Camera Pan Tilt Head - Digital Bird

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VIEW IN BROWSER

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Summary

This is the Digital Bird three axis balanced pan tilt head part of the Digital bird motion control system.

Gadgets > Photo & Video

Tags: camera wifi cameramount esp32 remote dslr thingiverse cameraaccessory ptz motioncontrol cameramotioncontrol pantilthead ptzhead

Also check out the new DB3 PTZ head with OBS & vMix support here: https://www.printables.com/model/558734-digital-bird-db3_visca-pan-tilt-head-with-support-

This is the Digital Bird three axis balanced pan tilt head part of the Digital bird motion control system. The head can be used on its own or as part of the wider Digital Bird Motion control system. In order to use this head you will also need to build one of the two WIFI controllers found here: https://www.printables.com/model/326748-ptz-plus-camera-motion-control

or https://www.printables.com/model/326750-digital-bird-wifi-remote

Features:

• 360 deg. of continues rotation in the pan axis and 130 deg in the Tilt axis

• Capable of lifting a Tilt payload up to 3.5KG

• Automated mount/dismount via two buttons on the control panel

• Sony NP style batteries with 7.5v external power port

• 3rd axis support for Focus motor through RJ45 port

• Full feature interface though Digital Bird compact WIFI remote or PTZ remote

• OLED battery monitor and PTZ slave ID

• Battery lock for Inverted mounting safety

• Camera shutter control

Operating modes:

• A-B straight run

• A-B with acceleration controls (ramp/Ease)

• A-B-A Bounce mode

• Time-lapse mode with built in intervalometer and camera shutter control.

• Six key sequencer for more complex moves.

• Stop motion functions for animators.

• PTZplus real-time camera functions.

Links:

Component Kits : https://digital-bird-motion-control.myshopify.com

Software : https://github.com/digitalbird01/DigitalBird-Camera-Slider

Credits: This project makes particular use of two main open source arduino libraries for which I am very grateful

- gin66/FastAccelStepper A great resource for controlling multiple stepper motors with acceleration control on all steppers
- Seithan/EasyNextion Library An easy to use method of setting up and actioning commands from the Nextion displays.

Updates:

I have added an additional focus motor mount which allows the focus motor to be mounted on the right hand side of the camera where the motor is less obstructed. The mount parts are 18 & 19 glued together and must be printed as shown to avoid the tube mount simply splitting along the layer lines when tightened.

The mount fits under the camera L bracket and is held in place by the same 30mm long low-profile bolt used to secure the camera swiss clamp. Note however a longer RJ45 cable is required for this location. Part 005_100 the focus mount for the other side has also been updated.

Print Settings

Rafts:

No

Supports:

Yes

Resolution:

0.2 layer height

Infill:

Percent fill is the second part of part name so 001_60 = part 1 60%fill

Filament: Matt PLA Black & a colour

Notes:

Infill for each part is listed as part of the part name for example 001-60 required 60% fill.
Ensure you understand where supports are required on each part.

Parts are supplied in the correct orientation for printing.

Non Plastic Bill of materials

Bolts

- M5 cap head 45mm long -Pan shaft x1
- M4 cap head Bolts 20mm x1-Tilt tensioner hub bolt
- M4 cap head Bolts 25mm x2 - battery bay
- M4 cap head Bolts 45mm x1 - Top cover
- M1.7 Self tapping screws 10mm long - PCB mount x2
- M1.7 Self tapping screws 6mm long - PCB mount x4

- M5 low profile bolt 30mm x 5 - control bay
- M5 low profile bolt 15mm x 1 - Pan tensioner
- M5 low profile bolt 20mm x 1 -Base
- M5 low profile bolt 50mm x 2 -Tightening Key & Tilt Axle
- M5 Nuts x2
- 7x4x1 washer x2
- 10x5x1 washer x2
- 1/4 -3/8th Camera screw adapter x1
- 5/8 -3/8th Camera screw adapter x1 (Also commonly known as a microphone adapter)
- 1/4-inch x 3/4-inch Countersunk Flat Head Hex Socket Cap Screw
- M5 Lever bolt x1 -for focus motor tube clamp

Belts & Gogs

- GT2 6mm wide Closed loop timing belt 360mm for Tilt
- GT2 6mm wide Closed loop timing belt 200mm for Pan
- GT2 Pulley 20 Teeth 5mm bore 6mm Width for Nema 17 Stepper
- GT2 Pulley 16 Teeth 6mm bore 6mm Width for Nema 11 Stepper

Bearings:

- (10x4x4) x 3
- 61806 2RS ZEN Sealed Deep Groove Ball Bearing 30x42x7mm x 2
- 625 2RS ZEN Sealed Deep Groove Ball Bearing 5x16x5mm x1
- 6811 2RS bearing 55x72x9mm x1

Electronics:

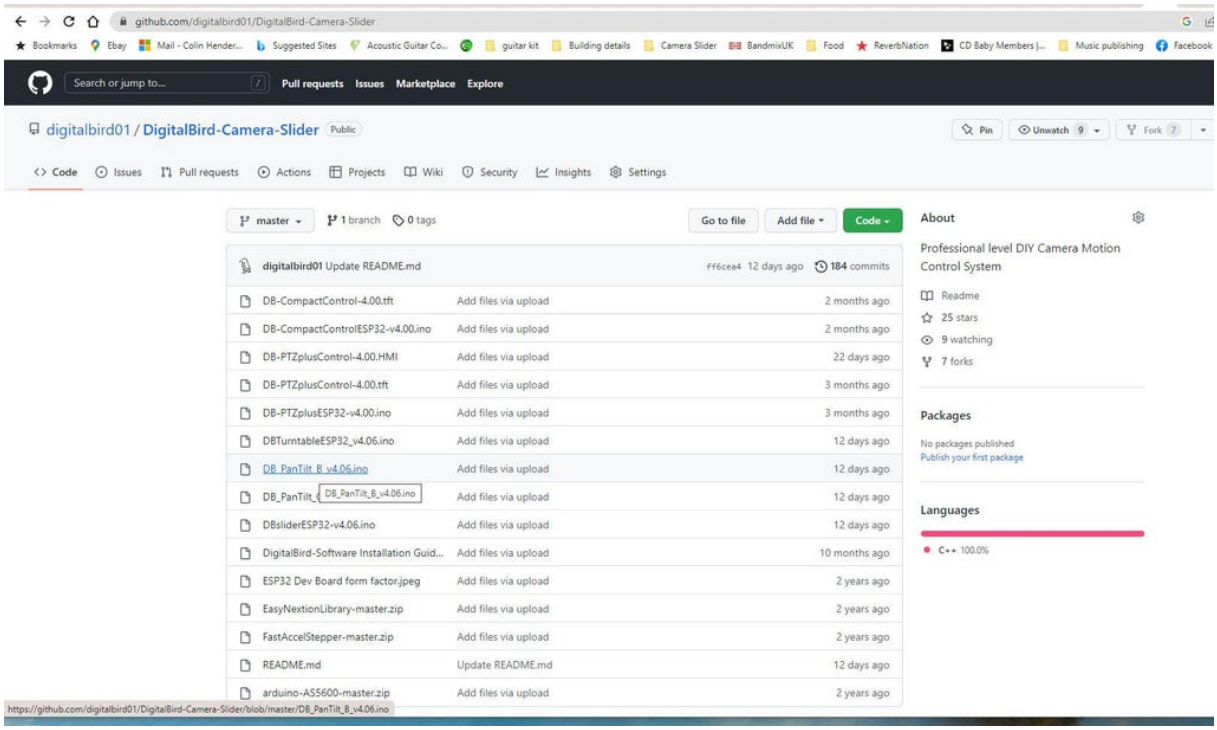
- Digital Bird Mainboard with ESP32
- Shutter cable 2.5mm Stereo Jack socket & Cable
- Thumb Joystick with cable x 1
- Power Cable 210mm with DigitalBird NP Battery Terminals
- Switch Cable 150mm with two twitches
- Power switch harness 150mm long x1
- Aux power harness with 150mm cable
- OLED Display 0.49 Inch 128x32 res & Cable 180mm long
- Magnets 8x3mm x 3

Stepper motors:

- Nema 11 Stepper Motor Bipolar L=51mm w/ Gear Ratio 19:1 Planetary Gearbox Part Number: 11HS20-0674S-PG19
- Nema 17 Bipolar 45Ncm (63.74oz.in) 1.5A 42x42x39mm 4 Wires Part No. 17HS15-1504S-X
- Arca Swiss clamps:
- Andoer Quick Release Plate Clamp for Arca Swiss Tripod Ball Head Quick Release Plate

- Neewer 38 mm Screw Knob Aluminium Quick Release Clamp
- Arca swiss camera L Bracket 110mm or longer

Software Installation



If you have purchased the digital bird kit then the main board will come pre installed with the most up to date software.

If however you are building everything up for yourself on the back of a generic Digital Bird main board you will need to download and install the software yourself. In any case it is likely you will want to keep your system up to date with the latest software releases. If you are building the system from scratch make sure you read to step26 for additional wiring and setup information.

The software for all parts of the system can be downloaded free from the Digital Bird GitHub repository here: https://github.com/digitalbird01/DigitalBird-Camera-Slider

1. If you haven't done so already your first step is to download the contents of the Digital Bird code repository from GitHub this is the link.https://github.com/digitalbird01/DigitalBird-Camera-Slider.git
2. Click on the green “CODE” button top right and select **<Download Zip>**
3. Unpack the ZIP file to somewhere you will remember on your system but do not unzip the zip files contained in that top level folder. This folder contains all the Digital Bird specific software you need to install

the system but be aware the project is still under development and you should check back for future updates and bug fixes.
4. Read the installation guide provided in the folder and titled 'DigitalBird-Software_Installation_Guide.pdf'

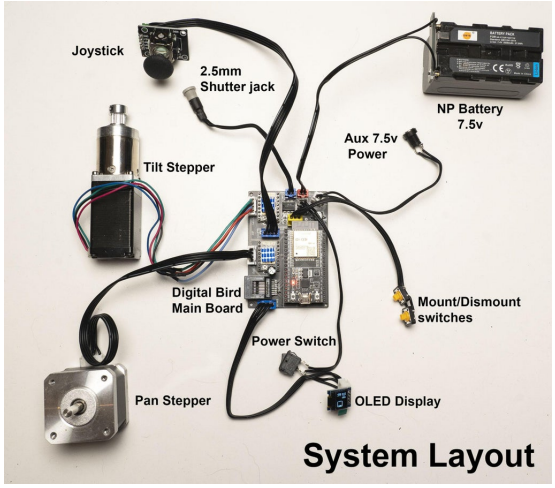
Or click on this link to read it know: Digital bird Installation guide

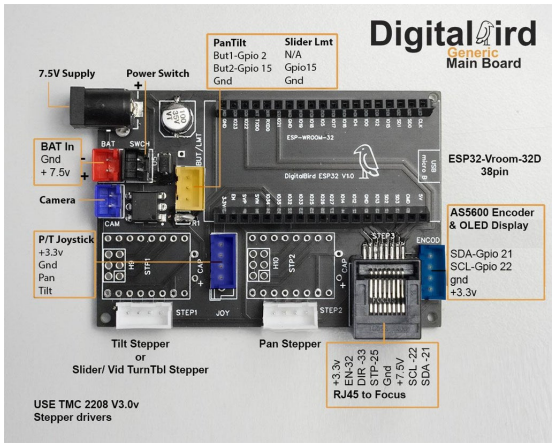
Digital Bird Generic mainboard

The same generic main board is used on all the devices except the DB3 head is available here: https://digital-bird-motion-control.myshopify.com either as a simple board for you to build up from scratch or as part of a more comprehensive kit.

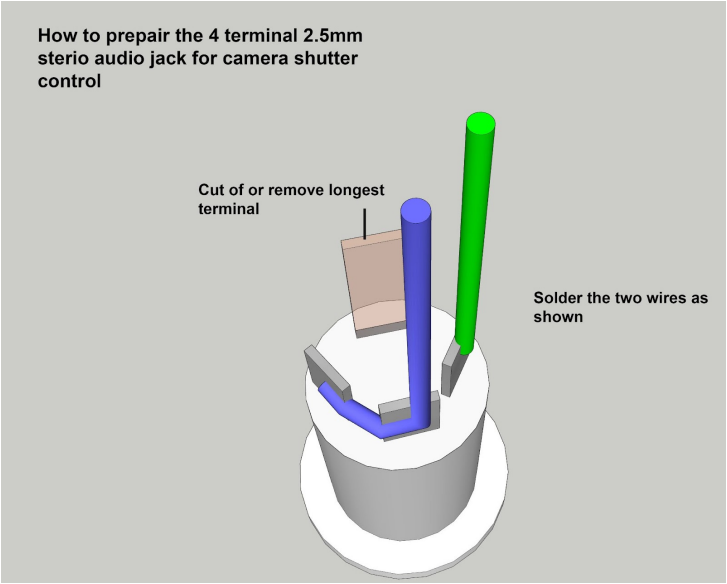
Additional Notes for Scratch Builders

The Digital Bird Kits are good value for money taking a lot of work out of the project for you and removing much of the pain of scratching around the internet looking for the correct small parts. If however you are happy to work from scratch I do provide the Generic main board used on all the Digital Bird devices except the DB3 head which requires a larger board with additional features. The following notes are for those of you working from just the generic mainboard.





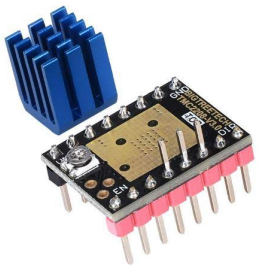
Wiring the 4 pin 2,5mm Shutter Socket



Resistor patch

Main boards are now supplied with a resistor patch on the back which allows us to use the OLED display as a battery monitor and PTZ ID status for the device. The resistors used are a 330 ohm and a 220 ohm. Future versions of the board will do away with this patch and provide additional device ports however for now it requires the patch.

TMC2208 v3.0 stepper drivers



Important note:

If you are building the board up to be used on one of the pan tilt heads these drivers should be soldered directly to the main board with no pin risers. This is because space in those devices is at a premium.

All the other devices using only one driver can be mounted on the single set of pin risers supplied with the boards.

The two capacitors provided loose with the generic main board should be installed one for each driver with the negative side facing in towards the ESP32 board. When Risers are being used on the single stepper configuration this capacitor can be bent over on its side below the driver.

The pan stepper motor cable provided in the kits comes configured for **ABAB** Nema 17 motors commonly used for 3D printers. However if you purchase your motors from steppers online for example your motor may be configured **AABB**. If this is the case you will find that your motor will not spin but simply judder back and forward on the spot. The solution is

simply swap the two outer cables over on the main board end of the supplied Pan stepper cable. If you find any of the motors are working but turning in the wrong direction simply reverse all the cables to reverse the direction. From behind the camera when you pull back on the joystick the camera should tilt up. Looking from above when you move the joystick to the right the head should turn clockwise to the right. **(Note another reason your motor may judder like this is if you have a bad connection on one of the 4 wires)**

Tuning the drivers Vref to the motor

Stepper drivers need to be tuned to the requirements of the motor thay are driving. Otherwise they may become very hot in operation and reduce the life of the driver and the motor This is achieved using a simple Voltage meter.

1. Install the drivers on the board ensuring that the small adjustment screw on the top is alongside the capacitor position. Do **not** plug in your stepper motors. Use a 7.5v NP style battery to power the board. Do **not** power the board using the usb port on the ESP32.
2. Power up the board and carefully place your black meter probe to the board's earth. (I use the earth on the Auxiliary power port) And the red probe on the small screw on top of the stepper driver. On the meter you can now read off the Vref voltage the driver is set up for by default typically around 1.2v.
3. Using a small flat head screwdriver Turn turning the small screw clockwise in very small steps will reduce the Vref voltage down to the voltage we require to drive our steppers. For the **Nema17** steppers this should be about **0.9v** The **Nema11** stepper should be set for **0.6v**

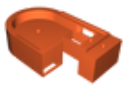
This remix is based on

Camera Pan Tilt Head - Digital Bird

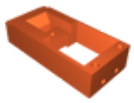
by colinh3D

Model files

001_60.stl

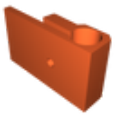


002_30.stl



003_25.stl

004_100.stl

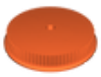


005_100.stl

006_100.stl

007_30.stl

008_100.stl

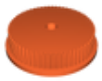


009_100.stl

Re-modelled to improve print quality

010_100.stl

011_100.stl



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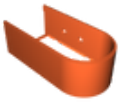
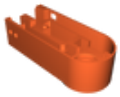


013_30.stl

014_100.stl

015_100.stl



016_30.stl

Updated with new Tilt belt tensioner arrangement

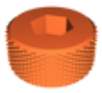
017_30.stl

018_100.stl

Updated 16-10-23

019_100.stl

Updated 16-10-23



020_100.stl

021_100.stl

New Tilt belt tensioner block to be glued into part 016-30

Find source .stl files on Thingiverse.com

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