PART THREE

BATTERY STUDIO FLASH

This review of battery-powered heads rounds off our testing trilogy of super-power flash systems. Over the last couple of months we've run a total of 19 heads through the mill, from ten different manufacturers, ranging from entry-level to top-end professional

WORDS & PICTURES RICHARD HOPKINS

Magazines very rarely get around to such extensive reviews and this is the third and final part of a huge studio flash test. The objective was to test them all side by side and show the different strengths and weaknesses that you can't find out about – not from the manufacturers' literature, or even from actually using them. You've got to put them all together, with side by side comparisons of key performance parameters, and it's thrown up a few surprises, both good and not so good. Check out the last page here that outlines the test procedures and explains what the numbers are about, and if you've missed parts one or two, back issues (December 2011 and January 2012) are available from www.advancedphotographer.co.uk.

This final part looks at the wonders of portable on-location flash and with the increasing popularity of using studio quality light outdoors, it's a growing part of the market.

The freedom of battery power is tremendously liberating, and advances in technology mean you no longer have to lug hefty packs around, or worry too much about them running flat. Lithium in particular is much lighter than lead-acid and runs long and hard with virtually no reduction in recycle time before they finally give up. Even then, spare battery cassettes are not too costly.

Shooting outdoors asks a lot of any flash unit, let alone a battery system, so we had to apply some tough test criteria. The first demand is for sheer power, much more than in the studio because you're battling with daylight or even wanting to over-power the sun to get those moody skies and reasonable depth-of-field.

That takes more than any hotshoe gun can muster, and if you are to have any hope of reliably winning against daylight at realistic distances, you need at least 400Ws of power as a rule of thumb. You can sometimes do it with less if it's overcast or late in the day, but since you can't control the weather, it's best to grab as much power as you can get. For the record, we tested three big hotshoe guns. The Nikon SB-900 put out an estimated 150Ws, a Canon 580EX gave 120Ws, and the Nissin Di866 recorded 110Ws. That's very impressive from a set of AA batteries.

In addition to power, almost by definition shooting outside often involves moving subjects, so you also need fast flash durations and quick recycling. That's a tall order, and all these demands are technically difficult for flash manufacturers to achieve. So as always, compromises have to be made.

While those were some of the measures applied in our test, if your needs are not quite the same, then your pick may be different. Or if you already have a studio outfit and need compatibility, then that will obviously steer you to one brand.

VITAL STATISTICS...
£1250 STREET PRICE
GM250R TWIN HEAD
TRAVELPAK KIT AND CASE
WWW.BOWENSDIRECT.COM

Bowens Gemini GM250R Twin Head TravelPak Kit

The Bowens GM250R kit stands apart from the others in this review. The two GM250R heads are regular Gemini studio issue, and intended to be transportable rather than hand/shoulder portable. The heads are battery-compatible as standard, and come supplied with a TravelPak battery so they can be used anywhere. Otherwise, they're the same as the more powerful GM500R versions that performed well in last month's review.

Power output measured f/16+0.1 and was right on the money for 250Ws, reducing by 5.2 stops at minimum power which is a decent range. The modelling light is disabled when using the battery, as it's a tungsten bulb that eats energy, but from the mains it puts out a bright 7.4EV.

The lead-acid battery is compact but weighs a meaty 5.8kg. In our 250Ws test, the Bowens was at full power and recycled in 3.5secs on the fast setting, which is a bit longer than Bowens' claim and about three times longer than from the mains. The TravelPak should manage 300 full output flashes, and is available separately for £500 to power any suitable Bowens head. There's also a larger version for £570 with double the capacity, but the same recycle time.

Colour quality is good, measuring 5450K at full power and dropping by 350K at minimum. Flash durations checked out at an estimated 1/900sec (illustrated) at full power to 1/800sec at lowest output. That's good for an entry level studio head, and a bit faster than the GM500R, but a little slower than average in this company. A super-fast Pro version of the GM250R is not listed.

The TravelPak kit also includes two heads, stands, a 60x80cm softbox and umbrella. It all fits neatly in a custom roller case, ready to go – just add Bowens' Pulsar radio trigger and plug-in module for the finishing touch.

At full power, flash duration was estimated at 1/900sec. See comparison pictures on the last page.

THE VERDICT

This is a studio system first, and a mobile option second

For its intended purpose, as a studio outfit that you can also use away from the mains when needed, the TravelPak kit works well. It's certainly a very useful option, and cost effective when viewed in that way.

It's clearly more at home when fed by the mains though, and the battery powered recycle time is getting tardy. Bear in mind that with both heads plugged in, that time doubles while the shooting capacity is also halved.

A similar solution is offered by the Innovatronix Explorer battery pack, that will power any studio head. We'll be testing the Innovatronix unit soon.

HOW IT RATES

FEATURES 16/25
Fully featured as a studio head, though lowish power for outdoors

PERFORMANCE 18/25
Great from the mains, but slow recycle from the battery

HANDLING 15/25
Battery is neat and compact, heads very heavy in this context

VALUE FOR MONEY 22/25
Good value compared to separate battery and mains kits

OVERALL 71/100
It's a studio head, but with a very handy battery option for occasional use

PROS Versatile all-in-one outfit in a quality roller case

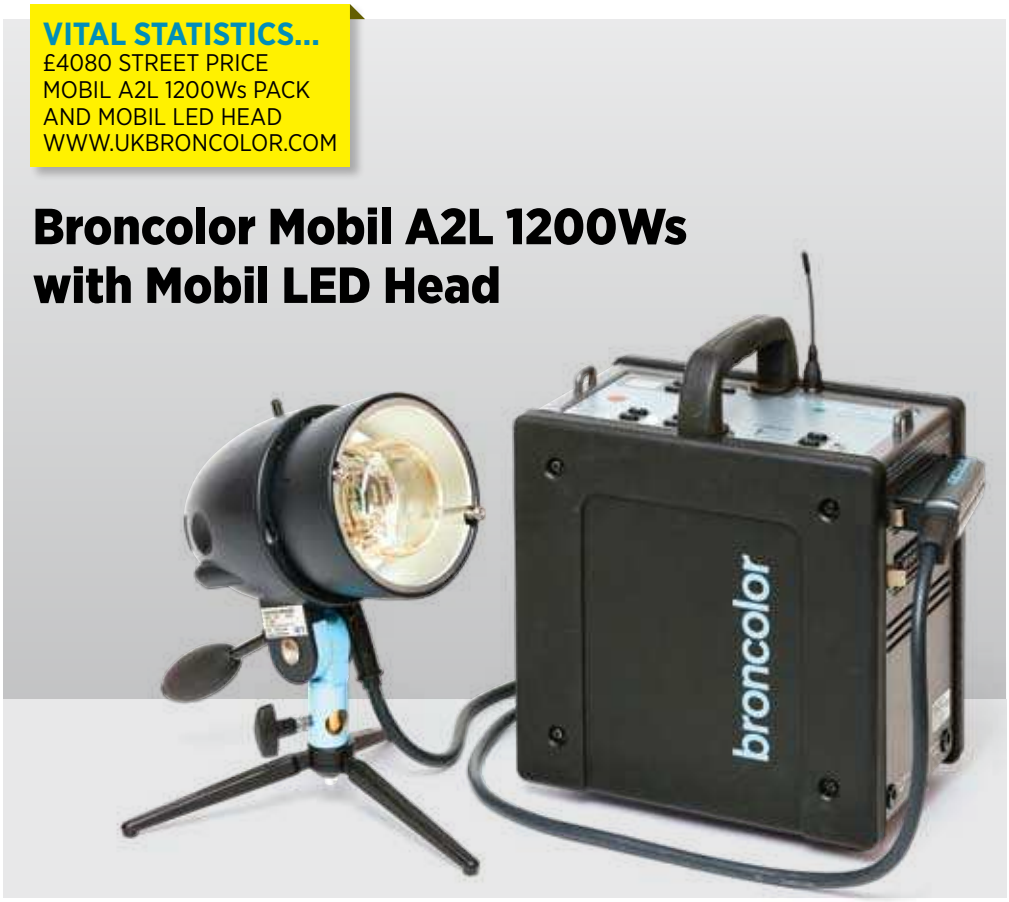
CONS The head is strictly for use on a lighting stand

SPECS

POWER Claimed 250Ws, tested at f/16+0.1, with 5.2 stops range
RECYCLE TIME Tested 3.5sec at full power, 250Ws
BATTERY Lead-acid, estimated 300 flashes at full power
FLASH DURATIONS Test estimate 1/900sec to 1/800sec
COLOUR TEMP 5450K to 5100K
MODELLING LIGHT Tungsten, measured at 7.4EV but disabled with battery
WEIGHT Pack 5.8kg, head 3.4kg inc cable, length 3m
ACCESSORY FITTING S-type
EXTRAS Battery £150, head £330
IN THE BOX 2x GM250R heads, 2x stands, softbox, umbrella, TravelPak, roller case £1250

VITAL STATISTICS...
£4080 STREET PRICE
MOBIL A2L 1200Ws PACK AND MOBIL LED HEAD
WWW.UKBRONCOLOR.COM

Broncolor Mobil A2L 1200Ws with Mobil LED Head



The Broncolor Mobil's massive 1200Ws makes it the most powerful unit here, and for mains-free use they don't come much bigger than this. It's large in every dimension and matched by the high build quality and price.

Power checked out at f/22+0.9, the highest on test, but still short of expectations for an output of 1200Ws. Using Broncolor's Minicom 300Ws reviewed last month as a pro rata measure, around 0.5EV of power is being lost somewhere. Prime suspect has to be the cable, and even though it's meaty enough, losses are inevitable when you try to shove that much power through it. This is not a criticism, just a fact of life with high-powered battery systems.

Power can be reduced by a modest 4.0 stops in 0.1EV increments, but over a greater range when two heads are used with the asymmetric split buttons. The LED modelling light measured a bright 5.5EV.

Despite the substantial 6.7kg weight of the generator, the lithium battery only accounts for less than a third of that. Considering it's driving 1200Ws, the recycle time of 3.7secs is good, and when the power was reduced for the 250Ws test, it fell dramatically to a swift 1.7secs. At that output, capacity was estimated at around 650 pops, but actually ran out of puff at 510 flashes.

Short flash durations are not the Mobil's strongest suit, measuring 1/600sec (illustrated) at full power and 1/400sec at minimum output. Colour temperature checked at 5300K using full power, falling by 500K at minimum.

That's not a huge shift, but it's not the tightest over a 4EV range and we've seen better.

The Mobil unit has Broncolor's RFS radio receiver built in, though the trigger unit is extra.

At full power here, flash duration was estimated at 1/600sec, and it got slower at lower power outputs.

THE VERDICT

Beautifully made in Switzerland, but the price is hard to justify

There's no denying the superb build quality of Broncolor, and attention to detail like the umbrella reflector which reverses to form the protective travel cap. That's neat.

And Broncolor also has a great reputation for reliability, hard won over many years in the hands of top professional photographers.

But it is equally hard to ignore the price, or the fact that in performance terms it is hard to justify. The flash durations are simply too long for kit of this calibre, and the colour temperature shift, while not particularly out of line, should be tighter.

HOW IT RATES

FEATURES 18/25
Power and versatility with second head. Radio control built in, trigger costs extra

PERFORMANCE 20/25
It has plenty of power, but relatively long flash durations

HANDLING 18/25
Heaviest on test (just) and limited mobility

VALUE FOR MONEY 15/25
Big power always costs, but the price is hard to justify

OVERALL 71/100
It really only makes sense for existing Broncolor users

PROS Power, build quality

CONS Cost, slow flash durations

SPECS

POWER Claimed 1200Ws, tested at f/22+0.9, with 4.0 stops range
RECYCLE TIME Tested 1.7sec at 250Ws equivalent
BATTERY Lithium, tested 540 flashes at 250Ws equivalent
FLASH DURATIONS Test estimate 1/600sec to 1/400sec
COLOUR TEMP 5300K to 4800K
MODELLING LIGHT LED, measured at 5.5EV
WEIGHT Pack 6.7kg, head 1.9kg inc cable, length 3.3m
ACCESSORY FITTING Broncolor
EXTRAS Additional head £900
IN THE BOX Mobil A2L kit with 1200Ws power pack and Mobil LED head, £4080 inc fitted case. RFS trigger extra

VITAL STATISTICS...
£1725 STREET PRICE
RANGER RX 1100Ws PACK AND A-HEAD KIT
WWW.THEFLASHCENTRE.COM

Elinchrom Ranger RX 1100Ws with A-Head Kit

Elinchrom's Ranger series comprises three units, all offering a thumping 1100Ws of power. The RX reviewed here is a little cheaper than the RX Speed with faster recycling, and the RX Speed Asymmetric which adds more flexible power output options from the two asymmetrically split outlets.

The full power output measured f/22+0.8, and while that's hardly likely to leave you wanting, it's not quite where you might expect 1100Ws to be. Power can be reduced by 5.4 stops, and the modelling light gave 4.4EV.

The lead-acid battery pack weighs in at a hefty 6.6kg, double some of the others, but the Ranger is not intended to be walked around very far. The head is much happier on a stand, and an upside of the weight is that it's very handy ballast to stop your umbrellas taking flight.

Recycle time at full power was a lengthy 5.2secs in fast mode (the Speed version cuts that almost in half) but when turned down for the 250Ws comparison test, it was a much more usable 2.4secs, with a capacity estimated around 450 flashes at that power.

The A-head offers the fastest flash durations, measuring a handy 1/1200sec (illustrated) at full power, down to 1/900sec at minimum. Colour temperature was 5900K at full power, warming by 650K at lowest output, which is a noticeable shift.

As always with Elinchrom, the build quality and finish is to a very high standard. This is rugged pro-grade kit, weather-sealed, and you can even stand it in water. The Ranger accepts standard EL-mount attachments, and is compatible with Elinchrom's Skyport radio remote control and triggering system, via the dual purpose remote/charger socket.

Flash durations were nippy, estimated at 1/1200sec at full power (above) falling to around 1/900sec.

THE VERDICT

Powerful, robust, reliable, go-anywhere – but deserves a better battery

This is rugged workhorse gear, built to deliver and be used and abused on a regular basis. It's manufactured in Switzerland (as is the Quadra) which is Elinchrom's home ground, as opposed to the company's monoblocs that are made in India.

Compared to the much more nimble Profoto Acute B2 that comes in at a similar price with lithium power, it's heavy and old tech. This is also in contrast to Elinchrom's ultra-modern monolights, that came best in test in both our recent reviews of entry-level and semi-pro mains outfits.

HOW IT RATES

FEATURES 20/25
Big power and well featured, but Speed-AS pack has more options

PERFORMANCE 20/25
Plenty of power, but recycle time and capacity not quite as good as you might expect

HANDLING 18/25
Big lead-acid battery is heavy. Fine on a stand, but not on your shoulder. Needs a handle.

VALUE FOR MONEY 18/25
Cheapest of the high power systems

OVERALL 76/100

Hefty but powerful. RX Speed-AS is more versatile, for not much more money

PROS Lots of power, rugged

CONS Heavy, modest capacity if you use the power

SPECS

POWER Claimed 1100Ws, tested at f/22+0.8, with 5.4 stops range
RECYCLE TIME Tested 2.4sec at 250Ws equivalent
BATTERY Lead-acid, estimated 450 flashes at 250Ws equivalent
FLASH DURATIONS Test estimate 1/1200sec to 1/900sec
COLOUR TEMP 5900K to 5250K
MODELLING LIGHT Halogen, measured at 4.4EV
WEIGHT Pack 6.6kg, head 1.9kg inc cable, length 3.5m
ACCESSORY FIT Elinchrom EL
EXTRAS Spare battery £150, additional head £595
IN THE BOX Ranger RX 1100Ws pack with A-head kit, £1725. Skyport remote extra

VITAL STATISTICS...
£1115 STREET PRICE
QUADRA 400Ws PACK AND A-HEAD
WWW.THEFLASHCENTRE.COM

Elinchrom Quadra 400Ws with A-Head Kit

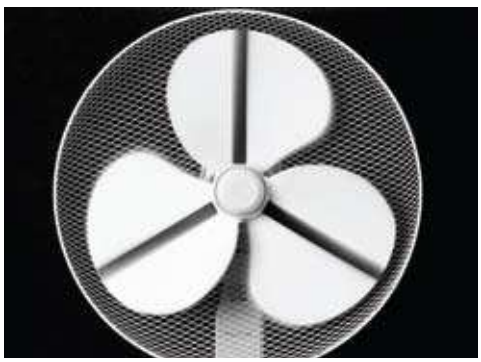
Compared to the other outfits here, the Elinchrom Quadra can only be described as dinky. It's very compact and gadget-cool, yet packs 400Ws that puts it very much in the studio head league. Its appeal doesn't stop there, as the A-Head also gives fast durations.

The measured power output didn't quite meet the expectation of 400Ws though, reaching f/16+0.2 at full power, which equates to something nearer 270Ws. The range extends down by a total of 5.8 stops across the two outlets. The LED modelling light tested at 4.1EV, which is about average.

The battery pack is very small and light at 3.0kg, but it's lead-acid so doesn't have the staying power of lithium. The fastest recycle time in our 250Ws test, which is virtually flat out for the Quadra, was 2.7secs which is a bit slower than specified with a capacity estimated at a modest 120 pops.

Flash durations were impressively short, measuring 1/1200sec at full power. At lower settings, depending on how you select the two asymmetric outlets, that rose to an action-freezing 1/2500sec (illustrated) at quarter power, reducing slightly to 1/2000sec at minimum output. In terms of the shortest durations at the most useful power settings, the Quadra comes top. Colour is good, and measured 5300K at full power, reducing by 400K at minimum.

The Quadra comes with its own smaller Q-mount modifier fitting, and an £80 adapter converts it to standard Elinchrom EL. This extends the versatility enormously, yet adds very little to the size and weight. If the head was made with an EL mount to start with, it would save the addition of the inelegant adapter.



Quadra has fast durations, never longer than 1/1200sec and reducing to 1/2500sec, as shown here.

THE VERDICT

The Quadra is a cool concept, but just misses out on performance

The Quadra is a great looking product, appealing to a wide range of photographers from strobists to studio workers, with a unique blend of power and portability.

Yet it just falls short, and would be so much better if Elinchrom could tighten up the specification in a few key areas. It needs to deliver a real 400Ws of light to put clear blue water between itself and hotshoe rivals. And it needs a lithium battery to speed up the recycle and extend the shooting capacity, without adding to the weight.

HOW IT RATES

FEATURES 24/25
Spec is comprehensive, and Skyport ready for radio sync and control

PERFORMANCE 21/25
Shortest flash durations good for action, lower power and capacity less so

HANDLING 22/25
Very neat, light and compact. Modifier mount should be EL as standard

VALUE FOR MONEY 20/25
Good value, especially in the twin head kits with cases available

OVERALL 87/100
Killer concept, that would win hands down with a bit more power and lithium battery

PROS Small, light, short durations

CONS Down on power, longish recycle time

SPECS

POWER Claimed 400Ws, tested at f/16+0.2, with 5.8 stops range
RECYCLE TIME Tested 2.3secs to 2.7secs at 250Ws equivalent
BATTERY Lead-acid, tested 142 flashes at 250Ws equivalent
FLASH DURATIONS Test estimate 1/1200sec to 1/2500sec
COLOUR TEMP 5300K to 4900K
MODELLING LIGHT LED, measured at 4.1EV
WEIGHT Pack 3.0kg, head 0.7kg, EL adapter extra 340g
ACCESSORY FITTING Elinchrom Q, or EL with adapter
EXTRAS EL adapter £80, battery £115, extra head £300
IN THE BOX Quadra A-head, battery £1115

VITAL STATISTICS...
£800 STREET PRICE
SAFARI 600Ws HEAD AND LI-ON PACK
WWW.LENCARTA.COM

BEST IN TEST
Advanced PHOTOGRAPHER

Lencarta Safari Li-on 600Ws Single Head Kit

Lencarta is quickly building a name for itself with a range of higher spec products at entry-level prices. It only sells direct to keep costs down. They're made by Jinbei, China's biggest studio flash manufacturer, but tweaked to Lencarta's own final specification.

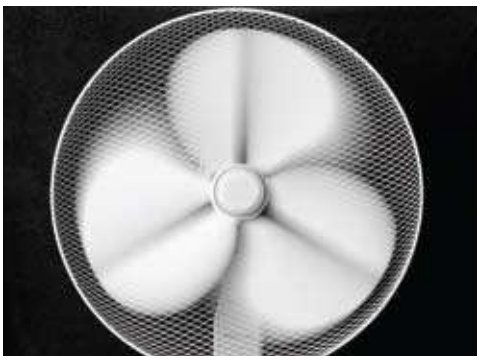
The Safari Li-on looks tempting, offering 600Ws of power through twin asymmetrically split outlets, with fast recycle and high capacity from the lightweight lithium battery.

The promise is delivered, too. Maximum power measured f/22+0.3, and by swapping the outlets it can be reduced down by 6.2 stops. There's an LED modelling lamp, though it's not the brightest at 3.2EV.

The pack is light for its size at 3.4kg. At full power, the fast mode recycled in 3.1secs, and in the 250Ws test that was cut to 1.9secs which is right up there with the best. At this power, battery capacity was calculated at almost unbelievable 1100 flashes, so we put that to the test and it did 1364. Even more remarkably, right up to the last it was still recycling in the same time, and with exactly the same output.

Colour measured 5250K at full power, dropping by 350K at minimum output which is good for the range, but if there's a fly in the ointment it's the longish flash durations. At full power it was estimated at 1/700sec (illustrated) and that rose slightly to 1/900sec from the other socket at minimum output. In-between, we got from 1/500sec up to 1/1000sec depending on which outlet was used.

The Lencarta head has a Bowens S-type fitting, and only weighs 1.1kg with cable. There's a stand fitting, or the whole outfit is light enough to sling over your shoulder with the head on the handle and flash bracket provided.



Estimated 1/700sec duration at full power here, running both faster or slower at different outputs.

THE VERDICT

Solid all-round performance, and at a very attractive price

If your priorities for outdoor flash are power, capacity, fast recycling, short durations and low weight, all wrapped up for a nice price, then the Lencarta scores an impressive five out of six.

The Safari Li-on only misses a full house on flash durations which, depending on your subject, may or may not be a deal breaker. If action-stopping flash photography is a priority, and by definition it often is when shooting outdoors, then you may need to look elsewhere.

But if not, Lencarta's impressive overall score makes it Best in Test.

HOW IT RATES

FEATURES 23/25
Everything you need, except perhaps a radio remote control option

PERFORMANCE 23/25
Excellent all round, though faster flash durations would be good

HANDLING 24/25
Lightweight, easy to use, comes with handle and camera bracket

VALUE FOR MONEY 25/25
Bargain. Nothing in this review to touch it for value

OVERALL 95/100
It does most things very well, at a great price

PROS All-round performance and value for money

CONS Some subjects need faster flash durations

SPECS

POWER Claimed 600Ws, tested at f/22+0.3, with 6.2 stops range
RECYCLE TIME Tested 1.9sec at 250Ws equivalent
BATTERY Lithium, tested 1364 flashes at 250Ws equivalent
FLASH DURATIONS Test estimate 1/1000sec to 1/500sec
COLOUR TEMP Test estimate 5250K to 4900K
MODELLING LIGHT LED, measured at 3.2EV
WEIGHT Pack 3.4kg, head 1.1kg inc cable, length 3.1m
ACCESSORY FITTING Lencarta/Bowens S-type
EXTRAS Spare battery £140, additional head £200
IN THE BOX Safari head, Li-on pack, handle, bracket £800

VITAL STATISTICS...
£2150 STREET PRICE
ACUTE B2 AIRs 600Ws KIT
WWW.PROFOTO.COM/UK

Profoto Acute B2 AirS 600Ws Kit

In last month's test, the Swedish made Profoto D1 studio heads turned in an sparkling performance, albeit at a price. This Acute B2 battery kit also performs very well, but at a similar cost to rivals, especially considering the fast-sync AirS remote trigger system is built in.

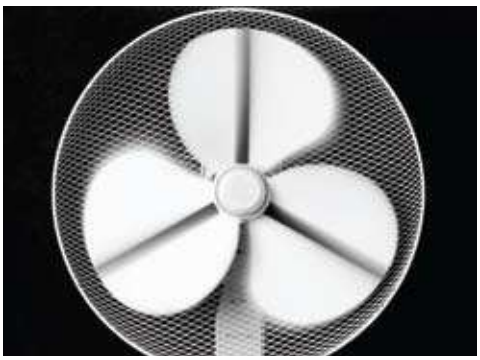
Power is 600Ws, and it hit f/22+0.5 at maximum, which is as good as it gets for the rating, possibly assisted by the very fat cable transmitting power efficiently. Output can be reduced by a huge 7.4 stops using a combination of switching and the dial. There's a halogen modelling lamp that measured a useful 5.6EV.

The lithium pack is compact and while not quite the lightest at 3.8kg it's not far off. At full power, the head recycled in 2.5secs, and in the 250Ws test, that was reduced to just 1.4secs making it the fastest here. It achieved 430 flash bursts at that level.

Flash durations are variable, because the Profoto can configure its capacitors in different ways using a combination of the -4 and -2 stops switch, and the adjustable -2 stops dial. Using the various permutations, durations can range from 1/900sec at full power, rising to 1/1100sec (illustrated) using the -2 stops switch, and going up to around 1/3500sec at minimum power. Colour consistency was very good, measuring between 5450K and 5250K at all settings.

While the Acute B2 and head is perhaps best used on a stand, the total weight of 5.6kg is only one kilo more than the Lencarta, so you could be fully mobile at a pinch. Certainly no bother for an assistant to carry both.

There's only one drawback, and it could make a vital difference for some, if only on grounds of cost – the Acute B2 will only power one head.



Durations can be very short at lower powers. Estimated at 1/1100sec here using the -2 stops switch.

THE VERDICT

High power and portability, for less than you might think

Using the same performance yardstick that won the Lencarta our rosette for best outdoor use (power, capacity, recycle time, short durations, low weight and price) the Profoto Acute B2 can punch pretty hard. It also adds another advantage, and that's the known robust build quality.

Profoto is also popular in the rental market, which bodes well for reliability and is a good way to try before you buy, and see if it's mobile enough, has fast enough durations, and sufficient battery capacity. A spare battery is a hefty £350, or a lead-acid version is available for half that.

HOW IT RATES

FEATURES 22/25
Only thing missing is a second power outlet

PERFORMANCE 23/25
Good all round, with fastest recycle time

HANDLING 23/25
Easy, and just about hand/shoulder portable.

VALUE FOR MONEY 20/25
Not the cheapest, but on a par with rivals

OVERALL 88/100
Good performance from a quality brand. AirS remote control/trigger included

PROS Power, control, fast recycle

CONS Only one power outlet

SPECS

POWER Claimed 600Ws, tested at f/22+0.5, with 7.4 stops range
RECYCLE TIME Tested 1.4sec at 250Ws equivalent
BATTERY Lithium, tested 430 flashes at 250Ws equivalent
FLASH DURATIONS Test estimate 1/900sec to 1/3500sec
COLOUR TEMP Test estimate 5450K to 5250K
MODELLING LIGHT Halogen, measured at 5.6EV
WEIGHT Pack 3.8kg, head 1.8kg inc cable, length 3m
ACCESSORY FITTING Profoto
EXTRAS Spare lithium battery £350, lead-acid £170
IN THE BOX As tested, Acute B2 AirS pack, Acute B head, AirS remote trigger/controller, fitted case, £2150

VITAL STATISTICS...
£1630 STREET PRICE
X5D-R HEAD, 200Ws COMMANDER
PXC 200WS MODULE, QFLASH PILOT
WWW.FLAGHEAD.CO.UK

Quantum X5d-R with Qflash Pilot and 400Ws Qpaq-X

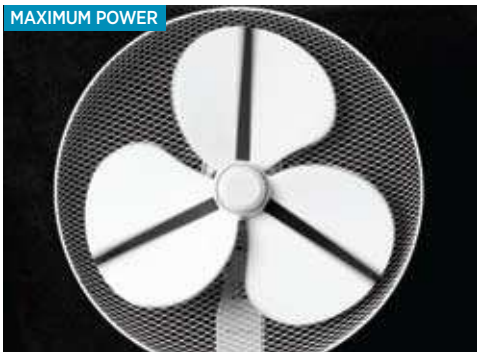
Quantum is different. Made in the US, its range of flash heads and extensive accessory options are more high-powered hotshoe guns than studio heads. They function internally like a speedlight, which is fundamentally different as explained on the last page, with the major advantage being they're fully auto-TTL compatible for exposure, and the Pilot unit can control remote heads via radio. There is also the prospect of very short flash durations.

Quantum's modular approach means there's lots of choice and numerous ways of mixing and matching components. The review kit is top of the range, and we also doubled up the power with an additional PXC generator pack to bring it up to a claimed 400Ws output.

It all looks great on paper, but the proposition only holds good if the promise of high output measures up. We tested the power at f/16+0.1 which falls some way short of the 400Ws claim and is more like a real 250Ws. You could match that with a pair of Nikon SB-900s. That approach would also retain all the benefits of auto-TTL and other speedlight functions.

The power can be reduced by 7.9 stops, which is a massive range and greater than the 1/64th stated as minimum – the power settings were not particularly accurate. Colour consistency was maintained around 5900K +/-100K in the main power range, and at two stops below peak power the flash duration measured an impressively short 1/2000sec. This gets progressively shorter as power is reduced, and although you're not likely to use the lowest power settings very often, it was too short to measure accurately at somewhere less than 1/10,000sec which is typical of a hotshoe-style flashgun.

MAXIMUM POWER



1/2000sec estimated duration at 1/4 power, but can get much shorter. See graph opposite.

THE VERDICT

Promises a lot, but the claim of 400Ws power is overstated

The Quantum system looks very attractive, with lots of studio-style power in a compact package, with auto-TTL and wireless radio remote control on top. The range of accessories has most things covered for location shooting.

There are a number of shortcomings though, including a slow 4.6secs recycle time at full power that is about 1.5secs longer than the beeper suggests, the rather clunky and old-fashioned design, not to mention a hefty price tag. All would be forgiven if Quantum only delivered on the power.

HOW IT RATES

FEATURES 25/25
Great spec, with unique radio auto-TTL remote control

PERFORMANCE 15/25
Power falls short of claims and slow recycle

HANDLING 18/25
Quirky and a little cumbersome compared to a speedlight

VALUE FOR MONEY 15/25
Expensive, though different configurations can be cheaper

OVERALL 73/100
Quantum promises hotshoe-style features with studio power, but falls between two stools

PROS Built-in radio auto-TTL control is unique

CONS Doesn't deliver 400Ws

SPECS

POWER Claimed 400Ws, tested at f/16+0.1, with 7.9 stops range
RECYCLE TIME At full power (250Ws equivalent) 4.6secs rising to 8.0secs as the battery fades
BATTERY Lead-acid, tested 168 flashes at full power
FLASH DURATIONS 1/400sec to 1/10,000sec at minimum power
COLOUR TEMP Tested at 6050K to 6750K at minimum power
MODELLING LIGHT Strobed flash
WEIGHT Pack 2.9kg, Pilot 0.4kg, head 0.7kg inc cable
ACCESSORY FITTING Quantum
EXTRAS Battery £220, head £630
IN THE BOX X5d-R head £630, Qpaq-X 200Ws Command module inc battery £510, extra PXC 200Ws module £140, QFlash Pilot £350, total £1630

HOW WE DID OUR TEST

What you need to know about flash performance is the real light output, the consistency of exposures, the colour temperature and the truth about flash durations. In addition, with these battery-powered heads, it's essential to have directly comparable figures, at the same light output, for recycle times and the number flashes you get from a full charge.

Power

Power is usually given in Watt-seconds (Ws or joules) and that is usually a good guide, but Ws is actually a measure of energy stored by the capacitors, and doesn't always translate directly to how much light finally comes out of the front. With these battery-powered units, a little power is inevitably lost in the cable, possibly something in the region of 0.3EV.

We fired each unit into the same modifier, a 100cm Lastolite Umbrellabox, which is a reverse-firing white brolly with a softbox front. This ensured the light was collected, projected and diffused identically, then measurements were taken 1m from the front surface.

Output is expressed as the aperture achieved at ISO 100, with decimal fractions of a stop shown after the f/number, eg f/16+0.5 would be exactly halfway between f/16 and f/22.

We also measured the modelling lamp (where applicable) under the same conditions, shown as an EV number at ISO 100.

Consistency

Consistency of power output from flash to flash is also a vital feature, and while this was checked and even double-checked, it's not commented on in the reviews because it didn't vary with any of the heads, not even by a tenth of a stop.

The reason for this is DC battery power is more stable than mains AC, and the slower recharge time also helps.

Battery

To test the recycle time and battery capacity, we levelled the playing field by turning everything down to the same light output, which had to be the equivalent of 250Ws, which is the maximum achieved by the least powerful units here, the Bowens and Quantum. All tests were done using the fast recycle setting, if there's an option.

As a rule of thumb, power output, recycle time and battery capacity all run pretty much pro-rata. That is, if you halve the power, the recycle time is also roughly halved, and the number of flashes the battery will give is doubled. Note that battery performance can reduce in low temperatures, and can decline with age or if you store them when discharged.

Colour temperature

When tested for colour accuracy, all these lights proved pretty good – close to daylight, and not varying by much. Comments are made in each review. Actual colour temperature was measured in Adobe Lightroom, but we've not published the test images as the changes are often too subtle to see in print. In practice, a shift of 400K is not that much.

Flash durations

The flash durations quoted for studio heads are usually unhelpful. Manufacturers tend to use the industry standard t0.5 time, but it's very optimistic and the duration which really matters for action-stopping is usually about double that, in terms of what you'd expect with fast shutter speeds in normal light.

We used a real world test for this, an office fan with a strip of black tape on the blades, and it proved very revealing. For comparison, the pictures above show what this looks like when shot under continuous light at actual shutter speeds.

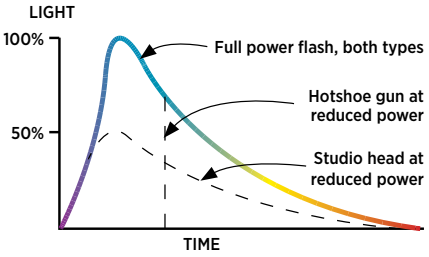
Note how the focal plane shutter scanning down the image frame during the exposure appears to bend the blades (it's normal) but the flash pulse creates a different kind of blurring that's hard to compare exactly, so the test figures given are our best estimates.

Power control

The graph illustrates how the brightness of a typical flash pulse changes over a few milliseconds. The dotted lines show the fundamentally different ways that studio heads and hotshoe guns vary their power. Total light output is the same, but the way it's delivered is different. In both cases, brightness rises rapidly after triggering and quickly reaches a peak, but then the light fades away much more slowly as it tails off, and it also becomes more yellow.

To reduce power, studio flashes simply lower the output from the capacitors and fire a less bright flash (dotted curve). While the total flash duration remains much the same, the peak is lower and it's the height of the peak that provides the visual action-stopping effect. The yellow tail also forms a greater proportion of the whole output, so the light gets warmer.

Speedlights, like the Quantum, do it differently. They always fire at full power and when the right amount of light has been delivered, either because it's in manual or when the auto metering system says exposure is correct, an IGBT circuit cuts in and chops off the tail abruptly (vertical dots). Each time output



is reduced by one stop, flash duration is roughly halved, which results in very brief durations – sometimes as short as 1/40,000sec at lowest output. Cleverly, the unused power is recycled, giving fast recharge times. And also, because all the yellow component of the tail is completely eliminated, speedlights can get a bit blue at low power.

The flash duration time of t0.5 often quoted by manufacturers is the period the light output stays above 50 per cent of the peak. We've found that's not a very accurate guide, as the test pictures of the fan in each review demonstrate when compared to manufacturers' claims. As a very general guide, with most studio heads the effective action-stopping duration appears to be roughly double the t0.5 time.