

Thirst

8 kHz wired & wireless controller

Most high-speed controllers get their speed by cutting something. Some swap adaptive triggers and HD haptics for basic rumble motors. Some read sticks and triggers at 8 bits, which is 256 steps from rest to full tilt. Some advertise 8,000 Hz but only check your buttons 1,000 times a second, then wait a few milliseconds to confirm each press. Others drop the touchpad or motion controls, or go wireless at Bluetooth speeds.

Thirst doesn't make that trade. It keeps the adaptive triggers, HD haptics, touchpad, motion controls and lights, adds eight extra buttons, and runs at 8,000 Hz wired and wireless. Sticks and triggers are read at 16 bits, 65,536 steps, and every report carries a brand-new reading taken just before your PC collects it. Two inner layers of solid copper shield the sensitive circuits from the radio, motors and haptics.

It is also a specialised low-power design. Every feature can be switched off when you don't need it. Turn off rumble, the adaptive triggers and the lights, and it runs for 50+ hours on a stock DualSense battery, even at 8,000 Hz over the dongle with motion controls still on.

PROTOTYPE • figures are design targets and estimates, to be confirmed on hardware

<div>8,000 Hz</div> <div>Wired polling rate</div>	<div>8,000 Hz</div> <div>Wireless polling rate, with the dongle</div>	<div>16-bit</div> <div>Sticks and triggers (stock: 8-bit)</div>	<div>0 ms</div> <div>Debounce delay on button press</div>
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Connection modes

	WIRED	2.4 GHZ DONGLE	BLUETOOTH
Link	USB-C, USB 2.0 High-Speed 480 Mbit/s	Proprietary 2.4 GHz 4 Mbit/s air rate	Bluetooth Low Energy 2 Mbit/s air rate
Report rate	8,000 Hz	8,000 Hz The radio link runs 9,000 slots a second: 8,000 carry your input and 1,000 carry rumble, haptics and settings back to the controller. A dropped packet costs at most one report, because the next one always carries the latest input	~65–133 Hz Set by the host device (PC, Android, other). 133 Hz is the fastest any current host allows
Latency, press to PC	0.07 ms From the moment the button closes to the input arriving at your PC	as low as 0.13 ms The whole chain, button to PC, not just the gap between reports. 0.17 ms with every feature on	~4.5 ms Set mostly by the host's Bluetooth interval
Motion (gyro) rate	up to ~7,680 Hz limited by the sensor	4,000 Hz gyro and accelerometer sampled together	~65–133 Hz same as the report rate
Input data stream	~4.1 Mbit/s	~1.4 Mbit/s up ~0.2 Mbit/s down for rumble, haptics and settings	up to ~70 kbit/s
Timing	Frame Sniping Tracks your PC's polling in real time, so every sample is taken just before the PC collects it	Frame Sniping Tracks polling through the dongle the same way, across the wireless hop	Frame Sniping Plus the host's Bluetooth interval. For convenience, not competition
Charging	Yes, while playing	Battery, or from a dock or wireless-charging input	

Latency: press to PC

Latency is how long after you press a button or move a stick the PC has it. It includes everything the controller does along the way: scanning, confirming the press, processing, and the radio hop when wireless. Polling rate alone tells you none of this. Many controllers report at 8,000 Hz and still take milliseconds to confirm a button press. This one doesn't wait.

CONTROLLER AND MODE	BUTTONS	STICKS	WIRELESS	SOURCE
Thirst · wired	0.07 ms	0.07 ms	Yes	On-controller, calculated
Thirst · 2.4 GHz dongle	0.13–0.17 ms	0.13–0.17 ms	Yes	On-controller, calculated
Thirst · Bluetooth (PC)	~4.5 ms	~4.5 ms	Yes	On-controller, calculated
Marius Heier MH4 board · wired, 8 kHz	0.96 ms	0.51 ms	No	Gamepadla
Hyperstrike DS4 · wired, 8 kHz	1.05 ms	0.35 ms	No	Gamepadla, user-submitted
EasySMX Dune 8K · wired	1.52 ms	5.93 ms	Yes	Gamepadla
Void FireBird · wired, 1 kHz	1.97 ms	3.06 ms	No	Gamepadla, user-submitted
EasySMX Dune 8K · dongle	2.18 ms	8.22 ms	Yes	Gamepadla
ZD Super Legend 8K · wired, 8 kHz	2.53 ms	0.57 ms	Yes	Gamepadla
Xbox Series controller · wired	6.5 ms	8.3 ms	Yes	Gamepadla
Xbox Series controller · dongle	7.2 ms	8.9 ms	Yes	Gamepadla
DualSense · wired	7.8 ms	12.6 ms	Yes	Gamepadla
DualSense · Bluetooth	9.0 ms	13.6 ms	Yes	Gamepadla

Average press-to-PC latency. Our figures are the controller's own time, from the button closing until the report reaches the PC's USB port, calculated from the design; with in-frame averaging switched on, stick readings add up to about 0.03 ms. Rows marked Gamepadla come from Gamepadla's Prometheus 82 hardware tester via gamepadla.com, which physically actuates the controller and also includes the tester's and Windows' own delays; Gamepadla states its tester's error margin as ± 1 ms. Measured the same way, Thirst is expected to read about 0.15–0.4 ms. User-submitted results have not been checked by Gamepadla's moderators. Prototype measurements will be published alongside.

Measured, not just calculated

We test the full pipeline, from the instant a button closes to the moment the input arrives at your PC, not just the gap between reports. A custom tester presses the controller electrically on a precise schedule and timestamps every stage along the way, to a precision current latency testers don't reach. It also records internal timing that ordinary testers can't see. Our goal is simple: the lowest true press-to-PC latency of any controller.

Report rate isn't freshness

Two controllers can both say 8,000 Hz and deliver very different data. Many scan their buttons and sticks only 1,000 times a second, then send the same reading in eight reports in a row. Their data can be a full millisecond old, even though it arrives 8,000 times a second. Others send 8,000 reports on their own clock,

which slowly drifts against your PC's. A report can sit waiting for the PC to ask for it, and every so often two land at once and one is lost, or none arrives and the last one repeats.

Thirst stays in step with your PC. Every input, every button, stick and trigger, is captured in time with your PC's own collection timing, so each report carries the newest reading the controller could have sent. Never a repeat, never a gap.

HOW THE CONTROLLER WORKS	REPORTS PER SECOND	AGE OF THE READING WHEN YOUR PC COLLECTS IT
Inputs scanned 1,000 times a second, sent in 8,000 reports	8,000	~0.5 ms average, up to 1 ms 7 in 8 reports repeat the last reading
Sends 8,000 reports on its own clock	8,000	~0.06 ms average, up to 0.125 ms Drifts against your PC, so reports are sometimes doubled or missed
Thirst	8,000	A few hundredths of a millisecond, every report Taken just before your PC collects it

Figures for other designs are typical for each approach and vary by model.

Data freshness

How old the newest stick or button reading is when the game reads it, from the moment it is sampled. Games read at their own times, so this is averaged over when the read happens. The game, Windows and the display add the same delay whichever controller you use, so they are left out.

CONTROLLER AND MODE	AVERAGE	WORST CASE	BUTTON DEBOUNCE ON TOP
Thirst · wired	0.07 ms	0.14 ms	0 ms
Thirst · 2.4 GHz dongle	0.13–0.17 ms	0.25–0.3 ms	0 ms
Thirst · Bluetooth (PC)	~4.5 ms	~9 ms	0 ms
Typical "8 kHz" pro controller	~0.5–1 ms	~1–2 ms	1–5 ms
Typical 1 kHz pro controller	~1 ms	~2 ms	1–5 ms
Typical console controller on PC, wired	~2–4 ms	~5–8 ms	1–5 ms
Typical Bluetooth controller	~5–10 ms	~10–20 ms	1–5 ms

Bars show the average on a 0–10 ms scale. Figures for other controllers are typical estimates for each class and vary by model. Thirst reports a press on its first edge.

Head to head: custom 8 kHz boards

	THIRST	MARIUS HEIER MH4 / MH5	HYPERSTRIKE DS4	VOID FIREBIRD
Shell	DualSense	MH4: DualShock 4. MH5: DualSense	DualShock 4	DualShock 4
Polling	8 kHz wired and wireless	8 kHz, wired only	8 kHz, wired only	1 kHz, wired only
Button latency, Gamepadla-style	~0.15–0.4 ms*	0.96 ms (MH4)	1.05 ms†	1.97 ms†
Stick latency, Gamepadla-style	~0.15–0.4 ms*	0.51 ms (MH4)	0.35 ms†	3.06 ms†
Controller timing	0.07 ms average, 0.14 ms worst, including all on-chip and peripheral processing	0.125 ms, excluding on-chip and peripheral processing (community tests)	Not published	Not published
Stick reading	Dedicated 16-bit converter outside the processor, in-frame averaging, locked reference	Processor's built-in 12-bit converter	Not published	Not published
Wireless	8 kHz dongle + Bluetooth	None	None	None
Battery life	~13 h with light rumble and triggers, ~6 h medium, ~81 h with them off, lights off (8 kHz dongle); up to ~145 h on Bluetooth	None, wired only	Not published; tested wired only	No battery (unverified)
Gyro	6-axis	None	Not published	Yes (unverified)
Rumble	HD haptics	None	Not published	None
Adaptive triggers	Yes, with position sensing	None	None	None
Touchpad	Full multi-touch + click, with player LEDs	Click only, no touch sensing	Not published	Not published
Extra buttons	8, plus separate digital trigger inputs	Up to 6	Not published	2 paddles
Console	No, PC-first	No	No	PS4 listed (unverified)

* Calculated from the design, including a typical Windows delay, so it compares with Gamepadla's measurements; to be replaced with measured results. † User-submitted on Gamepadla, not checked by its moderators. Marius latency is the MH4 (DualShock 4) board, the only one Gamepadla has tested; its features column describes the MH5, the DualSense version. The MH4 is one of the fastest wired boards Gamepadla has tested, and it gets there by leaving out wireless, the battery, gyro and rumble. Sources: Gamepadla (Prometheus 82 hardware tests on gamepadla.com) and the makers' and resellers' published listings. Our figures are calculated from the design.

Measurement and signal quality

<p>In-frame averaging</p> <p>Sticks and triggers are sampled 384,000 times a second, and each reading is averaged inside a single 8,000 Hz report cycle, before it reaches the processor. Every report carries a new, true 16-bit reading: never repeated, never upscaled, with no extra processor load, leaving its full attention for timing and the radio. Other controllers average across several reports, so their readings are already old when they're sent. Thirst's are a fraction of a report old, measured from the moment of sampling.</p>	<p>Locked-reference sensing</p> <p>Stick and trigger readings don't shift with battery level, with switching between battery, USB and dock power, with different ports and cables, or with the load from rumble and the adaptive triggers. Centre and full travel stay where they were calibrated, so your deadzones and curves feel the same in hour one and hour ten.</p>
<p>Digital from the start</p> <p>Sticks and triggers are converted to digital on their own dedicated converter, outside the processor, so the processor's electrical noise is kept out of the reading.</p>	<p>Built for stability</p> <p>Precision, low-drift components are used throughout the measurement and timing circuits, so readings and wireless timing hold steady across temperature and from unit to unit.</p>

INPUT	RESOLUTION	PATH TO THE PROCESSOR
Thumbsticks	16-bit sampling 14–16 effective bits, depending on the averaging you choose	Dedicated analog converter sampling 384,000 times a second, averaged inside every report cycle. Each stick axis is buffered, so one axis never disturbs another
Analog triggers	16-bit sampling ~15 effective bits	Same converter as the sticks, plus a separate digital click at the end of travel
Gyro + accelerometer	16-bit, 6-axis up to $\pm 4,000$ °/s and ± 16 g	Own dedicated bus, read on its data-ready signal
Adaptive trigger position	12-bit	Measured directly, so trigger resistance is controlled in a closed loop
Buttons	Digital	Every button has its own processor pin, read directly with no scanning chips in between
Touchpad	Multi-touch + click	Own bus, kept separate from the power and motor bus

The board also accepts Hall-effect and TMR sticks that use the standard 3-wire analog interface.

Battery life

Every setup below is active play: sticks and triggers read continuously, buttons pressed, the touchpad on, and the radio sending every report. HD rumble, the adaptive triggers and the lights are then added at the levels defined here.

USAGE LEVEL	STRENGTH	PATTERN	HD RUMBLE, BOTH ACTUATORS	ADAPTIVE TRIGGERS, BOTH MOTORS
Light	33% of maximum current	On for 25% of each hour (15 min)	~15–25 mA	~45–70 mA
Medium	66% of maximum current	On for 25% of each hour (15 min)	~60–100 mA	~90–140 mA
Heavy	100%, Thirst's maximum output	On for 25% of each hour (15 min)	~140–225 mA	~135–210 mA
Constant	100%, Thirst's maximum output	The whole hour, never off	~555–900 mA	~545–825 mA

LIGHT	OFF	LOW (25%)	MEDIUM (50%)	HIGH (100%)
RGB status light, one colour	0 mA	~2 mA	~4 mA	~8.5 mA
Mic mute light	0 mA	~1 mA	~2 mA	~3.5 mA
Touchpad player LEDs, all 3 segments	0 mA	~5 mA	~10.5 mA	~21 mA

The rumble and trigger columns are the average current each feature draws from the battery at that level, on top of everything else. 100% is the most Thirst can deliver. Each rumble actuator then draws about 280–450 mA from the battery, with both together capped by the battery's ~0.9 A limit; each trigger motor draws about 270–410 mA, set by the board's 0.4 A per-motor current limit. The rumble amplifiers also draw about 5 mA whenever rumble is enabled. Rumble power rises with the square of its current, so 33% strength uses about 11% of full power; trigger current rises in step with force. A typical shooter such as Call of Duty falls between light and medium. Rumble and triggers are never at constant 100% together: firmware limits rumble while the trigger motors are pushing, to stay inside the battery's current limit.

BUTTONS, STICKS, TRIGGERS, TOUCHPAD AND GYRO, PLUS HD RUMBLE AND ADAPTIVE TRIGGERS AT THE SAME LEVEL

■ Dongle · carbon sticks
 ■ Dongle · TMR sticks
 ■ Bluetooth · carbon sticks
 ■ Bluetooth · TMR sticks

■ ■ Solid: RGB status light on medium · whole bar: all lights off

HD rumble heavy · adaptive triggers heavy

■				~3.3 / 3.3 h
■				~3.3 / 3.3 h
■				~3.3 / 3.4 h
■				~3.3 / 3.4 h

HD rumble medium · adaptive triggers medium

■				~5.7 / 5.8 h
■				~5.7 / 5.8 h
■				~5.9 / 6.0 h
■				~5.9 / 6.0 h

HD rumble light · adaptive triggers light

■				~12 / 13 h
■				~12 / 13 h
■				~13 / 14 h
■				~13 / 14 h

BUTTONS, STICKS, TRIGGERS, TOUCHPAD AND GYRO, PLUS HD RUMBLE · ADAPTIVE TRIGGERS OFF

■ Dongle · carbon sticks
 ■ Dongle · TMR sticks
 ■ Bluetooth · carbon sticks
 ■ Bluetooth · TMR sticks
■ ■ Solid: RGB status light on medium · whole bar: all lights off

HD rumble constant

■			~1.5 / 1.5 h
■			~1.5 / 1.5 h
■			~1.5 / 1.5 h
■			~1.5 / 1.5 h

HD rumble heavy

■			~5.6 / 5.7 h
■			~5.6 / 5.7 h
■			~5.8 / 5.9 h
■			~5.8 / 5.9 h

HD rumble medium

■			~11 / 12 h
■			~11 / 12 h
■			~12 / 13 h
■			~12 / 13 h

HD rumble light

■	■		~28 / 31 h
■	■		~28 / 31 h
■	■		~33 / 36 h
■	■		~33 / 36 h

BUTTONS, STICKS, TRIGGERS, TOUCHPAD AND GYRO, PLUS ADAPTIVE TRIGGERS · HD RUMBLE OFF

■ Dongle · carbon sticks
 ■ Dongle · TMR sticks
 ■ Bluetooth · carbon sticks
 ■ Bluetooth · TMR sticks
■ ■ Solid: RGB status light on medium · whole bar: all lights off

Adaptive triggers constant

■			~1.7 / 1.7 h
■			~1.7 / 1.7 h
■			~1.7 / 1.7 h
■			~1.7 / 1.7 h

Adaptive triggers heavy

■			~6.2 / 6.3 h
■			~6.2 / 6.3 h
■			~6.4 / 6.5 h
■			~6.4 / 6.5 h

Adaptive triggers medium

■			~9.0 / 9.3 h
■			~9.0 / 9.3 h
■			~9.4 / 9.7 h
■			~9.4 / 9.7 h

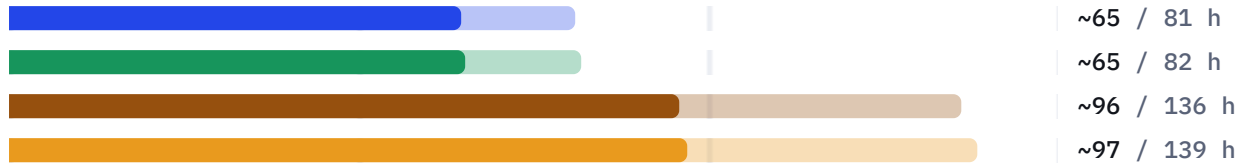
Adaptive triggers light

■			~16 / 17 h
■			~16 / 17 h
■			~17 / 18 h
■			~17 / 18 h

HD RUMBLE AND ADAPTIVE TRIGGERS OFF

■ Dongle · carbon sticks
 ■ Dongle · TMR sticks
 ■ Bluetooth · carbon sticks
 ■ Bluetooth · TMR sticks
■ ■ Solid: RGB status light on medium · whole bar: all lights off

Buttons, sticks, triggers, touchpad and gyro



Buttons, sticks, triggers and touchpad (gyro off)



0 h 50 h 100 h 150 h

SETUP	2.4 GHZ DONGLE · 8 KHZ, RGB STATUS LIGHT				BLUETOOTH, RGB STATUS LIGHT			
	OFF	LOW	MEDIUM	HIGH	OFF	LOW	MEDIUM	HIGH
BUTTONS, STICKS, TRIGGERS, TOUCHPAD AND GYRO, PLUS HD RUMBLE AND ADAPTIVE TRIGGERS AT THE SAME LEVEL								
HD rumble <i>heavy</i> · adaptive triggers <i>heavy</i>	~3.3 h	~3.3 h	~3.3 h	~3.2 h	~3.4 h	~3.3 h	~3.3 h	~3.3 h
HD rumble <i>medium</i> · adaptive triggers <i>medium</i>	~5.8 h	~5.8 h	~5.7 h	~5.6 h	~6.0 h	~6.0 h	~5.9 h	~5.8 h
HD rumble <i>light</i> · adaptive triggers <i>light</i>	~13 h	~13 h	~12 h	~12 h	~14 h	~13 h	~13 h	~13 h
BUTTONS, STICKS, TRIGGERS, TOUCHPAD AND GYRO, PLUS HD RUMBLE · ADAPTIVE TRIGGERS OFF								
HD rumble <i>constant</i>	~1.5 h	~1.5 h	~1.5 h	~1.5 h	~1.5 h	~1.5 h	~1.5 h	~1.5 h
HD rumble <i>heavy</i>	~5.7 h	~5.7 h	~5.6 h	~5.5 h	~5.9 h	~5.9 h	~5.8 h	~5.7 h
HD rumble <i>medium</i>	~12 h	~12 h	~11 h	~11 h	~13 h	~12 h	~12 h	~12 h
HD rumble <i>light</i>	~31 h	~29 h	~28 h	~26 h	~36 h	~34 h	~33 h	~30 h
BUTTONS, STICKS, TRIGGERS, TOUCHPAD AND GYRO, PLUS ADAPTIVE TRIGGERS · HD RUMBLE OFF								
Adaptive triggers <i>constant</i>	~1.7 h	~1.7 h	~1.7 h	~1.7 h	~1.7 h	~1.7 h	~1.7 h	~1.7 h
Adaptive triggers <i>heavy</i>	~6.3 h	~6.3 h	~6.2 h	~6.1 h	~6.5 h	~6.5 h	~6.4 h	~6.3 h

SETUP	2.4 GHZ DONGLE • 8 KHZ, RGB STATUS LIGHT				BLUETOOTH, RGB STATUS LIGHT			
	OFF	LOW	MEDIUM	HIGH	OFF	LOW	MEDIUM	HIGH
Adaptive triggers <i>medium</i>	~9.3 h	~9.1 h	~9.0 h	~8.8 h	~9.7 h	~9.5 h	~9.4 h	~9.1 h
Adaptive triggers <i>light</i>	~17 h	~16 h	~16 h	~15 h	~18 h	~18 h	~17 h	~16 h
HD RUMBLE AND ADAPTIVE TRIGGERS OFF								
Buttons, sticks, triggers, touchpad and gyro	~81 h	~72 h	~65 h	~54 h	~136 h	~113 h	~96 h	~74 h
Buttons, sticks, triggers and touchpad (<i>gyro off</i>)	~87 h	~77 h	~69 h	~56 h	~145 h	~119 h	~100 h	~76 h

Every battery figure on this sheet comes from an electrical simulation of the board: 20,000 runs per figure, each using the published current draw of every component, varied across its specified range, together with the usage levels above, for the stock-size 1,560 mAh battery. The figure shown is the conservative result: 9 in 10 runs lasted at least this long, and the typical (median) run lasts longer. All figures are to be confirmed by measurement on prototype hardware. Carbon sticks are the stock carbon-film potentiometer sticks; TMR sticks are HallPi drop-in TMR sticks for the same 3-pin footprint, with four TMR sensors drawing about 0.25 mA each. On this board the two draw almost the same, so their battery life matches to within a few per cent; the table is for carbon sticks. The chart and the table use the RGB status light only, on one colour, with the mic mute light and touchpad player LEDs off; white uses up to three times as much. Adding the other two lights is shown further down. With rumble and triggers off, the lights become the biggest single load. A full charge takes about 2.5 hours, over USB-C or the dock input.

Battery calculator

The web version of this sheet has an interactive calculator that runs the same electrical simulation live, 20,000 runs per result, for any combination of gyro, rumble, adaptive triggers and the three lights. The tables below come from the same model.

WHAT EACH LIGHT COSTS

Gyro on, no rumble or adaptive triggers, every other light off. Hours are the conservative result of 20,000 simulated runs per figure.

LIGHT	LEVEL	CURRENT	DONGLE • 8 KHZ	BLUETOOTH
All lights off	–	0 mA	~81 h	~136 h
RGB status light	Low	~2.1 mA	~72 h	~113 h
	Medium	~4.3 mA	~65 h	~96 h
	High	~8.5 mA	~54 h	~74 h
Mic mute light	Low	~0.9 mA	~77 h	~125 h
	Medium	~1.75 mA	~73 h	~115 h
	High	~3.5 mA	~66 h	~98 h
Touchpad player LEDs	Low	~5.3 mA	~60 h	~85 h
	Medium	~10.5 mA	~46 h	~60 h
	High	~21 mA	~32 h	~38 h

ADDING THE TOUCHPAD LEDS AND MIC MUTE LIGHT

The battery figures above use the RGB status light only. These grids add the touchpad player LEDs and the mic mute light on top: all 64 combinations of the three lights. Each grid is one mic mute light level; RGB status light runs across, touchpad player LEDs run down. Gyro on, no rumble or adaptive triggers, 2.4 GHz dongle at 8 kHz. Hours are the conservative result of 20,000 simulated runs per cell.

~25 h  ~81 h

Mic mute light: Off

Pad ↓ RGB →	Off	Low	Med	High
Off	81	72	65	54
Low	60	55	51	44
Med	46	43	41	36
High	32	30	29	27

Mic mute light: Low

Pad ↓ RGB →	Off	Low	Med	High
Off	77	69	62	52
Low	58	53	49	43
Med	45	42	40	35
High	31	30	28	26

Mic mute light: Med

Pad ↓ RGB →	Off	Low	Med	High
Off	73	66	59	50
Low	56	51	47	41
Med	44	41	39	35
High	31	29	28	26

Mic mute light: High

Pad ↓ RGB →	Off	Low	Med	High
Off	66	60	55	47
Low	52	48	44	39
Med	41	39	37	33
High	29	28	27	25

TOUCHPAD LEDS AND MIC LIGHT IN EVERY SETUP

The battery chart above uses the RGB status light on medium. These grids keep it on medium and add the touchpad player LEDs (down) and the mic mute light (across) for every setup in the chart. Each grid is shaded on its own scale. Hours are the conservative result of 20,000 simulated runs per cell; the printed sheet shows the 2.4 GHz dongle at 8 kHz.

HD rumble heavy · adaptive triggers heavy

~3.1 to ~3.3 h

Pad ↓ Mic →	Off	Low	Med	High
Off	3.3	3.3	3.3	3.2
Low	3.2	3.2	3.2	3.2
Med	3.2	3.2	3.2	3.2
High	3.1	3.1	3.1	3.1

HD rumble medium · adaptive triggers medium

~5.2 to ~5.7 h

Pad ↓ Mic →	Off	Low	Med	High
Off	5.7	5.7	5.7	5.7
Low	5.6	5.6	5.6	5.5
Med	5.5	5.5	5.5	5.4
High	5.3	5.3	5.2	5.2

HD rumble light · adaptive triggers light

~10 to ~12 h

Pad ↓ Mic →	Off	Low	Med	High
Off	12	12	12	12
Low	12	12	12	11
Med	11	11	11	11
High	10	10	10	10

HD rumble constant

~1.5 to ~1.5 h

Pad ↓ Mic →	Off	Low	Med	High
Off	1.5	1.5	1.5	1.5
Low	1.5	1.5	1.5	1.5
Med	1.5	1.5	1.5	1.5
High	1.5	1.5	1.5	1.5

HD rumble heavy

~5.1 to ~5.6 h

Pad ↓ Mic →	Off	Low	Med	High
Off	5.6	5.6	5.6	5.6
Low	5.5	5.5	5.5	5.5
Med	5.4	5.4	5.4	5.3
High	5.2	5.2	5.2	5.1

HD rumble medium

~9.4 to ~11 h

Pad ↓ Mic →	Off	Low	Med	High
Off	11	11	11	11
Low	11	11	11	11
Med	11	10	10	10
High	9.7	9.6	9.6	9.4

HD rumble light

~18 to ~28 h

Pad ↓ Mic →	Off	Low	Med	High
Off	28	28	27	26
Low	25	25	24	24
Med	23	22	22	22
High	19	19	18	18

Adaptive triggers constant

~1.6 to ~1.7 h

Pad ↓ Mic →	Off	Low	Med	High
Off	1.7	1.7	1.7	1.7
Low	1.7	1.7	1.7	1.7
Med	1.6	1.6	1.6	1.6
High	1.6	1.6	1.6	1.6

Adaptive triggers heavy

~5.6 to ~6.2 h

Pad ↓ Mic →	Off	Low	Med	High
Off	6.2	6.2	6.2	6.1
Low	6.1	6.1	6.0	6.0
Med	5.9	5.9	5.9	5.9
High	5.7	5.7	5.6	5.6

Adaptive triggers medium

~7.8 to ~9.0 h

Pad ↓ Mic →	Off	Low	Med	High
Off	9.0	9.0	8.9	8.8
Low	8.7	8.7	8.6	8.5
Med	8.4	8.4	8.4	8.3
High	7.9	7.9	7.8	7.8

Adaptive triggers light

~12 to ~16 h

Pad ↓ Mic →	Off	Low	Med	High
Off	16	16	16	15
Low	15	15	15	14
Med	14	14	14	14
High	13	13	12	12

No rumble or adaptive triggers, gyro on

~27 to ~65 h

Pad ↓ Mic →	Off	Low	Med	High
Off	65	62	60	55
Low	51	49	47	44
Med	41	40	39	37
High	29	28	28	27

No rumble or adaptive triggers, gyro off

~28 to ~68 h

Pad ↓ Mic →	Off	Low	Med	High
Off	68	66	63	58
Low	53	51	49	46
Med	42	41	40	38
High	30	29	29	28

Roadmap

The order things happen in, from pre-orders to production.

1 Pre-orders open VERY SOON, LIKELY WEEK 1-2 OF NOVEMBER

Pre-ordered boards make up the alpha program: the first prototypes open for public testing. They will be the first to test new features as they are rolled out, and alpha firmware will only be available on these initial prototype boards. Open beta software will follow at a later date.

The price depends on how many boards are pre-ordered. All prices are in US dollars. \$350 is the maximum, for under 20 boards, and a 50% deposit (\$175) reserves a board. At 20 to 49 boards our cost per board falls a lot, and our early, highest projection is \$250 per board, including shipping within the USA and Australia. Shipping to other countries will probably cost about \$15 more. The price drops again at 50 and at 100 boards.

When pre-orders close and we know how many boards are on order, we balance the final price, and you pay only the difference. For example, if 21 boards are pre-ordered and the price comes to \$250, you have already paid \$175, so the balance is \$75. If you order more than one board, an extra discount is applied on top, automatically, when the final price is balanced.

These prices are a rough estimate: we have not yet gone through every cost of making the boards and having them delivered. Concrete prices will be published when pre-orders open.

2 Test board order

The initial test boards are ordered. Initial runs take about 3–4 weeks, plus shipping.

3 Design validation and basic firmware

The physical design is validated on real hardware, and a basic firmware build brings up comms with the dongle.

4 Latency testing

Real input latency is measured with a high-speed, firmware-linked test device.

5 First consumer prototypes ordered

Once testing shows the boards are stable, the first round of consumer prototypes is ordered. Remaining balances are calculated from the number of boards on order, and the price per board drops as milestones are met.

6 Production

Firmware work continues while boards are in production. Later runs take about 2–4 weeks each, plus shipping.

Features

CONTROLS

- **Full standard layout:** D-pad, four face buttons, L1/R1, analog L2/R2 with digital end stops, L3/R3, Create, Options, Home, Mute and touchpad click
- **8 extra buttons** for back paddles or anywhere else you want them, all remappable
- **Encoder input** for a scroll wheel or dial. It is decoded in hardware, so fast spins never drop steps
- **Frame Sniping:** the controller tracks your PC's polling in real time and adapts to it. Every input is sampled at the last useful moment, so each report reaches the PC as fresh as it can be
- **Zero-delay debounce:** a press is reported on its first edge, and contact bounce afterwards is ignored
- **Home button wakes** the controller from deep sleep. There is also a rear pinhole reset

TOUCHPAD AND LIGHTING

- **Touchpad:** full multi-touch with click, using the original touchpad
- **Touchscreen-ready:** the touchpad connector can also run a small touch display in place of the touchpad. The board detects which one is fitted at power-up
- **Player LEDs** on the touchpad, three segments, each dimmable separately
- **Full-colour RGB status light** and a dimmable mic/mute light

FEEDBACK

- **HD rumble:** two voice-coil actuators driven by digital amplifiers. On PC, haptics arrive as audio channels, the same way the original controller does it
- **Adaptive triggers** on both sides: motor-driven resistance with about 60 force steps. Trigger position is measured, so effects like weapon kick and tension zones respond to where your finger actually is
- The trigger motors are current-limited and report faults, so a jammed trigger shuts off safely

POWER AND CHARGING

- Fits the **stock battery**, with temperature-monitored smart charging
- **Built-in fuel gauge** for an accurate battery percentage
- **Wireless-charging ready:** a protected 5 V input for charging dock contacts or a wireless charging receiver. It is reverse-blocked and surge-protected
- **Storage mode** cuts the drain to almost nothing; press Home to wake it

COMPANION APP IN DEVELOPMENT

- **PC and phone app** for button remapping, including the 8 extras
- **Stick curves and deadzones;** trigger curves and click points
- **Report rate** selectable from 125 Hz to 8,000 Hz
- Adaptive trigger profiles, rumble strength, gyro sensitivity and lighting
- **Always in sync:** change a setting from the PC or the phone and the other updates to match. The controller holds the settings
- **Built-in latency self-test** that checks the controller's own timing
- **Cable and port test:** checks your USB cable and port for a stable link and their effective speed at 8,000 Hz, with a simple pass, marginal or fail result and details for those who want them
- Profiles stored on the controller. Firmware updates over USB

PLANNED FUTURE FIRMWARE

- **Controller as dongle:** plug one Thirst into your PC and it acts as the wireless receiver for a second one, at full 8 kHz

BUILD

- Drop-in board for the DualSense shell. Stick, button and connector positions are kept
- **Expansion boards:** the trigger motors, haptics, shoulder buttons and extra buttons connect through removable expansion boards. More expansion boards are planned
- **USB-C** with through-hole anchoring for cable-yank strength, and ESD protection on the data lines
- 4-layer board with an impedance-controlled USB pair, for a clean High-Speed link
- Antenna kept clear of copper at the board edge, for range in the stock shell

Not in this revision

- 3.5 mm headset jack, built-in speaker and microphone
- PS5 console play. This revision is PC-first; console support would need a future dongle

This is a live document. It will be updated as the project moves forward, and all information and documentation in it is correct to the best of our knowledge at the time of writing.