AutoDesk v Dyason

by Jim FitzSimons & Peter Knight

Clearly the most important recent decision for us here in Australia in computer law, is the case involving the famous hardware dongle.

Background

AutoDesk produces and markets the AutoCad program. In Australia it is marketed with a 'hardware lock' which fits into the serial port at the back of the computer using the program. The program then periodically sends a 'challenge' to the lock and provided the correct 'answer' is received, the program continues processing. If the wrong answer is received the program immediately ceases to function. AutoDesk actually encourages users to make multiple copies of the program on the different computers within the users' office. AutoDesk relies on the hardware lock to ensure that only one copy of the program is used at a time. The theory is that one person will have to cease using the program and hand the lock to the next person before the second person can commence to use the program.

None of the judgments in the various courts are clear on the precise details of the technology employed in either the AutoCad lock or the AutoKey. However, the following summary is based upon the elements of the technology which appeared to the various judges who heard the case, to be important.

The AutoCad software contains a small program, known as Widget C, which sends a number to the AutoCad lock. The AutoCad lock consists primarily of a shift register and an 'exclusive or' (XOR) gate. The lock processes that number in the following manner:

The original number is loaded into the shift register and each time a pulse is received from Widget C the shift register causes the binary digits to shift one place to the left, thereby having the effect of doubling the number.

The sixth and seventh digits of the seven bit number are put through the XOR gate (which produces a '1' if both the digits are the same and a '0' if they are different). The resulting digit is fed back and becomes the first digit in the shift register.

The Widget C program then polls the sixth bit and compares what it finds with the expected result.

The program continues to operate only if this value is the value expected by Widget C.

The expected results are stored in a 'look-up' table within Widget C.

The respondents duplicated the function of the lock and provided their own version of it which would send back the correct 'answer' when it received a 'challenge'. In producing their version of the AutoCad lock the respondents had not examined the internal workings of the AutoCad lock, they had merely examined the answers produced by that lock by inserting an oscilloscope between the lock and the PC to which it was attached.

The AutoKey contains a counter module and an EPROM. Loaded into the EPROM is the table of expected answers. Each pulse from Widget C causes the counter to increment by one. The counter then provides the address for the relevant location in the EPROM of the correct answer. Thus initially the counter is set to 0 and in location 0 in the EPROM is the first 'answer' which would have been provided by the 6th bit of the shift register in the AutoCad lock. Location 1 contains the second such answer and so on.

In essence, therefore, both the AutoKey and Widget C contain a table of binary digits 127 characters long and these two table are identical. The AutoCad lock, on the other hand, does not contain a copy of this table but does encompass a method of generating the same string of binary digits.

The High Court Decision

In overruling the decision of the Full Bench of the Federal Court, the High Court found the whole problem much simpler than either the judge at first instance or the Full Bench.

Whilst the earlier judges spent a great deal of time deciding on the correct meaning of 'computer program' and, in the case of Northrop J., the meaning of the word 'function', the judges in the High Court were unanimous in concluding that:

- Widget C is a computer program.
- A substantial (because it is an essential) part of Widget C is the look-up table against which the response from the lock is checked.
- The digital information which forms the input to Widget C from the AutoCad lock or the AutoKey cannot, however, constitute a set of instructions within

the meaning of the definition of 'computer program'.

- On the other hand, the mere fact that the AutoCad lock is hard-wired does not mean necessarily that it could not be a computer program.
- The fact that both the AutoKey and the AutoCad lock perform the same function does not mean that there is any similarity between the two sets of instructions.
- It is not necessary that the reproduction of a substantial part of a computer program should itself be a computer program within the meaning of the Copyright Act.
- The look up table in Widget C is not itself a computer program.
- The AutoKey reproduces the look-up table in the EPROM which it uses.
- It follows therefore that the contents of the AutoKey Eprom is a reproduction of a substantial part of Widget C.
- The reproduction is in a material form (the definition of material form includes any form (whether visible or not) of storage from which the work can be reproduced).
- In copying the sequence of numbers put out by the AutoCad lock Mr Kelly indirectly copied the look-up table in Widget C. (The sequence of numbers put out by the AutoCad lock is clearly a copy of the sequence in the look-up table.)

Their Honours therefore concluded that the production of the AutoKey constituted an infringement of the copyright in the AutoCad program, in particular Widget C.

Little if anything in the above summary of the findings of the High Court contradicts any of the findings of the Full Bench of the Federal Court. The finding that the function of two programs can be the same without the underlying instructions being the same, on the other hand, expressly overrules a crucial point in the finding of Northrop J. at first instance.

The above findings are described as 'unanimous' because they were contained in the judgment of Dawson J with which Gaudron J simply agreed

"... the production of the AutoKey constituted an infringement of the copyright in the AutoCad program ..."

and with which the other three judges agreed before adding 3 paragraphs of 'supplementary comments'. As we shall see below, these supplementary comments provide one of the most perplexing areas of the decision.

Attitude of the High Court

One of the most interesting features of the judgment is the change in the attitude of the High Court between its decision in *Apple* v *Computer Edge* and this decision. The Court seemed determined to give full force and effect to the amendments to the Copyright Act introduced as a result of the decision in Apple. For instance, in *Apple* v *Computer Edge* his Honour, Gibbs CJ said that

> 'It seems to me a complete distortion of meaning to describe electrical impulses in a silicon chip, which cannot be perceived by the senses and are not intended to convey any message to a human being and which do not represent words, letters, figures or symbols as a literary work; still less can a pattern of circuits be so described'.

and

> [There must be] 'a sufficient degree of objective similarity between the two works ... It is impossible to say that there is any objective similarity between the ROMs and EPROM on the one hand and the written source programs on the other. Neither the silicon chips nor the electrical impulses that may be generated in them have the slightest resemblance to the written source programs'.

His Honour has since retired but he was supported in that case by Deane J who said, in his judgement:

> 'the written object code denotes the series of electrical impulses produced by following the directions of the source code. The charged silicon chip reflects the application of that series of electrical impulses. The written denotation of the electrical impulses in object code - as distinct from the electrical impulses themselves - played no part whatever in the production of the Apple][or Wombat ROMs however and it would be a distortion to regard the other as representing a reproduction or adaptation of the former. It is not the point that an Apple][or Wombat ROM is capable of functioning as a switching device in an appropriately instructed operating microcomputer to reproduce the series of electrical impulses and to display or print out their denotation in object code. Indeed, it would be an inversion of logic to

regard that consideration as supporting the conclusion that the silicon chip was an adaptation or reproduction of the written denotation of the program in object code.'

Compare that with the comments of the same judge (together with Mason and Brennan JJ) in the present case:

'[a] narrow literal construction would, however, partly frustrate the obvious legislative intent to confer real protection upon the actual set of instructions regardless of whether they be actually expressed in written form or merely embedded or stored in a non-sensate form such as electrical impulses on a disk, ROM or EPROM.'

'The stored set of instructions in a non-sensate form such as electrical impulses is itself protected on the basis that copyright actually subsists in any expression or description of it which can theoretically be made in language, code or notation.'

and

'Where a set of instructions does not itself satisfy the requirement of originality that requirement can, of course, be satisfied by the originality of an expression or description of it in language, code or notation with the result that copyright is confined to that particular expression or description alone.'

Dawson J added in his comments:

'It may be doubted whether the AutoCad lock can be said to constitute a set of instructions [and therefore capable of being a computer program] at all, but not because it is hard-wired.'

Clearly the High Court is now intent on ensuring that the 1984 amendments are interpreted in the widest possible fashion. The width of their Honours' decision can be seen in the findings that a reproduction of a computer program does not itself need to be computer program; the liberal interpretation of the extent to which the stream of bits produced by the AutoCad lock is seen as a copy of the look-up table in Widget C and the fact that an 'essential' part of a program is seen to be automatically a 'substantial' part.

"... a reproduction of a computer program does not itself need to be a computer program ..."

Analysis of the Decision

Some interesting questions are posed by this judgment. It principally raises questions of reproduction, substantiality and indirect copying.

Reproduction in a material form

This decision is based solely on the fact that Mr Kelly created an EPROM which contained a copy of the look-up table. The reasoning of the High Court would not have affected Mr Kelly if he had made an exact copy of the AutoCad lock. Had he done so, however, he may have lost on other grounds. The High Court was not forced to rule on a number of the important issues covered in the lower courts.

If, instead of storing the digits in the EPROM Kelly had devised a method whereby the 127 digits were generated rather than stored the High Court would have had to examine much more closely the decision of the Full Bench.

In following this analysis to its logical conclusion it is worth remembering that had he used the oscilloscope to determine the string of digits involved and, without looking inside the AutoCad lock, devised a method of creating the numbers, he could be said to have derived the lock independently and so would not, from the mere fact that the two locks were the same or very similar, be said to have infringed the copyright in the AutoCad lock itself. To put it another way, had he devised a method to generate the string, rather than recall it from a table, it would be irrelevant whether the method by which he generated those numbers closely resembled the original AutoCad lock or did its generation in a completely different way.

It seems to the authors that if Kelly had simply devised a means of creating those numbers, even if the equipment had no other purpose, he would not have made a reproduction in a material form. A different question might arise, however, when the lock was actually used, would that create a reproduction in a material form - the stream of bits?

An analogy from the world of music would be this: it is clearly a reproduction in a material form when a piece of music is copied onto an audio tape. If I devised a machine which would blow air through a trumpet and work the valves in an appropriate fashion and so produce a particular piece of music could it be said that my machine sitting there in an idle state was a reproduction in a material form of that piece of music?

The answer is probably 'no', although one would not be wholly confident of that outcome, and sales of the machine might constitute an

authorisation to reproduce the music (when the machine is turned on) in breach of the Copyright Act.

So, had Mr Kelly generated the numbers, rather than stored them, the High Court might still have found that an infringement of the copyright in the look up table had occurred.

Look and feel arguments

The judgment at first instance, based on the finding that one program could infringe the copyright in another if it had the same function, went much further than the US look and feel cases. The structure, sequence and organisation of the program made no difference. The test was merely on how the program performed.

Although the decision of the High Court reinstates the earlier decision the major substantive (as opposed to the majority supplementary) opinion does not obviously form the basis of a look and feel doctrine in Australia. That decision is based squarely on ancient precepts of copyright law and depends upon being able to compare two 'documents' which are precisely the same. There is no need to discuss the structure sequence and organisation of the two programs.

By the same token this decision by no means rules out the possibility that the reasoning in, say, *Lotus* v *Paperback* would be followed in this country. Encouragement for the proposition that a look and feel case would succeed in Australia can be found in several key areas in this judgement.

First, there is the ruling that the look up table is an essential part of the program and therefore is a substantial part of the program. It could be said, for instance, that in a similar way the user interface is an essential part of Lotus 123 and therefore a look and feel clone would be an infringement.

Secondly, there is the fact that the string of digits in the EPROM was held to be an indirect copy of the look up table which Mr Kelly had never seen, and neither had he seen the working of the AutoCad lock itself. Clearly the 'access' required to the original work is something far short of examining the source code of a program or systematically reverse-engineering it.

It is in the majority comments, however, that the greatest (although quite perplexing) encouragement for a look and feel argument can be found. Consider the following passage:

> 'The stored set of instructions in a non-sensate form such as electrical impulses is itself protected on the basis that copyright actually subsists in any expression or description of it which can theoretically be made in language, code or notation. On that basis the test of originality is satisfied by the originality of the set of instructions and any unauthorised expression of it in language, code or notation will infringe the copyright in the computer program. Where a set of instructions does not itself satisfy the requirement of originality that requirement can, of course, be satisfied by the originality of an expression or description of it in language, code or notation with the result that copyright is confined to that particular expression or description alone.'

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Why did three judges (of the five who heard the case) feel the need to add these thoughts to the substantive judgement? They expressly agreed with that judgment so these words cannot be taken to displace anything said by Dawson J.[1]

The word 'theoretically' seems like a slap in the face to a copyright lawyer. It is trite to say that copyright subsists in the expression of an idea. To say that there is copyright in any theoretical expression of an idea would be the same as granting copyright in the idea itself. From the final words of the quoted passage their Honours seem anxious to confine copyright to a particular expression but the words which they have chosen seem to open up the look and feel debate with a vengeance.

Could it be said that a description in the English language (ie a functional specification) represents an expression or description of a program which can theoretically be made in a language? Or, to narrow the scope somewhat, but still leave the look and feel door wide open, is the test satisfied by a Fortran program which fills the same function as a Pascal program?

Whilst one could not be confident that a future court would accept this interpretation it seems that is the most plausible reading of a difficult passage.

Indirect Copying

The three majority judges agreed with Dawson J that the actions of Mr Kelly involved an 'indirect copy-

ing of the look-up table.' This statement should not, in our view, be accepted at face value.

It can be very cogently argued that the EPROM created by Mr Kelly is derived from the AutoCad lock and is not a copy of the look-up table. The look-up table was derived from the same source as the EPROM but the EPROM is, therefore, not a copy of the look-up table.

There is no copyright in the stream of bits produced by the AutoCad lock; at no point are they embodied in a material form, so the EPROM is not a copy of that.

If I take a photograph of the Sydney Opera House from a particular vantage point in a particular light I certainly have copyright in that photograph and can prevent anyone making a reproduction of it. However, I cannot prevent another person seeking out the same vantage point and waiting for similar light before they take their own photo of the Opera House, a work in which they would enjoy an unimpeachable copyright.

Substantial Part

Australian law has long recognised that a 'substantial part' of a copyright work need not be significant percentage of a copyright work. The test is a flexible one, depending very much upon the circumstances of a particular case. Both the size of the original work and importance in the work of the portion which is alleged to have been copied are relevant factors. His Honour deals with this issue in the following way:

> '...Widget C is a computer program and a substantial, indeed *essential*, part of that program is the look-up table by reference to which Widget C processes the information which it receives...' [emphasis added]

Nowhere does his Honour feel that it is necessary to justify his assertion that the look-up table is indeed a 'substantial part'.

In this case the string of digits has been labelled 'essential' presumably because the AutoCad program cannot function without it. In that sense many portions of a computer program are essential, even though they would be considered a trivial part of the program by a programmer. For instance, a word processing program would not be considered functional if it were not possible to save onto a disk documents created by use of it. On the other hand it is a trivial part of the program and it is impossible to imagine that one word processing program would be held to infringe the copyright in another (or even in a spreadsheet program) simply because they used the same 'save' routines.

"The three majority judges agreed with Dawson J that the actions of Mr Kelly involved an 'indirect copying of the look-up table.'"

Equally AutoDesk could have had a locking mechanism which simply alternated between '0' and '1'. Not a very sophisticated locking mechanism and easy to break, but essential to the operation of the program nonetheless. Would a reproduction of that string of digits have been reproduction of a 'substantial part'?

The string of digits in this case was essential only because the program was written that way; any other string of digits, matched with the appropriate lock, would have served just as well. The notion that something essential is automatically substantial is not unknown in English/Australian jurisprudence, however it is rare. There is also good authority for the proposition that whether or not a something is 'essential' is irrelevant to a claim of copyright.

A further issue raised in this regard was the support for the position of Sheppard J in his decision in the Full Bench decision to the effect that a reproduction of a substantial part of a computer program does not itself need to be a computer program, within the meaning of the Copyright Act.

Alternatives

We cannot leave this subject without looking back at the article which one of us wrote for the International Computer Law Adviser:

> 'It seems odd that there was no thought given to the possibility that the table embodied in the EPROM of Auto-Key infringed the copyright in the look-up table in Widget C. This is despite the fact that the judge comments finds that the sequence in the EPROM is "identical to that contained in the original state machine table contained in the AutoCad program and used in the AutoCad lock shift register." It is well established law that there can be copyright in a table; it was found that a railway timetable attracted copyright over 100 years ago. Certainly if the two tables were printed out they would be identical and provide a very easy method of finding an infringement.
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> 'Of course the analogy to a train timetable does not necessarily provide support to the Autodesk

position. While there is clearly copyright in a train timetable, there has never been a suggestion that once a timetable has been produced it is not open to a competitor to compile his/her own timetable (possibly, although not advisedly in Sydney), by timing the arrival of each train at each station.'

We stand by the contrary argument put in that passage. It cannot be the case that trains running on the tracks are an intermediate copy of the train timetable. If they were then the famous rabbit pie would be an infringement of the recipe after all.

If the reasoning in this case were applied to train timetables the author of the timetable would have a monopoly in it.

This is a difficult decision to come to grips with; certainly one cannot be dogmatic on an interpretation of the principles that it stands for or on how the case might be interpreted when applied to a different set of facts. This partly arises from the fact than several important issues such as the substantial nature of the infringement and whether or not there was copying are dealt with in a very cursory fashion.

One's sense of unease with the judgement can be focussed on the last words in the primary judgement which are as follows:

> '...it is fair to say that the basis upon which I have concluded that the appeal may be determined was not in the forefront of their submissions. But having given the matter consideration, I am persuaded that the argument was sufficiently put to enable the appeal to be disposed of upon that basis.'

There is an inevitable feeling that the matters upon which the decision was based were not properly aired in the appeal itself. Had the court been forced to rule upon these questions in light of detailed submissions from the respondents one would feel far more comfortable with the result.

For AutoDesk to succeed in this appeal it was necessary for the Court to find in favour of AutoDesk on each of a number of important questions. On the question of whether the look-up table formed a substantial part of Widget C the court could as easily have found for the respondents as the appellants; the judicial discretion on such questions is extremely wide. On the question of whether Mr Kelly made a copy of the look-up table in Widget C, I believe that the High Court not only could have but should have found that he had not.

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Had the court found for the respondents on these questions, it was still open to their Honours to find for Autodesk on other grounds; it would have been necessary for them to examine the judgements of the full bench of the Federal Court in much greater detail. Possibly, in this case, we would have a decision which examines the look and feel arguments directly rather than obliquely.

Consequences of the Decision

There can be little doubt that the proponents of open systems in Australia will consider this decision to be a setback. The analysis applied in this case could be applied to the protocol of a printer and find that any compatible printer (that is one not manufactured by the maker of the computer) is an infringement of copyright. A printer protocol would certainly pass the test of being 'essential' and therefore, a substantial part of the printing module. Neither is there any doubt that the protocol of the compatible printer would be derived after access to the original computer. Any method of determining the responses expected by the original computer, whether using an oscilloscope or carrying out an object code dump of the original would be enough for a finding of infringement under the reasoning in this case.

If compatible printers are infringing works then it is not only the act of manufacture which is a breach of the Copyright Act; the printers themselves would constitute infringing works and would be subject to confiscation by the copyright owner.

To look at the matter in another light, there seems to be now no legal way to derive the sequence of digits used by AutoDesk. AutoDesk have a monopoly in that string of digits and there is no way that the string could be derived from the AutoCad lock without being an infringement. The only possible exception that we can see to that statement is if the string was derived by a process of trial and error and no outputs from Widget C or the AutoCad lock were examined, only inputs to Widget C tested. However, it is fanciful to suggest that anyone would carry out such a process, or that anyone would believe a claim that such a process had actually occurred.

In practice it is unlikely that a manufacturer will take action against a maker of plug compatible equipment. It is worth remembering that when the appeal of this case was heard by the Full Bench of the Federal Court, IBM sought to appear under an amicus brief, on the side of the Kellys and Mr Dyason. IBM took the view that the decision at first instance was against the interests of the computer industry as a whole, even though it could be said IBM stood to benefit from it more than anyone else.

On the other hand maybe someone who wants to bring some certainty into this area of the law will see fit to run a case on this point.

Summary

In general the large software copyright owners will appreciate that this decision supported the position of one of their number.

The other good news for copyright owners is that court has declared itself to be in favour of giving the widest possible interpretation to the 1984 amendments. In giving a wide interpretation the court has ruled that anything which is essential to the operation of a program is a substantial part of that program, a copy taken from a 'master' work can infringe the copyright in a pre-existing copy of that master and that a copy of a program does not need itself to be a program.

Advocates of open systems who, in general, would like to see reverse engineering 'legalised' will be disappointed in the result. The attitude of the High Court is clearly against any loosening in this regard. The threshold for infringement has been set very low by this case. There is really no way in which, under the reasoning in this decision, Mr Kelly could have legitimately derived the look-up table. Anything he could do would have meant he had access to the 'original' copyright work.

Looked at in another way, the decision leaves open the possibility of a look and feel case being successful in this country. While the decision at first instance was very clearly decided on look and feel principles which were overruled by the Full Bench of the Federal Court, this decision at least leaves open the possibility or, if one accepts the analysis of the majority comments above, gives look and feel arguments more credence than they have ever had before in this country.

Perhaps the greatest irony of the decision is that it has, in one sense, reversed the *Apple* decision in that the person who is riding in the slipstream of the copyright owner has lost the case. However, it is not inconceivable that the effect of the decision will be the same. A further amendment to the *Copyright Act* will be needed to overcome its effects and ensure that forms of reverse engineering which copy only ideas are clearly legal.

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This is an edited extract from a speech given at the BLEC Computer Law seminar presented in Sydney on 11 June 1992.'

Footnotes

[1] Although, clearly Gaudron J wished to disassociate herself from these comments.