

Ball Bearing Blue Switch Review

-ThereminGoat, 3/24/24

It still amazes me that even after well over a hundred years of time has elapsed and countless societal, technological, and cultural changes have taken place, that we here in the United States are still somehow willing to engage in the barbaric practice of “Daylight Savings” time changes. That’s right – after a few weeks of struggling to adjust my sleep schedule and general concept of time – I am sick of the idea of clocks changing forwards, backwards, sideways, or really any direction that messes with my sleep schedule. I, as a self-centered American, have even less sympathy for the farmers that this was supposedly all started to assist. I don’t even know a farmer; much less could I ever dream of getting to know one when I can’t sleep straight two different months out of the year. Hypothetically speaking, if farmers were working less because of our fixed times, and were thus making less food, I would probably be eating less and also losing some weight, which is nothing but an upside if you ask me. For what it’s worth, I’m not partial to either of the particular “times” to be chosen from either in Standard vs. Daylight Savings. All I want is for us to pick a time, stick with it, and suffer whatever consequences may come with that down the line. Right now, the only consequences I could see is my electricity bill being marginally higher a couple of months out of the year.



Figure 1: Hell, even this idea from XKCD would be more acceptable.

All sleep-deprived rants about clocks springing forwards and backwards aside, I am managing more or less fine in my new role at my current company and haven’t been falling asleep at my desk too often. As alluded to at the end of Meta Update VI, the past few months have been rife with work-related stress but all of that has been more or less resolved by this point and I feel like I’m progressing rather well in my new position. Further re-establishing the normalcy of the world, I’ve also grown quite the backlog

of modern switches that I need to add to the collection, photograph, and document as well. Yes, even in spite of the family photo of my collection that I did take for the Meta Update/birthday of the website just a few weeks ago, I am yet again in a hole filled with switches and trying to dig my way out. In fact, these particular switches here were among some that I had been meaning to talk about, share, and document at length for at least a month or so now but haven't had the time due to other content being posted and/or falling asleep at random parts of the "day" like I have narcolepsy. Rest assured though that even though they may *look* a bit plain, their alliterative name is far from the most interesting details about them...

Switch Background



Figure 2: The search for background information about the Ball Bearing Blue switches.

...And that is because the details that are the farthest from the most interesting about these switches are their historical background notes. In my desperate search to find out damn near anything about them, all I kept mentally picturing after search upon search was Dark Helmet's troopers searching through the desert in that iconic Spaceballs scene. Much like those poor troopers out in the sweltering heat, I too ain't found shit. About the only thing that I *can* say for certain is that these 'ball bearing' switches popped up for sale at the tail end of 2023 on a singular TaoBao page and more recently on KBDFans as of the start of 2024. Referred to by a whole slew of names including 'Roller Linears', 'Gold Inlaid Linears', 'Ball Bearing Metallographic Axis', and just 'Ball Bearing' switches, these uniquely designed linears have absolutely no context surrounding their release, let alone a coherent name to refer to them by. As well, I, nor any switch collector I know for this matter, is certain as to who is manufacturing these switches or where they are coming from beyond the TaoBao and KBDFans sales pages. There

sales volume	Number of
Keyboard switch- ¥ 20.00 22 items sold	
Keyboard switch- ¥ 40.00 1 piece sold	
Keyboard switch- ¥ 20.00 0 pieces sold	
Keyboard switch- ¥ 40.00 0 pieces sold	
Keyboard switch- ¥ 388.00 0 pieces sold	

Keyboard switch key electronic ball

A total of 8 matching products were four

show: Sort by: Popularity

Keyboard switch-with ball metallographic axis-linear axis

¥ 17.00 **excerpt** ¥ 2-50

Sold: 22 pieces

Figure 3: Snapshot of Ball Bearing switch sales page on TaoBao. This was originally translated as "Ball Bearing Metallographic Axis" at one point.

are marginally substantiated rumors that these were made either partly, or fully by relatively new switch manufacturer KeyGeek based on their teasing of a switch with this design back in July of 2023, though beyond this post there's effectively *zero* understanding about the history nor origin of these switches. About the only contextually relevant things that can be shared here are photos of the storefronts selling these switches as well as an exploded-part diagram that came from the TaoBao sales page, as well.

手感类型/Feel type: 线性轴/Linear Switch
触发行程/Pretravel: $2.0 \pm 0.3\text{mm}$
总行程/Total travel: $3.5 \pm 0.3\text{mm}$
触发压力/Operation force: $40 \pm 5\text{gf}$
触底压力/Total travel force: $50 \pm 5\text{gf}$
寿命/Durability: >50 million
厂润
5颗/单

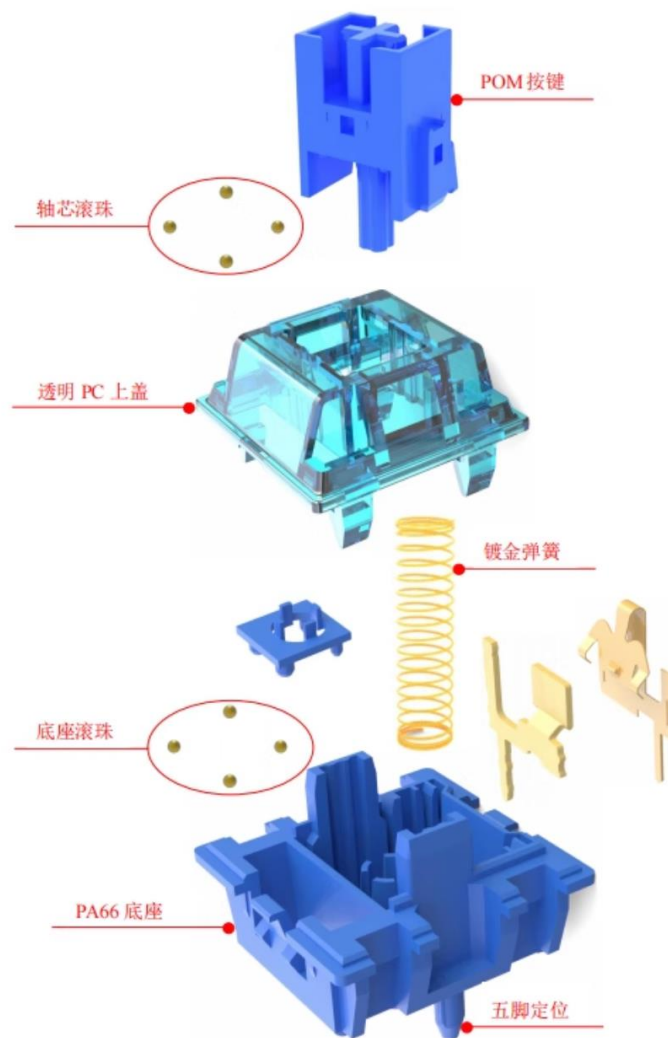



Figure 4: Ball Bearing Blue switch blowout and specs from original TaoBao listing.

Home > Roller Linear Switches



ROLLER LINEAR SWITCHES

\$6.00

There are 56 people on the waiting list, click the button below to join! We will notify you by email when the product available

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SKU: ZH16102
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Figure 5: KBDfans Ball Bearing Black switch sales page, labeled as "Roller Linear" switches.



Figure 6: Discord post by KeyGeek showing off a switch with identical design details to those noted in the Ball Bearing switches.

In the pursuit of buying and collecting these Ball Bearing switches alongside me, my proxy in SwitchOddities has come across quite the variety of colors that have been released without any nominative differentiation between them. In addition to the all-black version on KBDfans and yellow-ish ones shown above in Figure 5 that neither he nor I have in hand, so far there has been Grey, Clear/Pink, Blue, Blue/Pink, and Pink colored variants of these switches documented. As well, weird variants with silencing pads and plastic ball bearings instead of metallic ones were included, at random, in orders that were placed by SwitchOddities. While it's not necessarily outside of the realm for manufacturers to toss in samples of new and upcoming designs to people who are placing orders as large or as frequently as he is, it's basically unheard of for them to do so with zero notice or information about what was included in the package. Everything from the details about the switch to the seller's own behavior appears to be fueling the mystique behind these switches. As of the time of writing this review, the only place that the Ball Bearing switches remain in stock is on their TaoBao storefront, as both the KBDfans and AliExpress extensions of these switches are sold out and/or with 'Notify Me' buttons up in place of a checkout option. Pricing, like all things about this switch, are variable and uncertain though KBDfans has their original listing priced at \$6.00 per 10 switches, or \$0.60 each.



Figure 5: Ball Bearing switch family photo from my current collection.

Ball Bearing Performance

Note: With the sparse amount of details available about these switches, I can not definitively state if these are identical in design to the other colored linear variants above. From brief testing, these all appear to be more or less similar and thus you can read all discussion below, minus that about weighting, and assume it to be more or less fitting for most other Ball Bearing switches.

Appearance

Viewed from a ridiculously far away distance, the Ball Bearing Blue switches effectively just look like any other modern, MX-style switch with a translucent blue colored top housing that matches the opaque, middle-of-the-road blue stem and matching bottom housing. However, upon any closer inspection, these switches immediately stand out from the crowd due to their more square, boxy-style top housings. Reminiscent of other 'big top housing' switches like the Zeal 3-in-1 Clickiez, Taiwan Jet Axis, and ProWorld Blacks, the Ball Bearing switches feature near N/S half symmetry in their otherwise

unbranded top housings. Unlike those other switches with large top housings, though, the Ball Bearing switches do not appear to have any functionality that *necessitates* the added space over where the LED/diode slot would be in a traditionally designed MX-style switch. Beyond this weird design quirk, though, there are no other outwardly identifying details that help differentiate the Ball Bearing switches from other MX switches. (As if you would struggle with separating them based on shape, alone.) All details of note about the design of these switches, as numerous as they may be, can be found in the following paragraphs.

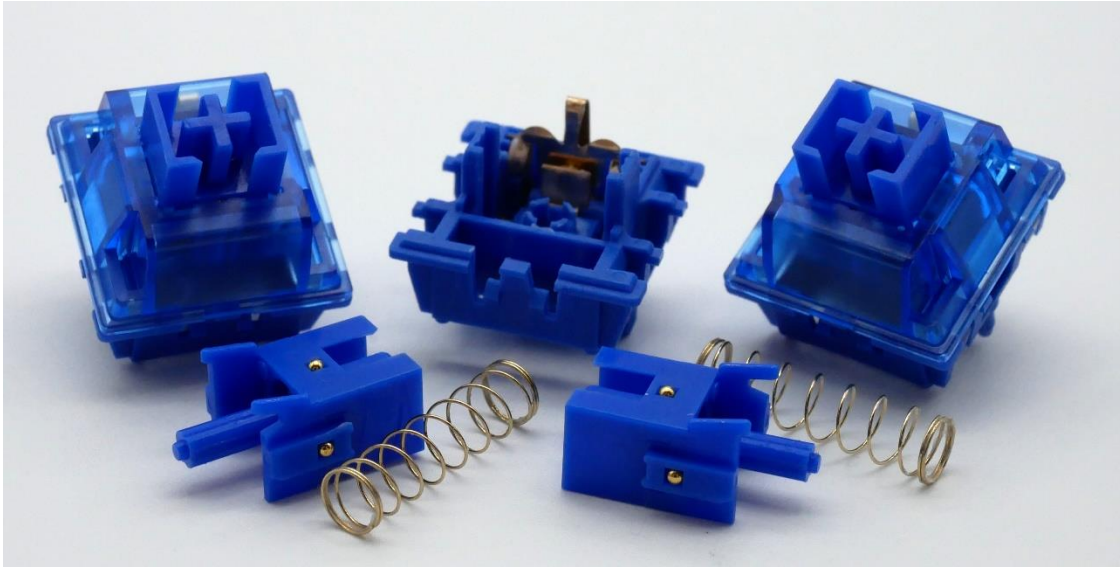


Figure 6: Ball Bearing Blue switches and their components.

Looking first to the top housings of the Ball Bearing Blue switches, their external design is rather plain and unadorned in spite of their fundamentally different structure. The near symmetry between north and south halves of the external design is broken by the south portion, where the LED/diode slot would normally be, having a slightly more angled face on the front than the north side which is where the nameplate region would be. The differences between north and south side are also somewhat noted internally insofar that the north side guider rail wall has two notches cut out in the left- and right- hand sides to accommodate the smaller, bent portions of the leaves whereas the south side is one solid, flat wall. In spite of what it may seem from the photographs, the housings are *not* reversible as the smaller halves of the leaves are effectively pinched from moving by the full wall on the inside of the design. Both internally and externally, these housings feature no mold markings that I could find after thorough inspection. About the only details which demonstrate their injection-molded origins are that of mold ejection marks present on the upper, internal rim of the top housings.

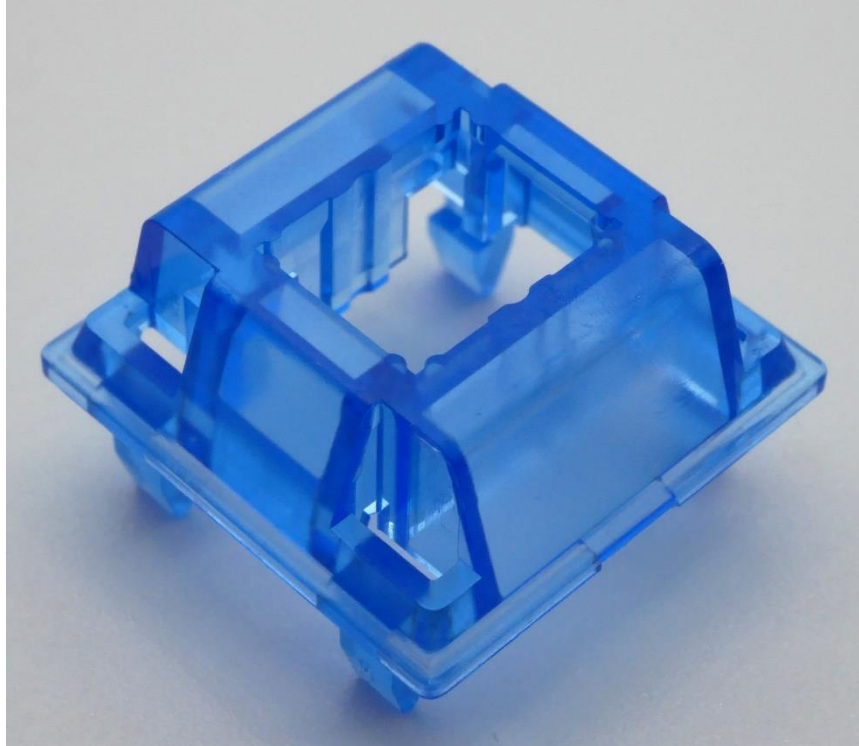


Figure 9: Ball Bearing Blue top housing external design showing boxy structure over LED/diode slot location in traditional MX-style constructions and lack of overall distinguishing features.

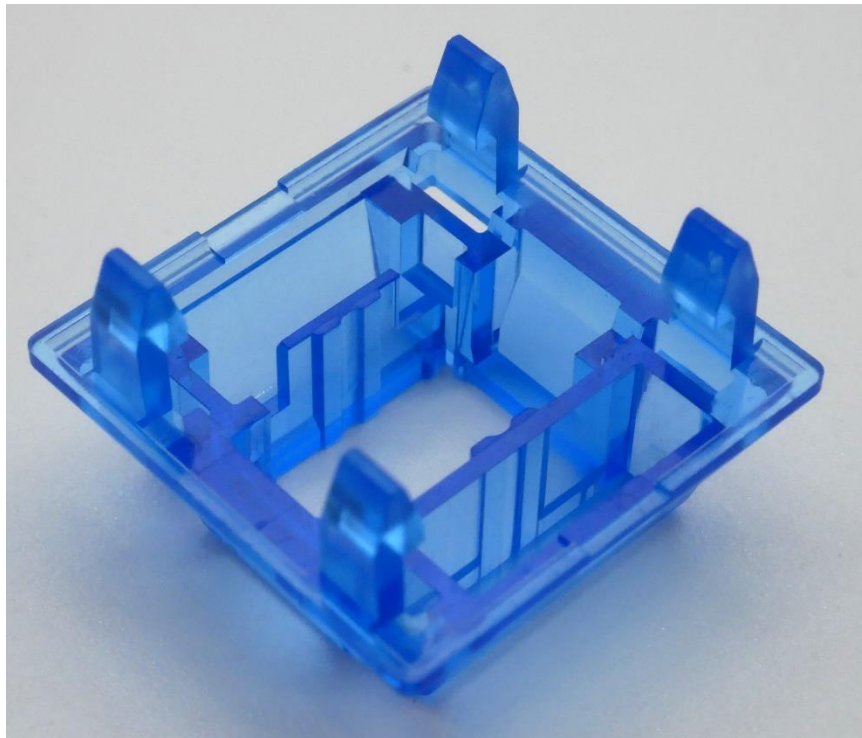


Figure 10: Ball Bearing Blue top housing internal design showing minor differences between north- and south-side constructions to accommodate leaves.

Moving next to the stems of the Ball Bearing Blue switches, this is where the details begin to get quite a bit interesting. Structurally, the stems appear to be rather similar to that of an average, dustproof-style stem, though they feature golden, metallic ball bearings that are trapped in recesses in the front plate, back plate, and both slider rails of the stem. Protruding from these surfaces, these roller balls are able to articulate and are functionally designed to be the only points of contact between the stem and the bottom housing, thus greatly reducing plastic-on-plastic friction and scratch. If viewed closely enough, each of the four sides of the stem appear to have lines which form a layer-like pattern surrounding the cages in which the roller balls are trapped, suggesting that the balls are not pressure fit, but rather somehow trapped and then piece-meal caged in by top to bottom stem construction. In spite of this design style, though, these 1.00 mm diameter ball bearings do appear to come loose rather frequently and should be assumed that if the switches are to be opened that a substantial number of roller balls will be lost into your carpet in the process.

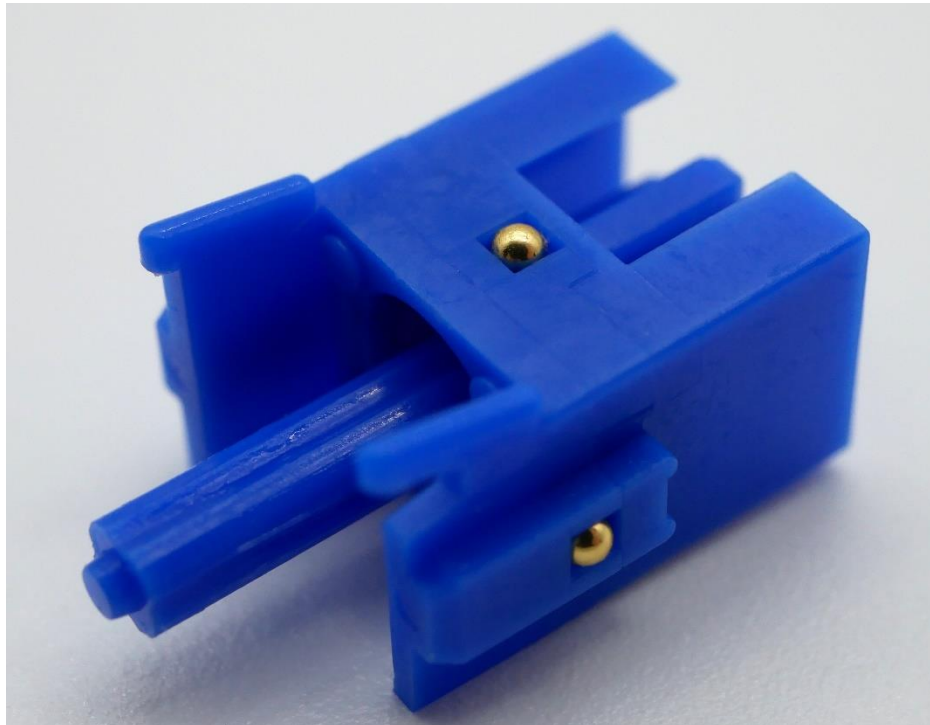


Figure 7: Ball Bearing Blue stem picture showing embedded, 1-mm diameter ball bearings in front plate and slider rail. Note the faint layer lines running across the front plate of the stem as well as the faint amount of factory lubing on the center pole.

In addition to the interesting application of ball bearings in the stems, both the slider rails and center poles also share quite some interesting design quirks. Firstly, the slider rails have ‘u’ shaped tops to their design which functionally appear to, again, reduce points of contact between the stem and housings upon topping out. Additionally, the bottom of the slider rails feature an incredibly small taper. As for the center poles of these stems, these feature a unique, clover-style vertical ribbing to them that is unlike anything I’ve seen in a modern, MX-style switch to date. When viewed head on from the bottom of the stem, there are ridges in the NE, NW, SE, and SW directions that run the length of the stem center pole and ostensibly interface with the ball bearings located underneath of the plate in the bottom housing as is shown below. When also viewed from this underside angle, a substantial amount of factory lubing can also be seen in the switches, which is also present on the tips of the stem/leaf legs as well as mildly on the various faces of the stem in a more freshly opened switch.

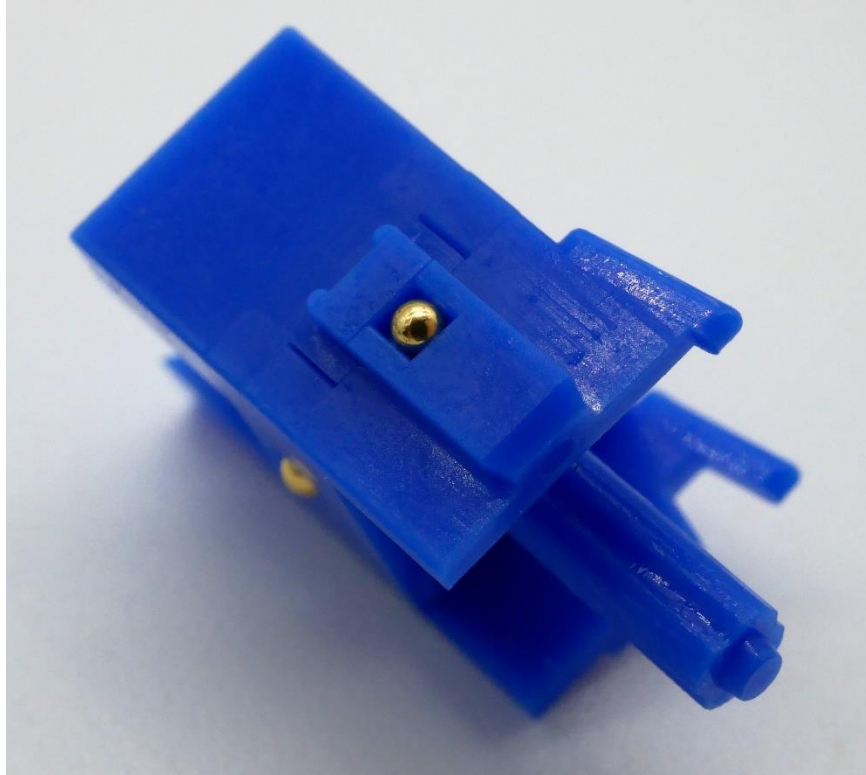


Figure 9: Side angle of Ball Bearing Blue switch stem showing 'u' shaped upper side of slider rail, slightly tapered bottom end of slider rail, and ribbed, clover-like center pole.

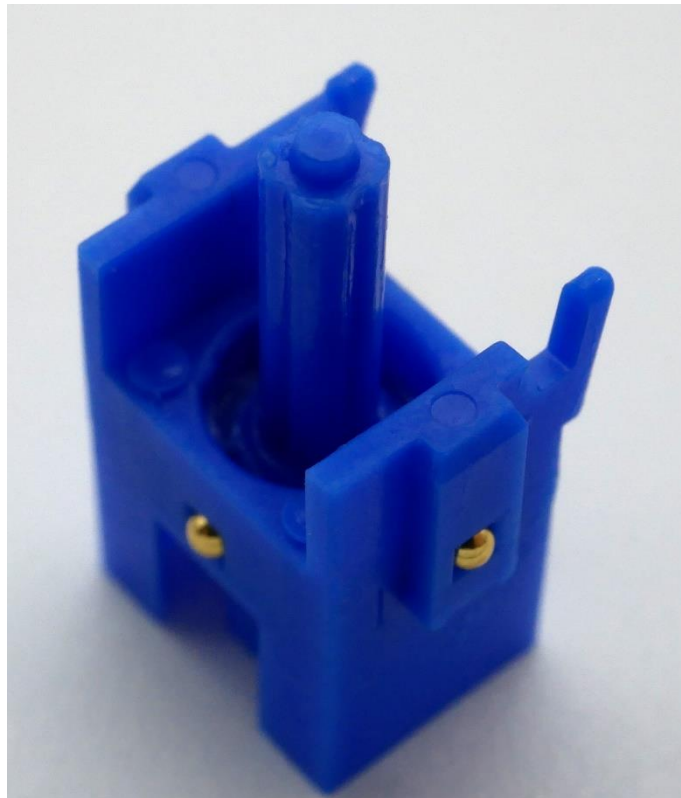


Figure 8: Inverted view of Ball Bearing Blue switch stem demonstrating ribbed, clover-like design of the center pole.

Finally arriving at the bottom housings of the Ball Bearing Blue switches, these too integrate the ball bearings in a unique concept not previously seen before in switches. As can be better seen in the product blow-apart image shown above in Figure 4, the Ball Bearing switches feature a small, flat plate that is fixed around the center pole of the housing and appears to trap rollerballs between it and the sides of the center pole hole. Given that the center pole hole has cutouts in the NE, NW, SE, and SW directions in this render, it is assumed that the ball bearings sit in these directions and interact with the raised stem pole ribs noted in the previous paragraph above. This effectively has to remain the assumed functionality as I was unable to pry this portion of the bottom housing out from the rest of its construction even after some rather decent attempts at such. Beyond this inclusion, though, the housings are more or less identical to other modern switches, even with a large gap for LED/diodes that is closed over by the top housings. Externally, the Ball Bearing Blues, and all other ball bearing switches that I've tried to date, come in PCB mount/5-pin variety and have no mold numbers or manufacturing marks present on the underside to help distinguish them from other switches.

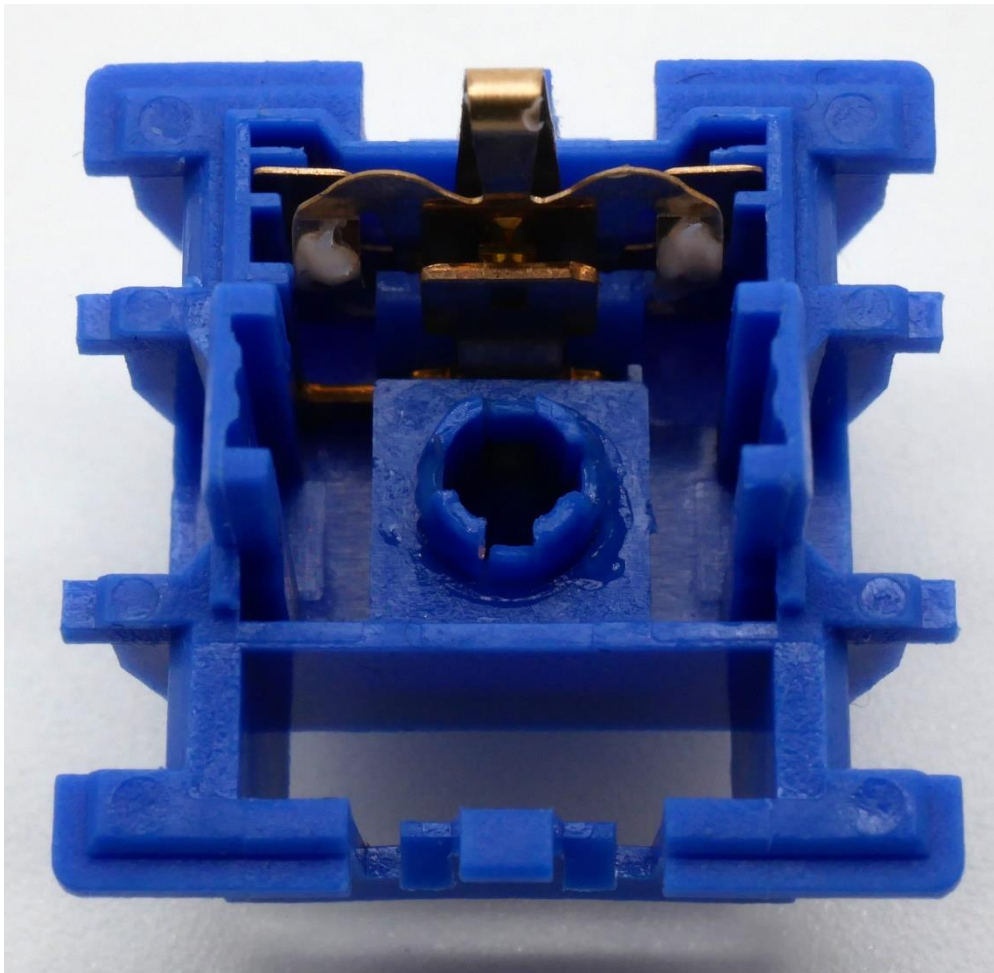


Figure 10: Ball Bearing Blue bottom housing internal design showing center plastic 'plate' which is holding ball bearings in the bottom housing for interaction with the stem pole.

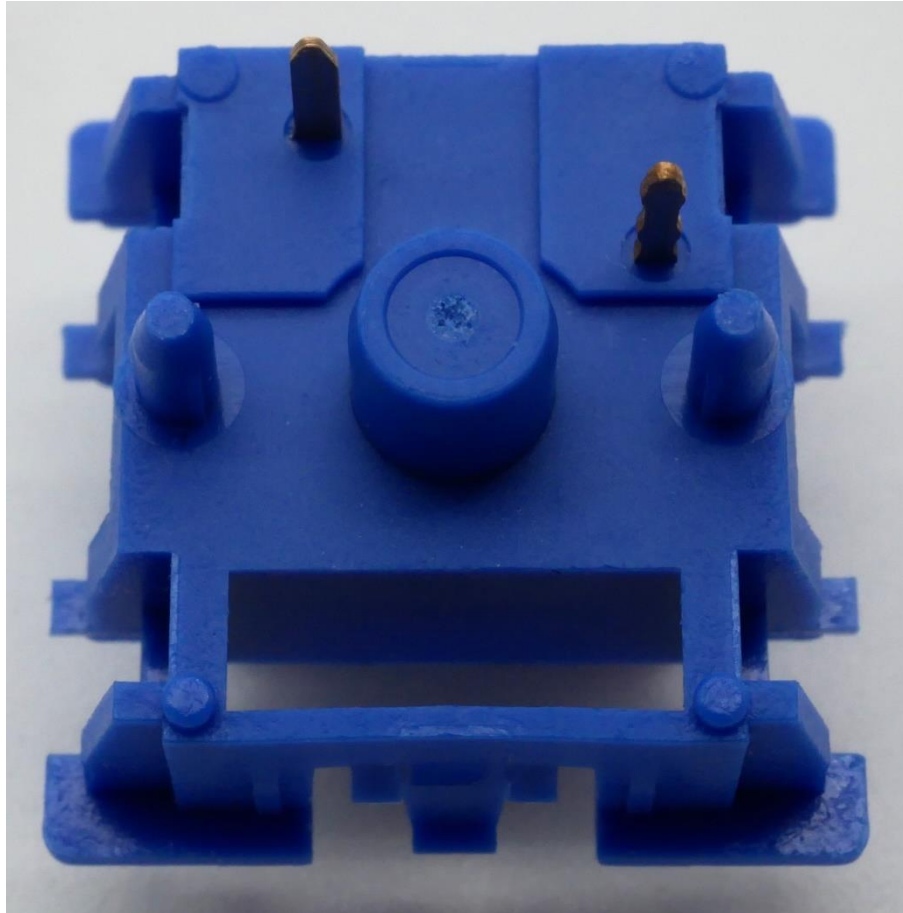


Figure 11: Ball Bearing Blue bottom housing external design showing 5-pin/PCB mount construction and lack of identifying mold markings.

Push Feel

Surprisingly, the metal ball bearings embedded in the stem and bottom housings of the Ball Bearing Blue switches do seem to have a noticeable effect on the smoothness of this linear's stroke without much of an impact elsewhere throughout its feeling even in spite of a lack of large amount of factory lubing. Now, while its not unheard of for some linear switches to feel smooth directly out of the box despite an absence of large amounts of factory lube, those switches still have a noticeable amount of plastic-on-plastic contact that can be felt in their stroke. These switches, however, feel a lot more 'airy' throughout their stroke as what I assume to be is a result of the lesser surface area of contact between the ball bearings and the other plastic parts of the switch. What little factory lubing that is present on the stems only works to make this gliding more effortless, and the full upstroke and downstroke of the Ball Bearing Blues feels a lot more free and significantly less encumbered by drag than most other linear switches. As a result of this, these switches are incredibly smooth feeling and only have the most minor amount of friction that can be felt. While the ball bearing mechanism does seem to drastically improve the feeling of these switches, it can be seen from the composite force curve below in Figure 16 that the mechanism almost certainly doesn't change the feeling of the switches in any other substantial way. The only notable point of difference between the force curves of the Blue Ball Bearings and other linear witches is that of the weird 'bump' in force around 0.25 mm of travel distance in, though I can not really determine and origin for this nor feel it in hand when testing them.

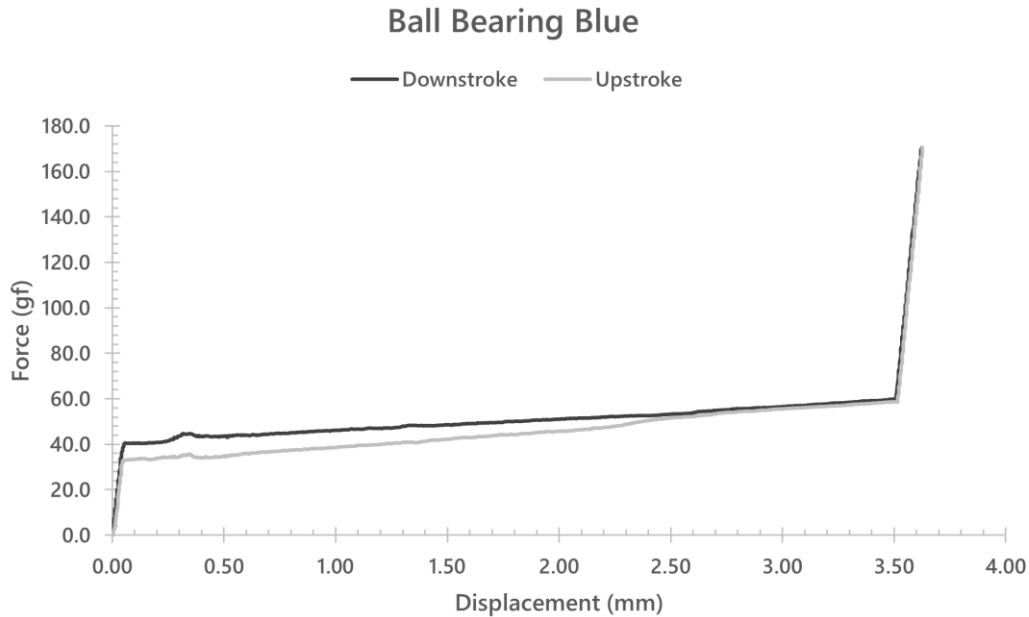


Figure 12: Force curve diagram for stock Ball Bearing Blue switch.

As for the other performance metrics that I tend to look at here that wouldn't be impacted by the inclusion of the metal ball bearings into the design, the Ball Bearing Blue switches do leave a bit left to be desired. This is most notable in the bottom out of the switches, which is noticeably more pointed, forceful, and thin feeling than the topping out. While this bottoming out doesn't quite take on the same thin, prickly feeling that some polycarbonate-housing switches with long stem poles have been able to invoke over the years, its still noticeably more jarring than I think most people would be a fan of in this context. Never mind the direct impact that a design like this has on the sound of the switches – the abruptness and 'in your face' nature of this bottom out might be a lot for some to want to deal with in a full build. The topping out, on the other hand, is more or less unnoticeable and is likely due in large part to the 'u' shaped upper portions of the slider rails on the stems minimizing contact between the top housings and the side of the stems. If only the designers of these switches would have given just that extra bit of effort to the bottoming out of these switches as they seem to have given everywhere else, I'd imagine these would feel damn near like typing on clouds.

Sound

Following the age old trope of the sound of mechanical keyboard switches largely matching the descriptive notes of how they feel, the Ball Bearing Blue switches have a sound profile that is almost entirely comprised of their sharper, more pointed feeling bottom out. Noticeably louder than most other linear switches out there, this bottom out punctuates the switch a medium-high to high pitched clapping noise that pretty squarely lets you know that you've reached the bottom of this switch and have nowhere else to go. Occasionally in some of these switches you'll get a metallic sort of 'sticking' noise to the bottom out, though at normal typing speeds and under normal conditions, I doubt that this will be able to be noticed at all. In the sound of these switches, this is even more contrasting from the topping out of these switches as they make virtually no noise whatsoever. As for the linear stroke in between these two ends of the switch, the Ball Bearing Blues are largely silent and consistently so across the batch that I received. Sure, the occasional switch very faint small grain scratch can be heard when the ball bearings

encounter a dry spot of plastic to roll across, though admittedly this is few and far between and likely unnoticeable in normal typing situations like that aforementioned ‘stickiness’ issue before.

Wobble

While the Ball Bearing Blue switches are certainly technically impressive from a uniqueness of design standpoint, perhaps the most impressive performance notes that can be made about them is that they just do not have any wobble whatsoever. I know what you’re thinking – you’ve already tried switches that have “no stem wobble”. In spite of what you may hold as an adamant personal belief, I’m here to tell you that you have not tried stock switches with a lack of wobble like these. These stems simply do not budge and largely locked in stone where they are both in each switch and across the batch that I received. These are, in spite of what I may have said before, as close to manufacturing perfection as you can probably actually reach with respect to stem wobble.

Measurements

<i>Ball Bearing Blue Switch Measurements</i>			
	Component	Denotation	mm.
Stem	Front/Back Plate Length	A	7.16
	Stem Width	B	6.05
	Stem Length with Rails	C	8.87
	Rail Width	D	2.02
	Center Pole Width	E	1.89
	Rail Height	F	5.03
	Total Stem Height	G	13.07
Bottom Housing	Diagonal Between Rails	L	9.53
	Interior Length Across	M	9.60
	Rail Width	N	2.63
	Center Hole Diameter	O	2.27
Top Housing	Horizontal Stem Gap	X	7.64
	Vertical Stem Gap	Y	6.04
Methods	Number of Switches Used		3
	Replication Per Measurement		3

If you’re into this level of detail about your switches, you should know that I have a switch measurement sheet that logs all of this data, as well as many other cool features which can be found under the ‘Archive’ tab at the top of this page or by clicking on the card above. Known as the ‘Measurement Sheet’, this sheet typically gets updated weekly and aims to take physical measurements of various switch components to compare mold designs on a brand-by-brand basis as well as provide a rough frankenswitching estimation sheet for combining various stems and top housings.

Ball Bearing Blue	
Switch Type: Linear	Unknown
Total Stem Travel	3.505 mm
Peak Force	59.8 gf
Bottom Out Force	59.8 gf
# of Upstroke Points	955
# of Downstroke Points	1048

Figure 13: Numerical details regarding the stock Ball Bearing Blue switch force curve diagram.

The latest in the content-adjacent work that I've picked up, the new 'Force Curve Repository' is now hosted on GitHub alongside the Scorecard Repository and contains all force curves that I make both within and outside of reviews. In addition to having these graphs above, I have various other versions of the graphs, raw data, and my processed data all available for each switch to use as you please. Check it out via the 'Archive' tab at the top of this page or by clicking any of the force curve cards above.

Break In

Ball Bearing Blue Break In Testing			
Metric	Activations		
	17,000	34,000	51,000
Push Feel (Overall)			
Smoothness			
Ping (Spring/Leaf)			
Wobble (Overall)		-	-
Stem Wobble		-	-
Top Housing Wobble			
Sound (Overall)		-	-
Scratchiness			
Ping (Spring/Leaf)			

Color Scale			
Improvement	+	++	+++
Deterioration	-	--	---
Null Change			

Break In Notes:

17,000 Actuations

- To put it about as bluntly as I can – there is absolutely *no* difference between the Ball Bearing Blue switches in their stock form and broken in to 17,000 actuations. To my surprise there were no changes in stem wobble, sound, or the push feeling of these switches that that made me able to distinguish the broken in batch from a set of stock switches I was comparing them to.
- Unless my memory is failing me, I believe that this is the first switch that I've done Break In testing on that has shown absolutely zero wear and tear through its first stage.

34,000 Actuations

- At 34,000 actuations, the Ball Bearing Blue switches began to take on just the most minor amount of N/S and E/W direction stem wobble that would be more apt to be described as a 'budge' than actual 'wobble'. Even in this "worn down" form, these switches are still among the least wobbly and with the tightest tolerances that I've tried to date.
- The only real notable performance change in the Ball Bearing Blue switches which would show up under normal use case scenarios is that of a slight increase in the pitch and overall sound of the housing collisions at 34,000 actuations. At this point, the switches begin to sound just a touch more thin, and the topping outs especially suffer from sounding higher pitched than in their stock form.

51,000 Actuations

- The only change that was noted in the performance of the Ball Bearing Blue switches broken in to 51,000 actuations that wasn't previously seen in the 34,000 actuation set is again a very minor sound-based shift. In addition to pitching up a touch higher than the 34,000 actuation set before them, the Ball Bearing Blues broken in this far also have a sporadic 'stickiness' to their bottoming out that is noticeable if you're looking for it. Overall, though, the effect that this has on the sound is pretty minor.

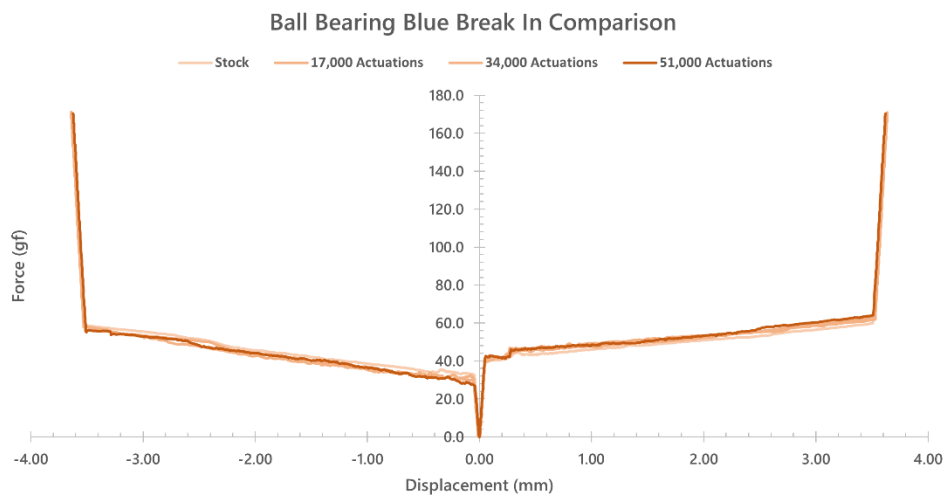


Figure 20: Comparative force curve diagram showing no distinctive trend in change of Ball Bearing Blue force curve diagrams through the break in process.

Other

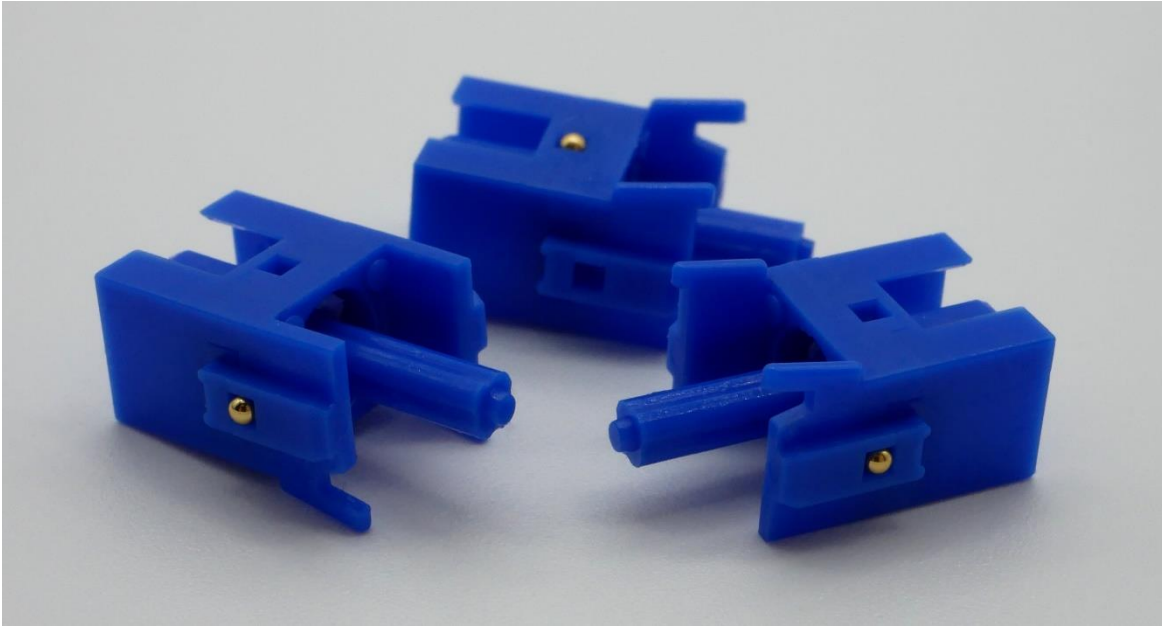


Figure 21: Ball Bearing Blue switch stems with missing ball bearings that have fallen out during the course of inspection for this review.

The one thing that I feel obligated to note in my review of the Ball Bearing Blue switches is that they are certainly not the most friendly switches to open and make any sort of modifications to. Just opening the switches to inspect their internal design elements and take photos of their components caused quite a few ball bearings to fall out of the stems of these switches and fly all over the place. Given their literal 1 millimeter diameter size, these balls almost often disappear without you even noticing and even if you do manage to track one down, good luck getting it to go back into the stems. While I did not notice any of these ball bearings coming loose within the stock switches before they are opened, and even after pretty aggressive break in testing, I suspect that if these switches get opened after a decent amount of usage that the ball bearings would have become quite loose and will absolutely escape the switch. It should also be noted that the stems of these switches are largely ineffective in delivering on their intended mechanisms if they are missing one or more of these ball bearings.

Comparison Notes to Other Notable Linear Switches

Note – These are not aimed at being comprehensive comparisons between all factors of these switches as this would simply be too long for this writeup. These are little notes of interest I generated when comparing these switches to the Ball Bearing Blue switches side by side.

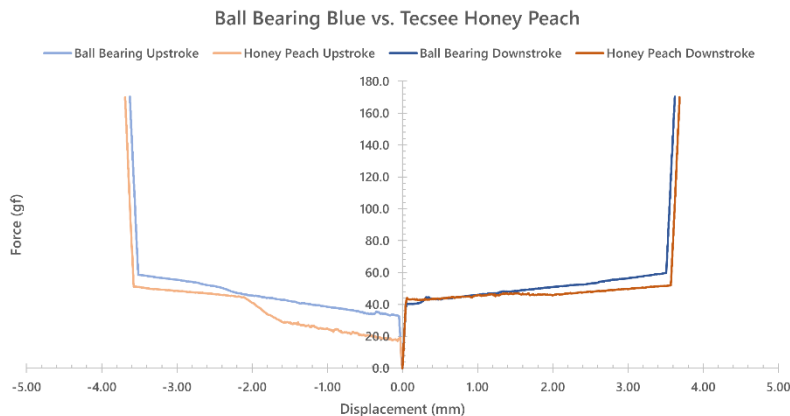


Figure 14: Switches for comparison. (L-R, Top-Bot: Tecsee Honey Peach, Sarokeys BCP, Cherry MX2A RGB Black, Huano Pineapple, Wuque Studio Morandi, and Novelkeys Cream)

(Lack of Editor's) Note: I realize after this review has already been up that I used a Cherry MX New Nixie in the switch comparison photo rather than a Cherry MX2A RGB Black switch. The comparisons in this section *were* done with an MX2A RGB Black and I simply grabbed the wrong switch for photos...

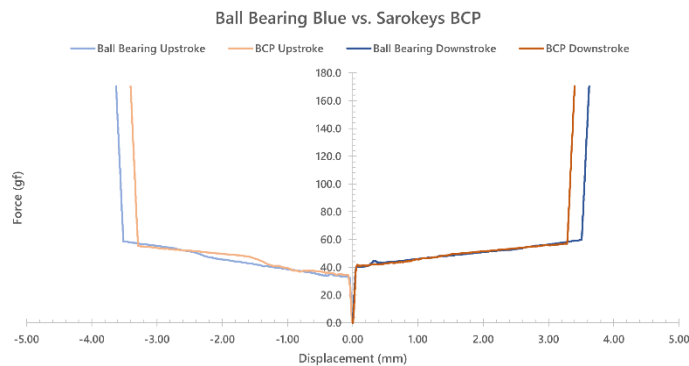
Tecsee Honey Peach

- In spite of the Tecsee Honey Peaches having stem poles made entirely of metal, the Ball Bearing Blue switches have the louder and more thin sounding bottoming out sound between these two switches.
- The average performing Ball Bearing Blue switch is similarly smooth to the average Tecsee Honey Peach switch. That being said, though, the consistency in the small grain scratch noted in the Ball Bearing Blue switches was significantly more consistent between switches and it felt as if the design tolerances for such here were much more narrow than in the Honey Peaches.
- In terms of their overall sound profiles, the Ball Bearing Blue switches are much more clean, crisp, and click bar-like in their housing collisions than the slightly more fuzzy, occasionally scratchy sounding Tecsee Honey Peach switches.



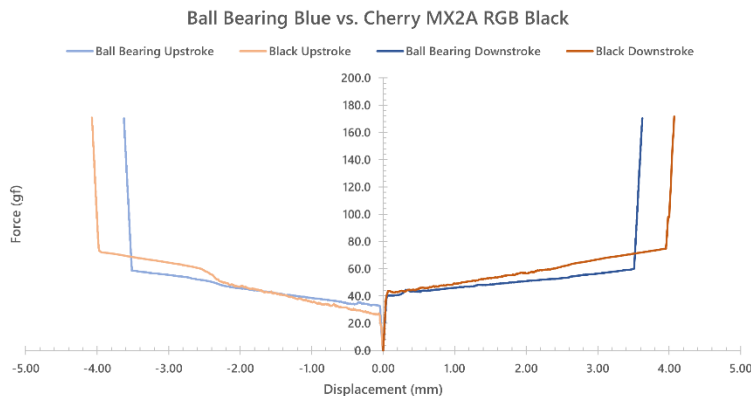
Sarokeys BCP

- Of these two switches, the Sarokeys BCP switches are significantly more muted feeling *and* sounding in their housing collisions. Compared to the general sharpness and forwardness of the Ball Bearing Blues, the BCPs almost feel Cherry-like and as if they had full Cherry nylon housings.
- The comparison of the smoothness of these two switches is a touch difficult insofar that the Ball Bearing Blues are incredibly light, airy, and only with the faintest grain of scratch whereas the Sarokeys BCPs are smooth but with a heavy, lubricated, and more ‘gummed over’ sort of feeling to their stroke.
- Much like with literally any other switch on this list, the Sarokeys BCPs don’t even remotely stand a chance against the Ball Bearing Blues in terms of stem wobble. Literally no modern, MX-style switch which I’ve tried to date really stands a chance against the Ball Bearing switches on this metric.



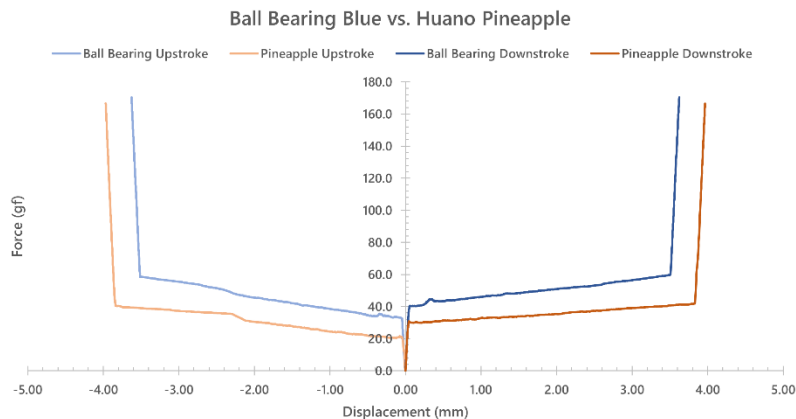
Cherry MX2A RGB Black

- As is to be expected, the general scratchiness of any Cherry switches, even those with improved factory smoothness like in the MX2A platform, is simply more than the competition here in the Ball Bearing Blue switches. Even incredibly uniquely designed switches from a ghost manufacturer are smoother than Cherry switches, or so it would seem.
- Much like with the Sarokeys BCP switch comparison above, the housing collisions of the Cherry MX2A RGB Black switches are significantly more deep, dampened, and muted feeling than the pointed, brisk housing collisions of the Ball Bearing switches.
- In terms of their overall sound profiles, the Ball Bearing Blues are noticeably more loud, higher pitched, and ‘in your face’ than the Cherry MX2A RGB Black switches. The contrast is so sharp between these two switches that you could almost argue them to be on the opposite ends of the ‘aggressive sound spectrum’ present in linear switches.



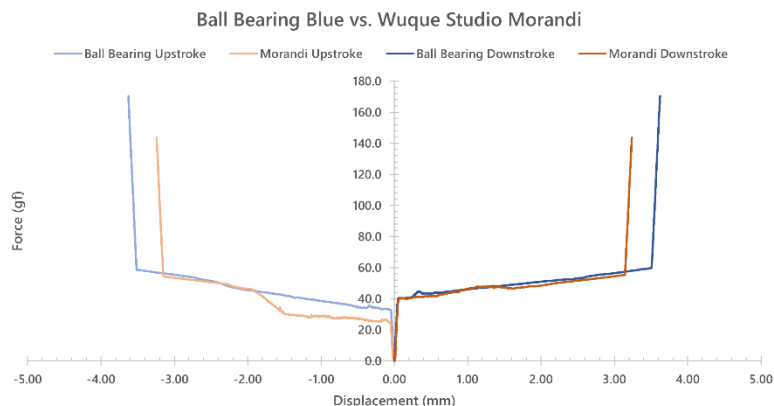
Huano Pineapple

- Of all of the switches on this list, the Huano Pineapple are the most similar to the Ball Bearing Blues in terms of bottom out feeling and sound, though it is admittedly a touch more subdued and less aggressive in the Pineapples than the Ball Bearing Blues.
- In spite of their slight differences in bottoming out, the Huano Pineapples are surprisingly similar sounding to the Ball Bearing Blues in terms of their overall sound profile. Perhaps the only real notable difference in this point is that the Huano Pineapples are slightly less crisp and crystalline sounding, with some of the dampening effect likely coming from the housing materials used.
- As was said once in the Sarokeys BCP switch comparison above and should really be stressed again, the Ball Bearing Blue switches absolutely dominate the Huano Pineapples in terms of stem wobble.



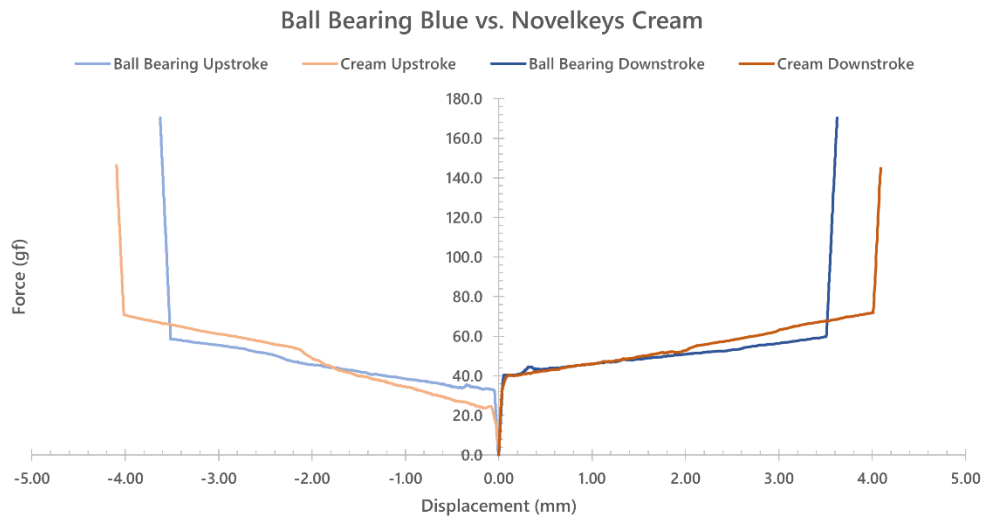
Wuque Studio Morandi

- While the bottoming out of the Ball Bearing Blue switches is a bit more pointed than the Wuque Studio Morandis, the overall forcefulness of the bottoming out is the most similar between these two switches. As could be imagined, though, the Morandi have a slightly more dampened feeling as opposed to the more pointed bottoming out of the Ball Bearing Blues.
- In terms of their overall sound profiles, the Wuque Studio Morandis more or less sound like silent linears when compared directly in hand next to the Ball Bearing Blues. For what its worth, the Ball Bearing Blues aren't exactly the most aggressive sounding linears that I've tried, either.
- "Morandi" is an objectively funny thing to say given that I have absolutely no understanding of what a Morandi is. However, repeating "Ball Bearing Blue" to yourself over and over is infinitely more funny to me, personally.
- Yes, the Ball Bearing Blues are even better than the Morandi switches in terms of stem wobble.



Novelkeys Cream

- Much like with the Cherry MX2A RGB Black comparison above, you could probably have already guessed that stock Novelkeys Cream switches have more scratch to them than the Ball Bearing Blue switches based on the other comparisons above. That being said, though, the Ball Bearing switches are still smoother than even broken in Cream switches.
- In terms of overall volume, the housing collisions of the Novelkeys Creams are a bit quieter than the Ball Bearing Blues, though their overall sharpness and thinness are in a similar vein as the Ball Bearing Blues.
- The cross-batch consistency of the Ball Bearing Blue switches is quite a bit better than any of the batches of Novelkeys Creams that I've tried to date, though then again these are almost certainly being produced at much lower volumes than the Novelkeys Creams.



Linearity

Linearity and Slope Chart Values		
Regular Values	Slope	R²
Ball Bearing Blue	5.2280	0.9914
Tecsee Honey Peach	2.3350	0.9409
Sarokeys BCP	5.2709	0.9908
Cherry MX2A RGB Black	8.6185	0.9972
Huano Pineapple	3.2061	0.9962
Wuque Studio Morandi	4.6732	0.9588
Novelkeys Cream	8.3742	0.9941
Normalized to Avg. Values	Slope	R²
Ball Bearing Blue	-0.5502	0.0116
Tecsee Honey Peach	-3.4432	-0.0389
Sarokeys BCP	-0.5073	0.0110
Cherry MX2A RGB Black	2.8403	0.0174
Huano Pineapple	-2.5721	0.0164
Wuque Studio Morandi	-1.1050	-0.0210
Novelkeys Cream	2.5960	0.0143
Number of Data Points in Avg.		233

Figure 29: Absolute and relative Linearity and Slope values for each switch in this comparison section.

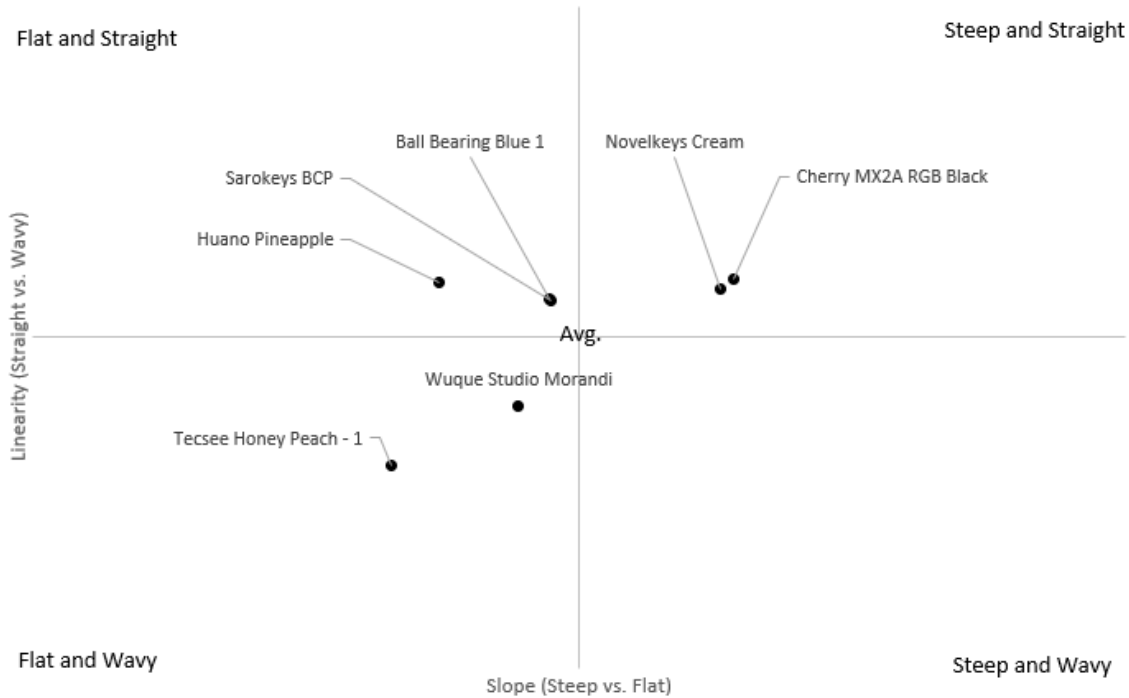


Figure 30: Qualitative comparison of the normalized Linearity and Slope for each switch in this comparison section.

If you are just now seeing this section for the first time and are a bit confused as to what I am talking about when discussing ‘Slope’ and ‘Linearity’, I highly suggest checking out my article titled ‘On Differences in Linear Switches’ where I explain what this section is for and how it came to be! For a bit of a shorter answer, know that this is part of my ongoing attempt to better quantify and articulate differences between linear switches which have historically not been captured in discussions about them.

Scores and Statistics

Note – These scores are not necessarily completely indicative of the nuanced review above. If you’ve skipped straight to this section, I can only recommend that you at least glance at the other sections above in order to get a stronger idea of my opinion about these switches.

Ball Bearing Blue		
Switch Type: Linear		Unknown
31	/35	Push Feel
25	/25	Wobble
8	/10	Sound
9	/20	Context
9	/10	Other
82	/100	Total

Push Feel

The Ball Bearing Blue switches, aided by their unique embedded roller ball stem design, glide more or less effortlessly throughout their linear stroke with only a minimal amount of factory lubrication needed. Capped off at the top end by a barely noticeable topping out and at the other end with an aggressive, pointed, and slightly sharp feeling bottom out, these switches are almost airy and cloud like if not for the very end of the stroke. Occasionally there is some 'stickiness' that can be felt in the bottom out of these switches, though this is largely unnoticeable under any normal use cases.

Wobble

This is it. This is as near absolute manufacturing perfection that can be reached for stem wobble in switches. The batch that I received is not only virtually entirely absent of wobble in each switch, but consistently so across all of the switches I received.

Historical Note: This is the first time that any switch has received a perfect score for stem wobble.

Sound

The sound of these switches, much like their push feel, is largely driven by the more aggressive, pointed bottoming out. Noticeably loud with a medium-high pitched clap for a bottom out, the Ball Bearing Blues are certainly in your face more than most linear switches, though it's hard to complain about such given how consistent they are at this across all of the switches I've tried.

Context

I don't think I've ever had a switch be so technically proficient and with such a unique design while simultaneously having so little context surrounding them. They're not in stock hardly anywhere, they have an absolutely no background to them, and we can't even say who made them or why they did so. These have nothing but untapped potential to be the next big thing.

Other

Whoever made these deserves a large amount of credit for executing such a unique, interesting, and novel design with the MX-switch platform. Honestly, I hope we see even more of it...

Statistics

Average Score			Ball Bearing Blue		
26.5	/35	Push Feel	31	/35	Push Feel
17.2	/25	Wobble	25	/25	Wobble
5.6	/10	Sound	8	/10	Sound
12.7	/20	Context	9	/20	Context
6.1	/10	Other	9	/10	Other
68.1	/100	Total	82	/100	Total
Ball Bearing Overall Rank			T-#11/290 (82/100)		
Ball Bearing 'Hard' Rank			#1/290 (64/70)		
Ball Bearing 'Soft' Rank			T-#163/290 (18/30)		

If you are looking at this statistics section for the first time and wondering where the hell are the other 289 switches that I've ranked are, or what 'hard' versus 'soft' ranks refer to specifically, I'd encourage you to head on over to my GitHub linked in the table above or at the links in the top right hand of this website to check out my database of scorecards as well as the 'Composite Score Sheet' which has a full listing of the rankings for each and every switch I've ranked thus far.

Final Conclusions

When my first set of these Ball Bearing switches arrived from my buddy at SwitchOddities, I absolutely knew that I had to do a review on them at some point in the future. In a similar vein as Gateron Melodics, Novelkeys Cream+, and Novelkeys Cream Clickies before them, the Ball Bearing switches executed upon an entirely new, never before seen mechanism in modern, MX-style switches and not documenting them would be a massive loss on my part. However, I was almost entirely interested in reviewing these because of their unique internal mechanism, with only the faintest amount of consideration being paid to how they actually performed relative to other switches out there. As a result, damn near all of this review has been pleasant surprise after pleasant surprise. I would not, and could not, have been able to predict that switches with such a vague, mysterious background and circumstances surrounding them would absolutely knock most of their performance metrics out of the park. The Ball Bearing Blues are light, airy feeling linear switches that have basically no scratch that shows up under any normal use cases and only a slightly aggressive, sharp bottoming out that takes away from their cloud-like feeling. Stack on top of this push feeling some incredibly tight tolerances that produce a lack of stem wobble unlike anything I've seen over the years of collecting switches, and I'm really left wondering how the manufacturers of these switches were not screaming the praises of these switches from the roof top. While I don't think that these will fully replace the traditional MX-style design any time soon, this concept has a damn good potential to be a parallel design structure not dissimilar to how Kailh Box switches continue to exist today with entirely different internal designs from most other MX pin out switches. Screw the general lack of ability to open and modify these switches – if the makers of these continue to improve upon and further develop this mechanism as is, they very well could remove any need to open and modify Ball Bearing switches at all. Simply put, the Ball Bearing Blue switches were incredibly impressive to me as a linear switch and I deeply hope that you all reading this get a chance to try some for yourself soon.

Sponsors/Affiliates

Mechbox.co.uk

- A wonderful UK based operation which sells singles to switches that I've used above in my comparisons for collectors and the curious alike. Matt has gone out of his way to help me build out big parts of my collection, and buying something using this link supports him as well as my content!

KeebCats UK

- A switch peripheral company based out of the UK which sells everything switch adjacent you could ask for, they've been a huge help recently with my film and lube supply for personal builds, and they want to extend that help to you too. **Use code 'GOAT' for 10% off your order when you check them out!**

Proto[Typist] Keyboards

- An all-things keyboard vendor based out of the UK, proto[Typist] is a regular stocker of everything from switches to the latest keyboard and keycap groupbuys. While I've bought things from the many times in the past, they also are a sponsor of my work and allow me to get some of the great switches I write about!

Divinikey

- Not only do they stock just about everything related to keyboards and switches, but they're super friendly and ship out pretty quick too. Divinikey has been a huge help to me and my builds over the last year or two of doing reviews and they'll definitely hook you up. **Use code 'GOAT' for 5% off your order when you check them out!**

ZealPC

- Do they really need any introduction? Zeal and crew kicked off the custom switch scene many years ago with their iconic Zealios switches and the story of switches today couldn't be told without them. **Use code 'GOAT' (or click the link above) for 5% off your order when you check them out!**

MechMods UK

- A rising vendor based in the UK, Ryan and crew have been a pleasure to work with and have nearly everything you'd need to build your first or fourteenth keyboard. **Go build your latest or greatest one right now with them by using code 'GOAT' at checkout for a 5% discount!**

Dangkeeps

- A longtime supporter of the website and the collection, Dangkeeps has quite possibly the widest variety of switches of any vendor out there. Not only is their switch selection large, but it rotates and is constantly adding new stuff too. **You're going to need 5% off your order with my affiliate to save off the cost of all those switches!**

SwitchOddities

- The brainchild of one my most adventurous proxies, SwitchOddities is a place where you can try out all the fancy, strange, and eastern-exclusive switches that I flex on my maildays with. **Follow my affiliate code and use code 'GOAT' at checkout to save 5% on some of the most interesting switches you'll ever try!**

Cannonkeys

- Does anybody not know of Cannonkeys at this point? One of the largest vendors in North America with keyboards, switches, keycaps, and literally everything you could ever want for a

keyboard always in stock and with an incredibly dedicated and loving crew. **Follow my affiliate link above in their name to support both them and I when you buy yourself some switches!**

Kinetic Labs

- One of the most well-rounded keyboard vendors out there, Christian and crew have been supporters of all my switch and switch-adjacent needs for some years now. **I'm honored to have them as an affiliate and think you should check them out using my affiliate link above to support both them and I when you check out their awesome products!**

Keebhut

- Want to try out some switch brands that fly under most vendor's radars? Keebhut is always seeking out that next latest and greatest and has been super helpful in hooking me up with new brands over the past year. **They are all about sharing that love as well, and want to give you 5% off your next order with them when you use code 'GOAT' at checkout!**

Further Reading

KBDFans 'Roller Linear Switch' Sales Page

Link: <https://kdbfans.com/products/roller-linear-switches>

Wayback: <https://web.archive.org/web/20240321225801/https://kdbfans.com/products/roller-linear-switches>

AliExpress 'Roller Linear Switch' Sales Page

Link: <https://www.aliexpress.us/item/1005006419551504.html?>

Wayback:

<https://web.archive.org/web/20240321230057/https://www.aliexpress.us/item/3256806233236752.html?gatewayAdapt=4itemAdapt>

KBDFans' Roller Linear Switch Sound Test

Link: https://www.youtube.com/watch?v=eUeBpEqy_Xw

ArPeyKey's Roller Linear Switch Sound Test

Link: <https://www.youtube.com/watch?v=FC-DbyfHwTw>

Roller Linear Switch Bilibili Review Video

Link: https://www.bilibili.com/video/BV1DV411G7eF/?spm_id_from=333.337.search-card.all.click