QUANTUM 3.0

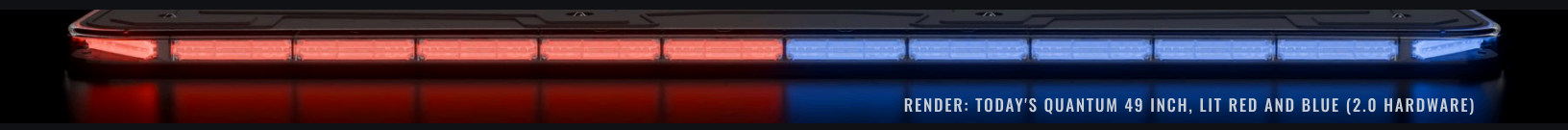
PRODUCT REQUIREMENTS DOCUMENT

Feniex Industries · Rev A draft for engineering review · 15 Nov 2026

16 OPEN QUESTIONS

50 ITEMS TO CONFIRM (TBC)

One SKU. One level. Five colors. Three ways to control. Target: the brightest in the industry.



RENDER: TODAY'S QUANTUM 49 INCH, LIT RED AND BLUE (2.0 HARDWARE)

THE LINE, 1.0 TO 3.0

three generations, as Hamza Deyaf described them, 14 and 15 Nov 2026

	Quantum 1.0	Quantum 2.0 TODAY'S	Quantum 3.0
	5 levels	+ green · Dual · Tri · Full · 2x	ONE LEVEL · ALL ON
COLORS	4: red, blue, amber, white	5: green added	5
UNLOCK LEVELS	5	3: Dual, Tri, Full	1: everything, out of the box
POWER		dual transistor: double the power	switching regulators: red and blue at 1 A
LEDS		mid-power (TBC)	Cree ceramic red, blue, green; amber and white stay mid-power
CONTROL		mode wires, serial	mode wires, serial, Bluetooth
PART NUMBERS PER PRODUCT		3	1
PRICE		a ladder (44 inch: $1,899 / $1,999 / $2,099)	the Tri price ($1,999)

Blank cells are engineering's to fill (OQ-12). The 44 inch ladder and Tri price: feniex.com, read 14 Nov 2026.

WHAT STAYS housings, mounting, sealing, harness exits, the 10 to 18 VDC supply, the mode wires, the serial pair, amber and white.

WHAT CHANGES the red, blue and green LEDs, their drivers, the three controller boards, the optic, the part numbers.

HIS TEN DECISIONS (14 NOV 2026), AND WHERE EACH ONE LIVES

1. Cree ceramic LEDs for red, blue and green; amber and white stay mid-power → `LED-01 to LED-03`
2. Switching regulators drive red and blue at 1 A → `DRV-01, LED-04`
3. The 10X and 30X upgraded for 1 A; a Bluetooth radio on the 10X, the 30X and the Quantum Module (formerly the Q Link) → `BRD-01 to BRD-05, BLE-01`
4. The blue wire: 12 V opens Bluetooth pairing; a phone, and Eve, program the light → `BLE-06, BLE-07, BRD-06, APP-04`
5. Three ways to control: mode wires, serial, Bluetooth → `CTL-01 to CTL-03`
6. One SKU, one unlock level, preset programming out of the box → `FAM-01, FAM-03, CTL-04`
7. Tri pricing for everything → `FAM-02`
8. The mechanicals stay; the linear optic is new → `BRD-01 to BRD-03, BRD-07, OPT-01, OPT-02, THM-01`
9. The whole family is Quantum 3.0, the Light Module series (formerly Q Series) included → `FAM-04`
10. Written for the engineers to develop → `every table, and page 10`

SYSTEM The system on one drawing

OWNER: ALL

VEHICLE POWER
10 to 18 VDC, unchanged

+12 V

THREE WAYS TO CONTROL

1 MODE WIRES
analog, programmed: switch a wire, get a pattern; the preset runs out of the box

wires per product: today's count

2 SERIAL PAIR
two wires from a Feniex controller: white A, green B

3 BLUETOOTH NEW
a phone, tablet or computer runs the app; Eve helps write the program; it reaches the controller's Bluetooth radio

THE BLUE WIRE: 12 V OPENS PAIRING

CONTROLLER · 10X
inside light sticks and interior bars

processor | Bluetooth radio | serial port
mode-wire inputs | blue-wire input
1 A switching regulators: red, blue, green

CONTROLLER · 30X
inside full-size bars

processor | Bluetooth radio | serial port
mode-wire inputs | blue-wire input
1 A switching regulators: red, blue, green

CONTROLLER · QUANTUM MODULE
a separate box (formerly the Q Link)

processor | Bluetooth radio | serial port
mode-wire inputs | blue-wire input
8 serial outputs, one lighthead each

serial

WHAT EACH CONTROLLER DRIVES
LED cells: 4 to 30 per product (TBC)

light stick or interior bar: up to 10 LED cells (TBC)

ONE LED CELL (not a controller)
24 or 27 LEDs in a row, one linear optic over it
Cree ceramic red, blue, green (new)
mid-power amber and white (today's)

full-size bar: up to 30 LED cells (TBC)

... 8

lightheads of the Light Module series (formerly Q Series); no radio of their own

the new linear optic, every cell

light out: SAE Class 1 (target); target: the brightest in the industry

new in 3.0 | today's, carried over

Regulators on the 10X and 30X: the baseline (OQ-3)

THREE NAMES, THREE THINGS

Quantum Module
the controller, formerly the Q Link.

LED cell
the repeated unit of 24 or 27 LEDs behind each linear optic, inside every stick and bar.

Lighthead
one product of the Light Module series, formerly the Q Series.

The Bluetooth radio
always called so: the radio part on each controller.

PAIRING, IN FIVE STEPS

1. Touch the blue wire to 12 V.
2. The light shows a short, dim pairing cue.
3. Open the app; the light appears, and the app asks for the 6-digit code on its label.
4. Paired; the light confirms.
5. Program it, by hand or with Eve: say what you want, see it on an animated bar, approve, write.

WHO WINS

1. an active mode wire
2. a serial command
3. Bluetooth

Bluetooth can always read and program. It controls live only when no wired input is active. Nothing is written while a warning mode is on.

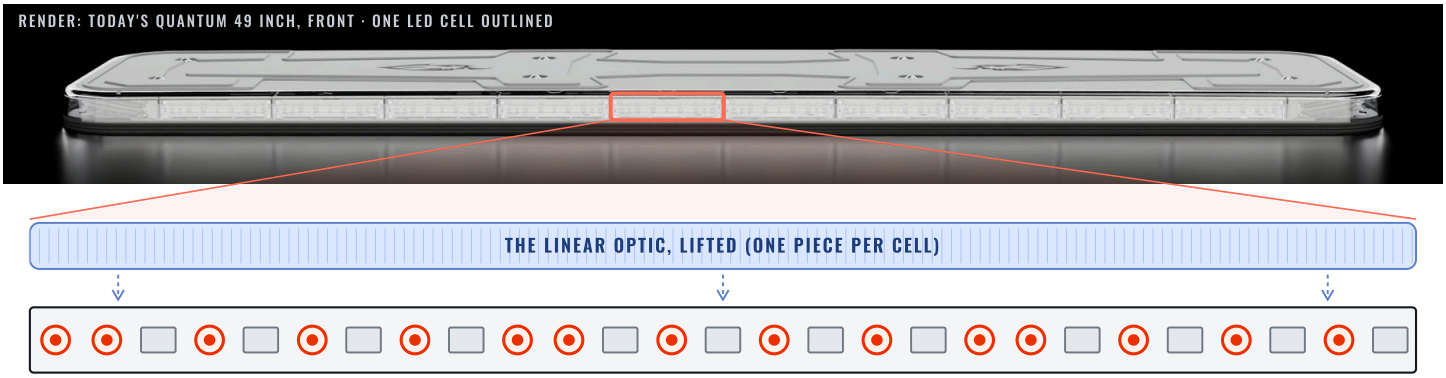
SAME LOGIC EVERYWHERE: blue wire to pair, the same three controls, the same app, on the 10X, the 30X and the Quantum Module.

RED The LEDs

OWNER: EE

STAYS supply range, harness, per-cell color control, amber and white.

CHANGES the red, blue and green LEDs.



● 15 round packages, read as the red, blue and green positions (how many of each: TBC): Cree ceramic, 1 A

▭ 12 rectangular packages, read as the amber and white positions (TBC): unchanged

A bar's cell: one row of 27 LEDs (a stick's: 24, TBC). Order drawn for illustration; the true order and colors come from the cell board's drawing (OQ-2). How many positions change is fixed at G0 (LED-08).

COLOR	QUANTUM 3.0 LED	DRIVE
Red	Cree XLamp ceramic: XD14 (TBC) or XQ-E High Intensity	1.0 A, switching
Blue	the same	1.0 A, switching
Green	the same family	1 A-capable, set by photometry
Amber	today's mid-power LED	today's
White	today's mid-power LED	today's

WHAT CREE'S DATASHEET SAYS ABOUT THE XQ-E HIGH INTENSITY

Source: Cree LED, CLD-DS83 Rev 22B. 1.6 × 1.6 mm ceramic; 1.5 A maximum, so 1 A is two thirds of its rating; 150 °C maximum junction; 3 °C/W from junction to solder point for red and blue, 5 °C/W for green; dominant wavelength 620 to 630 nm red, 465 to 485 nm blue, 520 to 535 nm green.

The XD14's figures are to confirm against Cree's own datasheet (OQ-1): Cree's site did not list one on 14 Nov 2026.

REQUIREMENTS

ID	REQUIREMENT	WHY	VERIFIED BY	PRI	OWNER
LED-01	Red and blue use a Cree LED XLamp ceramic LED. Named part: XLamp XD14 (1.4 mm), TBC against Cree's datasheet; alternate: XLamp XQ-E High Intensity (1.6 mm, 1.5 A maximum). The part is fixed at gate G0	His decision; ceramic carries 1 A	I, datasheet review	M	EE
LED-02	Green uses the same Cree ceramic family	His decision	I	M	EE
LED-03	Amber and white stay on today's mid-power LEDs and today's drive	His decision	I	M	EE
LED-04	Red and blue strings run at 1.0 A ±5% from 10 to 18 VDC, across the product's operating temperatures; green runs on the same 1 A-capable channel at a current set by photometry (TBC); each color's current can be set lower in firmware, down to 0.35 A (TBC)	"Even brighter"; night and balance	T	M	EE
LED-05	No LED exceeds its datasheet maximum current, or a junction of 125 °C, at the highest ambient in the worst pattern	Life; red dims with heat	T, A	M	EE
LED-06	Every color stays inside SAE J578 and 13 CCR §816 at thermal steady state	Legal color	T (lab)	M	CMP
LED-07	One flux bin and one wavelength bin per color per build	Cells match along a bar	I	S	EE
LED-08	The number of ceramic LEDs per color in an LED cell is fixed at gate G0 from Cell Zero's measurements; every cell of a product is alike	It sets brightness, heat, input current and the look of the lit line	T, A	M	EE

YOUR FIRST WEEK confirm the LED (OQ-1); write down 2.0's cell, LED by LED (OQ-2); order the Cree samples and Cell Zero's two cell boards.

RED The drivers and the heat

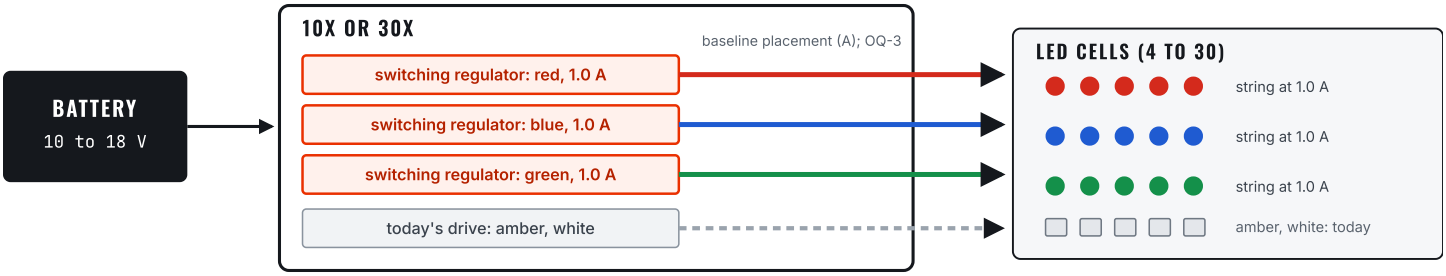
OWNER: EE, FW

STAYS the supply range, the harness and fuse, the heatsink, pad and housing.

CHANGES linear regulation becomes switching for red, blue and green.

THE POWER PATH

amber and white keep today's path, drawn in gray

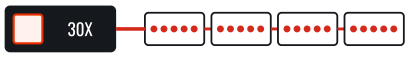


WHY SWITCHING: a linear regulator turns the gap between the battery and the LED string into heat. A switching regulator converts it, so the same amps from the vehicle give more light and leave less heat in the product. How much depends on today's string lengths (OQ-2).

THREE PLACES THE REGULATORS COULD SIT

decide in week one, confirm at G0 (OQ-3)

A



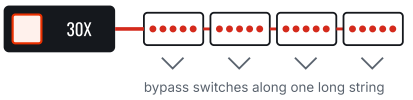
A, the baseline: on the 10X and 30X, with the LED cells left simple, as today; fewest changes to the cells; the check is the voltage left at the farthest cell at full-bar current.

B



B: one converter on each LED cell; the best efficiency and any bar length; the most parts and the most noise sources, and it needs room on the cell's board.

C



C: long color strings with bypass switches; the fewest converters; the wiring between cells changes and one open LED darkens a string.

REQUIREMENTS

ID	REQUIREMENT	WHY	VERIFIED BY	PRI	OWNER
DRV-01	Switching regulators, not linear, drive red, blue and green; at least 85% efficient at 13.5 V and 1 A (TBC). Baseline: they sit on the 10X and 30X and the LED cells stay simple; G0 confirms or moves them	More light for the same amps and heat	T	M	EE
DRV-02	Every LED cell and color stays separately controlled, as in 2.0	Colors are chosen per cell	D	M	FW
DRV-03	Input current at 13 V, worst pattern, does not exceed today's published draw for the product (44 inch 17 A, 49 inch 20 A, 60 inch 23 A)	The harness and fuse stay	T	M	EE
DRV-04	Dimming from 10 to 100% with no visible flicker or color shift	Night and cruise modes	T	M	FW
DRV-05	Open or shorted string, over-temperature, reverse polarity and over-voltage are survived; one failed cell never darkens the bar	Reliability	T	M	EE
DRV-06	CISPR 25 emissions: Class 3 at least, Class 5 the goal, in 136 to 174, 380 to 512 and 764 to 869 MHz (est.; band edges TBC by the lab)	The bar sits beside radio antennas	T (lab)	M	CMP
DRV-07	ISO 7637-2 pulses 1, 2a, 2b, 3a, 3b and ISO 16750-2 load dump, reverse voltage and jump start: no damage, recovers by itself	Real vehicles	T (lab)	M	CMP
DRV-08	Switched off, the product draws at most 1 mA with the radio idle (TBC)	Parked cars	T	M	EE
DRV-09	No regulator switches between 0.53 and 1.8 MHz; spread spectrum on (TBC)	The AM band and the radio's receiver	T	S	EE
DRV-10	No flicker, reset or dropped Bluetooth link while the vehicle's own two-way radio transmits at full power	The radio next door	T	M	CMP
THM-01	On the unchanged pad, heatsink and housing, the LED solder point stays within 45 °C of ambient at steady state (60 minutes, worst pattern; again in a 50 °C chamber)	Mechanicals stay	T	M	EE
THM-02	Firmware lowers current smoothly before LED-05 is broken, never blacks out, and reports it over serial and Bluetooth	Protects the LED and the claim	T	M	FW

YOUR FIRST WEEK write down 2.0's strings and regulators (OQ-2); run the trade study on where the regulators sit (OQ-3); order the two driver evaluation boards.

BLUE The boards and the radio

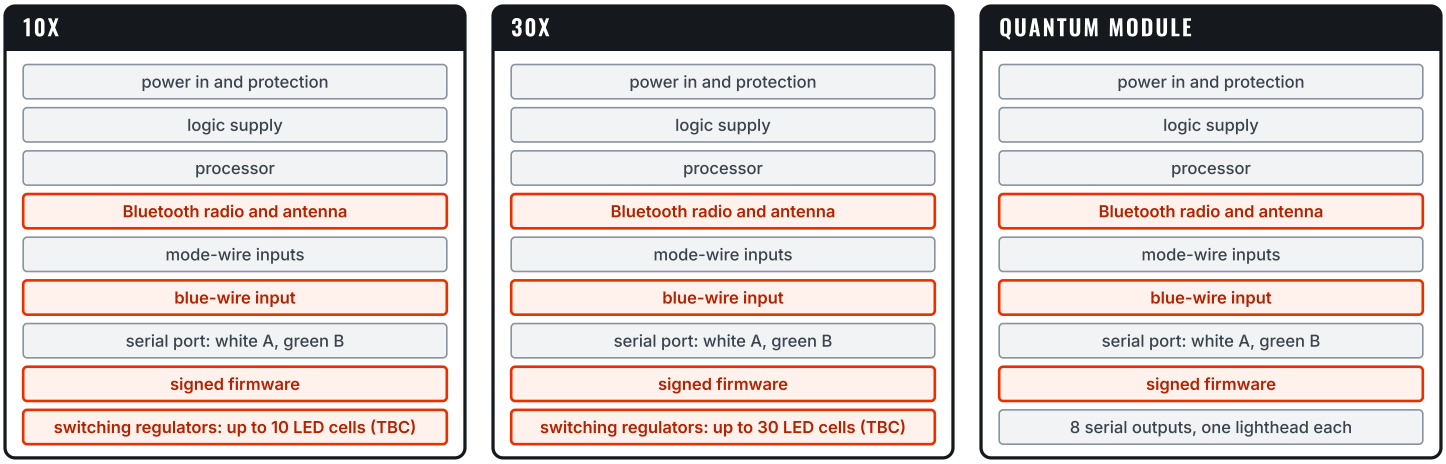
OWNER: EE, CMP

STAYS each board's outline, mounting and connectors.

CHANGES 1 A drive on the 10X and 30X; a Bluetooth radio and the blue wire on all three.

BLOCK DIAGRAM, EACH BOARD

today's blocks in gray, new ones in red



REQUIREMENTS

ID	REQUIREMENT	WHY	VERIFIED BY	PRI	OWNER
BRD-01	10X for 3.0: drives its LED cells at LED-04; same outline, mounting, potting housing and connector positions	Sticks and interior bars keep their housings	T, I	M	EE
BRD-02	30X for 3.0: the same, for full-size bars, on today's adapter plate	Bars keep their housings	T, I	M	EE
BRD-03	Quantum Module: same enclosure and harnesses as the Q Link (27 inputs, 8 serial outputs, one lighthead each, the 3-pin USB connector); Bluetooth and the blue wire added; renamed on the label, manual and software	The rename; same topology	T, I	M	EE
BRD-04	One command set and one behavior across the 10X, 30X and Quantum Module	"Same logic and topology"	D	M	FW
BRD-05	Each lighthead drives its ceramic red, blue and green at LED-04 inside its present housing, on one board that takes both mode wires and serial (TBC); it has no radio of its own and is reached through the Quantum Module	The whole family is 3.0; one SKU	T	M	EE
BRD-06	The blue wire is added without a new connector or cable exit: a spare conductor, or one added inside today's cable and grommet	Mechanicals stay	I	M	EE
BRD-07	LED cell: same outline, heatsink, thermal pad and optic envelope; it carries the ceramic red, blue and green and today's amber and white	Mechanicals stay	I	M	EE
BLE-01	Bluetooth Low Energy on a pre-certified radio with its own FCC grant (47 CFR 15.212, 15.247) and ISED certification, used inside the grant's conditions (antenna, enclosure, potting); the product is labeled "Contains FCC ID" and "Contains IC"	Legal sale without a new radio certification	I	M	CMP
BLE-02	The radio is rated -40 to +85 °C or wider	Roofs and winters	I	M	EE
BLE-03	A stable link from the driver's seat with the doors shut, and at 10 m outside the vehicle, on an iPhone and an Android phone, in a Tahoe and an Explorer (target -85 dBm or better, TBC)	Program from the seat or the curb	T	M	EE
BLE-04	Antenna position proven in each housing type: aluminum bar (facing the lens), potted stick, Quantum Module	Metal and potting block radio	T	M	EE
BLE-05	Bluetooth SIG qualification and listing for each product that carries the radio, before sale	Required to use the name	I	M	CMP

YOUR FIRST WEEK list which board is in every product (OQ-5); check for a free blue conductor in every harness (OQ-6); shortlist pre-certified Bluetooth radios rated for vehicle temperatures.

BLUE Pairing, security, three ways to control

OWNER: FW, APP

The pairing flow and the priority ladder are on page 2; the rows below make them testable.

ID	REQUIREMENT	WHY	VERIFIED BY	PRI	OWNER
BLE-06	12 V on the blue wire opens pairing (9 to 18 V counts; floating or 0 V does not). Pairing stays open while the wire is held and for 120 s after, 5 minutes at most (TBC); the light shows a short, dim pairing cue	His decision	D	M	FW
BLE-07	No device pairs unless the blue wire opened pairing. Pairing is encrypted (LE Secure Connections) with a 6-digit passkey printed on the product's label and box card; no PIN is shared between units	Only someone at the vehicle's wiring can pair	T	M	FW
BLE-08	Up to 4 paired devices (TBC) reconnect without the wire. A different, deliberate gesture clears them all and keeps the program: the blue wire pulsed five times within 10 s (TBC)	A lost phone; a sold car	D	M	FW
BLE-09	Outside pairing the radio sends no product name and no Feniex identifier, uses a private address that changes, and answers only paired devices; an agency can set the radio off until the next blue-wire pairing	An unmarked car must not be found by its light bar	T (sniffer)	M	FW
BLE-10	Every firmware image is signed and checked at each start; updates arrive over Bluetooth and the USB connector; no downgrade	A radio fault can be fixed in the field	T	M	FW
CTL-01	Every 10X, 30X and Quantum Module product offers three controls: mode wires, serial, Bluetooth	His decision	D	M	FW
CTL-02	Priority: an active mode wire, then a serial command, then Bluetooth; within one source, today's input order. A wire that goes active takes over within 1 s (TBC); a Bluetooth "off" clears only what Bluetooth started	An officer's switch always wins	T	M	FW
CTL-03	If the Bluetooth link drops, modes the phone started keep running until a wire or serial input changes, the app reconnects or power is cycled	No dark scene because a phone slept	T	M	FW
CTL-04	Out of the box the mode wires run a preset program, with no app and no pairing	"Working out of the box"	D	M	FW
CTL-05	Mode-wire counts and functions are unchanged per product (TBC against today's manuals)	Installers' habits and harnesses	I	M	PM
CTL-06	Serial stays two wires, white A and green B. A 3.0 product works with today's Feniex controllers, the 3-pin USB connector and the PC software (updated for 3.0), and shares a serial line with today's Quantum and Q Series products	Dealers keep their tools and stock	D	M	FW
CTL-07	No program is written while a warning mode is on; a write is all or nothing, and a power loss keeps the last good program	Safety	T	M	FW
CTL-08	Products synchronize over serial; over Bluetooth if it can be made reliable	Patterns in step	T	S	FW
APP-01	An app for phones and tablets (iOS and Android) and a program for Windows computers (OQ-10)	"Smartphones or tablets or computers"	D	M	APP
APP-02	From blue wire to the first changed pattern in under 60 s (TBC)	Easy is the point	T	M	APP
APP-03	The app programs everything today's PC software does, shows the program on an animated bar before writing it, and saves a vehicle's whole setup	No step backwards	D	M	APP
APP-04	Eve is in the app: the user says what they want, Eve proposes a program within the product's valid settings, and nothing is written until the user approves the preview	"Have Eve help them program"	D	M	APP
APP-05	A live control screen, within CTL-02	The third way to control	D	S	APP
APP-06	Programming by hand works with no internet and no account; Eve needs a connection	Garages and roadsides	T	M	APP
APP-07	Save a program, share it (a file or a QR code) and apply it to many products	Fleets and upfitters	D	S	APP
APP-08	The app collects no vehicle location, and logs each program change with its time and device	Agencies	I	M	APP

YOUR FIRST WEEK write the three-control state table from CTL-02 and CTL-03; list every setting the PC software writes today (APP-03); answer OQ-10.

WHITE The optic and the light

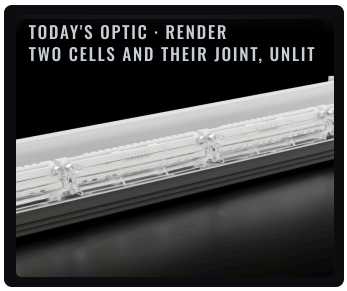
OWNER: OPT, CMP

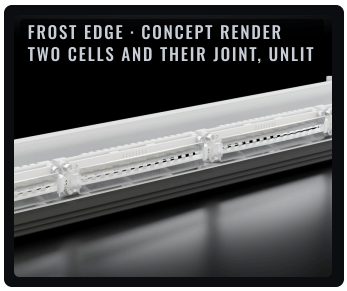
STAYS the optic's footprint, fasteners and seal.

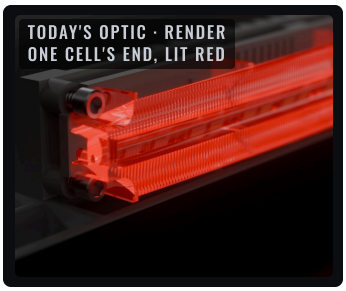
CHANGES the optic itself, and what comes out.

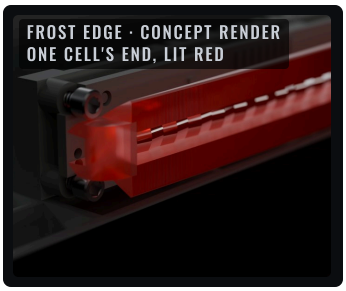
The new linear optic: Frost Edge (the Quantum 3.0 Linear Optic concept). It keeps today's beam-shaping surfaces as they are and changes what the eye meets: satin light bands in place of today's fine ribs, frosted lines and a fine frosted frame around each LED cell, a faceted crystal line down the center lens, and a frosted, lightly rounded shoulder at each cell's end that lights up, to close the dark joint between cells (about 15 mm of unlit length today, measured from the engineering geometry; the concept aims for the 3 mm gap, to be measured). Same footprint, same fasteners, one molded part.

Each pair: today's optic, then Frost Edge, rendered from the Quantum 49's own geometry with the same cells, camera and light; the Frost Edge pictures are concept renders. Optic: see the Quantum 3.0 Linear Optic concept pack.









REQUIREMENTS

ID	REQUIREMENT	WHY	VERIFIED BY	PRI	OWNER
OPT-01	Every LED cell carries the new linear optic named above	The visible change of 3.0	I	M	OPT
OPT-02	It drops into today's place: same footprint, fasteners, seal and outer envelope	Mechanicals stay	I	M	OPT
OPT-03	Its light at every SAE test point is no lower than today's optic, same cell, same current (measurement tolerance 5%, TBC)	"Doesn't affect optical efficiency"	T (goniophotometer)	M	OPT
OPT-04	It reads as new, sharp and edgy, with a frosted effect, and carries light to both ends of each cell with no hard stop; the look is visible unlit from 3 m and matches the chosen renders	His brief for the optic	D	M	OPT
OPT-05	It is aligned to the ceramic emitters' positions and size	A smaller source moves the focus	A, T	M	OPT
OPT-06	It passes the weathering, chemical and impact tests today's optic passes, and SAE J576 for optical plastics	Roof life	T	M	OPT
PHO-01	SAE J845 Class 1 (360° products) or SAE J595 Class 1 (directional products) in every color the standards class, on every product, in every preset, at thermal steady state; California 13 CCR §§810 to 818	Agencies specify by class	T (lab)	M	CMP
PHO-02	Red and blue from one LED cell are at least 1.5 times today's Quantum 2.0 cell, as intensity on the optic's axis, hot, same pattern (target 2 times; the figure is set at G0)	"Even brighter" as a number	T	M	EE
PHO-03	The benchmark: one current flagship full-size bar each from Whelen, Federal Signal, Code 3 and SoundOff Signal, bought through the channel, measured with Quantum 3.0 at one accredited lab, one method, one voltage, per color, peak intensity and light per flash cycle. Target: 3.0 leads in red and blue	"The brightest in the industry" must be proven; until then it is a target	T (lab)	M	CMP
PHO-04	The California preset keeps the flash rate and on-time of 13 CCR §813, and every product with a forward-facing red has a steady red forward mode (Vehicle Code §25252, TBC; 13 CCR §818)	Legal out of the box there	T	M	FW
PHO-05	Amber and white output are reported beside red and blue	They stay at 2.0's level	T	S	CMP
PHO-06	A night setting (automatic or wired, OQ-16) lowers output and still meets PHO-01	Glare at night	T	S	EE, FW
PHO-07	UN R65 and R10 for export models	Markets outside North America	T (lab)	C	CMP

YOUR FIRST WEEK get the chosen optic's files from the optic team; measure today's optic on today's cell, hot, as the baseline for OPT-03 and PHO-02.

AMBER Verification, compliance, gates

OWNER: CMP

THE VERIFICATION MATRIX

TEST	STANDARD	ON	GATE
Photometry and color, hot	SAE J845, J595, J578; 13 CCR §§813, 816, 817, 818	every product, every color, every preset	G2
Competitive benchmark	PHO-03's method	49 inch bar first	G2
Emissions	CISPR 25	10X, 30X, lighthead, Quantum Module	G0 pre-scan, G2 lab
Supply transients	ISO 7637-2, ISO 16750-2	every board	G1
Immunity	SAE J1113 series; ISO 11452-2 and -4; the vehicle's own radio keyed (DRV-10)	every board	G1, G2
Radio	47 CFR 15.212 and 15.247, with 15.103(a) for the host; ISED RSS-247; Bluetooth SIG	each host product type	G2
Radio privacy	BLE-09, with a sniffer	each controller	G1
Heat	THM-01, LED-05	each housing type	G0, G2
Sealing, vibration, weathering	today's Quantum test plan (SAE J575), unchanged; SAE J576 for the optic	every product	G2
Bluetooth range and pairing	BLE-03, BLE-04, BLE-06 to BLE-08	each housing type	G0, G1
End of line	MFG-01	every unit of the pilot run	G3

GATES

Rev A, this document: Hamza's yes releases it to engineering and starts Cell Zero. Each gate after it is read the same way: the evidence, then his yes.

G0 Cell Zero
the bench proof (page 10); it fixes the LED, the count per cell, where the regulators sit and PHO-02's figure.

His yes releases the board layouts and the optic's mold quote.

G1 First boards
10X, 30X and Quantum Module at 1 A with Bluetooth; a 3.0 49 inch beside today's 2.0 on a vehicle, by day and at night, and a pairing from the driver's seat.

His yes releases the optic's tooling and the certification work.

G2 Whole products
at the lab: photometry, the benchmark, emissions, radio, heat, sealing.

His yes turns the target, the brightest in the industry, into a claim, for what the report proves.

G3 Ready to build
reports filed, manuals and labels final, the end-of-line test proven on a pilot run, service parts numbered, one part number per product in the store.

WHAT MAY BE SAID, AND WHEN

the claims register; the catalog, site and film read the same rule

CLAIM	NOW	AFTER
The brightest in the industry	"Target: the brightest in the industry"	PHO-03's report: the colors and products it proves
SAE Class 1	"Designed to SAE J845 and J595 Class 1"	PHO-01's report, per product
Bluetooth	"Bluetooth programming" as a plan	BLE-05's listing
Cree LEDs	"Cree ceramic LEDs"	OQ-1 closed; Cree's trademark terms followed
1 A red and blue	a design value	measured at G1
Brighter than today's Quantum 2.0	"designed to be brighter"	PHO-02's figure, measured at G0
One SKU, one level, five colors	yes	
Made in the USA	on products that carry it	

THE STANDARDS, BY NUMBER AND CLASS

cited, never quoted: the lab reads the limits

LIGHT

SAE J845 Class 1 (360° products) and SAE J595 Class 1 (directional products), per color, every preset; SAE J578 color; SAE J575 tests; SAE J576 for optical plastics; California 13 CCR §§810 to 818 (§813 flash rate and on-time, §816 color, §817 photometry, §818 the steady red and the police blue classes) and Vehicle Code §25252 (TBC); UN R65 with R10 for export models (could); NFPA 1900 where sold to fire and EMS.

ELECTRICAL

CISPR 25: Class 3 at least, Class 5 the goal in the land-mobile bands; ISO 7637-2 (pulses 1, 2a, 2b, 3a, 3b); ISO 16750-2 (load dump, reverse voltage, jump start); SAE J1113 and ISO 11452-2 and -4 immunity.

RADIO

47 CFR 15.212 and 15.247, with 15.103(a) for the host's own electronics (a vehicle-only digital device); ISED RSS-247; Bluetooth SIG qualification and listing per product.

GREEN Product, one SKU, price, production

OWNER: PM

ID	REQUIREMENT	WHY	VERIFIED BY	PRI	OWNER
FAM-01	One part number per product. No Dual, Tri or Full variants; all five colors enabled at every LED cell at the factory; no unlock keys, levels or fees in firmware, software or the store. Proposed numbers: today's base number plus "-Q3" (for example QT4420S-Q3), TBC	"One SKU, one unlock level"	I	M	PM
FAM-02	Each product sells at its present Tri price (table); the Quantum Module and the lightheads keep today's price	"Tri pricing for everything"	I	M	PM
FAM-03	Each product ships with a documented preset program on its mode wires, printed in its manual	Works with no app	D	M	FW
FAM-04	Every product below is Quantum 3.0: the Light Module series is the former Q Series; the Quantum Module is the former Q Link	The whole family	I	M	PM
FAM-05	Manuals, cut sheets, labels, the website and Eve's product library change before the first shipment	Today they teach Dual, Tri, Full	I	M	PM
FAM-06	Each lighthead becomes one part number in place of its 3-Mode and Serial pair (TBC: the cable exit, OQ-7)	One SKU	I	S	PM
BOM-01	The change in each product's bill of materials against today's Quantum 2.0 is measured at every gate; the target is set after G0	Tri pricing must hold	A	M	PM
MFG-01	Every unit is tested at the end of the line: each 1 A channel, amber and white, the radio's link and signal, the preset loaded, the label checked; on a fixture beside today's	Every new function is tested	T	M	PM
MFG-02	Quantum 3.0 is built where Quantum is built today; products that carry "Made in the USA" keep it	Origin	I	M	PM
SVC-01	New manuals for every product (the blue wire, pairing, three controls, presets); 3.0 service parts are numbered apart from 2.0's	Service	I	M	PM
SVC-02	A 3.0 test set on the repair bench, so the 3-business-day repair holds	The repair promise	D	S	PM

THE FAMILY

prices: today's Tri prices on feniex.com, read 14 Nov 2026 (the lightheads and the Quantum Module: today's one price)



PRODUCT	TODAY'S PART NUMBER	LED CELLS (EST.)	CONTROLLER	QUANTUM 3.0 PRICE
Full-size bar 44 inch	QT4420S	22	30X	$1,999
Full-size bar 49 inch	QT4918S	26	30X	$2,099
Full-size bar 60 inch	QT6020S	30	30X	$2,199
Mini bar 12 inch	QT6125	6	TBC	$479
Mini bar 18 inch	QT1823	8	TBC	$579
Mini bar 27 inch	QT2723	12	TBC	$689
Light stick 400	QT0420	4	10X	$419
Light stick 600	QT0620	6	10X	$529
Light stick 800	QT0820	8	10X	$689
Light stick 1000	QT1000	10	10X	$739
Rocker	QT8820	8	10X (TBC)	$719
Arrow	QT1020	16	TBC	$1,149
Split Arrow	QT1020-H	8	10X (TBC)	$629
90° Arrow	QT1020-B	18	TBC	$2,899
Interior bar	by vehicle	8	10X	$949
Pillar mount	by vehicle	6	TBC	$949
Spoiler mount	by vehicle	6	TBC	$899
Light Module series: 15 lightheads (formerly Q Series)	by product	1 or 2	its own driver; Quantum Module for serial	$119 to $399
Quantum Module (formerly Q Link)	QLM-24	none	itself	$179

LED cells and controllers are estimates, TBC: by cell count the 12 and 18 inch minis, the rocker, the split arrow, the pillar and the spoiler fit a 10X; engineering confirms (OQ-5). Housings and dimensions are unchanged: see each product's cut sheet. Photos: today's products; the mechanicals do not change.

START Open questions and the first 30 days

OWNER: ALL

#	QUESTION	OWNER
OQ-1	The LED: XLamp XD14 or XQ-E High Intensity? And a second source in the same footprint class	Hamza, EE
OQ-2	The 2.0 baseline: LEDs per color in the 24-LED and 27-LED cells, string voltages, regulators, the dual transistor	EE
OQ-3	Do the 1 A regulators sit on the 10X and 30X, on each LED cell, or on long strings?	EE
OQ-4	How many ceramic LEDs per color in a cell? May red and blue be lit at the same moment in one LED cell?	EE, PM, FW
OQ-5	Which board drives the minis, the arrows, the rocker, the pillar and the spoiler? How many cells can a 10X and a 30X drive?	EE
OQ-6	Is a blue conductor free in every harness?	EE
OQ-7	The lighthead's driver board, one part number per lighthead, and whether a merged cable fits each exit	EE, PM
OQ-8	The warranty for Quantum 3.0, and the day it starts when the product ships programmed	Hamza, PM
OQ-9	The new part numbers (proposed: today's base number plus "-Q3")	PM
OQ-10	Who builds the app, is the Windows program today's software with Bluetooth added, and how far does Eve go in it?	APP, PM
OQ-11	United States only, or export models too?	PM
OQ-12	Each generation's dates and hardware revisions (today's manuals and boards say "Quantum 2.0"), and the launch date	Hamza, EE
OQ-13	Quantum 2.0 in the field: an upgrade path, and the Feniex Converter's place	PM
OQ-14	Green's drive current and its class	OPT, CMP
OQ-15	Each product's preset program, the California preset among them	PM, FW
OQ-16	The rivals' models for PHO-03, and how the night setting is triggered	PM, EE

CELL ZERO: THE FIRST 30 DAYS

the cheapest build that proves the riskiest part

WEEK 1

close OQ-1; write down OQ-2; decide OQ-3; order parts and two quick-turn LED cell boards.

WEEK 2

build it: board A with a Cree ceramic LED at every red, blue and green position, board B with fewer; one of today's cells as the control; each on today's heatsink and pad under today's optic, in a section of a 49 inch bar; two candidate switching drivers at 1.0 A; a Bluetooth kit on a 10X's serial pair, inside a potted stick housing.

WEEK 3

test it, against the figures below.

WEEK 4

gate G0. It fixes the LED, the ceramic LEDs per color per cell, where the regulators sit and PHO-02's figure. Pass: board layouts begin. Fail: the result and the options go to Hamza.

TEST	PASSES AT
Regulation	1.00 A ±5% at 10, 13.5 and 18 V
Heat	solder point within 45 °C of ambient, steady state, worst pattern
Light	red and blue at least 1.5 times a 2.0 cell, hot, on the optic's axis (target 2 times)
Farthest cell	1.00 A still held at the far end of a 49 inch bar at full-bar current
Input current	no more than today's published draw for the product
Radio noise	under CISPR 25 Class 3 in the three radio bands (pre-scan)
Bluetooth	a stable link at 10 m from inside each housing

HOW THE TESTS ARE READ

Light: a dark room; an illuminance meter on the optic's axis at 3.0 m; intensity = illuminance x distance squared; at power-on and after 60 minutes, beside the control cell. Heat: a type-T thermocouple at the LED solder point, 60 minutes to steady state, at room temperature and again in a 50 °C chamber. Radio noise: a spectrum analyzer, a near-field probe and a LISN.

THREE ANSWERS ONLY HAMZA GIVES

OQ-1, the LED. No Cree part is called "XQ14"; the XLamp XD14 is the likely one, and the XQ-E High Intensity is the proven alternate.
OQ-8, the warranty. Today's terms tie the longest cover to the Full level, which 3.0 retires; this document prints no term.
OQ-12, the dates. Each generation's dates and hardware revisions, and the launch date.

WHO BUILDS CELL ZERO

Feniex's electrical engineering, in house, in Austin; the two cell boards from a quick-turn board house. About ten working days of bench work after the parts land; four weeks to gate G0. Engineers start Monday: each opens their own pages (Red, Blue, White, Amber, Green) and their "Your first week" box.