro switch drop tube system.
B-1	Drop_Tube_X	This drop tube is used to implement the photosensor or proximity sensor drop tube systems that connect directly to bullet feed dies.
B-2	Drop_Tube_Alt_X	This drop tube is used to implement the photosensor or proximity sensor drop tube systems that connect directly to the collator.
B-3	Drop_Tube_Proximity_Housing	This housing connects the proximity sensor to parts **B-1** or **B-2**.
B-4	Drop_Tube_Proximity_Thread_Insert	This insert threads over the proximity sensor and fits into part **B-3**.
B-5	Drop_Tube_LED_Sensor_Knob	This quick attach knob housing fits over the photosensor and LED for quick connecting to parts **B-1** or **B-2**.
B-6	Drop_Tube_Spacer_X	These spacers fit on the bottom of parts **B-1** or **B-2** and should be used if light is bleeding through bullet noses; this an **optional** part.

The drop tubes are designed to work with both brass and bullets. Their bases are sized to fit commercial bullet feed dies with an outer diameter of ~16.5mm, our bullet feed dies and Lee APP accessories. The chart to the right shows which drop tube size is needed based on the base diameter of the brass and bullets being used.

#	Base Diameter
6	6.3mm
7	7.3mm
8	8.3mm
9	9.5mm
10	10.5mm
11	11.2mm
12	12.2mm
13	13.2mm

There are 3 drop tube systems to choose from, photosensor, proximity sensor and micro switch activated. All the systems are designed to stop the motor when a backlog of brass or bullets is detected to prevent jamming.

To connect a drop tube directly to the collator, connect parts **B-2** with parts **G**, **H** and **J**, from Step 5, as follows: Drop Hole Adapter → **B-2** → **G** → Spring Tube → **H** → **J** → Bullet Feed Die

THE PHOTOSENSOR DROP TUBE SYSTEM

This system uses a photosensor relay circuit and LED combo for backlog detection. One side of the drop tube houses an LED while the other houses a photosensor. Both are secured to the drop tube with quick connect sensor knobs, part **B-5**. If brass or bullets block the photosensor from detecting the LED's light, the relay on the photosensor circuit activates and stops the motor. If bullet noses allow light to bleed through and prevent the motor from stopping, attach a drop tube spacer, part **B-6**, to the bottom of the drop tube to raise it by 8mm; the chart below shows which spacer will work with the drop tube number being used. Here are the required parts:

Drop Tube Mount
Drop_Tube_X
Drop_Tube_LED_Sensor_Knob
Drop_Tube_Spacer; this is an optional part.

Drop Tube #	Drop Tube Spacer
6-7	**Small**
8-10	**Medium**
11-3	**Large**

THE PROXIMITY SENSOR DROP TUBE SYSTEM

This system uses a proximity sensor switch for backlog detection. We recommend using a 18mm diameter normally closed (NC) inductive proximity sensor with a minimum detection range of 8mm. As brass or bullets accumulate and approach the proximity sensor's detection range, its switch will activate and stop the motor. Watch this video to understand how this system works and here are the required parts:

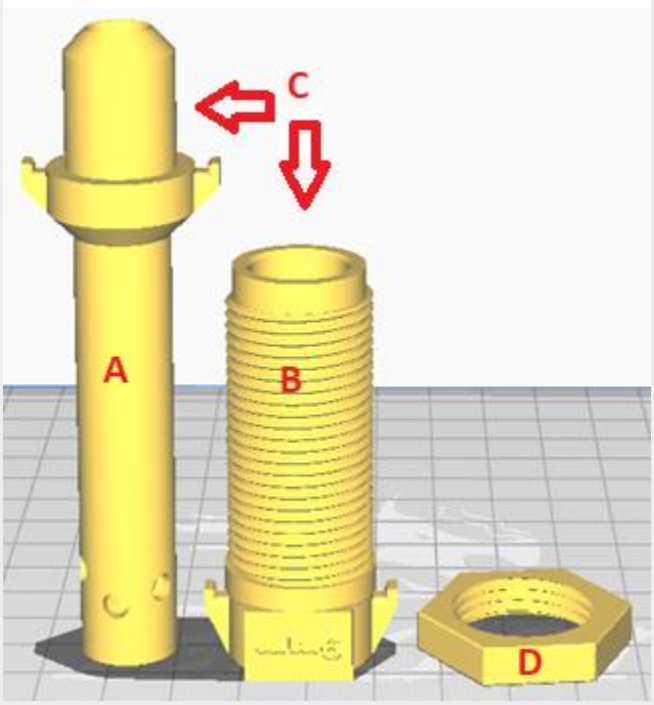
Drop Tube Mount
Drop_Tube_X
Drop_Tube_Proximity_Housing
Drop_Tube_Proximity_Thread_Insert

THE MICRO SWITCH DROP TUBE SYSTEM

This system uses a micro switch for backlog detection. The micro switch body attaches to the side of the drop tube while its switch arm protrudes into the drop tube itself. As brass or bullets begin to accumulate, the switch arm is tripped which stops the motor. Only parts labelled Switch_Drop_Tube_X are required for this system but ensure the 3D printer can do bridges of 15mm prior to printing; setting the parts cooling fan to 100% can help with bridging.

STEP 7 – BULLET FEED DIES (OPTIONAL)

Part	Layer Height	Infill	Supports	Walls	Adhesion
All	0.12mm	10-20%	None	2	None

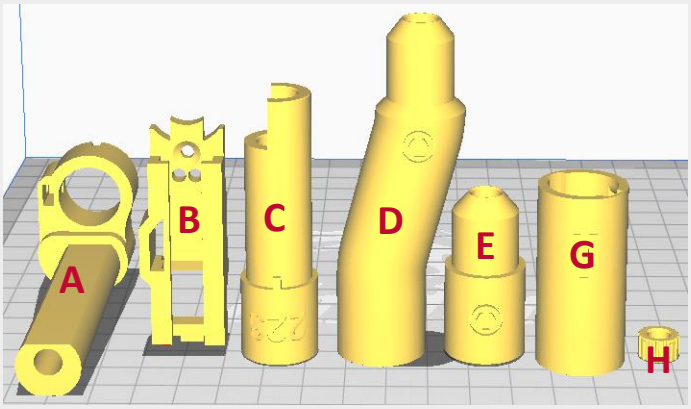


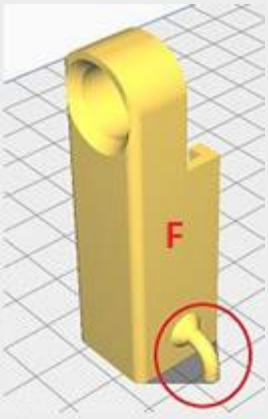
Bullet Feed Dies Folder		
Part	**STL File**	**Description**
A	Feed_Die_X_Insert	This caliber specific bullet feed die insert slides into the bullet feed die main body and requires ball bearings and springs to operate.
B	Feed_Die_X_Body	This caliber specific bullet feed die main body threads directly into the toolhead.
C	Feed_Die_X_Set	A set of the above two parts for ease of printing
D	Lock_Ring	This lock ring fastens the bullet feed die to the toolhead.

A bullet feed die is composed of 2 parts and requires 3.5mm ball bearings and some elastic bands, hooked springs or O-rings. Using acetone on the inserts can help smooth them out and eliminate any friction issues. The inserts have 6 holes cut into them and are to be used with a pair of 3.5mm ball bearings. Use the upper holes for longer bullets and the lower holes for shorter bullets.

STEP 8 – LEE APP ACCESSORIES (OPTIONAL)

Part	Layer Height	Infill	Supports	Walls	Adhesion
Base Slide	0.12mm	10-20%	60˚ Overhang	2	None
Bullet Slide	0.12mm	10-20%	None	2	Raft
All Others	0.12mm	10-20%	None	2	None





A raft is needed for the bullet slides so that the spring pin, **circled in red**, is printed correctly.

APP Folder		
Part	**STL File**	**Description**
A	APP_Bracket_Main	This main bracket replaces the stock APP tube brackets allowing for usage of the quick caliber change system. Thread a ¼" nut between the press and bracket to achieve the proper height.
B	APP_Base_Slide	This base slide replaces the stock APP slide base for more reliable brass feeding; here is a video showing its assembly.
C	APP_X_Insert_X	This caliber specific brass/bullet insert allows for quick caliber changes.
D	APP_Offset_Connector_X	This offset connector comes in various sizes and is **required** if the APP handle is modified; this is an **optional** part otherwise.
E	APP_Drop_Tube_X_Adapter	This drop tube adapter allows for the usage of stock APP clear tubes with the quick caliber change system; this an **optional** part.
F	APP_Bullet_Slide_X	This caliber specific bullet slide replaces the stock APP slide for more reliable bullet feeding.
G	APP_Spring_APP_Insert_X	This caliber specific insert allows for the usage of spring tubes instead of stock APP clear tubes.
H	APP_Thumb_Screw	This thumb screw cover fits over the screw that secures the caliber specific brass/bullet inserts to the main bracket; this an **optional** part.

The offset connectors (OC) have inner diameters ranging from 6mm to 15mm whereas the drop tubes range from 6mm to 13mm. Due to the bend in the OC, more space may be required for ease of brass and bullet flow. If there are blockages, increase the OC size. The OC are designed to interface directly with stock Lee APP drop tubes and can be matched up using the chart on the right:

APP Tube #	OC #
1	6-7
2	8-10
3/4	11-15

The Lee APP accessories can be connected in the following 3 ways:

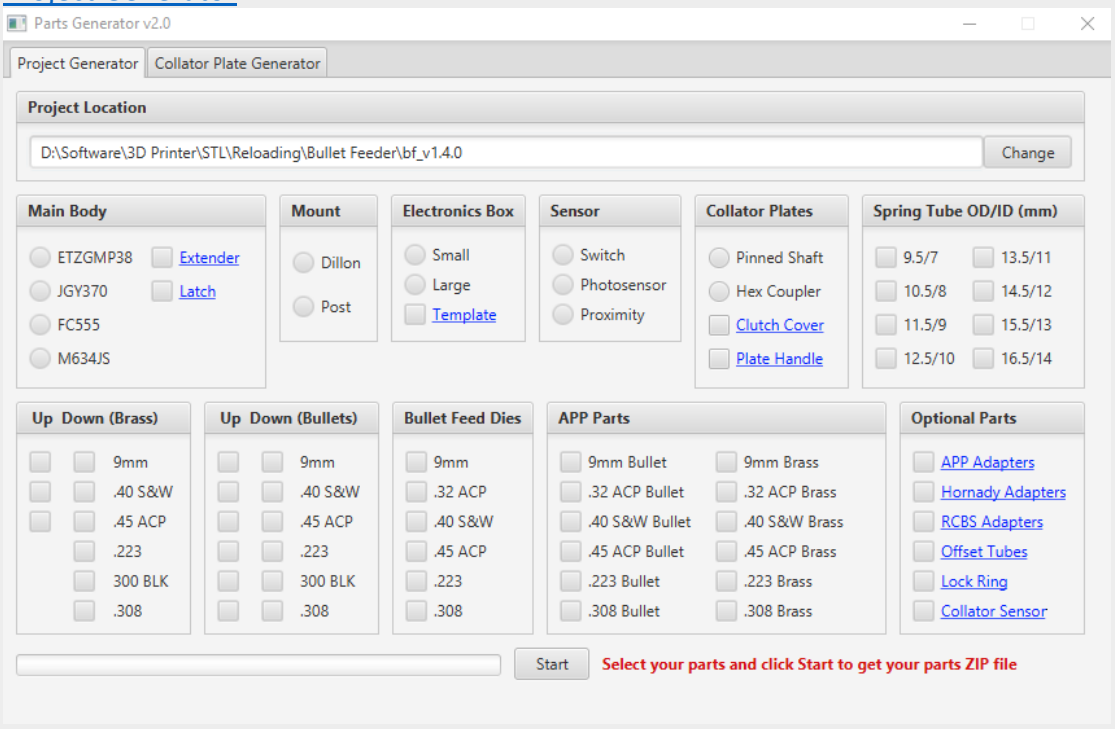
1. Main Bracket → Insert → OC → APP Drop Tube → APP Drop Tube Adapter → Drop Tube
2. Main Bracket → Insert → OC → Drop Tube

3. Main Bracket → Insert → APP Drop Tube → APP Drop Tube Adapter → Drop Tube

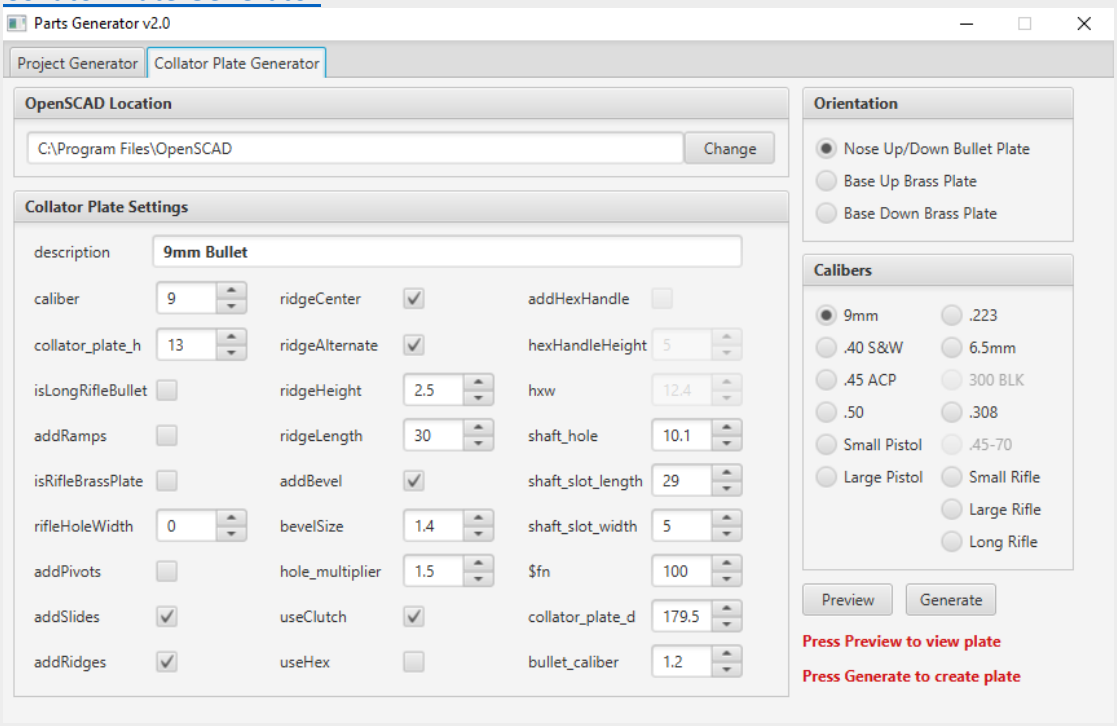
PARTS GENERATOR

Prior to double-clicking on PartsGenerator.jar, ensure that the latest version of Java Runtime Environment (JRE) has been installed. The application contains the 2 following sub-programs:

1. Project Generator



2. Collator Plate Generator



Hovering the mouse cursor over an option that is blue and underlined will display a brief explanation about that option.

PROJECT GENERATOR

The first tab in the application is the Project Generator which collects the necessary STL part files to print.

The following steps explain how to use the Project Generator:

1. Ensure that Project Location is correct (see the above picture for reference)
2. Select the desired option(s)
3. Press the Start button
4. Wait for the ding sound to signal the completion of the process
5. Go to the main project folder and locate the newly created ZIP file called Parts.zip
6. Unzip Parts.zip to desired folder

The unzipped folder will have all the necessary STL part files and a file called Settings.pdf which will contain the recommended slicer settings for the parts.

COLLATOR PLATE GENERATOR

The second tab in the application is the Collator Plate Generator which creates custom collator plates.

Ensure that OpenSCAD is installed prior to using this feature. The default installation folders are as follows:

- C:\Program Files (x86)\OpenSCAD – for a 32-bit installation
- C:\Program Files\OpenSCAD – for a 64-bit installation

The following steps explain how to use the Collator Plate Generator:

1. Ensure that OpenSCAD Location is correct (see the above picture for reference)
2. Select the desired brass/bullet orientation
3. Select the desired caliber
4. Modify the settings on the left (optional step)
5. Press the Preview button to view the plate (optional step)
6. Press the Generate button to create; this can be a **very long** process but can be cancelled
7. Wait for the ding sound to signal the completion of the process
8. Go to the main project folder and locate the newly created collator plate file

Alternatively, custom collator plates can be created directly from OpenSCAD by double-clicking on the .scad file located in the Collator Plates sub-folder of the main project folder. When the program starts, there will be an editor on the left side and a 3D rendering of a collator plate on the right. If the editor is not visible, uncheck the “Hide editor” option in the View menu item. Instructions for creating the plate can be found on the very top of the editor window.

Descriptions and recommendations of all the collator plate settings can be found on the next few pages.

SETTINGS OVERVIEW

Here is a description of all the adjustable settings; all measurements are in **millimetres (mm)**:

Setting	Description
description	Sets the text that will appear on the top of collator plate.
caliber	Sets the hole size (caliber) for the collator plate.
collator_plate_h	Sets the desired height of the collator plate.
isLongRifleBullet	Signifies that a long rifle bullet collator plate is being created.
addRamps	Adds ramps to the holes for better long bullet feeding.
isRifleBrassPlate	Signifies that a rifle brass collator plate is being created.
rifleHoleWidth	Sets the hole size according to the width of the rifle brass.
addPivots	Adds pivots for base down brass collation.
addSlides	Adds slides to the top of the collator plate for nose up/down bullet collation.
addRidges	Adds ridges to the top of the collator plate for base up/down brass collation.
ridgeCenter	Sets the ridge to align with hole center, otherwise it aligns with far side of hole.
ridgeAlternate	Adds ridges to every other hole.
ridgeHeight	Sets the height of the ridges.
ridgeLength	Sets the length of the ridges.
addBevel	Adds a bevel to the top of the holes.
bevelSize	Sets the size of the top bevels; use values between 1.3 and 1.6
hole_multiplier	Sets the number of holes using this multiplier.
useClutch	Adds a circular cut out to the center of the plate for a slip clutch.
useHex	Adds a hex shape cut out to the center of the plate for a hex motor coupler.
addHexHandle	Adds a handle to the top of the hex shape for easy plate lifting.
hexHandleHeight	Sets the height of the hex handle.
hxw	Sets the width of the hex shape cut out.
shaft_hole	Sets the diameter of the motor shaft hole.
shaft_slot_length	Sets the length of the motor shaft pin.
shaft_slot_width	Sets the width of the motor shaft pin.
$fn	Sets the resolution of the plate; use values between 50 and 100
collator_plate_d	Sets the diameter of the plate; AmmoMike83 plates are 147.5
bullet_caliber	Adds an offset amount to each hole for oversized bullets; use values between 1 and 1.5

BRASS COLLATOR PLATE SETTINGS

Here is a table of recommended settings for caliber specific and generic base up/down brass collator plates:

Setting	Base Down										Base Up	
	9	.40	Small Pistol	.45	.50	Large Pistol	.300	Small Rifle	.45-70	Large Rifle	Small Pistol	Large Pistol
description	Enter the text to appear on the top of the bullet collator plate.											
caliber	9	10.2	12	11.5	12.7	15	36	46	56	54	10.5	12.5
collator_plate_h	7			8							20	22
isLongRifleBullet	false											
addRamps	false											
isRifleBrassPlate	false						true				false	
rifleHoleWidth	0						9		12		0	
addPivots	false										true	
addSlides	false											
addRidges	true											
ridgeCenter	true											
ridgeAlternate	true											
ridgeHeight	2.5											
ridgeLength	30											
addBevel	false										true	
bevelSize	1.6											
hole_multiplier	1.5											
useClutch	true/false; this is an **optional** setting											
useHex	true/false; this is an **optional** setting											
addHexHandle	true/false; this is an **optional** setting											
hexHandleHeight	5											
hxw	12.4											
shaft_hole	10.1											
shaft_slot_length	29											
shaft_slot_width	5											
$fn	100											
collator_plate_d	180											
bullet_caliber	1.2											

BULLET COLLATOR PLATES SETTINGS

Here is a table of recommended settings for caliber specific and generic nose up/down bullet collator plates:

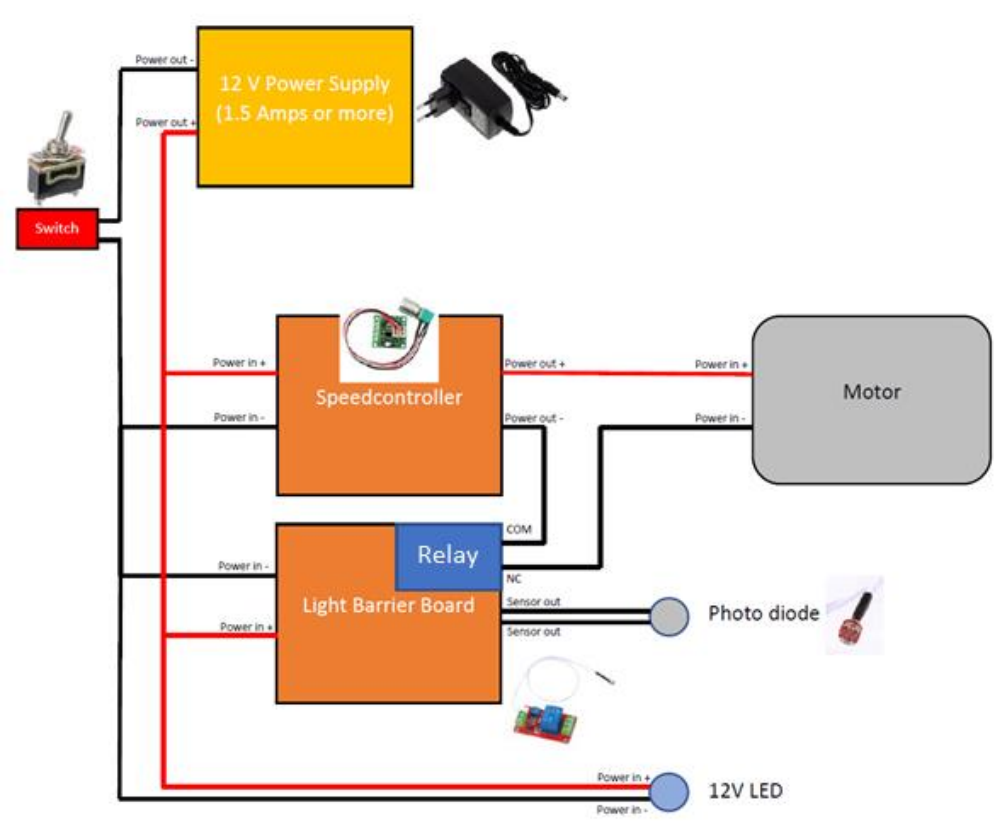
Setting	9	.40	.45	.50	Small Pistol	Large Pistol	.223	6.5	.308	Small Rifle	Large Rifle	Long Rifle
description	Enter the text to appear on the top of the brass collator plate.											
caliber	9	10.2	11.5	12.7	9	11.5	5.69	6.72	7.82	5.7	7.82	7.82
collator_plate_h	13						18					22
isLongRifleBullet	false											true
addRamps	false											true
isRifleBrassPlate	false											
rifleHoleWidth	0											
addPivots	false											
addSlides	true											
addRidges	true											
ridgeCenter	true											
ridgeAlternate	true											false
ridgeHeight	2.5											3
ridgeLength	30											10
addBevel	true											
bevelSize	1.4											
hole_multiplier	1.5											3
useClutch	true/false; this is an **optional** setting											
useHex	true/false; this is an **optional** setting											
addHexHandle	true/false; this is an **optional** setting											
hexHandleHeight	5											
hxw	12.4											
shaft_hole	10.1											
shaft_slot_length	29											
shaft_slot_width	5											
$fn	100											
collator_plate_d	180											
bullet_caliber	1.2											

APPENDIX

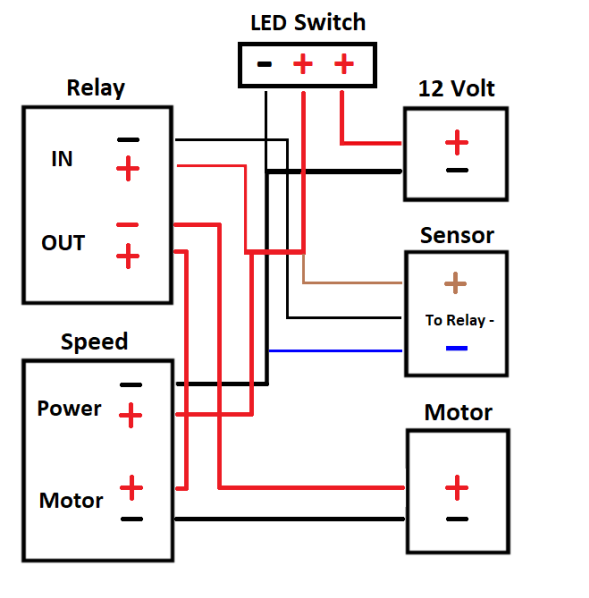
COLLATOR WIRING

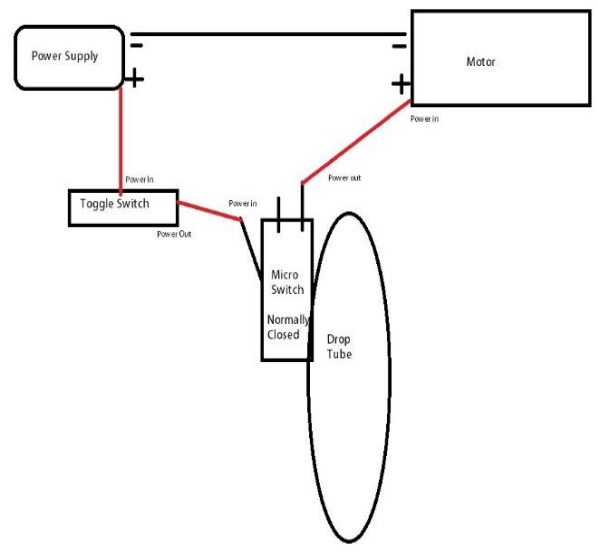
Here is a detailed video explaining the entire collator wiring process.

Here is a wiring schematic for the photosensor activated drop tubes.:



Here is a wiring schematic for the proximity and micro switch activated drop tubes:





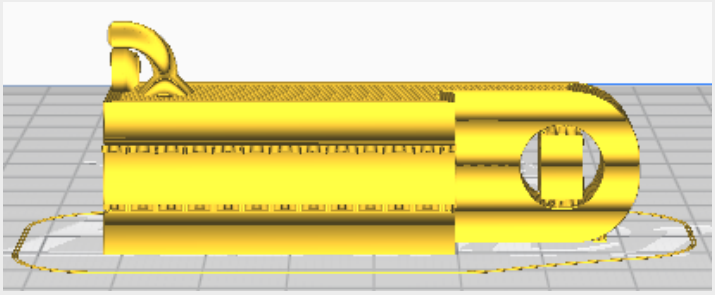
TROUBLESHOOTING

1. **My parts are not sticking to the print bed.**
   There are multiple causes and remedies for this situation. Try the following steps one at a time:
   i. thoroughly clean the bed with isopropyl alcohol
   ii. ensure the bed is level
   iii. check the print nozzle height; first layers should look “squished”
   iv. increase print and/or bed temperature in small increments
   v. use a brim or a raft
   vi. add a small amount of Elmer’s Purple Glue Stick to help with adhesion

2. **My prints are not coming out accurate and/or have defects in them.**
   Try the following steps one at a time:
   i. make sure the printer is calibrated according to the 3D PRINTER section
   ii. check to make sure the recommended print settings are being used
   iii. try a different brand of filament; we recommend Hatchbox, Overture, Sunlu, E-Sun, AMZ3D, … etc.

3. **My collator is jamming and/or not collating correctly.**
   Try the following steps one at a time:
   i. ensure the correct parts are being using
   ii. increase or decrease motor speed
   iii. increase or decrease collator tilt
   iv. adjust the slide plate further out by adding a screw to the hole on the rear of the plate

4. **The spring pin on the bullet slide is not adhering to the bed and/or breaks off during printing.**
   The bullet slide can be tricky to print due to the small surface are of the bevelled spring pin which contacts the bed. Therefore, we recommend printing it with a raft using the following settings:



If the raft doesn’t work, print the bullet slide on its side and ensure that the Everywhere option is selected in the Support Placement setting as shown in the above picture.

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