

RC Mark Version 3

Why another Version?

Version 2 worked very well but required a lot of maintenance - in particular the small underwater gearbox needed to be drained and greased regularly. There were some comments about the lack of performance when driving into big wind with chop. From a practical view the body required a printer with a large plate. I also had a comment about the mark being hard to assemble.

With all this in mind I set about re-designing the mark with the following in mind:

Dimensions	Total Weight including anchor (900gm) approx 3.5 Kg. 400mm Diameter, Base to lid 160mm not including flag, Base to bottom of thruster 100mm,
Prints on a 250 x 250 Printer plate	I Used a Bambu Labs P1S - Printed in 4 quadrants which are then bolted and/or glued together. Bolt holes and location lugs well above flotation line to prevent leaks. overall width now 400mm. Quadrants can be printed in different colours to show if mark has been hit. Each quadrant's side bulkheads are at least 60mm high - well above flotation line
Mark sits higher	This version is at least 150mm from base line giving more room inside and make it easier to put any joining lugs/bolts above the flotation line.
More performance	Using a single Thruster running at 14.8 volts from a 4S Lipo Battery
Directional Stability	Single Thruster and rudder so no differential steering which gives better directional stability. Making the mart bigger also helps.
Winch System	Redesigned to be more compact - can now be used in other designs if required. Uphaul cut off system has been refined so that the cut off does not cycle when the anchor ball is fully retracted. The anchor ball now retracts fully into the body.
No protrusions	Catches for lid and lifting eyes designed to be hard to catch with a passing mainsheet or backstay.
No holes below water line	Except for the anchor hole which is now 80mm deep to prevent water ingress. There is one hole for the thruster cables but it is a tube which opens 100mm above the base - again to prevent water ingress.
Flexibility to change parts	I have included numerous 3 and 4mm inserts so that any user can create and use their own models. The FreeCAD files are also available on request. The motor mount is a sparate module which bolts to the main body so other motors can be used and only need to design a mount.

Any feedback greatly received to: robinpgray@gmail.com

Work on this project is always ongoing - in particular I would like to completely stop the ingress of water. It is not a big problem, just slightly annoying. I am now sheathing the base joints and painting the side of the mark with epoxy to stop any filament adhesion leaks between layers. Any thoughts on this will be well received.

I would appreciate seeing pictures/video if you do build or modify this design.

Licensing is free - It is not intended that this mark or derivatives should be sold, rather used to help the radio sailing and racing community.

Robin Gray

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3D Printed Mark Ver 3

For Bambu Labs Printers - the .3mf file available which includes all stl files required

File Name	Filament Required incl support			Comments
	Qty gms	Qty m	Print time P1S	

Main Body Parts

Do Not use tree support with quadrants - can fail

Mark Body Port Quadrant	342	113	7h50m	Winch Quadrant
Mark Body Aft Quadrant	404	133	9h48m	Steering servo and rudder post
Mark Body Starboard Quadrant	374	123	8h30m	Battery storage
Mark Body Fwd Quadrant	398	131	9h22m	Thruster plus most electrics

Main Body Lid

Mark Lid Aft Section	109	36	2h19m	Lid sections bolted and glued together
Mark Lid Fwd Section	109	36	2h 19m	Lid sections bolted and glued together
Flag Mast Base	See Yellow list below			Glued on
Flag Mast Swivel	See Yellow list below			Attach/Glue Flag to this
Flag Mast	See Yellow list below			
Flag 024	See Red list below			Better to use Ripstop or similar
Mark Lid Turn Tab	See Yellow list below			Helps to turn lid to secure position
Alternative lid fastner bracket				Use if not using the electrics bracket

Winch Assembly

Winch Assembly Baseplate	See Grey list below			
Winch Assembly Spacer tube	See Grey list below			
Winch Servo Gear Wheel	See Yellow list below			
Winch Spool LHS	See White list below			
Winch Spool RHS (Gear)	See White list below			
Winch Servo Pivot Arm	See Grey list below			Switches power off to Hauling motor via microswitch

File Name	Filament Required incl support			Comments
	Qty gms	Qty m	Print time P1S	

Anchor Well Lid

Anchor Well Lid	See Grey list below			Print with sloped side of sheave down
Anchor Haul out off pivot arm	See Grey list below			Print on side
Winch Assembly Splash Guard	See Grey list below			Snap in to lid - do not glue or unable to remove pivot arm

Motor and Other Parts

Electrics Bracket	See Grey list below			Holds most electrical components
ESC Bracket	See Grey list below			To suit thruster's 40A ESC (Glued on)
Battery Box 2200 4S	See Red list below			This is for a 4S 2200MaH Lipo Battery
Battery Clip	See Red list below			
Mark Body Motor Mount	See Yellow list below			To suit the green Thruster
Rudder Blade	See White list below			
Rudder Skeg	See Yellow list below			
Template Motor Mount				Help align heat inserts for motor mount

Quantities for parts of same colour printed together

Yellow Bits	102	34	3h2m	
White Bits	60	20	1h56m	
Red Bits	49	16	1h11m	
Grey Bits	255	84	7h35m	

Overall Totals	2202	726	53h 52m	
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3D Printed Mark

Prices in GBP July 2025

Item Ref	Item description		Quantity	Cost	Approx. Cost per Mark GBP
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Main Body

1	Connector bolts	4 x 10mm Bolts + lock nuts	12		
2	Fibreglass Glass Cloth	Very small amount			
3	Epoxy Resin	Approx 130g			£ 3.90

Main Body Lid

4	Water Ingress Rubber	AliExpress 2mm silicon rubber	1.2m	£ 7.34 for 10m	£ 0.88
5	Heat Inserts	3mm diam x 6mm	20		
6	Heat Inserts	4mm diam x 8mm	15		
7	Locking Knob	4mm x 25mm Hex Bolt			

Winch Assembly

8	Stainless Steel 8mm dia x 120mm machine screw plus washers and nyloc nut		1		
9	Bearings 8mm internal diam x 22mm x 7mm (Skateboard bearings)		2	£ 7.48 fo 16	£ 0.94
10	Winch Servo	Servo 35Kg (Wired direct to motor)	1	£ 10.59	£ 10.59
11	Anchor Drop Servo	MG996R or similar	1	£ 2.57	£ 2.57
12	Anchor Line	2mm Polyester rope (Polyester sinks)	10m	£ 19.00 for approx 300m	£ 0.63
14	Anchor	2lb (900g) Spherical Fishing weight	1	£ 7.50	£ 7.50
15	Dish scrubber pad	Any supermarket	1	£ 0.10	£ 0.10

Anchor Well Lid

16	Pivot Bolt	SS 8mm x 30mm plus washers and Nyloc Nut	1		
17	Pivot Pulley with bearing	Round U Groove 608 2RS Bearings Guide Pulley	1	£ 3.95	£ 3.95
18	Microswitch		1	10 for £ 9.49	£ 0.95
19	Microswitch attachment	3mm x 20mm Buttonhead	2		
20	Switch arm pivot	3mm x 40mm Buttonhead	1		
21	Switch Arm adjustment	3mm x 16mm Hex Head	1		
22	Lid attachment	4mm x 10mm Buttonhead	4		

Motor, Electrics and Other Parts

23	Thruster Motor		1	£ 20.62	£ 20.62
24	40A ESC Brushless for thruster		1	£ 16.78	£ 16.78
25	Battery 4S Lipo		1	£ 38.65	£ 38.65
26	Transmitter & Receiver	Flysky FS-i6/FS-IA6B (Mode 2)	1	£ 35.61	£ 35.61
27					
28					
29	Electrics Bracket	3mm x 8mm Buttonhead	6		
30	Skeg Attachment	4mm x 10mm Buttonhead	4		
31	Rudder post	3mm S/S rod approx 180mm	1	£ 11.76 for 10	£ 1.18
32	Motor Mount	4mm x 20mm Buttonhead	6		
33	Thruster to Mount	3mm x 12mm S/S Self Tapping Screws	3		
34	Battery Box Attacment	3mm x 8mm Buttonhead	2		
35	Miscelleaneous JST, XC60 wiring and connectors say				£ 8.00

36	All stainless steel nuts, bolts washers etc. bought from Kayfast (UK) Approx total cost				£ 20.00
37	Filament used (including support) approx 2.2KG - Say				£ 26.00

Approximate Total Cost

£ 198.85

3D Printed Mark

Some links to suppliers (I am UK Based)

Item
Ref

4	https://nl.aliexpress.com/item/32900174177.html?spm=a2g0o.order_list.order_list_main.42.4ea61802TyJYbu&gatewayAdapt=glo2nld
5	Search AliExpress for "heat inserts"
9	https://www.ebay.co.uk/itm/203874138324
10	Search Ali Express Servo 35Kg
11	Search AliExpress Standard Size servo
12	https://www.ebay.co.uk/itm/292401211527
14	Search Cannonball fishing weight or local fishing shop
17	https://www.ebay.co.uk/itm/202069620243?var=502065604349
18	Search Aliexpress for V-151-1C25
23	https://www.ebay.co.uk/itm/235115656312?var=535098293820
24	https://www.ebay.co.uk/itm/235115656312?var=535098293823
25	https://www.ebay.co.uk/itm/231955618124?var=531158291588
26	Search FlySky FS 16 Mode 2 plus FS iA6B receiver
27	
31	https://www.ebay.co.uk/itm/295202617258
36	https://www.kayfast.co.uk/category/1/all-products

3D Printed Mark Version 3

Links to YouTube videos

Seatrials day for Version 3 RC Mark

<https://youtu.be/Vbzp3XCz5i8>

Link to demo video Version 3

<https://www.youtube.com/watch?v=1Z3iKDESS68&t=47s>

Link to Assembly Video Version 3

https://www.youtube.com/watch?v=tVA_ieX68w4&t=1560s

Link to video on winch operation Version 3

<https://www.youtube.com/watch?v=yx4z4K5lj2c&t=132s>

Link to Electrical upgrade video Version 3

<https://www.youtube.com/watch?v=N-IH0XWE2r0&t=26s>

Link to North Down Model Yacht Club Facebook page

<https://www.facebook.com/groups/ndmyc>

Link to my Facebook page

<https://www.facebook.com/robin.gray.1654/>

Older Version videos

Evolution of the R C Mark up to Ver 2

<https://youtu.be/qqSzoXrNOL0>

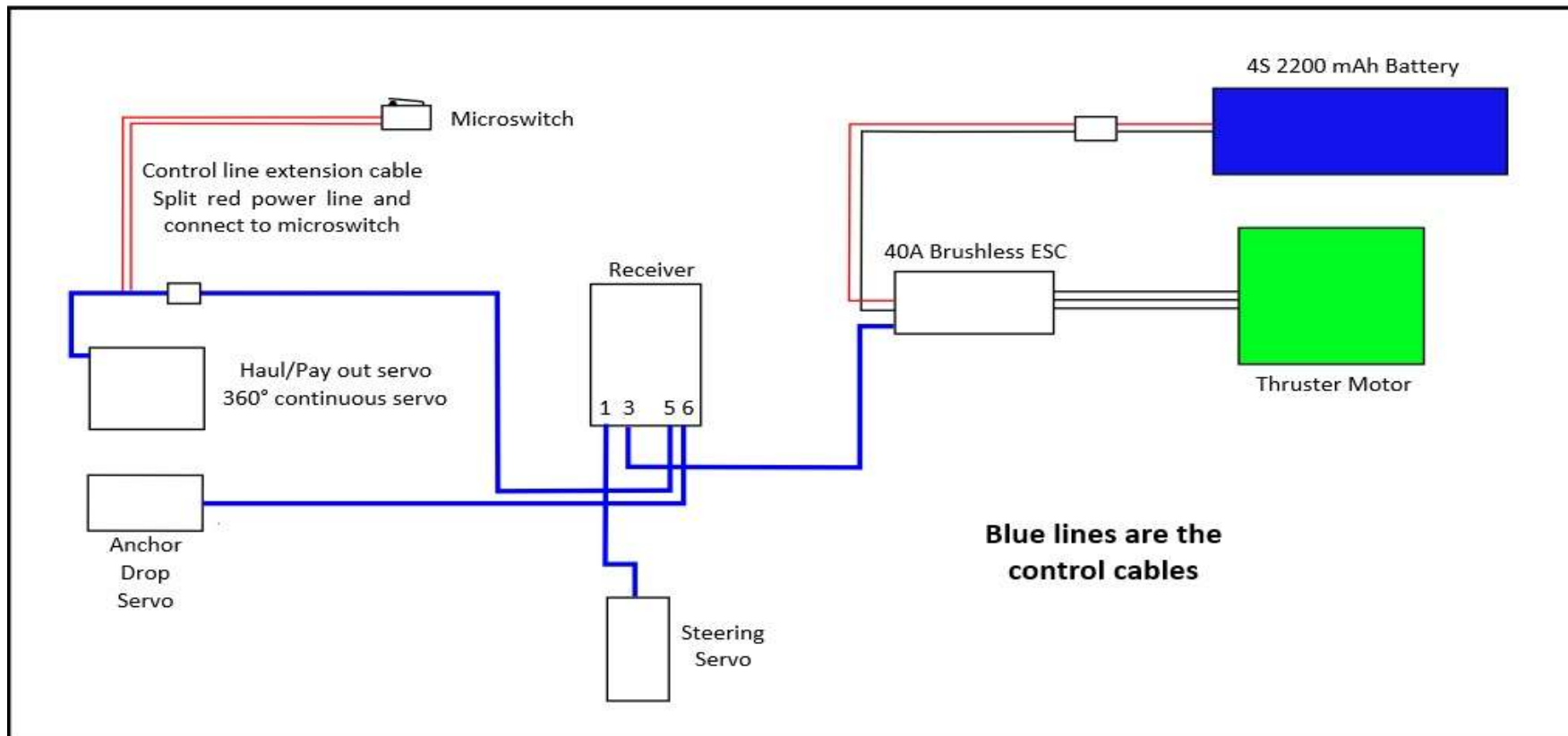
Link to Video of original (wooden) version

<https://www.youtube.com/watch?v=YBdlvV8qRWA>

Link to the how it works for original version

<https://www.youtube.com/watch?v=LKm29JYT0Tg&t=5s>

RC Mark Version 3 - Wiring Schematic - Updated Nov 2025



Receiver Setup

- | | |
|-----------|---|
| Channel 1 | Steering Servo |
| Channel 2 | ESC for Thruster (and power supply for receiver from ESC) |
| Channel 5 | Haul or pay out servo (360° continuous servo) |
| Channel 6 | Anchor Drop Servo |

Transmitter Setup

- Allocate Channel 5 to Source SwC (3 way switch)
- Allocate Channel 6 to Source SwD

On switching on Transmitter - all switches must be in up position.

Before switching on Receiver - switch SwC to central position to avoid it running the winch.