



RE-PURPOSING & UP-GRADING TRADITIONAL
LIGHT FITTINGS



Charter

LIGHTING

One of the many exhibits which benefitted from the major upgrade to the historic Fibre Optic Lighting Systems at the Ashmolean Museum in Oxford.



RETROFIT & UPGRADE OF TRADITIONAL LIGHTS TO LED

The Very Best in Sustainability!

The Throw Away Culture we have lived with for the past two or more decades is gradually being subsumed by a greater awareness of the value of thrift and re-purposing.

In the lighting industry, the arrival of LED technology was hailed as the saviour of the earth's resources. Preposterous early claims of life expectancies of hundreds of thousands of hours and impossible feats of energy reduction gained early momentum and, once the mantra had been set in motion, it took years before the myths were finally de-bunked.

In the earlier years, like-for-like LED replacement light bulbs failed to perform adequately. They simply weren't bright enough, and the quality of light they emitted was chilly and grey.

So attention quickly turned to the 'new generation' of composite LED Light Fixtures. These contained LEDs that were built-in onto the heavy metal heat-sinks which enabled the LEDs to be powered sufficiently to deliver the lighting output that was required.

Mountains of traditional light fittings were jettisoned in favour of the new ones in the stampede to reap the benefits from the now-realistic energy savings, with little thought given to the hardware that was being thrown away in the process – nor the mindless waste this actually represented in valuable materials.

However, with judicious care and attention to detail, we at Charter Lighting have found many nifty ways of upgrading these lovely, traditional, fixtures, often improving their performance in the process, and extending their life for literally decades to come.

FISHMONGERS' HALL—Traditional Pendant

This graceful, traditional pendant chandelier hangs over the central reading table in the Library at Fishmongers' Hall in London.

In a move to reduce energy consumption, the wonderfully warm, incandescent light bulbs were replaced by energy-efficient compact fluorescent tubes— a move which proved to be not very successful.

The light from the new, low energy light bulbs was cold, flat and dull, and members were soon complaining that they could not see well enough to read comfortably.



Original Chandelier



Up-Graded Chandelier with bespoke contemporary LED components including separate, battery-powered Emergency Lighting

Our solution was carefully to remove all the old electrical elements and replace these with a bespoke LED array. In the process, we also incorporated a separate, battery-powered, circuit which enabled the integration of a new emergency light facility into the one fixture.

Not only are members now delighted with the greatly-enhanced light quality and output, but the extra safety feature we included within the new design has saved another hole from having to be drilled into the Grade I listed ceiling to house a separate emergency light fitting. The integrated emergency feature is indicated by the Green LED.



ZOOM PROJECTORS

We have encountered these high-performance projection spotlights in several private residences over recent months.

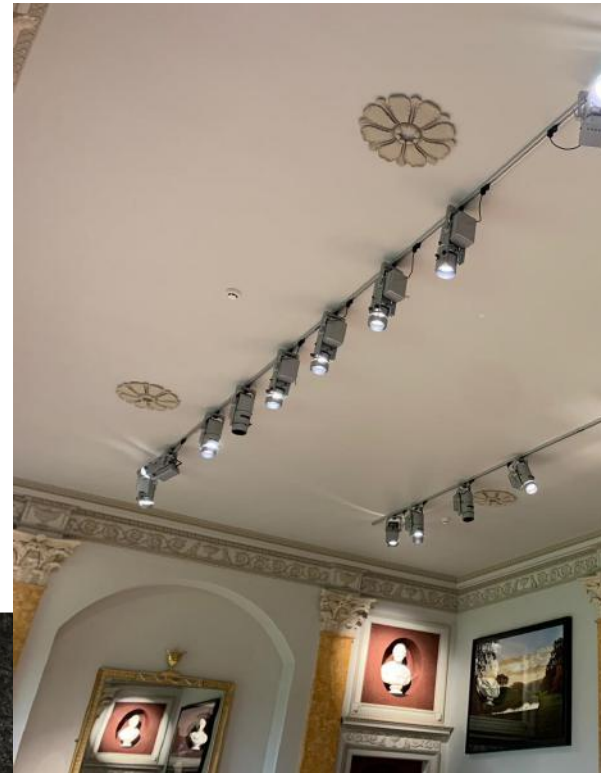
They are seriously sophisticated, containing an array of carefully-inter-relating optical elements which enable uniquely controllable and adjustable precision spotlighting.

However, the original lighting components are getting harder and harder to find, and nothing like these highly-engineered spotlights seem to exist in today's plethora of LED high-beam offerings.

Original Metal Halide



Up-Graded LED Version



Maintenance of these high-level spotlights had become increasingly irksome

So – with some difficulty, but with a determination to surmount the combined challenges of optical control and thermal management – we have now successfully re-purposed considerable numbers of these with carefully-engineered and balanced LED elements.

Not only have the original lights been restored to full functionality, but the light quality has been dramatically improved. Also, the need to change lamps (previously a somewhat irksome and hazardous task, given their often- elevated locations) has been eliminated for the next twenty-five or more years!

Which will be quite long enough for new lighting technologies to have emerged when they next need to be re-purposed....

ART GALLERY - Focusable Track Spotlights



These traditional halogen spotlights have been in widespread use for many decades.

They are particularly popular in Art Galleries where the high CRI and variable wattage of the halogen lamps was perfect for the quality, full-spectrum lighting scope that is required for Fine Art collections.

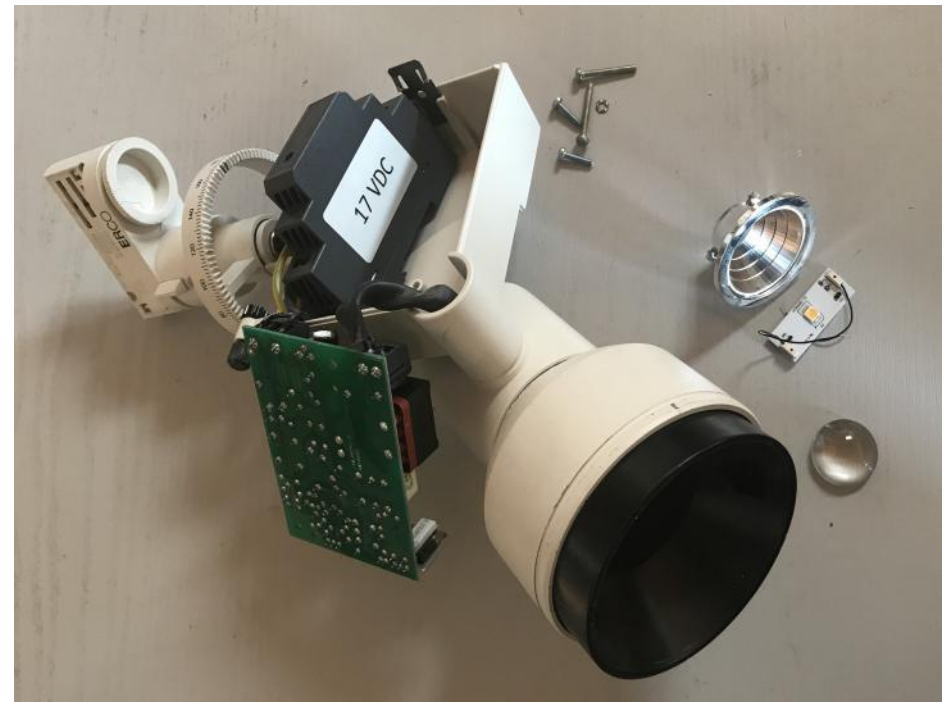
Even the best quality LED 'halogen equivalents' are unable to generate and project sufficient light output from a small enough lamp to enable the existing range of fixtures to be retained and still match the performance of the original halogen light bulbs.

Our solution has been to start from scratch. Working within the confines of the fixture hardware, we have devised a finely-tuned balance of optics (both lenses and reflectors) combined with the highest possible CRI LED on its own bespoke, miniaturised heat sink.

The result is a resounding success, both in performance and quality, enabling all the original fixtures and associated track hardware to be retained for many more decades to come.



The tungsten halogen components in the fixture above are replaced by the optical LED assembly below.



PICTURE LIGHT retrofitting options

Charter Lighting's original claim-to-fame in the retrofit game has been with our renowned picture lighting services.

We have now successfully re-purposed an astonishing number of different styles and sizes of traditional picture lights with our high-quality, warm toned LED components – to the joyous delight of many of our clients:-

“The lights are now magical! My pictures have never looked so good!”



This exercise is truly transformative.

Most traditional picture lights are much too small and have no optics at all – just an array of different light bulbs. Not only were these often very hot (bad for most paintings) and emitted UV rays (harmful to colour pigments), but the lighting coverage was appalling.

Usually, just the top of the painting was illuminated with a bright, glaring splotch of light, with the rest of the details being shrouded in gloom and largely lost to the viewer.

Old picture light



Wonderful coverage of light from the retrofitted LED components



(head of Christ) Picture courtesy of the National Trust,

Our picture-light retrofitting service is especially welcomed by many heritage properties up and down the country – for example, where the interior of a National Trust or English Heritage residence, or one of our wonderful Historic Palaces, needs to be preserved as faithfully as possible to its last resident's tastes.



Quebec House - National Trust

We approach the retrofitting of new LED components into historic picture lights very carefully. There are many things to consider.

We need to establish the immediate and long-term objectives, what is the preferred budget and, most importantly of all, is the existing hardware either suitable as-is, or otherwise sufficiently adaptable, to ensure a valuable return from the investment in such an exercise.

Critically, is the existing light head profile deep enough to take our bespoke power-rail and clip-on adjustable and focusable modular, variably-lensed, LED system?

Or would a lower-profiled (but fixed, so not focusable) arrangement be more suitable—as well as being less expensive?



The detail in this painting had never really been seen before! The results are truly transformative, and with a lovely warm tonality to the light colour.

Would a longer arm, with better articulation, enable a sufficient improvement in lighting coverage from an under-sized head?

Can the work be undertaken on site? Or is it better to bring the hardware back here, for attention (and often touching up of tired paint-work) in our workshops?

The good news is that, even aged and rather tired wiring around the property will be greatly unburdened as a result of the change-over—so no electrical intervention is needed.

The power load from the new LEDs is invariably so much lower than from traditional lights that even rather ancient wiring systems will cope well, and can be left undisturbed.

An example of our articulating adjustable and focusable modular LED and power-rail assembly



Simpler, lower profiled, solution with fixed LEDs and lenses—which are carefully selected to suit portrait or landscape orientation.



It is not just properties that are in the public domain which benefit, of course. Many people have picture lights that have aged comfortably in their homes and have literally become ‘part of the furniture’.

Our clients are generally happy to engage with us in the demounting of their old lights and their despatch to our workshop.

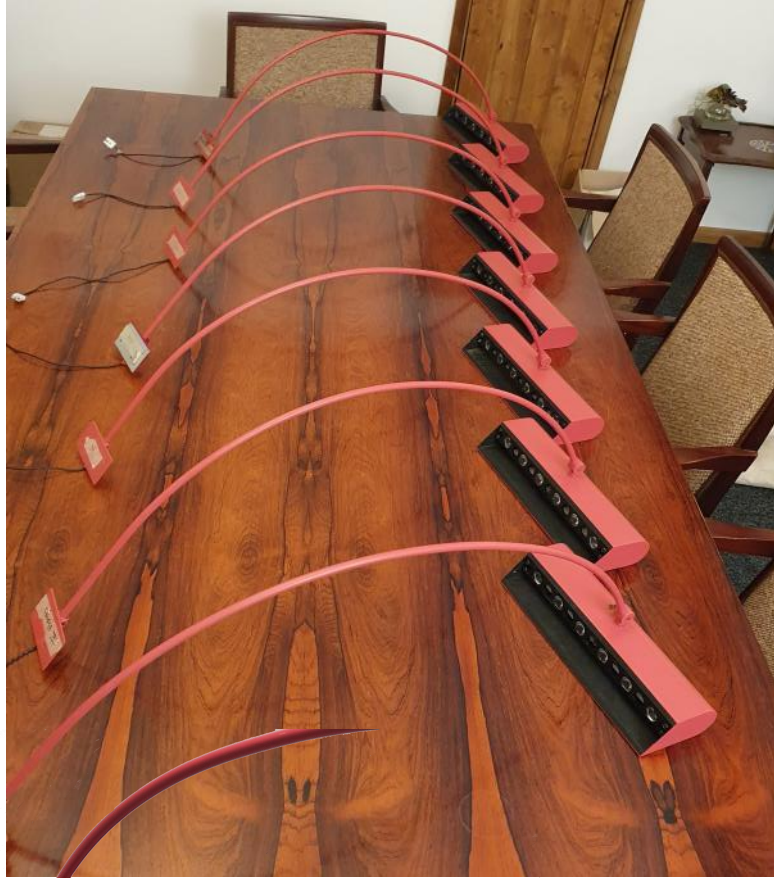
Here, with our specialist crafting and painting, metal-machining and even 3-D printing facilities, we can ‘make do and mend’ very creatively, and in a truly liberating way.

And, because the LED modules that we fabricate in-house are fitted with a range of optically-variable lenses, the newly-restored picture lights – when returned to their owners – will actually illuminate their paintings properly for the very first time.



Even though the picture light head for this painting was really far too small, we all agreed that lighting just the central focus of the picture would be sufficiently transformative to justify the work. And so it proved to be!

These remarkable pink picture lights were very challenging to upgrade; but the finished results are outstanding.



Fit for a King!

These amazing pink picture lights belong to a Banqueting Hall in one of the UK's palaces. They were originally painted specially to blend in perfectly with the richness of the flocked wall paper—and hence their rather unusual colour.

The room has retained its rich décor and there are no plans to change it, but the picture lights themselves had long-since failed to work properly. The room, which is hung with important portraits of early monarchs and their queens consort, is used frequently for important functions, so something needed to be done.

There were seven canvases in total. The paintings were all huge and surrounded by substantial, ornate and crested, gilt frames. So the throw of light was more than 4 metres from the light head itself to the bottom of the portrait in each instance.

In fact, although the traditional lighting had done a reasonable job, it had always faded away significantly towards the base. When the decision was taken to convert the existing picture lights to accommodate our variably-lensed LED system it was also agreed to take full advantage of the process, to get the power and the optics right, and so really boost the lighting performance as well.

To get a good, consistent, light delivery, the LEDs had to be driven to a more intense level than normal, and thermal management was always going to be an issue. The whole exercise took several months of detailed development work and careful trialling.

An array of different heat sinks and ventilation patterns were developed until, eventually, temperatures could be managed at a proper level, while all the necessary elements could still be discreetly contained and concealed within the existing pink-painted hardware.

The Guild Church of St Dunstan-in-the-West

This wonderful old Church on Fleet Street in London was given a complete lighting overhaul some ten years ago – with some specially-fabricated cylindrical brass fixtures designed to be suspended high and to harmonise with the soaring architecture of the vaulted space.

These delivered widely-distributed wash up-lighting into the beautiful arched ceiling above, as well projecting considerably more powerful down-lighting into the nave below, to provide sufficient levels of illuminance for the congregation to read by.

So, when the light bulbs kept failing – with the attendant travails associated with reaching such high-level fittings – it was clear that a solution was urgently required which would re-use these special fittings, distribute enough light for the congregation to read by, and fit within the constraints of the fixture body.

With the exception of our extensive range of picture light retrofit options, this, in fact, was one of the earliest light fixture retrofits that Charter Lighting undertook.

We learnt a tremendous amount in the process. The variable optics and thermal management that was required, without the benefits of assisted ventilation within the enclosed hardware, were both quite challenging.

Much of the technology and hardware we combined for this application originated from our early developmental work for our range of fibre optic projectors, where the balance between lighting performance and proper thermal management were often in conflict.

It is the resulting component combinations that have been adapted and modified for use in several subsequent exercises.



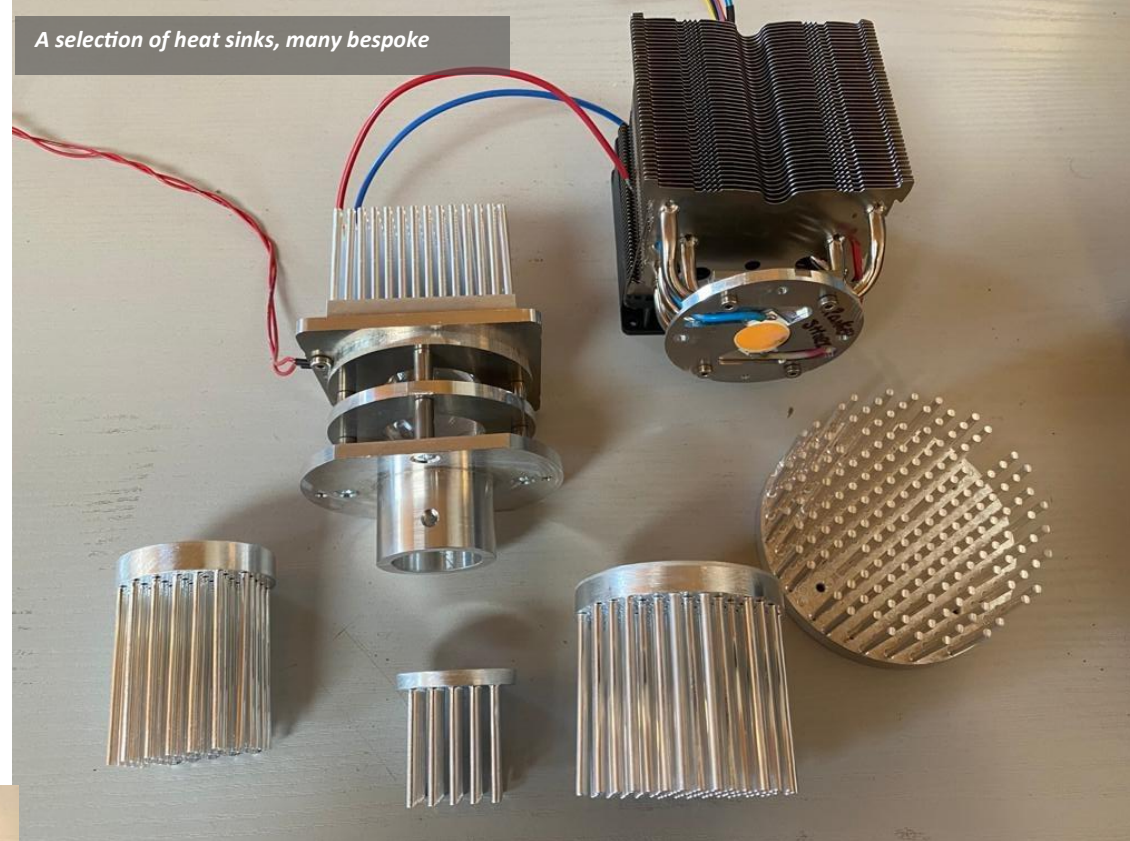
High-level suspended lights in the gracefully-vaulted Apse

FIBRE OPTIC LIGHTING UPGRADES

Good quality fibre optic lighting systems, when they were originally specified and installed, will have been viewed as an investment at that time. Most of the fibres themselves will have been incorporated completely into the built environment for permanent use—whether into hermetically-sealed museum cabinets for conservation display lighting, or fully encapsulated, designed to provide feature lighting from within the architectural fabric of a building.

Well installed, and left undisturbed in this way, fibre optic lightguides will endure for as long as the building itself. Just as you would expect stained glass windows to last for centuries, so will glass fibres.

But the lamp technology for the source projectors has moved on. We have worked in this specialist field for decades, and harnessing the optics of LEDs to deliver light efficiently into fibre was one of our very earliest tasks.



A selection of heat sinks, many bespoke



Retrofitted Fibre Optic Lightsources

Even when the objective is to replace a conservation-grade tungsten halogen unit, LEDs only of the highest possible CRI were selected, and critically-designed optics were vital to ensure efficient transfer of light into the fibre bundle.

The other key consideration was thermal management—especially when light output equating to that emitted by a 150W Metal Halide lamp was sought.

In the process of developing our own family of new, high-quality, high performance LED projectors for Fibre Optic systems, we commissioned the unique design and bespoke fabrication of a very wide range of different shapes, sizes and configurations of heat sinks. These are now made exclusively for our use by a specialist fabricator in Canada.

This range has subsequently expanded hugely to enable suitable heat-sink hardware to be incorporated, as part of the retrofit-assembly of LED equipment, into all manner of shapes and sizes of existing fibre optic lighting projectors from different manufacturers around the world.

One of our most important projects in this respect was in the extensive re-purposing of over 500 American fibre optic projectors at the Ashmolean Museum in Oxford. In a rolling project which spanned several months we carefully removed existing lighting hardware from 50 boxes per month, and replaced this with high-quality, high-performance, low energy, low heat LED equivalents—in two different COB sizes to match differently-sized fibre optic harnesses.

Using only 26W as opposed to the tungsten 100W lamps, the whole exercise saved a staggering 75% in the lighting energy costs alone, and greatly reduced loads on the air handling units.

Heat-damaged fibre bundles were also repaired *in situ* using techniques and equipment specially developed for the purpose.

Thus the whole lighting upgrade was accomplished with minimal waste and disruption and maximum benefit to the museum, and represented a truly exemplary exercise in sustainability throughout.

One employee, who had previously been tasked with changing light bulbs in the fibre optic projectors every day, day after day, has now been deployed to much more interesting and productive tasks around the museum!



A uniquely-devised set of equipment and techniques enabled the repair of even severely-damaged Pmma fibre bundles—and all this in situ.



Photo© Dan Paton—*Refurbishment at the Ashmolean Museum*

We hope this gives a comprehensive enough overview of the sort of things that can be achieved in our efforts to promote realistic, cost-effective Circular Economy Lighting.

Many of the components and processes we have developed in active projects now provide a flexible arsenal for us to draw upon, and are enabling the successful re-purposing of an ever-expanding range of other traditional lighting fixtures.

There will be different challenges in the future and more to learn, we are sure!

But our skilled craftsmen and pro-active and creative facility is now ready and waiting to be of wider service to the market.

Do please join us on this important journey.



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