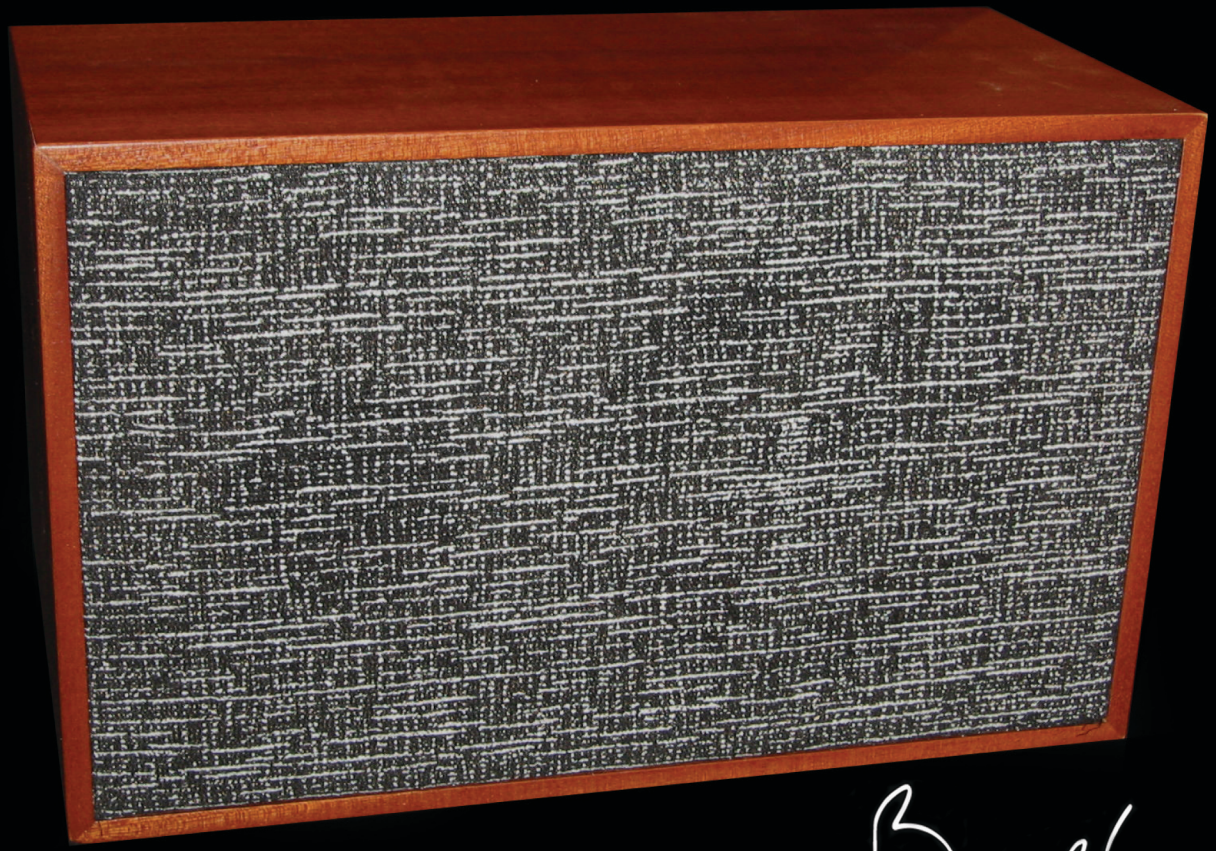
Brian May Deacy Amp Replica



Knight Audio Technologies Ltd

Brian May Deacy Amp Replica

Designed and built in the UK by;

Knight Audio Technologies Ltd

This booklet has been written and compiled by Nigel Knight, with additional contributions from Dr Brian May CBE, Greg Fryer, Ian White and Justin Shirley-Smith.

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Foreword: By Dr Brian May CBE

AT LAST – The Ultimate Deacy amp !

After many years of research, development, near misses and epic failures, The LEGENDARY DEACY AMP REPLICA is finally here ! This amplifier is a kind of clone of the original (legendary) 'Deacy Amp' – the twin brother it never had. Until now ....

It all started when John Deacon retrieved some electronic scraps from a skip around 1972. At that time, John was an honours electronics student at Chelsea College, London but by night played bass in an unknown band by the name of Queen. Through a mixture of divine inspiration and good fortune, he recycled these bits and pieces, constructing a tiny amplifier with magical powers. He used it himself on his own track "Misfire", but, long before this, I had already fallen in love with it, and Deacy generously allowed me to steal it; it became a vital part of the Queen sound on record.

I have lost count of the songs that feature the sound of me playing through the Deacy amp. I discovered that with a bit of care, I could make the guitar sound like trumpets, trombones, and clarinets, (Good Company) – but there was a special quality of the sound this amp could produce which was completely new … nothing like anything that can be made using electronic boxes or computer simulations (we have tried). I used it (alongside my tried and tested Vox AC30 sounds) to build guitar orchestras on "Procession", notably on "The Fellers Master-Stroke", on *Queen II*; later on, on "Killer Queen", Lily of the Valley", "God Save The Queen", "The Millionaire Waltz", "All Dead, All Dead", and even that old chestnut, "Bohemian Rhapsody". And many others too numerous to name.

But perhaps the most sublime sound that ever emerged from the Deacy amp is just one lone solo guitar 'voice' – on "A Winters Tale", on the *Made in Heaven* album. The combination of my old home-made Red Special guitar, a simple treble booster and the Deacy amp, just soared to the heavens, a perfect foil for this exquisite ethereal Mercury vocal.

Well, its been nearly 40 years, but finally we can offer you guys out there your very own personal Deacy, to enjoy. Who needs synthesisers ?!

Plug it in – turn it up - be inspired !!



Dr Brian May CBE


Photo © Nigel Knight

History and background of the Legendary Deacy Amp: By Greg Fryer

Perhaps the origins of this famous piece of "junkyard electronic wizardry" might sound to some as though it could have come from the pages of a "Boy's Own" adventure novel, but as often happens in life, coincidence and felicitous circumstance played their part in bringing into the hands of firstly John Deacon and then Brian May the small amplifier that the Rock Music world has come to know as the "Deacy Amp".

In July 1998 John Deacon related to me the circumstances surrounding his putting together of this unique sounding amplifier and speaker cabinet.

John literally found the circuit board as he was walking down the street one day in London - this occurred in early/mid 1972 at a time when he was first playing in Queen with Freddie Mercury, Roger Taylor and Brian May.

Being a keen electronics experimenter (he was then studying for an Electronics Degree), John's attention was drawn to the wires dangling over the side of a builder's skip that was sitting on the side of the road filled with rubbish and about to be taken away to the tip.

These wires were attached to a circuit board and John's curiosity led him to examine the board to see if he could salvage it and put it to some use.

He initially thought the circuit board might have come from a battery operated cassette player or radio, and after inspecting it further, decided it would do the job as a small practice amplifier for guitar (John played guitar as well as bass).

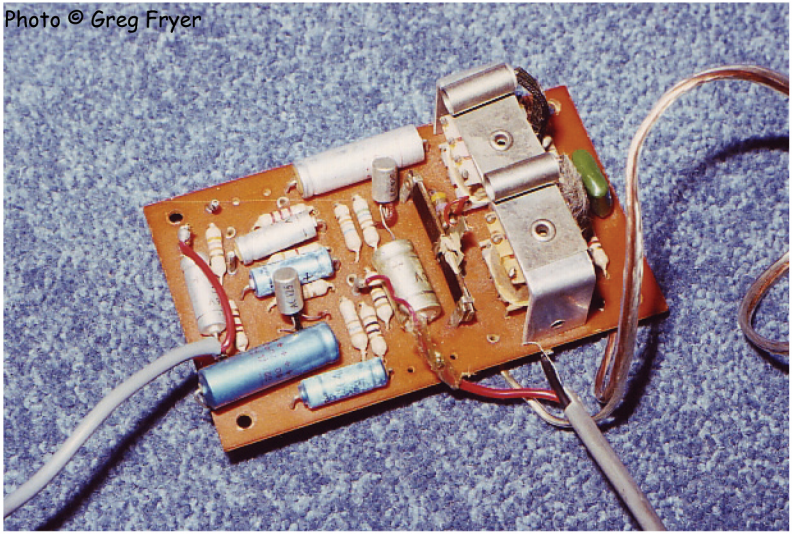


Photo © Greg Fryer

John coupled the newly found circuit board with a spare bookshelf speaker cabinet that he had lying around - the circuit board was fixed inside with two screws and the finished product featured no controls whatsoever.

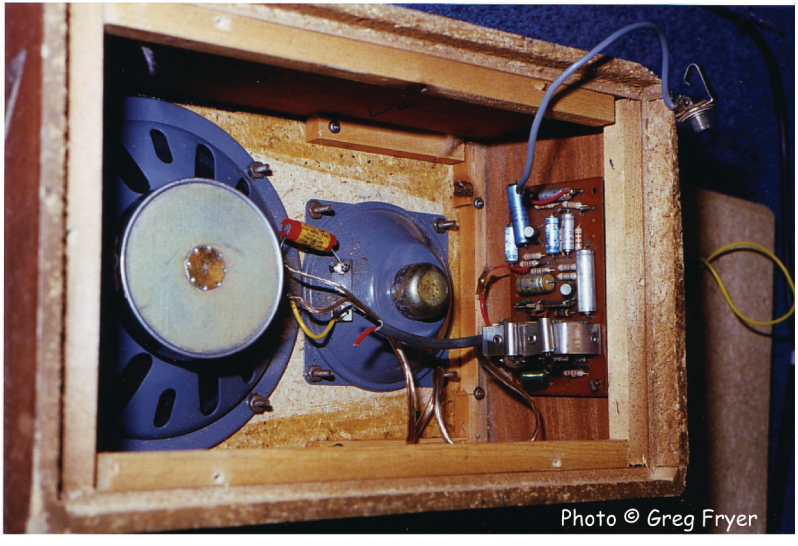
On the back panel of the cabinet was fitted a single jack socket to plug the guitar lead into - the amp's power was turned on by simply connecting the two battery clips terminating a lead which came out from the back panel, to a large PP9 battery - there were definitely no deluxe frills with this model!

With a standard guitar plugged in, John said the amp possessed a warm and pleasant if partly distorted sound, but lacked brilliance or much definition - however a new way of using this little amplifier was about to be found that would change its sound and make it an invaluable part of Queen's recording armoury...

By some chance John brought his practice amplifier along to band rehearsal one day and showed it to Brian – immediately, Brian was interested in the amp's possibilities - and especially so when he heard how it behaved once he plugged in his innovative home made Red Special guitar and Treble Booster pedal.

These two changed the amp's sound dramatically, overdriving both the input and output stages and producing a richly distorted yet defined and sustained sound which resembled such things as violins, cellos and even vocals.

John commented that the rich saturated compressed type of distortion produced by the combination of Red Special guitar, Treble Booster and Deacy Amp was very unique and different to the harder sounding distortion common at the time in many guitar effects and amps.



He mentioned that the recording engineers the band were working with, particularly liked the way the amp behaved in the studio. Here the amp would produce a constant response, whereas the engineers found it more difficult to capture on tape the exciting and more dynamic sound of Brian's Vox AC30 amps.

John's small amplifier became known as the "Deacy Amp", and featured regularly on Queen Albums where Brian used it for his creative and highly original multi-tracked Guitar Orchestrations. These were painstakingly built up line by line (and even note by note on some of the more complex pieces such as "Good Company" from Night at the Opera).

Although the Deacy Amp is a deceptively simple looking piece of equipment, the wide number of creative uses that Brian has managed to find for this little piece of rock history is nothing short of remarkable.

Brian has described the way that the Deacy Amp's sounds sit and blend together when recorded as being "symphonic", whereas when the AC30 was tried its combined sounds didn't have the same character and effect.

The tracks "Procession" and "The Fairy Feller's Master-Stroke" from the album "Queen II" (released in March 1974) saw the first recorded examples on a Queen album of the Deacy Amp.

Perhaps the best known example of the amp's use is "God Save The Queen" from 1975's "A Night At The Opera", whilst possibly the most unusual use was for all of the jazz band sounds on the song "Good Company" (trombones, clarinets and all!), from "A Night At The Opera".

The Legendary Deacy Amp continues to this day in good health and continues to occupy an important place in Brian May's recording studio.


Photo © Nigel Knight

The making of the Deacy Amp Replica Part 1: By Greg Fryer

During the early months of 1998 as Brian May was completing the recording of the "Another World" album at his Allerton Hill studio, Brian, Pete Malandrone and I discussed the idea of making a replica of the original Deacy Amp. For some time Brian and Pete had been aware of the need to have a good quality replica as a backup for Brian's own use in case anything ever went wrong with his original amp. Due to the great interest shown over the years in the Deacy amp we also thought it was worthwhile to start the process of examining the original amp so that we could possibly one day offer replica amps for sale.

At that point we had little idea of the amount of work that might be involved, how long it might take and how much it might cost, or who we might have to find as partners to be able to bring the project to physical reality and have amps eventually manufactured. As the project began, I asked assistance initially from two friends in London and Sydney who were experienced guitar and amplifier repairers: Dave Petersen and Colin Bloxsom.



In July 1998 Dave Petersen and I built 3 replica amps which were assembled in Brian's Allerton Hill studio, and after I returned home to Australia in late 1998 Colin Bloxsom worked with me on further development of the Deacy amp design. When Colin left to go overseas, I then asked Nigel Knight if he would like to be involved in the Deacy development project.

I would like to personally thank these three gentlemen for their invaluable technical assistance, and in particular Nigel Knight. Without Nigel's specialist electronic expertise and dogged determination to see the job through to the finish, the Deacy Amp Replica would not have come about.

The picture on the left shows the NK built MKII Deacy Replica development unit undergoing comparision tests against the original at Allerton Hill in 2005. This unit was fitted with the Eurotec B16 speaker.

I would also like to thank very much Brian May and Pete Malandrone who have always been very encouraging during the development of the various Deacy Amp prototypes and have always been extremely generous with both access to the original amp and with their time during the years of development.

The first 3 replica amps that Dave and I built during July/August 1998 took a fair bit of guesswork regarding the driver and output stages. Plotting out the basic circuit was fairly straightforward but there were areas that kept on being an intriguing mystery until Brian finally gave the go-ahead to take everything apart in January 2008. Because of the fragile and delicate nature of these areas of the original amp (mainly the transformers and some circuitry immediately adjacent to the transformers) we were extremely reluctant to take the amp completely apart due to the risk of doing irrepairable damage. Dave assured us that the Deacy's transformers were none that he had seen before and were not available commercially. Brian and Pete certainly didn't want to wind up with a non-functioning Deacy Amp and I certainly didn't want to be remembered as the man who killed the Deacy Amp. So we agreed to take educated guesses for the transformers (based on the old Mullard reference manual and advice from transformer manufacturers), and pinned our hopes that through trial and error we would eventually get the sound correct.

There were some surprises and frustrations in store for us....

The speakers are also a critical part of the Deacy amp sound, and we tested many speakers for these first 3 amps in 1998. Fortunately we managed to find a very good sounding twin cone English made Eurotec 6" speaker, and it was by far the closest sounding to the original Deacy amp's English made Elac twin cone speaker. The 3 Mk I replica amps sounded surprisingly good in their own right although it was clear to us that there was still much work to do to achieve an identical sounding replica Deacy amp.

The picture on the right shows the Deacy Replica MKII with its Eurotec speaker and pin-board style circuit board which gave us the flexibility to make changes easily and quickly. Note the lack of tweeter unit!

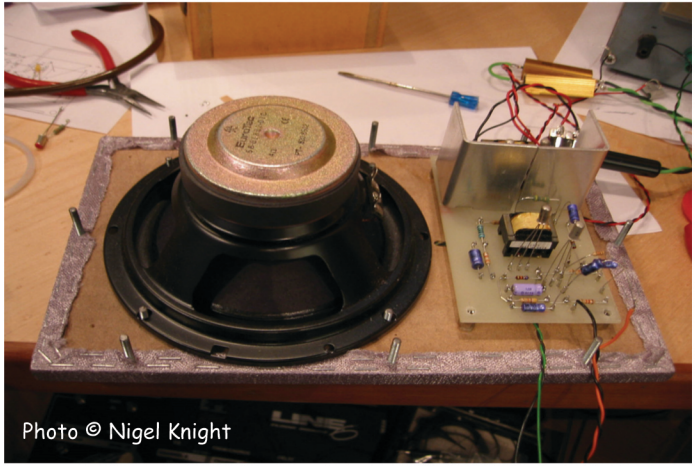


Photo © Nigel Knight

The picture on the right shows the MKIII Deacy Replica development units undergoing comparison tests at Allerton Hill in 2007. They were known as the 'Grey' and 'Caramel' units due to their differing grille cloth colours. We built two units in order that we always had a reference point as to where we started before making any changes or modifications. Both units were now fitted with the Dai Iche DC65-30 twin cone speaker and although the speaker baffles had appertures cut for a tweeter unit, none were fitted at this stage so the appertures were blanked off. We were still working on the assumption that the original's tweeter did not work.



Back in Australia in late 1998, I continued the development work with Colin Bloxsom in Sydney and we asked specialist transformer companies to make new experimental coupling and output transformers which were to be wound to different specifications and in various lamination sizes.

We also experimented with several circuit variations. Throughout 1999-2001 we made the Mk II and Mk III version amps which sounded closer again to Brian's original Deacy and its elusive tonal and distortion characteristics.

In 2003 Nigel Knight became involved with the Deacy replica project, and brought to the table his specialist knowledge of "Deacy era" 1950s-1970s transistor and valve electronics as well as his keen interest in Brian's Red Special guitar.

Over the next 4-5 years several prototype amps were built and modified whenever spare time was available, and we both had a lot of fun producing new versions of the amp and trying to crack the Deacy's tonal mysteries. During this time we continued to refine the transformer specifications, trial new speakers and refine the overall circuit. In both 2005 and 2007 I visited London with prototype amps to show Brian and Pete (amongst other things), and to make further examinations scope tests and A/B test recordings of the original Deacy amp.

By 2007 Nigel and I had gone about as far as we could go based on our still incomplete knowledge of the Deacy's transformers and circuit, and we were also in need a speaker that would sound identical to the tonality, focus and volume of the original Elac.



The picture on the left shows the insides of the 'Grey' Deacy Replica development unit. This is the MKIII unit that employed the Dai Iche twin cone speaker as well as a a two part printed circuit board. Note the tweeter blanking plate is not present in this shot.

As good as our previous Eurotec and Dai-Ichi speakers had been, they were just not the same as the old Elac so it was clear that we would have to take the extra step of finding a speaker company that was capable of producing a custom made replica of the Elac 6" twin cone speaker, and who was also willing to commit the R&D time towards achieving this.

In January 2008 Brian, Pete and Nigel got together to discuss the Deacy Amp prototype's future, and to our great delight Brian decided that it was now time to take apart whatever needed to be taken apart from the original Deacy in order to be able to produce an identical sounding amp.

Nigel then took on the task of conducting this vital final research work and also began the process of looking for suitable speaker manufacturers who could duplicate the Elac speaker, plus a host of other things.

Well its been a long and often amazing journey and there have been many times when we have wondered if we would ever see the finishing line.

From the very first times I heard the Deacy Amp on the "Queen II" and "Sheer Heart Attack" albums, to me it sounded like an inspired piece of equipment which produced inspired music, nothing like I'd ever heard before and almost "other worldly" and magical in its unique tones and the wonderful passages produced. I am still inspired when I hear those and later Deacy Amp pieces and I sincerely hope that our Deacy Amp replica will be enjoyed by a great many people and will help those people in making their own inspired music.

Best wishes, Greg Fryer

The making of the Deacy Amp Replica Part 2: By Nigel Knight

Greg has already covered the initial stages of the Deacy Amp Replica development in part 1 of this story. It now falls on my shoulders to fill in the final part of what has ended up being a 13 year 'journey' (although I hate that term, I find it equally as hard to offer a better alternative in this case!)

Although I started working on the project way back in 2003, these early stages have been covered in eloquent detail in part 1, so I'll begin my story in 2007, which was a kind of cross-over period, whereby, I began to take over the reigns of the R&D process so to speak. Now, it should be remembered at this juncture, that nearly all of our R&D up to this point had been based on Greg's memory of the original's sound. I had still not even seen the original, let alone heard it in the flesh. It was only when Greg flew back to England towards the end of 2007 to carry out further Deacy comparison tests, that I finally got to meet this elusive tone engine. *(That's the Legendary Deacy not Greg by the way!)*

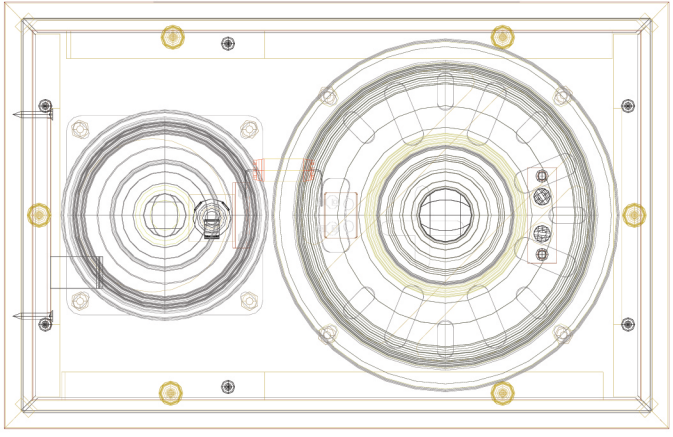


Illustration © Nigel Knight

By now, we had built around ten varying prototype units and were on our MKIII design. To explain; for a design to change up a mark, the degree of change had to be substantial. Simply changing a capacitor or transformer specification would not justify a new mark, simply a revision.

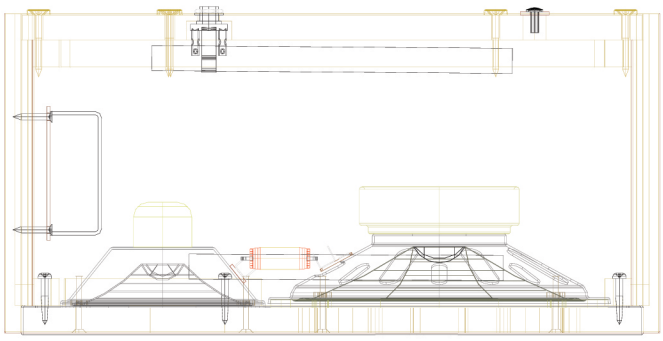
The differences therefore between the MKI and MKIII units warranted two totally new circuit and cabinet design iterations. The final Deacy Amp Replica, some thirteen years in the making is our MKV revision D.

So, the MkIII unit was the Deacy Amp Replica that Greg then took to Allerton Hill to demonstrate to Brian and Pete and compare side by side with the original unit. Now, although our MKIII unit had come a long way since Greg and Dave's first three units, it was still nowhere near close enough. We were still, of course, trying to develop a replica amplifier based on Greg's memory, so could only really get so far without hitting the odd cerebral boundary here and there.

Thankfully, Brian kindly allowed Greg to bring the Deacy back to my studio, whereby we were able to record it dry to Pro-Tools. This then gave us the reference we needed to take the Replica to the next level. Before you ask, no, we were not brave enough to take the back panel off at this point. We were just extremely appreciative of the faith and trust that Brian had in us that he'd allow the Deacy out of his studio for the first time!

Over the next year, we worked hard trying desperately to match the sound of Brian's original. We eventually produced the MKIV, which was based on an MDF replica of the Deacy cabinet and featured the Dai Iche twin cone speaker, a brand new amplifier design and a 2" tweeter unit. This unit was taken to the Birmingham Music Show by Andrew Morgan of A Strings, whereby it created quite a positive response.

Illustration © Nigel Knight



This was obviously very encouraging for us, although this euphoria was not to last as on the way home from the Birmingham show, Andrew dropped by Allerton Hill to return some items he'd borrowed for the show. Whilst unloading the equipment Pete (Malandrone) noticed the Deacy Replica and asked to have a listen. . . . . .

A short and concise email to Greg followed *(Pete rarely writes long ones!)* "Sorry mate, This still sounds nothing like the real Deacy and if this is to be sold as a replica, we have to do a lot better".

We had basically hit a brick wall. Up until now, the Deacy and all its secrets had been well photographed and documented, but never fully analysed. It would take a huge leap of faith from Brian to allow us the opportunity to physically separate all of the main components so they could all be individually tested and their parameters measured.
But in early 2008, that's exactly what happened. . . . .

Firstly, the speakers were removed and taken to a loudspeaker development company, who placed them in their state-of-the-art anechoic chamber and ran full analysis checks on both the twin cone woofer and paper tweeter. This gave us the data which would allow us to go about sourcing a twin cone speaker with the same or at least very similar characteristics to Brian's. But, of course, that ended up as a fruitless excersize as there are no modern speakers out there with the same characteristics as the original English made Elac unit.

Speaker technology had come a long way since the late fifties when the Elac was first crafted. Modern units are far more efficient, have totally different cone and voice coil configurations and stronger magnets. They just didnt hit the mark. Basically and in a nutshell, they were all far too good!

We spoke to many loudspeaker manufacturers, none of whom were really interested in developing and building us a bespoke unit for the low production quantities we would require. If we could commit to 10,000 units or more, then fine, they'd talk. Less than that, they were just not interested.

After five months of failed meetings with a number of loudspeaker manufacturers in both the UK and Germany, another brick wall descended and we were verging on finally throwing in that towel. Little were we to know that this would set the scene for the rest of the process.....

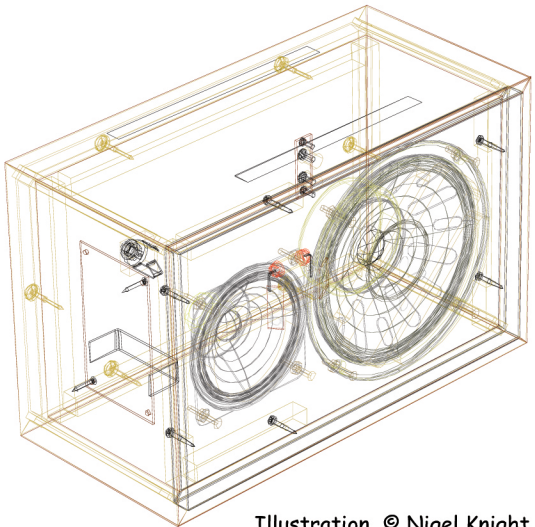


Illustration © Nigel Knight

Brian's long term Guitar Tech and Technical Manager, Pete Malandrone however, had other ideas. "Why don't you speak to Celestion?" he said. "They make guitar speakers!".

Now, I come from a Pro-Audio background and had always considered Celestion to be builders of exceptional quality high power guitar speakers, so was not sure why they would be interested in taking on the mantle of developing a small 6" low power, poor quality, fifties HiFi speaker clone. But, with all other avenues now effectively closed, it was worth giving them a shot.

It was, therefore, a total surprise and huge relief when the guys at Celestion agreed to help us and that was, Im sure, more down to their long term association with Brian May and Queen than any negotiating skills on my behalf.

So a meeting was set up and I drove to Ipswich with the Deacy on the back seat of my car. I purposely filled the tank to the brim with petrol so I would not have to stop and leave the amp in the car whilst I was paying at the kiosk. You have to think of all possible outcomes when you are transporting something of such value and rarity. Did I ever mention how much I hated doing that? . . . . . .

I met with the cream of Celestion's sales and development departments namely Paul Richardson and Ian White. Both made me very welcome from the start and both seemed very positive towards the prospect of working on the Deacy project. Having explained our requirements and agreed terms, we took the Deacy down to their test rooms, took out the twin cone and re-assembled it in their anechoic chamber.

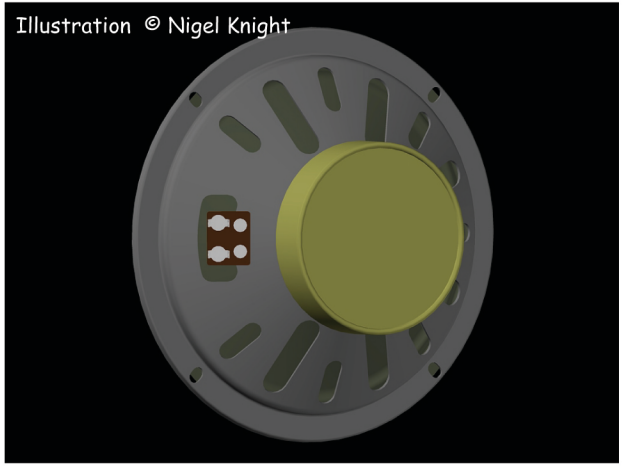
We must have spent a couple of hours running different tests on the unit before relieving it of duty and putting it safely back in its cabinet. More listening tests were carried out throughout the afternoon. We all knew that access to the Deacy would be limited, very limited in fact, so we had to make the most of every second we had together. I know that sounds like a line from a Mills and Boon novel, but that was what had to be done.

The next part impressed me the most and made me realise that a. we were definitely working with the right people and b. we had a very good chance of achieving our goal. Why? Because Ian then asked for the Deacy to be played in its 'normal' mode of operation. In other words, with a Red special and treble booster. Now, this might sound obvious to you and me, but this was the first time a loudspeaker manufacturer wanted to hear it in 'Deacy' mode rather than '50s HiFi speaker' mode.

Why the importance? Because in '50s speaker' mode, you hear the speaker driven within its design range values. In 'Deacy' mode, you hear it being driven well beyond its design range values and exhibiting cone break-up and all other types of distortion and resonances.

Ian knew full well that this was the sound we were chasing, not the clean response it was designed to reproduce. Their guitar speaker heritage was shining through and making me inwardly smile. Although we all knew this might me a lengthy project, I think we all felt relatively certain that it could be accomplished.

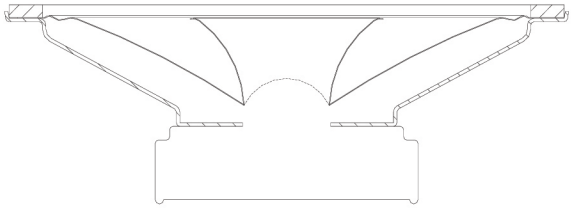
Now, 6" speaker chassis, magnet assemblies, cones and voice coils are not off-the-shelf items at Celestion. They did however, have an existing development 6" unit they had designed as a guitar speaker and this would be our starting point.



We tried this in our MKIII cabinet and already it was far better than the Dai Iche unit at reproducing the 'growl' of the Elac unit, so, it was definitely a step forward, but it lacked many other things we really needed; a whizzer cone for a start, but more importantly, the Deacy 'honk'. Fitting a whizzer cone was the easy part. Chasing after a 650Hz 'honk' was something else.

We tried different cone materials and make-ups, single and double wound voice coils and varying cone surrounds. We were always getting closer, but nowhere near close enough. We needed a bigger magnet! That would give us more sensitivity and more scope to be able to hone the required rise in frequency response. But this came at a price, as the existing chassis would not accommodate a larger magnet. We now needed a new chassis as well!

Whilst Ian and Co. were trying to source a suitable chassis and magnet assembly, I took on the onerous task of borrowing the Deacy again, this time to undertake a full mechanical survey of the twin cone Elac unit. This took me two days and nights of careful measuring then transferring those measurements to a 3D CAD drawing. Never before had the Elac speaker been looked at in such detail and never before had it given up so many of its secrets.



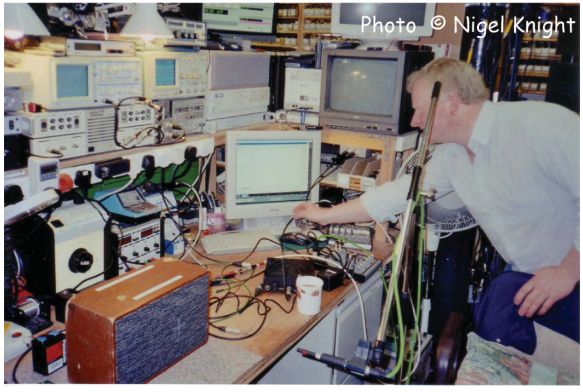
This additional research allowed us to source a cone of the exact thickness, density and curvature of the original. We also now understood the Deacy utilised a 25mm diameter voice coil, whereas we had been using a 20mm up till now.This new information helped Celestion locate a suitable chassis, magnet assembly and cone. We were now on our way!

No sooner had the new components arrived, Celestion had put together around sixteen differing test units ready for evaluation. Time to drive to Ipswich again with the Deacy on the back seat, only this time I took Pete (Malandrone) with me, in fact I lie, he took me! Pete has been instrumental in the R&D of the Deacy Replica. He also has a very good 'ear' and is very good at pinpointing exactly what needs to change. He was also paying for the petrol! . . . . .

Having reviewed the sixteen hopefuls, it was really just down to two units and we had to play and listen for hours before we could make our minds up as to the best way to go. They both had their own merits, but we had to make a decision as to which one would provide the best working platform. We chose wisely, and that chassis became the basis for the unit we have now.

The R&D did not end there. More cones, whizzers, voice coils and surrounds were trialled before we finally hit the magic sound. The Celestion G6 was born. It had taken over 14 months and numerous iterations of each prototype before we finally got there. It is an understatement when I say that we could not have got to this point without the guys at Celestion. They really were true partners, not just suppliers.

The picture on the right shows the Deacy under test on an Audio Precision test set. Almost all it's parameters were assessed at this time, including its frequency response and harmonic distortion characteristics.



The amplifier – Well, contrary to earlier research, theories and beliefs, we found that the amplifier, whilst enjoying many similarities to the well documented Mullard 4 transistor circuit, was in fact, nothing like it. Nor was this instantly physically recognisable either.

Sure, there were a few extra components on the board in addition to those you'd expect to see had it been a direct copy of the 60's Mullard circuit, but there are many variations of this original design, so to the naked eye, it 'was' the Mullard amplifier.

It was only when the individual components were tested and analysed in isolation that the bigger picture began to emerge and what it showed was an amplifier of quite high complexity utilising no less than three tuned feedback mechanisms. The Mullard circuit uses one resistive loop.

So, having now accurately mapped the components and tracks on the board, superimposed them to give us the circuit and analysed all the components so we knew exactly what each pin was connected to and what each component reacted like, we finally put together the missing parts of one of Rock-n-Roll's hardest and most complex jigsaw puzzles.

Finally we had a picture to work to. A full colour canvas with wonderful bright and articulate detail in glorious 3D. Now we just had to replicate it! Simple I hear you say! . . . . . Well no, not really! . . . . . .

The original transformers used a core material that was very difficult to source, some of the capacitors had values of little resemblance to the numbers printed on their cans, the variable resistor that sets the bias of the output transistors was faulty which caused the Deacy to slip effortlessly between class A and class B operation when ever it felt like it and the transistors had gains that were almost at the extremes of the manufacturers design ranges.

So, all, in all, it was like trying to make a perfect copy of the Mona Lisa painting knowing that apart from a couple of tins of off-the-shelf colour paint, we'd have to source, blend and mix our own colours until we got it just right. Great! . . . . . .

The biggest surprise was the transformers. As Greg mentioned in Part 1, Dave Petersen remarked that he had never seen units like this before, and to be honest, neither had I. This was really our first clue that the Deacy amplifier did not follow the same rules applied to the Mullard circuit.

The transformers themselves were simple enough and used older style laminate materials, but the windings made no sense whatsoever. Nor did the pin-outs. Simple resistance and inductance tests were not going to reveal anything of much use, so I took the board to some old friends of mine who design and make all our transformers for us. They also make great coffee there!

There was, to be brutally honest, a degree of head scratching initially because we had to find a way of testing the Deacy's transformers in isolation, yet without physically taking them out of the board. Greg had earlier stated that he did not want to be the guy known for killing the Legendary Deacy Amp, well, neither did I, so we scratched our heads further and had a few more cups of coffee.

Then the light bulb moment! "Lets put some extra windings around the existing coils and use that as the reference, that way we don't have to touch the actual units at all" said Dave (Transformer genius!) ! Ingenious I thought!

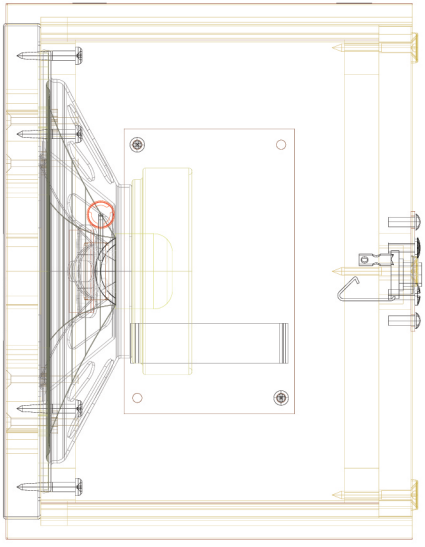
Basically, if you know the amount of turns you are applying in the new 'auxiliary coil', you can then go on to calculate the turns ratios to the other windings, the phase relationships between the windings, the inductance and DC resistance of the individual coils and even whether or not they are bifilar wound.

This was the perfect solution and so after a couple of hours of testing, and a few more coffees, we finally had enough data to know exactly how these transformers were built in addition to any foibles they may be exhibiting after many years of service. There was no place to hide! We knew everything!. . . . .

Now, these were not the best quality transformers we had ever come across, in fact, if I was sent these units now, I'd almost certainly reject them as they were very poorly constructed and wound. We are still at a bit of a loss as to how two sides of a bifilar winding can be so far out, but they are, and that imbalance is what helps give the Deacy its sound.

Reverse engineering any component is difficult, but trying to do that to a device that can neither be removed from the board nor disassembled in any way shape or form is the work of science fiction. Another two components analysed and documented. All we had to do now is build some prototype transformers to A/B test against the originals. Two months later, the first batch of ten arrived ready for test and I'm pleased to say performed just as badly as the originals!

Illustration © Nigel Knight



Slowly and surely though, we worked our way through the components list, sourcing devices off-the-shelf where we could and having others made to our specifications where we couldn't. We bought literally thousands of the germanium transistors and tested everyone in specially built Deacy drive circuits so that we knew they reacted and responded exactly the same as the originals.

Simply gain testing them did not give satisfactory or repeatable results. These stringent tests, whilst ensuring only the correct specification of transistor made it through, produced appalling yields with something like only 53% of AC128's passing the test and a mere 22% of AC125's making the grade. We had to buy more transistors but, that too had its own problems as our suppliers were literally running out!

The amplifier was not the only source of infinite frustration. The speaker cabinet was built sometime between 1960 and 1969 (the inspection stamp inside has the last digit missing and only reads 196...) using materials that are no longer readily available and production processes and techniques that have long since been updated and superseded a hundred times since. It was also built in a manner that would befit an old piece of art deco furniture and featured beautiful biscuit jointed mitered corners rather than the butted or rabbet styled corner joints found in modern cabinets of this size and function.

Balanced A/B Sapele veneered ½" chipboard now only seems to be readily available in Australia of all places. Please don't ask me why!

The rest of the world seems to have converted to MDF which is great for them, but not so good for us. Most CNC based machine shops now have filtration systems designed to catch MDF particles, which are, according to academics, different to chipboard particles, with the result being the majority of machine shops flatly refusing to work with chipboard.

So, a few more hurdles to jump then! Remember that towel I was close to throwing in earlier! . . . . . .

Well, first I had to scrutinize the Legendary Deacy Amp cabinet in high detail and to the nth degree. The resulting measurements being transferred to AutoCAD in the form of a full 3D model of Brian's cabinet to an accuracy of 0.001mm. I can even tell you the exact angle and location of the dymo labels on the top!

This done, we were able to produce a full set of working drawings for the favored machine shop (which we were still yet to find!) to build from.

Now back to those hurdles! We had to source Sapele veneered 12.5mm (1/2") chipboard and find someone to machine it. So let's start with the chipboard. After many weeks of scouting around, we managed to find a supplier of bare chipboard of the correct size and density.

And after a lot more research, we also tracked down a company that could supply, apply and pre-sand the Sapele veneer to our supplied boards. Marvellous! So we ordered in the minimum quantity of bare chipboard – (Now, even if we build 1000 Deacys, I'll still have enough spare to build a medium sized bedroom suite!) – and had them shipped to the specialist veneering company some 240 miles up the road, who, as it worked out, then had to ship the finished boards around 230 miles back down to the cabinet maker! As an aside, I once roughly calculated that the total milage covered by all the components in a single Deacy Amp Replica before it was shipped to the end customer is around 40,000 miles! I digress . . . .

In the meantime, I had been contacting and visiting a number of prospective cabinet makers up and down the country in an attempt to find one who could not only work with chipboard, but work to the exacting standards required to build this cabinet and in a way that would not result in heavy wastage.

Chipboard is notoriously bad for, well, 'chipping' to be frank. You can machine three sides perfectly, and then suddenly, the fourth side will chip and take the veneer with it. That can result in a lot of time and timber down the drain, which has the net effect of pushing the final cost up, so to be averted at all costs if at all possible.



Eventually though, we came across a wonderful cabinet maker who ticked all the boxes. He built us two prototypes that can only be described as 'little works of art'! Who'd have thought that a simple and cheap bookshelf speaker built in the 60's would end up taking so many man hours and so much care and attention to replicate in the twenty-first century!

Two hurdles over, the third was to be the speaker grille cloth.

Read on . . . . . .

As I mentioned earlier, the inspection stamp inside the original Deacy cabinet reads 196 . . and I would happily bet that the grille cloth on Brian's Deacy ceased production around that same time! It was effectively a one-off piece and no matter how long I trawled the internet or phoned grille cloth suppliers, we were never ever going to be able to buy this stuff off-the-shelf. So once again we had to start from scratch.

First things first, I had to borrow the Deacy again so I could take a high resolution scan of the cloth. Did I ever mention just how much I hated borrowing that little amplifier! Can you imagine the weight of responsibility carrying that little piece of Rock history around in the car! I digress again. . . having scanned the grille and returned the amplifier safe once more, I set about sourcing a suitable grille cloth material with a similar texture and transmission characteristic to the original. One year later, we tracked some down in the US and have been using it ever since.

Next we had to get the grille cloth printed. It would be nice at this stage to be able to tell you that this was the easy bit, but I'm sure by now you'll have got the general grasp of this story and know full well that this was not going to happen over night nor be a walk in the park.

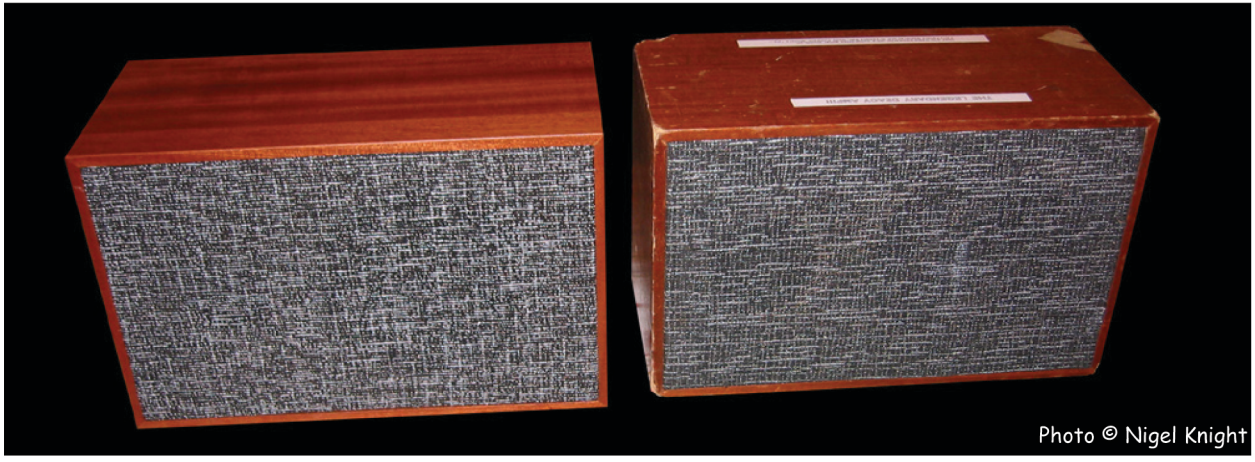
Firstly, and because we had no intention of physically removing the staples and grille cloth from the original Deacy baffle, we could only scan the very front surface of the cloth. As most of you will realise, the cloth wraps around the baffle and the return edges can be seen in part from the front.

This meant that we had to increase the size of the printed area to allow us to wrap the cloth. Now, there are two ways of doing this; the easy way, scale up the print size a little, or the hard way, import the cloth scan into photoshop and add all the extra strands and flecks by hand.

Scaling was not an option as we had to ensure both the chalk cross was in the correct place on the speaker cone and the white strands and flecks were of the correct pitch and spacing. Many long and painstaking hours later, the expanded grille cloth artwork was complete and sent off to one of this countrys most helpful and friendly fabric printers where around 20 varying test prints were initially produced.

These were taken back to Brian's studio where Pete and I compared them to the original. You'll note at this stage I had given up borrowing the Deacy for reasons covered earlier! Out of the twenty, only one had the correct break-up of the strand and contrast ratio.

The problem now was that we had initially decided that the strands and flecks should be white against the black cloth, but of course, due to the years of accumulated dust and dirt on the original, the white was now a pale grey. Back to the drawing board and back to our nice friendly fabric printers for another run of test prints, this time with pale grey strands and flecks. A few more test prints and a few more visits to Allerton Hill later and we'd got the Deacy Amp Replica grille cloth spot-on.



The picture above shows our initial attempt at the Deacy grille cloth (on the left hand unit!). The artwork was created from scratch as opposed to using a scan of the original. Once again, although it looked very close to the original, it was still not close enough to warrant 'Replica' status', so we had to go back to the drawing board once again.
The final cloth evolving over a year later!

So, to recap, Celestion were working on the speakers, we had several suppliers providing the specialist parts for the amplifier, chipboard panels were being veneered and shipped around the country, cabinet makers providing small works of art and fabric printers providing the grille material with a friendly spring in their step. It was finally all coming together!

By mid 2010, we had our first finished unit that we could confidently present to Brian for his approval. Remember the last time he had heard a Deacy Amp Replica prototype it was at very best, only 85% true to the tone of the original. Now, and after three long years of painstaking development, hurdle jumping and towell throwing, we felt it was nearer 99%. The day had come and it was time to face the music as they say. We set up our replica next to Brian's original Deacy and asked Brian, in a blind test, to switch between the two amps and pick the one that he felt was his original. I'm sure Brian won't mind me sharing this moment, but to our delight, he chose the Deacy Amp Replica as being his own. We could not have asked for a better result! Further A/B tests and a single crossover Capacitor value change and we were there!

Our quest was over. We had finally managed to nail the tone of the worlds most elusive Rock-n-Roll amplifier of all time! – Now we just had to continue to produce exact copies for the hoards of Deacy fans out there who have been waiting for this moment for nearly forty years! In other words, a few more hurdles to jump, but at least I've finally put that towel away! For now! . .

So, what were these new hurdles that needed jumping?

Well, firstly, we had to use the exact germanium transitors that were used in Brian's amp. Remember, the AC125, AC126 and AC128's? Now, apart from the obvious problem, that these devices were difficult to source and as described earlier, even more difficult to source in the same specification as the originals, we now had the onerous task of ensuring they were RoHS compliant. This is a Europen directive that ensures that no electrical or electronic goods are placed on the market if they contain any one of six defined heavy metals. Lead being one of them. Yes, the main component of the old solder that was covering each and every leg of every transistor we had in stock.

In order to get these old transistors to comply with the RoHS directive, we had to have them heated in an oven, stripped of their old solder using a laser, and a new compliant molten alloy applied. Now, let's not forget that these are germanium transistors which, by their own design, hate heat! And here we were baking them, blasting them with lasers and submerging their leads in molten alloy! Great!

A large batch of the 'treated' transistors was then sent off for analysis whereby the devices were dissolved in acid and the trace levels of each heavy metal measured. Thankfully, our process worked and we achieved full documented RoHS compliance.

Almost there then! . . . .

The final hurdle was probably the least expected and by far, the most traumatic. It makes for an amusing anecdote now, but believe me, it did not seem like fun at the time.

Remember reading the excellent foreword by Brian at the beginning of this booklet? Well, at the time of writing, Brian sent it to me and whilst bouncing further emails back and forth processing the odd amendment here and there, Brian just happened to throw in a one-liner at the bottom of his last email. It read, and I quote *"Have we talked to John Deacon about this? Seeing as we are using his name and his designs I think we ought".*

I was about to write back, *"yes, of course we would have got John's blessing"*, as I knew from the very start of my involvement that Greg had spoken to John back in 1998, but something stopped me and thankfully I didn't, instead writing, *"I'll check with Greg and get back to you".* So check with Greg I did, and, to my utter bewilderment, Greg replied saying *"No, he hadn't discussed this with John at all".* . . . . . .

Great! . . . . .

It seems that everyone had assumed someone else had done it, yet nobody actually had. Nobody was really to blame, it was just one of those things really, but, it was something that had to be resolved quickly as units were being manufactured and customers had paid their money.

Believe me, I can't thank Brian, Pete and Queen manager Jim Beach enough, as over the Christmas weeks they battled to get hold of John in order that the Deacy Replica could be brought to his attention and discussed with him. Those few days over Christmas 2010 were unsettling to say the least. Having invested over eight years building prototypes, running round the country sourcing suppliers and builders, working closely with Celestion and putting large sums of money in to set up and fund the production, what if John said "NO". That was unthinkable! but I did think it. In fact, I thought it a lot! Not a good Christmas to be honest! In the New Year and after badgering poor Brian and Pete for days, we finally got the good news!

The one good thing to come out of this 'hiccup', is that we now know that John is happy with the Deacy Amp Replica and has given it his blessing. To have the unit not only endorsed by Brian but also by John really is the icing on the Christmas cake!

The unit is now in full production, complete with endorsements, blessings and all the relevant and necessary documentation and certifications. My job is effectively done. I have no more hurdles to jump nor towels to throw to the floor. It's been a challenge, and yet has also been great fun along the way, and of course, I got to work with Brian and Pete!

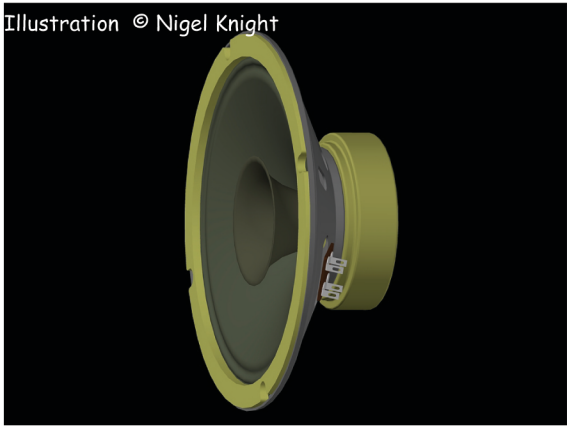
So, here it is! . . . . . Enjoy! Cheers, Nigel

A few words from Celestion: by Ian White

We thought we were skilled in shaping the sound of guitar speakers to meet specific sonic requirements, but the 6" project for the Deacy Amp Replica took us out of our 'comfort zone' and posed a real challenge.

The sonic target was very specific - Brian's original Deacy unit. Although we were able to measure and test the unit, access to it for critical listening, evaluation and comparison was limited due to the fact that it was often in use.

The 6" Elac unit performed appropriately for its intended '60's application (a domestic 'hi-fi' speaker) yet when driven by Brian's, Red Special guitar, treble booster and John Deacon's amp, this supposedly 'neutral' unit produced the famous 'Deacy honk'.





Replicating this precise tonal signature challenged us to find a range of novel, yet compatible solutions. The 6" format meant we had few components to immediately call upon, however once we had established the important elements and approach we set about tooling parts, and after a 14 month period involving 28 base prototypes, we were relieved to finally get prototype approval, allowing production to begin.

The unusual nature of this project has been an interesting opportunity to stretch our skills and it has been a pleasure to work on such a unique product.

The picture on the left shows the drivers pre-built ready for just one of our 'test days' at Celestion. You'll please excuse the quality.
The Picture above is a render from the 3D CAD model.

What makes the Deacy produce its characteristic sound?

The Deacy 'voice' is the resultant sound produced by the interaction of three main components; the amplifier, the speakers and the cabinet. Certainly, the same can be said for many guitar amps, but never more has this mantra been demonstrated to greater effect than in the 'Legendary Deacy Amp'.

The most amazing thing is that in isolation, none of these components are exceptional in performance. The amplifier is of such low quality that the output transistors are very badly matched, the speakers would have just about passed muster as low-end HiFi units and the cabinet's joints are hanging on by a few threads of chipboard and plywood. Yet, together, and surely by some miracle, they all harmonise together to produce one of Rock-n-Roll's most recognisable and totally unique sounds.

Amplifier Board

So let's start with the amplifier board. As I have mentioned earlier, this resembles in part, the basic four transistor Mullard circuit used in many domestic audio units of the day, however, it does have a few extra tricks up its sleeve in that it has extra components added to give it a form of frequency dependant feedback.

This has the overall effect of giving the amplifier a slight boost around the frequency range of the human voice, specifically the higher register of say a female or small child. As the board is a completed unit and not cut or salvaged from a larger PCB, my personal theory is that this unit was once part of a baby alarm or listening device, the type where you installed a small microphone unit in the cot and had the amplifier and speaker unit downstairs linked by yards of cable.

There are, of course, many other theories as to its origins, such as car radios, turntable or cassette deck amps etc., but these units would all generally use an amplifier with a flat frequency response not one with a lift in the upper mid band.

Note: the ill fitting 'alternative' capacitors added by John to make the front end more suitable for guitar.

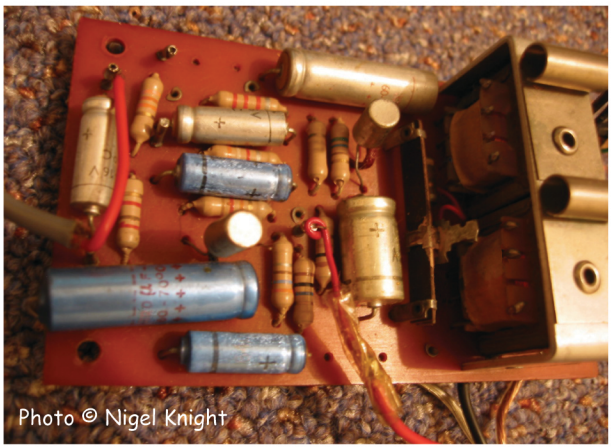
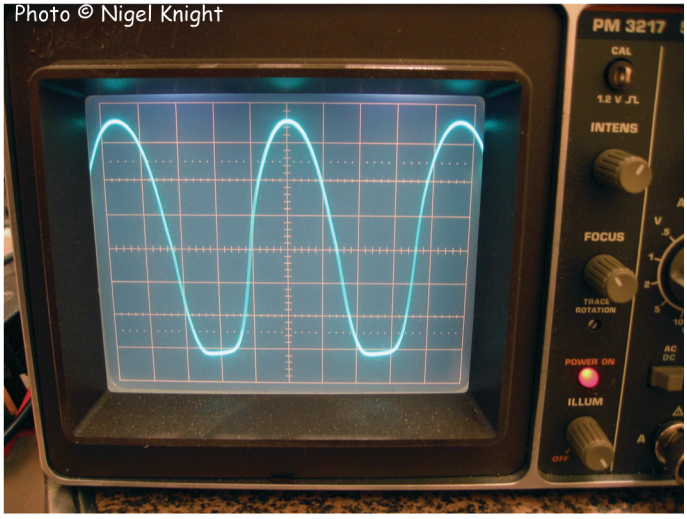


Photo © Nigel Knight



The image on the left, shows an ascilloscope connected to the output of Brian's Deacy with a sine wave injected into the front of the amp. You can clearly see the asymetrical distortion taking place as the lower part of the waveform is clipped before the upper part.

Also, the amplifier, due to its poor build quality, has very badly mismatched output transistors.

Most manufacturers would do their utmost to ensure the gains of the output pair were closely matched. The closer the match, the more expensive the output pair would be.

Well, these two really are like chalk and cheese, which makes for possibly a very badly performing HiFi amp, yet very interesting guitar amp, as when the amp is pushed a little, it begins clipping only the lower half of the output signal waveform, leaving the upper part still sinusoidal.

This reduces the odd order harmonic content and makes the amp sound far less distorted and smoother at this transitional stage.

This mismatch is further compounded by the poorly wound output transformer primary windings.

This semi-clipping effect along with the slight saturation of the interstage and output transformers when pushed hard makes this little amplifier sound and react like it is a valve amplifier.

Another interesting point with this amplifier is the gain structures of the transistors, which again, by sheer luck, have allowed this amplifier to do what it does with such ease. Three out of the four devices are right at the extremes of the specified design range for the transistors with only the 2nd stage driver AC126 being close to a mid range value.

Speakers

The main speaker in the Legendary Deacy Amp is a 6" twin cone Elac driver. In 1960, this would have been an 'average' choice for a low priced bookshelf HiFi speaker.

The whizzer cone was used extensively in those days to extend the frequency range of the woofer to a point that it was almost usable as a full range driver on its own merits. In fact, thousands of these drive units were installed on their own in wooden cabinets and peppered around the UK's factory units where they were used for background music and public address systems.

The 4" paper tweeter was only really added to further extend the high frequency range of the cabinet in order to achieve 'HiFi' status!

Whether by design or poor manufacturing, this particular Elac driver (lets not forget here that manufacturing tolerances were not great in those days, so a similar driver would not necessarily sound the same) exhibited a lower mid-band lift at around 600 - 650Hz.

This is what provides the familiar Deacy 'Honk' that we all know and love. Trying to replicate it, of course, was another matter and covered elsewhere in this booklet.

This characteristic 'Honk' was also augmented by the effect of cone break-up interacting with the whizzer set directly in front, which of course helped to give the 'Growl' effect.

The tweeter, a four inch paper coned unit with a sealed chassis, still working well after all these years, dutyfully 'whispers' the additional top 'fizz' in the background.



The Cabinet

The cabinet, due to its build quality, age and the fact that its probably inadvertently hit the deck more times than anyone would care to mention, is effectively hanging on by mere shreds of chipboard, plywood, glue and possibly a little divine intervention.

Being constructed almost totally out of chipboard, which is a low density material, the cabinet walls move and resonate with the low frequency content of the signal. This reduces the available low frequency driver damping from the cabinet and in turn loosens the bass note making it sound less defined yet warmer. The same can be said for the fact that the cabinet is now relatively loose in construction, as this too reduces the damping factor.

From a higher frequency point of view, the front speaker grille cloth, after decades of use is, to say the least, rammed full of dust and dirt, which, of course has the effect of attenuating the upper frequencies of both the tweeter and the twin cone mid-bass unit.

So, to summarise;

The amplifier has an upper-mid presence that provides clarity and punch to the individual notes played.

It has an asymmetrical output stage that provides a gradual onset of valve amp style distortion and transistor gains that allow this to happen whilst just pushing the transformers into saturation.

The twin cone speaker has a mid band lift that provides the 'honk' and cone break-up that provides the 'growl'. The tweeter provides the 'fizz' on top.

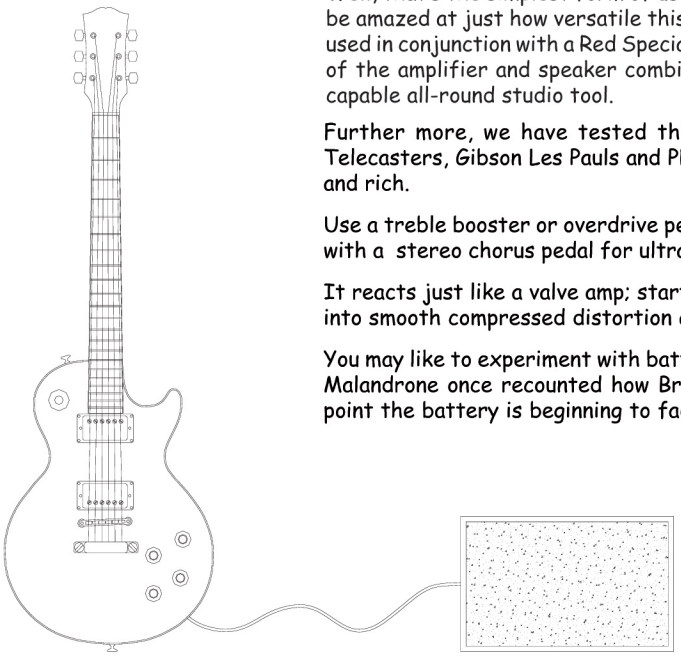
The cabinet takes all these elements, warms up the bass notes and calms down the treble frequencies.

So as they say . . . . . .

"the whole is greater than the sum of its parts"



Getting Started.



Simple; carefully snap the battery clips onto a new PP9 making sure you have the correct polarity before pressing the clips home, plug in a guitar and play!

Well, that's the simplest form of use, but it does work and work very well indeed. You will be amazed at just how versatile this little amplifier is. Yes, it's intended purpose is to be used in conjunction with a Red Special guitar and treble booster, but such is the sensitivity of the amplifier and speaker combination assembled by John Deacon, it is a more than capable all-round studio tool.

Further more, we have tested this little amplifier with Fender Stratocasters and Telecasters, Gibson Les Pauls and PRS's. They all sound very different, but very smooth and rich.

Use a treble booster or overdrive pedal to make it sing! Try a pair of Deacy Amp Replicas with a stereo chorus pedal for ultra-wide soundscapes. The possibilities are endless. . . .

It reacts just like a valve amp; starting with clean chimey bell-like tones, slowly drifting into smooth compressed distortion as the guitar's volume control is turned up.

You may like to experiment with batteries with differing levels of remaining charge. Pete Malandrone once recounted how Brian often loved the sound of the Deacy just at the point the battery is beginning to fade.

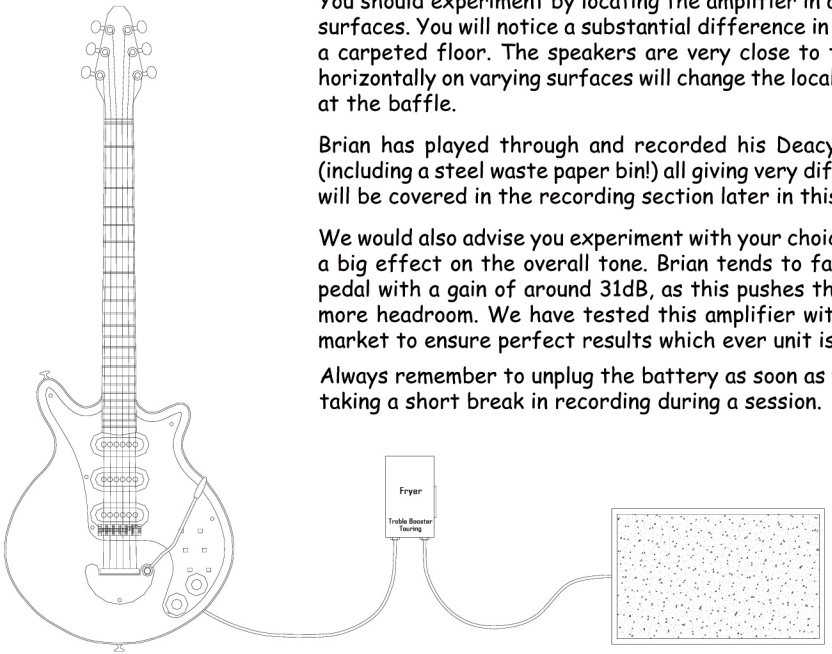
However, it's when you plug in a Red Special guitar with its series-wired pick-ups, via a treble booster that this amplifier literally takes off and heads for the heavens! This is pure Deacy tone at it's best!

You should experiment by locating the amplifier in a number of positions and on different surfaces. You will notice a substantial difference in tone between a hard table top and say a carpeted floor. The speakers are very close to the edge of the cabinet, so placing it horizontally on varying surfaces will change the local reflections and developing wave front at the baffle.

Brian has played through and recorded his Deacy in numerous positions and locations (including a steel waste paper bin!) all giving very different tonal responses. Some of these will be covered in the recording section later in this booklet.

We would also advise you experiment with your choice of treble booster, as these too have a big effect on the overall tone. Brian tends to favour a 'Fryer Treble Booster Touring' pedal with a gain of around 31dB, as this pushes the amp a little less and gives it a little more headroom. We have tested this amplifier with almost every treble booster on the market to ensure perfect results which ever unit is used.

Always remember to unplug the battery as soon as you have finished playing, or if you are taking a short break in recording during a session.



When recording the Deacy, keep it simple. I normally just use a Shure SM57 close to the grille cloth centred on the chalked cross.

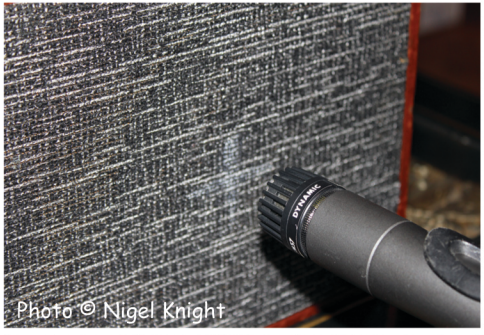




The image on the right shows the mic backed off a little for clarity.

Invariably, but not always, I will use a degree of EQ in order to attenuate some of the upper frequencies of the speaker or to lift the mids a little, but this is generally undertaken as part of the overall mix and thus dependent on the surrounding instruments and voices.

In some cases I will cover the amplifier and microphone with a coat or blanket being very careful not to move the mic off position in the process. This has the effect of controlling the local reflections as well as adding a little isolation.





There have been a number of occasions when the Deacy has been used to provide 'alternative' sounds to what we would consider to be the 'norm'. One such occasion happened during the recording of the recent Kerry Ellis album "Anthems", for the opening track "Dangerland", which has a Far Eastern style vibe.

Brian wanted a totally unique guitar sound for this track which was to provide a haunting riff throughout the song. The answer eventually lay in the waste paper bin! Literally! . . . .

We laid the steel waste bin on its side, pushed the Deacy deep inside and placed a condenser mic just inside the mouth of the bin.

The steel bin "resonant tunnel effect" worked better than expected and once again, gave us a totally new voice from the old Legendary Deacy.





There have been other occasions when I've decided not to use the coat at all, but add an additional ambience microphone approximately 1 metre away from the front baffle. This allows me to capture the small amount of HF produced by the little tweeter unit, which again, if tracked separately, can be utilised later in the mix.

All-in-all, this is a very easy and enjoyable amplifier to record and one which produces instantly gratifying results with the most basic of recording apparatus. It is also small enough that it can be inserted into an infinite number of recording locations for tonal variation.

The above is just a guide. The real art is in the experimentation!

Justin Shirley-Smith

Care and Maintenance

Overview

The Brian May Deacy Amp Replica is a totally sealed unit with no user-serviceable parts inside. The rear panel is screwed and glued in place to ensure the full mechanical integrity of the cabinet is maintained throughout its life. Any attempt to remove the rear or front panels will severely damage the unit and void your warranty.

Be sure to unplug the jack lead from the rear socket when not in use as this will reduce the risk of damage to the amplifier in the event of a pulled lead. Please bear in mind that the Switchcraft jack socket is rebated into the rear panel and is subsequently held in place by only a thin section of chipboard a few millimetres wide. Any sideways force on an inserted jack plug or lead could damage the rear panel and jack socket assembly.

The Brian May Deacy Amp Replica cabinet is a 'true' copy of the original using the same materials and build methods. Whilst this provides a perfect replica for the enthusiast, it also means that care has to be taken when handling the delicate cabinet. The mitered corners are susceptible to chip damage if the cabinet is dropped or roughly handled. Care should be taken at all times to ensure the amplifier is used on a flat and stable surface. We would also advise you keep the packing carton, polythene bag and protective corner pieces in order to facilitate safe transportation and storage when required. For additional protection, a high quality flight case is available for purchase and is detailed towards the end of this booklet.

General Cleaning

Dust the cabinet occasionally with a soft lint-free cloth. ***Do not use any water/alcohol based or abrasive cleaners***.

To dust the grille cloth, tip the amplifier forward to approximately 45 degrees, and then gently dust off the front surface again with a lint-free cloth. Be carefull not to press hard into the grille cloth directly above the speaker appertures as it may result in the fabric stretching.

Tipping the amplifier backwards will cause the dust to drop through the grille cloth and onto the speaker cones whereby it will remain trapped. This in time will build up and cause a significant drop in the Deacy Amp Replica's high frequency performance.

Do not use a vacuum cleaner on the grille cloth material as this may damage the cloth surface.

Battery

Use only a 9V PP9 battery to power the Deacy Amp Replica. Always check the battery terminal polarity before attempting to connect the amplifier. ***Do not try to run this amplifier on any other type of battery or third party power supply as this may damage the unit and void your warranty.***

Be careful not to put undue stress on the battery lead as its conductors are relatively small and quite delicate. Make sure the large and heavy PP9 battery is not placed near a table edge where it may fall and exert excessive strain on the battery lead and integral connector.

Always unplug the battery from the amplifier when not in use, or between sessions. This will increase battery life and help keep your running costs to a minimum.

Storage

Should you wish to store the unit for an indefinite amount of time, you should disconnect the battery and remove any leads from the rear jack socket. We would advise you clean the unit as described previously, then return it to its protective bag and secure it back in its original packing carton supported by the integral corner pieces.

General dos and don'ts

Do not place the Deacy Amp Replica near a heat source such as a fire or radiator.
Do not place the Deacy Amp Replica near water or fluids of any kind.
Do not precariously balance the Deacy Amp Replica on the edge of a table or high surface.
Do not place the Deacy Amp Replica near a CRT TV or Computer monitor as the speakers are not magnetically shielded.
Do not plug the speaker output of another amplifier into the rear jack socket.
Do not place heavy objects on top of the cabinet.

Do ensure the cabinet and grille cloth is kept clean and clear of dust.
Do ensure you have sufficient quantities of fully charged PP9 batteries before you start a recording session.
Do ensure the battery connector clips are kept in good order and not damaged by forced insertion.
Do remove the battery connector carefully with both hands ensuring that equal force is exerted at both ends of the connector.

Warranty

Our goal is to build every Deacy Amp Replica to the highest possible quality standards and from the finest components and materials in order to provide you with many years of reliable service. For your benefit, we recommend that you record the serial number found on the rear of the product and keep it safe along with proof of purchase. This information will allow us to better serve your needs. We have provided space on the back page of the booklet for you to note down your unit serial number.

What is covered: All parts defective in material and workmanship.

What is not covered: Defects resulting from improper or unreasonable use or maintenance, accident, unauthorised tampering, alteration or modification.

Limitation of liability: The maximum liability of Knight Audio Technologies Ltd shall not exceed the actual purchase price paid for the product. In no event shall Knight Audio Technologies Ltd be liable for incidental, consequential or indirect damages.

For how long: The Knight Audio Technologies Ltd warranty lasts for one year from the original purchase date.

What we will do: In the event of a problem, we will repair or replace any defective parts free of charge.

What to do if you suspect that the unit is faulty: Please return the product with proof of purchase either to the original place of purchase, or directly to Knight Audio Technologies Ltd with pre-paid return postage included.

Is the warranty transferable?; Yes, this warranty is fully transferable provided that the current owner furnishes the original proof of purchase from an authorised Knight Audio Technologies Ltd dealer.

For UK Only: This warranty in no way affects you rights under statutory law.

WEEE Directive

The Deacy Amp Replica is a sealed unit and has no user-serviceable parts inside. Should you wish to dispose of this unit, do not, under any circumstances, throw it into a bin or rubbish tip. Please return it to Knight Audio Technologies Ltd at the address supplied on the back page of this booklet, whereby we will dismantle it and dispose of it in-line with the WEEE directive. In the event that you do wish to send the unit to us for disposal, please contact us and we will organise collection of the unit free of charge.

Technical Specifications

Amplifier Section	
Form	Four transistor, transformer coupled push-pull amplifier
Output pair Operating Class	B with asymetric gains
Output Power (Undistorted)	750mW (RMS)
Power Requirements	9VDC
Reverse Polarity Protection	Yes
Current Consumption (Quiescent)	12mA
Current Consumption (Full Power)	168mA
Transistor Compliment	1 x AC125, 1 x AC126, 2 x AC128
Speaker Section	
Form	Twin driver/passive Crossover
Loading	Infinite baffle, sealed box
LF/MF Unit	Celestion 6" Twin Cone 25mm Voice Coil 30W
HF Unit	Celestion 3" Paper cone 15mm Voice Coil 15W
Crossover device	Non-polarised Capacitor
Crossover Frequency	5KHz
Cabinet Section	
Construction	Sealed chipboard box. Mitered corner joints
Finish	Sapele veneer
Cabinet walls	Matched A/B veneered Chipboard
Front Baffle Material	12mm bare chipboard
Rear Baffle Material	12mm bare chipboard
Joints	Biscuit jointed miters
Baffle mountings	12x12mm battens
Internal HF damping	25mm acoustic wadding
Connections	
Battery input	Flying lead with integral PP9 clip assembly. Internal strain relief.
Guitar input	Switchcraft 2 pole jack

Accessories for The Brian May Deacy Amp Replica

This is a specially built flight case for both the Legendary Deacy Amp and Deacy Amp Replica. It is built out of strong GRP and is sculpted and lined internally to protect your Deacy Amp Replica from harm. It also includes two recesses to store PP9 batteries ready for your next session.

You can order them in Red (as shown below), Black (as Brian's) or Blue.

We will also be developing a bespoke AC power supply unit for the Deacy Amp Replica in the very near future.



A special thank you to all those involved in bringing the Deacy Amp Replica to fruition:

John Deacon, Pete Malandrone, Greg Fryer, Justin Shirley-Smith, Ian White, Paul Richardson, John Paice, Nigel Wood, Jon Macnamara, Chris Richards, Robert Kingsbury, Tom Sim, Linda Macnamara, Shirley Harrington, John Allen, Richard Thrussell, Dave Guesdon, Joe Tumilty, Calum Drummond, Mark Dowling, Zoe Sullivan, John Redford, Scott Kellsall, Joan Macaulay, Michael O'Conner, Kris Fredriksson, Dave Petersen, Claire Bartlett, Pete Roberts, Richard Vigar, Bill Swank, Hunter Watson, Janet Simms, Ben Woolfrey, Richard Toomer, Kazutaka Ijuin, Frank Rohles, Andrew Morgan, Sandy Warner, Ian Shipp, Gary Sparkes, Mark Bowen.

And last but not least, of course I could not have even started this project let alone successfully concluded it, without the invaluable help, support and unwavering faith and trust of Dr Brian May CBE to whom I thank the most.